Diet, Physical Activity and Cardiovascular Disease Prevention in Europe

November 2011











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Summary Report

European Heart Network
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European Heart Network

The European Heart Network (EHN) is a Brussels-based alliance of heart foundations and other like-minded non-governmental organisations throughout Europe.

EHN plays a leading role in the prevention and reduction of cardiovascular diseases, in particular heart disease and stroke—through advocacy, networking, education and patient support—so that they are no longer a major cause of premature death and disability throughout Europe.

Members of the European Heart Network

Austrian Heart Foundation
Belgian Heart League
British Heart Foundation
Cyprus Heart Foundation
Danish Heart Foundation
Dutch Heart Foundation
Estonian Heart Association
Finnish Heart Association
Foundation of Health and Heart, Bosnia And Herzegovina
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Some key definitions

Europe: in this report Europe refers to the 53 member states of the World Health Organization's European region, stretching from Iceland in the west to Kazakhstan in the east, and including the 27 member countries of the European Union.

Cardiovascular disease (CVD) refers to diseases of the heart and circulatory system. The main forms of cardiovascular disease are **coronary heart disease** and **stroke**. It also includes, among other things, **heart failure**, **peripheral artery disease** and **arrhythmia**.

Population dietary goals represent a recommended average intake or level. Sub-groups of the population—such as babies and children, pregnant women and older people—will have different needs. The goals are intended primarily for informing and monitoring food policy and are not dietary guidelines for individuals. For nutrition education purposes these goals need to be translated into appropriate food-based dietary guidelines.

Fat and dietary lipids: in this report we use the term fat to refer to dietary lipids. This includes both solid fats and oils.

Fruit and vegetables: in general, the term "fruit and vegetables" includes fresh, frozen, dried and canned fruits and vegetables. Potatoes are usually excluded because in most European diets these are consumed as starchy staples and are major sources of complex carbohydrates. Beans and pulses may be included, although in some countries these are eaten as a non-animal protein source. Different studies examined in the course of the expert review on fruit and vegetables use a variety of definitions—these are outlined in the detailed scientific review paper.

1. Introduction

"Every child born in the new millennium has the right to live until the age of at least 65 without suffering from avoidable cardiovascular disease"

St Valentine's Declaration, 14 February 2000

This paper is a summary of a detailed report which reviews the evidence on diet, physical activity and cardiovascular health and sets out the scientific and policy rationale for change. The full-length version of this report is available from www.ehnheart.org.

In May 2002, the European Heart Network published Food, Nutrition and Cardiovascular Disease Prevention in the European Union: Challenges for the New Millennium.[1] There have been important changes in the landscape in relation to diet, physical activity and cardiovascular disease since 2002.

Many of the changes over the last decade give grounds to be optimistic that we will be able to achieve the vision set out on Valentine's Day 2000 of every child born in the new millennium being able to live free from avoidable cardiovascular disease (CVD) until at least the age of 65.

The case for taking action on diet and physical activity to prevent cardiovascular disease remains clear and compelling. Cardiovascular disease causes death and disability on a massive scale across the region, hitting the region's poorer countries and the poorer groups in wealthier European countries hardest. And as Europe's population grows older we must do everything we can to ensure that people remain healthy and independent for as long as possible.

Although progress has been made, not everyone has benefited from it. Some worrying trends have emerged which put this vision of a heart healthy future at risk. These changes threaten to undo some of the gains made in some countries and to hinder progress in others.

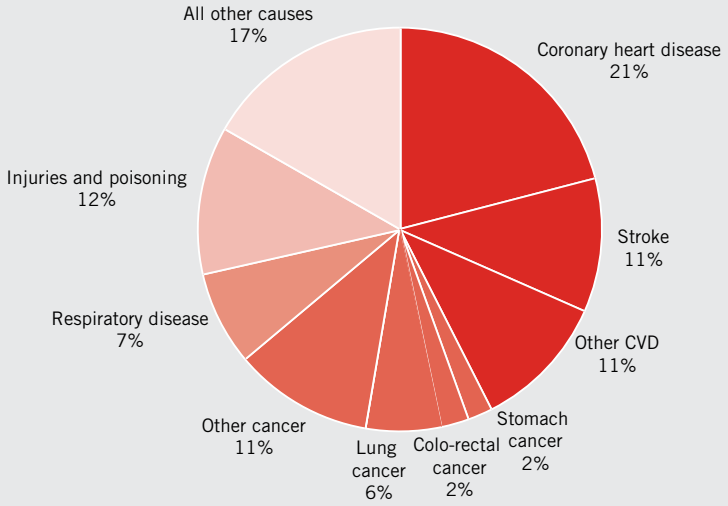
It is time to build on the progress which has been made, and to harness the growing public concern about nutrition and physical inactivity, to ensure the heart health of future generations across Europe.

2 Diet, Physical Activity and Cardiovascular Disease - The Burden

2.1 CARDIOVASCULAR DISEASE MORTALITY IN EUROPE

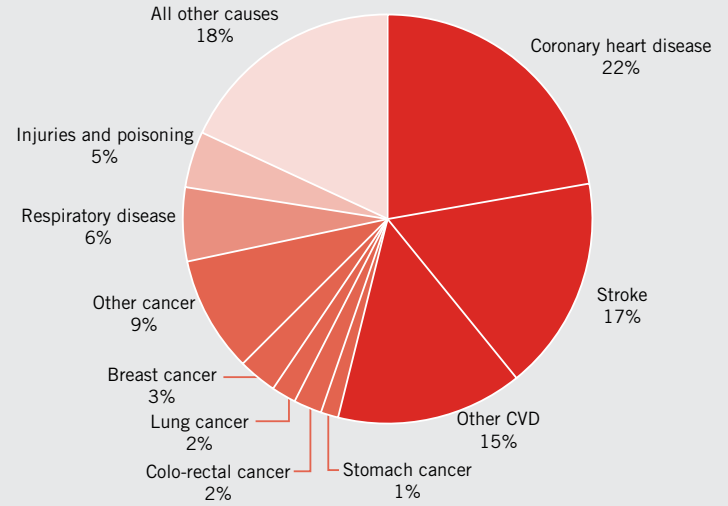
Cardiovascular disease (CVD) continues to be the main cause of death in Europe,[i] accounting for nearly half (48%) of all deaths in the region, equivalent to over 4.3 million deaths each year. It is also the main cause of death in the European Union, where it leads to over two million deaths a year. Just over half of all cardiovascular disease deaths are caused by coronary heart disease (CHD) and nearly a third are from stroke. Not only is cardiovascular disease the biggest cause of death in Europe, it is also the main cause of premature death (before the age of 65).

Figure 1 Deaths by cause, men, latest available year[ii], Europe[iii]



Note: No national mortality data available for Andorra, Bosnia and Herzegovina, Monaco and Turkey.

Figure 2 Deaths by cause, women, latest available year[ii], Europe[iii]

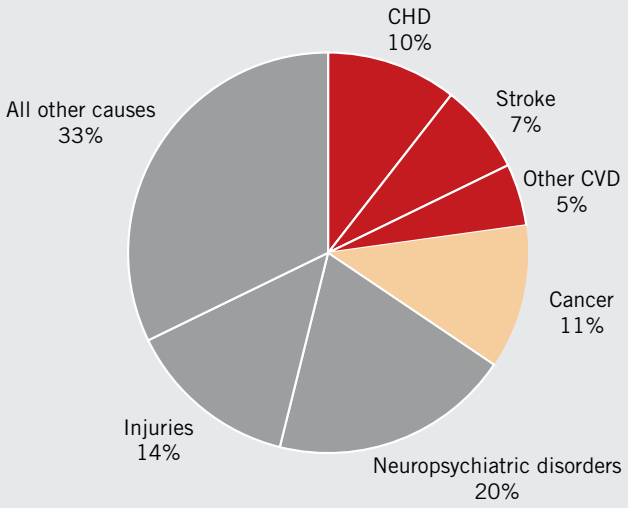


Note: No national mortality data available for Andorra, Bosnia and Herzegovina, Monaco and Turkey.

i Unless stated otherwise, the statistics and figures in the following sections are taken from European Cardiovascular Disease Statistics 2008, published by the European Heart Network. These are the most recent data available at the time of publication.
ii Between 1997 and 2006
iii Source: European Cardiovascular Statistics 2008, published by the European Heart Network. www.ehnheart.org

When examining the burden of cardiovascular disease in Europe it is important not to focus solely on deaths. Coronary heart disease and stroke are both major causes of ill-health and disability.

Figure 3 Disability adjusted life years lost by cause[iv], 2002, Europe



Source: European Cardiovascular Statistics 2008, published by the European Heart Network. www.ehnheart.org

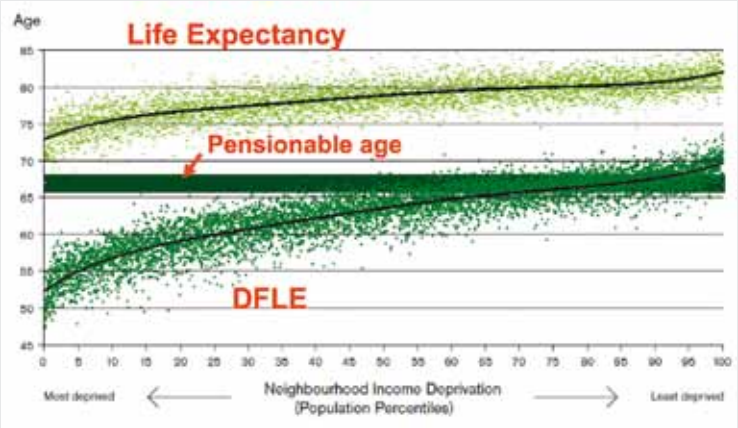
The economics of the problem are staggering: cardiovascular disease is estimated to have cost the European Union over 192 billion euro in 2006, including almost 110 billion euros on healthcare and 82 billion euros in lost productivity and informal care costs.[2]

Governments are contemplating raising retirement ages to compensate for the relative fall in the numbers of people of working age who will have to finance pensions and care for the growing numbers of older people. In reality, however, a large proportion of the population is not disability-free at the ages now being proposed as retirement dates, especially in more deprived areas (See Fig 4 which illustrates this issue with data from England as an example).

This is where the reality of the societal burden of cardiovascular disease really hits home: how will European societies be able to pay for the care for people living with cardiovascular ill-health? It is fundamentally important we do everything that we can to ensure that people remain healthy and independent for as long as possible.

iv Disability Adjusted Life Years (DALYs) measure all the years of healthy life lost to death or disability.

FIGURE 4 LIFE EXPECTANCY AND DISABILITY-FREE LIFE EXPECTANCY (DFLE) AT BIRTH, BY NEIGHBOURHOOD INCOME LEVEL, ENGLAND, 1999-2003



Note: the broad horizontal green band represents potential pension age increases between 2026 and 2046 on the basis of current policy discussions. Source: Adapted from The Marmot Review, 2010.[3]

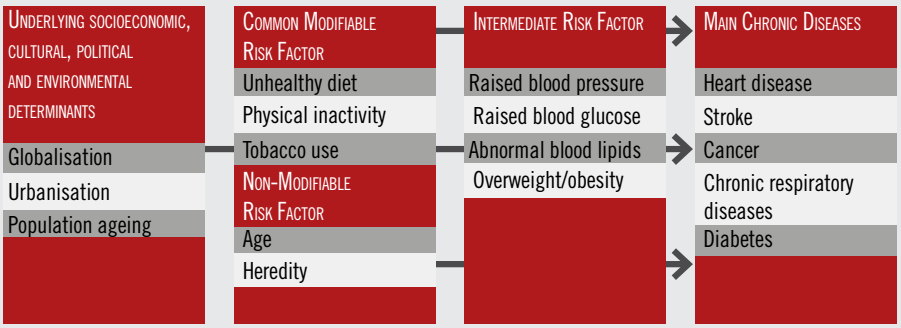
HEALTH INEQUALITIES IN EUROPE

- Within the European region there is a 19-year gap in life expectancy at birth for men and 15 years for women.
- The gap in healthy life expectancy (ie free from illness or disability) is even greater—a gap of 21 years in men and 19 years in women.[4]
- While many European countries have among the lowest rates of cardiovascular disease deaths in the world, some eastern European countries have among the highest.[5]
- There are differences of up to 10 years in male life expectancy between the lowest and highest socio-economic groups in some countries.[6]
- CVD is estimated to account for almost 40% of the difference in mortality rates between men in higher and lower educational groups, and the contribution to the gap in female death rates could be even higher (up to 60%).[7]

2.2 DIET, PHYSICAL ACTIVITY AND NON-COMMUNICABLE DISEASES

A small group of inter-related chronic diseases and key risk factors are responsible for a large part of the disease burden in Europe. Taken together, cardiovascular disease, cancer and diabetes account for almost half (46%) of the disease burden (as measured by disability adjusted life years or DALYs) and 73% of all deaths in the region.[8]

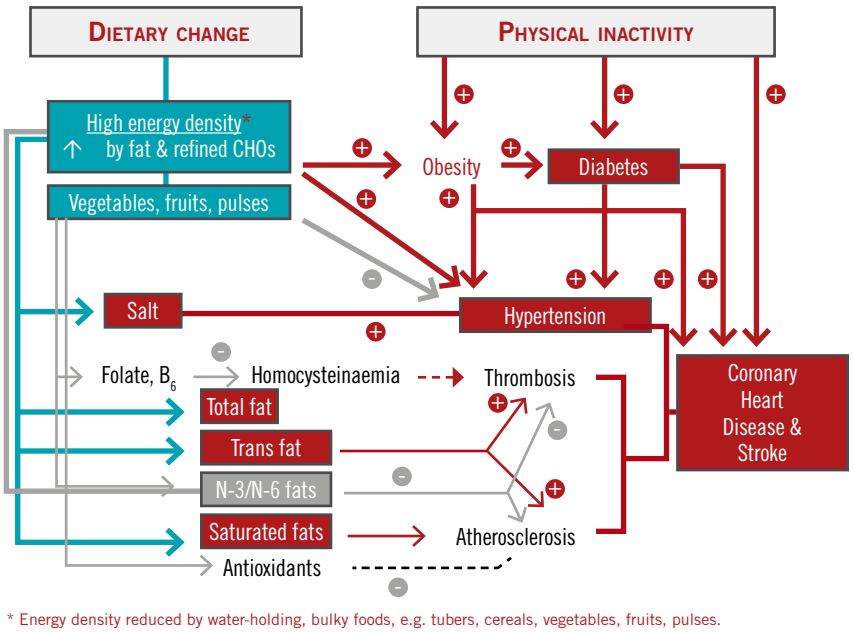
FIGURE 5 WHO MODEL OF CHRONIC DISEASES



Source: WHO

As with other diseases, both genetic and environmental factors play a role in cardiovascular disease development (see Figure 5). Diet and physical activity are key factors in the environmental side of the equation (Figure 6). Eight risk factors—alcohol use, tobacco use, high blood pressure, high body mass index, high blood cholesterol, high blood glucose, low fruit and vegetable intake and physical inactivity—collectively account for 61% of cardiovascular deaths globally.[9] And, of these, seven are related to diet and physical activity.

FIGURE 6 CHRONIC DISEASES AND RISK FACTORS - THE KEY ROLE OF DIET AND PHYSICAL INACTIVITY



Note: Factors that have a positive effect are shown with a green line; Factors that negatively impact on CHD and stroke are shown in pink. Dotted lines signify possible, but not proven, links. Source: Professor Philip James

Prevention is key: main messages

- **Cardiovascular disease is largely preventable.** Reducing cardiovascular mortality in Ukrainian males to Japanese rates, for example, would cut male cardiovascular deaths in Ukraine by 90%.[v]
- **We know prevention works.** A large proportion of the fall in cardiovascular death rates in western Europe in recent decades was achieved by reducing risk factors linked to diet, physical inactivity and smoking.
- **Even small changes to risk factors can dramatically reduce death and disability caused by cardiovascular disease.** We also know that the results can be seen relatively quickly.[10]
- **Prevention efforts have much greater impact if directed at the whole population**, and not only those who show clinical signs of illness or risk factors.
- **A preventive approach is cost effective**—from national policy changes to local interventions. Calculations from the UK alone, for example, estimate that ill health related to poor diet and physical inactivity cost the country's health system 7.7 billion euros in 2006-7.[11]

Some worrying trends have emerged which threaten to undo some of the recent gains made in tackling cardiovascular disease in some countries and to hinder progress in others. The dramatic increase in prevalence of overweight, obesity and type 2 diabetes are of particular concern.

In Europe, more than half of all adults are either overweight or obese and in some parts of Europe more than three quarters of older adults are affected, with eastern Europe having the greatest problems.[vi] Southern Mediterranean countries also have a surprisingly high prevalence of adult overweight and obesity. The usual pattern is for more women to be obese than men, but the prevalence of overweight (Body mass index between 25 and 30) in men is greater (Figure 7).

Figure 7 Prevalence of overweight and obesity in some European countries

Note: Men and women shown separately. Prevalences are from non-age-standardised surveys with measurements (not self-reported data) and relate to studies made since 2000. Some of the prevalences are based on sub-national surveys. Sources and references are available from IASO.

The data on children are also alarming as over a quarter of European children are overweight and about 5% of them are obese.[vi] There is some evidence of a potential levelling off in the prevalence of obesity in children in some countries, but only in some and even then the levelling off is barely significant.[12]

v Calculated from WHO Global Infobase figures for 2002. **www.who.int**
vi Data from the International Association for the Study of Obesity. See the chapter on overweight and obesity in the full-length version of this paper for more detail (available from **www.ehnheart.org**).

3 Diet, physical activity and cardiovascular disease prevention - the evidence

The population goals in EHN's previous paper on this issue, published in 2002, were based on the scientific recommendations of the Eurodiet Project published in 2001[13] and were appropriate and pragmatic in relation to the evidence available at the time.

For this report, EHN commissioned a series of expert reviews to examine the latest evidence. The Nutrition Expert Group then discussed these reviews and agreed a series of population goals.

3.1 Proposed population goals

These new population goals are summarised in Table 1. The goals represent a recommended average intake or level for the population as a whole and are not dietary guidelines for individuals. These population goals are intended primarily for use in informing and monitoring policy. They allow policy makers to make direct comparisons between the current dietary intakes and physical activity levels of a population and to identify the gap between actual and recommended dietary/activity patterns.

Two different sets of population goals are proposed:

- **Intermediate targets** based on an assessment of current dietary and physical activity patterns in Europe and including pragmatic considerations of what might realistically be aimed for in the next five to 10 years;
- **Ambitious longer-term goals** which highlight the levels we should ultimately be aiming for, if the pragmatic constraints that feed into the intermediate targets can be overcome.

Table 1 Proposed population goals

Component	Intermediate targets	Longer-term goals	Comment
Total fat (dietary lipids)	Intermediate target is less than 30% of energy.[vii] This maintains EHN's earlier 2002 target, based on the 2001 Eurodiet report[13] and is in line with WHO's recommendation.[14] We know that this is feasible—average total fat intakes are already <30 E% in Portugal and 31 E% in Norway.[15]	Ambitious longer-term goal is 20–25% of energy. The rationale for this more ambitious goal for total fat is to prevent unhealthy energy imbalance by lowering the energy density of the diet, and, given prevailing patterns of fatty acid consumption, to reduce saturated fat intake.[viii] This applies particularly to northern and central Europe. Unrefined carbohydrate from foods naturally rich in fibre should replace the fat as a source of energy.	Earlier population goals were largely based on pragmatic considerations, dating back to a time when total fat intakes in northern European countries were over 40% in the 1970s. These goals were often accompanied by caveats that total fat intakes should be lower in more sedentary societies: - Eurodiet recommended 20-25 E% for sedentary societies; - WHO proposed 20-25 E% for "sedentary individuals and societies" in its 2000 report on obesity. Although many countries have successfully reduced the fat content of diets, there has been an explosion in the prevalence of obesity and diabetes. Thus, there is a need for an ambitious population goal to prevent unhealthy energy imbalance. We know that it is possible to achieve diets with average total fat as low as 20 E%. Total fat intakes of at least 20% of energy are consistent with good health.[14,15]

vii These and other goals are given for percentage of dietary energy excluding alcohol.
viii This applies particularly to northern and central Europe. The Greek version of the Mediterranean diet is unusual in that it manages to combine a high total fat intake with high consumption of vegetables and fruit, as well as a low saturated fat intake—since the fat is mostly consumed as olive oil.

Component	Intermediate targets	Longer-term goals	Comment
Saturated fat	Intermediate target is less than 10% of energy.	Ambitious longer-term goal is less than 7% of energy.	Population goals for saturated fat range from "as low as possible" to <10 E%. The interim target (<10 E%) maintains the European Heart Network's 2002 target, based on the 2001 Eurodiet[13] report and is in line with WHO's 2003 goal from the 916 report.[14] There is a strong case for setting a more ambitious goal, and recent guidelines have advocated lower saturated fat intakes (EFSA "as low as possible"[15]; US 2010 Dietary Guidelines for Americans proposes 7 E% as long term goal).[16] Data on Greek, Japanese, and Chinese populations show that saturated fat intakes below 7% are possible.[17]
Trans fats	Intermediate target is less than 1% of energy.	Ambitious longer-term goal is less than 0.5% of energy.	The interim target (<1 E%) is in line with WHO's recommendation.[14] This evolution of EHN's 2002 goal (<2%) reflects the growing evidence about the harmful effects of trans fatty acids. The more ambitious longer-term goal (<0.5 E%) reflects the conclusions of a recent WHO scientific update on trans fats that the goal for 1 E% as a population mean could be revised to ensure that the vast majority of the population has intakes of 1% or lower.[18] This is also in line with EFSA's recommendation that trans fats intakes should be "as low as possible".[15]
Polyunsaturated fatty acids (PUFA) Total PUFA intake comprises linoleic acid (LA), alpha-linolenic acid (ALA) and the very long chain fatty acids, eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA).	Intermediate targets: The intake of polyunsaturated fatty acids should be between 6 and 11% of energy. Alpha-linolenic acid should make up between 1 and 2% of energy. Average intakes of very long chain n-3 polyunsaturated fatty acids—such as EPA and DHA—should be between 250 mg and 500 mg per day.	The longer-term goals for polyunsaturated fatty acid intakes is for between 5 and 8% of energy. Alpha-linolenic should constitute at least 2% of energy and daily intakes of very long chain fatty acids should be 250-500 mg.	Population goals for total polyunsaturated fatty acids range from 4-8 E% to 6-11 E%. The interim target (6-11 E%) presented here is in line with the proposals by the 2008 FAO/WHO Expert Consultation. Average PUFA intakes in Europe are commonly around 5-7 E%.[15] In the longer term a lower percentage of energy from polyunsaturated fatty acids is recommended, in proportion to the planned drop in the total fat content of the diet.
Mono-unsaturated fatty acids	The intermediate target for monounsaturated fatty acids (MUFA) is between 8% and 13% of energy.	In the longer-term, the percentage of energy from monounsaturated fatty acids should be between 7.5% and 9.5%.	Few specific population goals have been set for monounsaturated fatty acids. Like most recommendations, this target is based on the difference between total fat minus the sum of saturated, polyunsaturated and trans fatty acids. In the longer term, a lower percentage of energy from monounsaturated fatty acids is proposed, in proportion to the planned drop in the total fat content of the diet.

Component	Intermediate targets	Longer-term goals	Comment
Fruit and vegetables	The intermediate target is more than 400 g/day. This should relate to the amount actually consumed—that is, peeled and prepared fruits and vegetables.	The ambitious longer-term goal is more than 600 g/day. This should relate to the amount actually consumed—that is, peeled and prepared fruits and vegetables.	Population goals for fruit and vegetables intakes tend to range from more than 400 g/day to more than 600 g/day. The interim target proposed here maintains the EHN's 2002 population goal and is in line with WHO's recommendation.[14] The evidence suggests that the relationship between fruit and vegetables consumption and cardiovascular protection is linear and no upper limit has been found. The higher long-term goal of 600 g/day is in line with the most recent global population goal proposed by the World Cancer Research Fund in 2009.[19]
Salt	The intermediate target is less than 5 g/day.	The ambitious longer-term goal is less than 4 g/day.	The interim target proposed here (<5 g/day) is in line with the latest WHO[14] and WCRF[19] recommendations. Given current salt intakes in Europe (probably around 10 g/day), this interim target is pragmatic for the next three to five years. In the longer term, a further reduction is desirable and a longer-term goal of <4 g/day is proposed. This reflects the tendency in more recent guidelines (two national guidelines from 2010) to propose more ambitious goals (as low as <3 g/day).
Physical activity	150 minutes of at least moderate intensity endurance or aerobic activity per week (such as brisk walking at a pace of 4 to 6 km/h) for cardiovascular health. In addition, a goal of one hour of moderate activity on most days (around 300 minutes per week) is recommended for additional health benefits and to prevent overweight and obesity.	Higher, but still attainable, amounts of at least moderate-intensity physical activity, such as 60 minutes a day, will bring additional health benefits.	The interim targets are consistent with the latest recommendations from WHO (issued in November 2010)[20] and are recommended on the basis that such levels of physical activity are achievable on a large scale in European populations. In the longer term, higher, but still attainable, amounts of at least moderate-intensity physical activity are recommended to bring additional health benefits: 60 minutes a day is recommended, in line with WHO's recommendations from the 2003 report on diet, nutrition and the prevention of chronic diseases.[14] To attain these higher levels of physical activity (such as one hour daily) at the population level in the long term, it is important to increase active travel and to build physical activity into daily routines, such as commuting and other chores.
Body mass index (BMI)	The intermediate target is a population average BMI of less than 23 for adults.	The ambitious longer-term goal is for a population average BMI of 21 for adults.	Recommendations for population goals for BMI range from 21 to 23. The intermediate target (<23) maintains EHN's previous recommendation and is also in line with WHO's recommendation for a population median BMI range BMI of 21-23.[14,21] The longer-term goal is for a population average BMI of 21, reflecting WHO's conclusion that "adults in affluent societies with a more sedentary lifestyle are likely to gain greater benefit from a median BMI of 21."[21]

Component	Intermediate targets	Longer-term goals	Comment
Total carbohydrates	More than 55% of energy. The carbohydrate should be derived principally from whole-grain cereals, fruit, berries, vegetables and legumes.	Up to 60% - 70% of energy. The carbohydrate should be derived principally from whole-grain cereals, fruit, berries, vegetables and legumes.	Population goals for total carbohydrates range from 45 E% to 75 E%. The interim target for >55 E% is in line with the lower end of WHO's recommended range.[14] The longer-term goal reflects the fact that as the fat content of the diet decreases (see ambitious goal for total fat, above) and protein remains at 10-15% of energy, the proportion of energy from total carbohydrate will increase. These goals are in line with WHO's recommended range of 55%-75% (the top of the WHO range is higher because the 2003 guidelines accommodate non-European populations with fat intakes as low as 15 E%).
Added sugars	The intermediate target is less than 10% of energy.	The ambitious longer-term goal is tentatively set at 5 E%.	The interim target (<10 E%) is in line with WHO's 2003 recommendation for free sugars. The more recent WHO/FAO Scientific Update on carbohydrates reiterated this population nutrient goal of <10% of energy from free sugars.[22] The tentative longer-term goal of 5 E% reflects the fact that further reductions in added sugars are desirable to reduce the energy density of the diet—increasingly important in light of the overweight and obesity epidemic—with a particular emphasis on the importance of limiting the intake of sugar-sweetened drinks.
Sugar-sweetened drinks	The intermediate target for sugar-sweetened drinks (including dairy-based drinks) is to reduce consumption, as much as possible.	The ambitious longer-term goal is zero consumption of sugar-sweetened drinks.	There has recently been increasing emphasis on the role of sugary drinks in the diet, and a number of countries have introduced policy initiatives to reduce intakes. The only international recommendation relating to sugar-sweetened drinks we are aware of is from WCRF: to halve population average consumption of sugary drinks every 10 years.[19] Some national bodies have introduced national guidance. Denmark for example has set a target of less than 0.5 litres per week of sugar-sweetened drinks.[23] Finland has issued guidance that sugar-sweetened drinks (including sweetened fruit juice and sweetened dairy-based drinks) should be consumed only very infrequently.[24] Water is to be encouraged as the drink of choice, although there remains a place for unsweetened, low fat dairy drinks and unsweetened fruit juice (in limited amounts).

Component	Intermediate targets	Longer-term goals	Comment
Dietary fibre	The intermediate target is >20 g non-starch polysaccharides per day (>1.6 g/day of non-starch polysaccharides/MJ) or 27 g AOAC fibre. Fibre should be consumed as whole foods with a mix of whole grain cereals, legumes, vegetables, fruit and berries.	The ambitious long-term goal should be >25 g non-starch polysaccharides (>2 g non-starch polysaccharides/MJ) or >35 g AOAC fibre (2.8 g fibre/MJ). Fibre should be consumed as whole foods with a mix of whole grain cereals, legumes, vegetables, fruit and berries.	The interim target (>20 g NSP/day) is in line with WHO's 2003 recommendation. The longer-term goal (>25 g NSP/day) is coherent with the World Cancer Research Fund targets for >25 g NSP/day.[19]

Notes:

E%: Many of the goals are expressed as a percentage of dietary energy (E%). The total of dietary energy excludes calories obtained from alcohol.

Protein: Although a goal for protein intakes is not necessary in relation to the prevention of cardiovascular disease, a balance of fat, carbohydrate and protein is important. WHO recommends that between 10% and 15% of dietary energy should come from protein.[14]

Total energy (calories) intake should be adequate to support growth and development and to reach and maintain desirable body weight and **micronutrient intakes** should be adequate to ensure health, according to existing recommendations.

Breastfeeding: No population goal for breastmilk or breastfeeding is included in the table. It is important to emphasise, however, the important health benefits of breastfeeding. On a population basis, we recommend exclusive breastfeeding for the first six months of life, followed by continued breastfeeding with appropriate complementary foods for up to one year of age.

Water: Although it is not included in the table, water is essential for adequate hydration of the body and an adequate water intake is vital. Recommended adequate intakes for total water range from 2.2 to 3.7 litres per day for adults, including water from foods and beverages (including drinking water). Recommendations for water from drinks are around 1.5 litres per day. The European Food Safety Authority has proposed that adequate total water intakes should be 2 litres for women and 2.5 litres for men.[25] These adequate intakes are based on moderate levels of physical activity and a moderate environmental temperature—requirements will be higher in hotter climates or for people involved in vigorous physical activity. Increasing attention is focusing on the potential contribution of different beverages to energy intake, overweight and obesity. With this in mind, it is important that supportive policies are in place to ensure easy access to drinking water.

Folate: EHN's 2002 policy paper contained a population goal of more than 400 µg/day of folate from food. A new review on folate was commissioned for this report and the EHN's Expert Group decided that the evidence is not currently sufficient to justify inclusion of a population dietary goal for folate specifically targeted at preventing CVD.

Antioxidants and polyphenols: EHN's 2002 policy paper concluded that there was insufficient evidence to recommend a population goal for antioxidant vitamins. A new review on one group of antioxidants, polyphenols, was commissioned for this report and EHN's Nutrition Expert Group concluded that there is not currently sufficient conclusive evidence to justify making any public health recommendation for polyphenols specifically, or for antioxidants more generally.

Alcohol: If alcohol is consumed at all, it should be limited to not more than 20 g alcohol (two drinks) per day in men and not more than 10 g alcohol (one drink) per day in women.[ix] Heavy or binge drinkers should be urged to cut and modify their consumption. Binge drinking is defined as an intake of 60 g or more on one occasion, monthly or more often, during the past 12 months. People who already regularly consume small to moderate amounts of alcohol—no more than one drink (c.10 g of alcohol) per day for women or two drinks per day (20 g of alcohol) for men—should not be discouraged from continuing. A similar message can be addressed to patients who already suffered a cardiovascular event.

It is not recommended that adult abstainers begin drinking alcohol. This is because even moderate alcohol intake may also be associated with increased risk of other harm and there is a risk that some of those who start to drink will be drawn into consuming more than the very limited amounts

ix The official definition of a standard drink varies between countries. The definition used in this paper is 10 g of alcohol (ethanol).

of alcohol associated with decreased cardiovascular risk. For these reasons it is not recommended that anyone be advised to begin drinking alcohol on health grounds.

Dietary cholesterol: Although dietary cholesterol does impact on blood LDL cholesterol levels, the main dietary determinant of blood LDL cholesterol levels is saturated fat intakes.[15] Dietary cholesterol is mainly found in foods which are significant sources of saturated fatty acids. For these reasons, no specific recommendation for dietary cholesterol is proposed.

Definitions

Fruit and vegetables: In general, the term "fruit and vegetables" includes fresh, frozen, dried and canned fruits and vegetables. Potatoes are usually excluded because in most European diets these are consumed as starchy staples and are major sources of complex carbohydrates. Beans and pulses may be included, although in some countries these are eaten as a non-animal protein source. Different studies examined in the course of the expert review on fruit and vegetables use a variety of definitions—these are outlined in the detailed scientific review chapter in the full length version of this report.

Added sugar: Added sugar includes sucrose, fructose, maltose, lactose, starch hydrolysate (glucose, high fructose syrup), honey and fruit and berry-concentrates and other isolated sugar preparations, that are used as such or added as components in foods during food preparation.

Dietary fibre: The proposed goals include figures for fibre according to two different definitions in widespread use. **Non-starch polysaccharides (NSP)** refer to fibre of plant cell wall origin. The **Association of Official Analytical Chemists (AOAC) method** of measuring dietary fibre includes indigestible material and tends to give a higher value for fibre content of foods, hence the higher population goals proposed.

3.2 THE EVIDENCE BASE FOR THE POPULATION GOALS

For this report, the European Heart Network commissioned a series of expert reviews to examine the latest evidence in relation to diet, physical activity and health.

For most of the nutrients or dietary components included in this report, external experts summarised relevant systematic reviews and meta-analyses published since 2002 following a pre-determined protocol. In a small number of cases, a member of the EHN's Nutrition Expert Group carried out the review.

These reviews, summarised briefly in the following sections, were then reviewed by the EHN's Nutrition Expert Group and informed the process of formulating the proposed population goals.

3.2.1 Fats

Population goals

Interim targets: Total fat less than 30% of energy intake (E%); saturated fat less than 10 E%; polyunsaturated fatty acids 6-11 E% and alpha-linolenic acid should make up between 1 and 2 % of energy; mononsaturated fatty acids 8-13 E%; trans fatty acids less than 1.0 E%.

More ambitious longer-term goals: Total fat 20-25 E%; saturated fat less than 7 E%; polyunsaturated fat 5-8 E% and alpha-linolenic should constitute at least 2 E%; mononsaturated fatty acids 7.5-9.5 E%; trans fatty acids less than 0.5 E%.

Total fat Although the quality of fat is more important than the total quantity of dietary fat in determining the risk of CVD, the fat composition of western diets—with their high proportion of animal products—is such that almost any increase in total fat will result in increases in saturated fat, dietary cholesterol and energy density. Greater intakes of total fat (whether or not the fat is of a saturated kind) will also increase blood pressure and appreciably increase the risk of strokes.

An upper limit of 30% energy is therefore proposed as an interim population goal for total fat intakes. In order to achieve the longer-term goal for saturated fat, however, and to reduce the weight gain inducing energy density of European diets, a more ambitious longer-term goal of 20 to 25 E% is proposed.

Saturated fatty acids (SFA) increase blood total- and LDL-cholesterol which, in turn, are strongly related to the risk of CHD. The evidence of a strong relationship between saturated fat intake and total- and LDL-cholesterol comes from a wide body of research and, in particular, a very large number of metabolic experiments reviewed in several papers and reports.[26,27]

An interim population goal of less than 10% of energy from saturated fat is proposed—this will correspond to a population mean total cholesterol level of around 5.2 mmol/L (200 mg/dL).

It is now recognised, however, there is no known lower limit for total blood cholesterol levels below which risk reduces no further. A longer-term goal of less than 7% of energy from SFA is proposed to achieve an average total cholesterol level of < 5 mmol/L (190 mg/dL). Replacing saturated fat by PUFA in Western societies is supported by scientific evidence and the simplest way of reducing total blood cholesterol on a population scale.[27,28,29,30]

Saturated fat and CHD mortality

Considering the strong relationship between saturated fat intake and total cholesterol and risk of CHD one would expect an association between saturated fat intake and mortality from CHD when following a group of men or women within a country for several years. Such a relationship has not been consistently found, however. One recent meta-analysis[29] found no association with intake of saturated fat and a second meta-analysis failed to find consistent associations.[31]

This does not mean, however, that no such association exists. One of the problems identified with the analyses referred to above is the adjustment for blood cholesterol in some studies.[32] Since blood cholesterol is, in fact, a biomarker for cardiovascular risk, this will bias the results of the meta-analyses towards finding no association between dietary saturated fat intake and coronary heart disease. A second problem is that there is marked individual variation in cholesterol responses to saturated fat. This is combined with the fact that the studies are carried out in population groups with a relatively narrow range of often poorly defined saturated fat intakes, making it difficult to discern the link between saturated fats and heart disease.[33] The original multi-country studies by Keys[17] allowed a much greater range of saturated fat intakes to be related to coronary heart disease and demonstrated the very clear relationship with blood cholesterol levels, a finding which was subsequently repeatedly confirmed. Finally, the studies included in the meta-analyses described above suffer from other difficulties including problems with obtaining reliable data for food intake and with estimating the fatty acid composition of meat and dairy produce.

It is also important to consider which nutrients are used to replace fats in the diet. Replacing saturated fats with polyunsaturated fats is preferable, while replacement of saturated fatty acids with monounsaturated fats is less efficient at reducing blood cholesterol levels and heart attacks. When carbohydrates replace fats in the diet, the type of carbohydrate is important—replacement with refined carbohydrate diets, with substantial amounts of free sugars, may not be beneficial and will have different effects to substitution with fibre-rich, complex carbohydrates.

Trans fatty acids (TFA) are formed by bio-hydrogenation in the rumen of fats and oils in the feed of cows and other ruminants or industrially by partial hydrogenation of vegetable and fish oils. There is now convincing evidence that the intake of trans fatty acids predicts an increased risk of CHD and, given its marked deleterious effects on the different types of blood cholesterol, the removal of trans fats from the diet is desirable. An interim population goal of less than 1.0% of food energy is proposed, but in the longer-term an upper limit of no more than 0.5E% is recommended.

Polyunsaturated fatty acids (PUFA) include the essential fatty acids linoleic acid (LA, 18:2 n-6) and alpha-linolenic acid (ALA, 18:3 n-3), as well as the very long chain n-3 fatty acids.

There is convincing evidence that increased intake of PUFAs decreases the risk of CHD. The risk reduction is particularly important when PUFAs are replacing SFAs in the diet.[34,35] An interim population goal of PUFA (LA plus ALA) intake of between 6 and 11% of energy, based on a total fat content of 30% of food energy, is proposed. A longer-term goal, which takes account of lower total fat and saturated fat intakes, would require a PUFA intake of 5 to 8% of food energy, based on a proportionate reduction in PUFA intakes.

In view of the essential biological need for the n-3 fatty acid alpha-linolenic acid (ALA), its cholesterol lowering effect and the competition between n-3 and n-6 fatty acids, ALA should make up at least 1 to 2% of energy.

There is convincing evidence that intake of very long chain (VLC) n-3 polyunsaturated fatty acids reduces the risk of CHD death and sudden cardiac death and possibly CHD events in patients with heart disease.[36,29,37,38,39] A minimum intake of 250 mg/d of VLCn-3 PUFA—equivalent to two portions of fish per week—is proposed as a population goal.

Monounsaturated fatty acids (MUFA) include oleic acid (18:1 n-9), the most abundant fatty acid in food. There is no physiological need for oleic acid and the risk reduction linked to monounsaturated fatty acids *per se* is, if present, rather modest. The recommendation for MUFA is, therefore, set on the basis of simply providing the fat which accounts for the difference between total fat and the sum of saturated, polyunsaturated and trans fatty acid intakes. Thus, the interim target for MUFA is 8 to 13 E% with a longer-term goal—taking into account the reductions in total, saturated and trans fatty intakes—of 7.5 to 9.5%E.

For this paper, the recent evidence relating to fats and cardiovascular disease was reviewed by Jan I. Pedersen of the University of Oslo in Norway. For more detail, see the review in the full length version of this paper, available in pdf from **www.ehnheart.org**.

3.2.2 Salt

Population goals

Interim target: Less than 5 g of salt per day.

More ambitious longer-term goal: Less than 4 g of salt per day.

In the last decade, some large and important studies have been published on salt. These include the INTERSALT[40] study of over 10,000 individuals from 32 countries and analyses by Law and colleagues of sodium excretion of 47,000 individuals.[41,42] These studies reported correlations between salt intake and blood pressure, although both studies have been criticised for the complex methodology used to take account of country and other differences.[43,44,45] The DASH trials[46] then tested the impact of altering several components of the diet at the same time, such as low sodium and greater intakes of fruit and vegetables, without weight loss in two groups with normal blood pressure and high blood pressure and found modest, but statistically very significant, falls in systolic blood pressure in people with normal blood pressure.[47] In people with high blood pressure the magnitude of the effect was similar to treatment for hypertension. Other interventions with similar dietary changes, but also involving a modest reduction in body weight for several years, found a reduced incidence of hypertension over a five year period.[48]

Falls in salt intake reduce blood pressure, as do increases in the intake of potassium-rich foods such as fruits and vegetables. Despite some conflicting results, intervention studies in humans, backed up by findings in chimpanzees,[49] suggest that reducing salt intake lowers systolic blood pressure in adults with a normal blood pressure and weight (BMI 20-25). There is also clear evidence that individuals with higher blood pressures reduce their systolic blood pressure to a greater degree than normotensives when salt intakes are reduced.

There is not yet any universally accepted explanation of how increased salt intake increases blood pressure. Several mechanisms, including some which are related to an increase in the volume of blood circulating in the body and others which are independent of blood volume, are likely to play a role.

The concept of a sub-group of "salt-sensitive individuals" is difficult to define and is of little practical use since it neglects the important benefit that could arise should the whole population reduce its average salt intake.

Almost all large scale intervention studies with longer-term follow up and better measures of salt intake now report that reducing salt intake will contribute to a fall in average population blood pressures which will then induce a reduction in the incidence of hypertensive disorders, such as stroke. Individuals with prehypertension, established hypertension and those who are overweight or obese, seem to benefit the most from reducing their daily salt intake.

Similarly long term, i.e. 10-15 years, prospective analyses of the randomised hypertension prevention trials (the TOHP studies) show that the combination of advice to reduce salt intake and alter diet to improve potassium intakes was associated with a significant reduction in subsequent cardiovascular disease (i.e. myocardial infarction, stroke, coronary revascularisation and cardiovascular death.)[50,51]

Given the available evidence, it seems justified to propose an interim recommendation of a maximum average intake of 5 g salt per day for adults, with a more ambitious longer-term goal of less than 4 g per day. International experience suggests that a reduction of salt intake should be implemented progressively, rather than suddenly, and requires an integrated approach, both from public authorities and from the industry.[52]

For this paper, the evidence relating to salt and cardiovascular disease which has been published since 2002 was reviewed by Professor Per Ole Iversen of the University of Oslo, Norway, and Stellenbosch University, South Africa. For more detail, see Professor Iversen's review in the full length version of this paper, available in PDF format from **www.ehnheart.org**

3.2.3 Sugars

Population goals

Interim target: Less than 10% of energy from added sugars[x] and to reduce as much as possible consumption of sugar-sweetened drinks.

More ambitious longer-term goals: Less than 5% of energy from added sugar is proposed tentatively and the aim should be for zero consumption of sugar-sweetened drinks.

A role for dietary sugar[xi] intake in the pathogenesis of cardiovascular disease has been suggested.[53,54,55,56,57,58] Effects of dietary sugars on endothelial function, overweight, insulin resistance, dyslipidemia, blood pressure, uric acid and inflammation have been implied as mechanisms underlying a potential association between sugar consumption and cardiovascular disease.

Since EHN's previous population goal for sugary foods on four or fewer occasions per day[1] new evidence has emerged—mainly from large observational studies and from controlled studies in humans. On the basis of the recent evidence examined, the review of evidence for this paper concluded that there is limited and inconsistent evidence for an effect of consumption of sugars on cardiovascular disease risk. Most consistent evidence is found for an association between high intake of sugar-sweetened drinks and risks of cardiovascular disease and high intakes may increase the risk of overweight. Recommendations on sugar intakes need to take a variety of factors into account—such as the high energy density, and poor nutrient density, of many sugary foods and drinks.

Furthermore, there is new evidence on the unfavourable effects of consumption of sugars on blood lipids related to high intakes of fructose (> 100-150 g/d or > 15-25 E%). Near equal amounts of fructose and glucose are found in all common nutritive sweeteners, including sucrose and high fructose corn syrup, except for those based solely on glucose, such as pure glucose or regular corn syrup.[59] In North America a lot of attention has focused on the widespread use of high fructose corn syrup (HFCS), but HFCS production is limited in Europe and foods and drinks are predominantly sweetened with sucrose. This does not make a difference to the fructose consumption, however, because sucrose and high fructose corn syrup contain similar amounts of fructose per gram. This means that most foods and drinks with high added sugar contents also have high fructose levels.

In conclusion, a prudent recommendation would be to avoid high intakes of fructose, especially in the form of sugar-sweetened beverages. This report proposes, therefore, two interim targets: first, less than 10% of dietary energy from added sugars and, second, consumption of sugar-sweetened drinks to be "reduced as much as possible". The rationale for these goals is mainly to reduce the energy density of the diet, in order to ensure healthy energy balance and prevent overweight and obesity.

In the longer-term, EHN considers that more ambitious goals are advisable. The report sets a tentative longer-term aim of less than 5% of dietary energy from added sugars, along with zero consumption of sugar-sweetened drinks. Again, the main reason for these goals is to further reduce the energy density of the diet.

For this paper, the evidence relating to sugars and cardiovascular disease which has been published since 2002 was reviewed by Marleen A van Baak of Maastricht University Medical Centre, the Netherlands. For more detail, see Dr van Baak's review in the full length version of this paper, available in PDF format from **www.ehnheart.org**.

x Added sugar includes sucrose, fructose, maltose, lactose, starch hydrolysate (glucose, high fructose syrup), honey and fruit and berry-concentrates and other isolated sugar preparations, that are used as such or added as components in foods during food preparation.
xi The main dietary sugars are the monosaccharides glucose and fructose and the disaccharides sucrose and lactose.

3.2.4 Dietary fibre and complex carbohydrates

Population goals

Interim target: Total carbohydrate should provide more than 55% of energy. A daily population mean intake of more than 20 g of fibre defined as non-starch polysaccharide (NSP) is recommended. (This is equivalent to >27 g of fibre as defined by the AOAC method). This is equivalent to 1.6 g NSP/MJ of dietary energy (>2.2 g fibre/MJ dietary energy).

More ambitious longer-term goal: Total carbohydrate should provide up to 60 - 70% of energy. More than 25 g of fibre defined as non-starch polysaccharide daily (> 35 g AOAC-defined fibre), equivalent to >2 g NSP/MJ of dietary energy (>2.8 g fibre/MJ of dietary energy).

With both goals, the carbohydrate should be derived principally from whole-grain cereals, fruit, berries, vegetables and legumes.

Dietary fibre is a term which has several definitions and different methods are used to measure the fibre content of foods.[60] In general, two figures for fibre intake are now usually provided:

- non-starch polysaccharides (NSP) predominantly from plant cell walls and as measured by the Englyst method;
- fibre as measured by the AOAC method which includes non-starch polysaccharides and other components which are not digested in the small intestine. This measure gives higher fibre values.

Fibre is known to have an effect on total daily faecal output and this laxation effect is taken to be a simple marker, which is likely to correlate with other effects on the body's metabolism, and therefore was used as the basis for initial public health advice on recommended fibre intakes. In 1990, WHO estimated that an average goal of 16 g NSP (for adults) would limit constipation and would be compatible with the goal for 400 g/day of fruit and vegetables.[61]

By 2003, WHO found that a high intake of dietary fibre was convincingly important in preventing obesity and probably important in preventing type 2 diabetes and cardiovascular disease.[14] A new analysis by the European Food Safety Agency (EFSA) sets out their basis for recommending diets with a reasonable content of dietary fibre.[62] They suggest 25 g/d dietary fibre or 2 g fibre/MJ energy intake as the Dietary Reference Value on the basis of analyses relating to gastrointestinal function. This is equivalent to 18.5 g/d NSP.

Recently a detailed systematic review from cohort and randomised intervention studies by the Population Health Research Institute in Canada[63] found strong evidence that intakes of vegetables, nuts, and "Mediterranean" and high-quality dietary patterns were protective against coronary heart disease. There was moderate evidence that whole grains, fruit, and fibre were protective. Analysis of the 15 cohort studies in the review which looked at dietary fibre found a 22% reduction in risk of coronary events associated with a high fibre diet.

On the basis of current evidence in relation to cardiovascular disease it seems reasonable to conclude that fibre intakes should be consumed as whole foods with a mix of whole grain cereals, legumes, vegetables and fruit and that the intermediate target for average population intakes should be >20 g NSP (> 1.6 g/d NSP/MJ) or 27 g AOAC fibre.

More recently, the World Cancer Research Fund has recommended a more ambitious goal of more than 25 g of non-starch polysaccharides per day for the prevention of cancer.[19] In line with this more ambitious target, this report recommends a longer-term goal of 25 g/NSP/day (>2 gNSP/MJ) or >35 g AOAC fibre (2.8 g fibre/MJ).

For this paper, Professor Philip James of the International Association for the Study of Obesity reviewed the recent evidence in relation to dietary fibre and complex carbohydrates. For more detail, see Professor James' review in the full length version of this paper, available in PDF format from **www.ehnheart.org**.

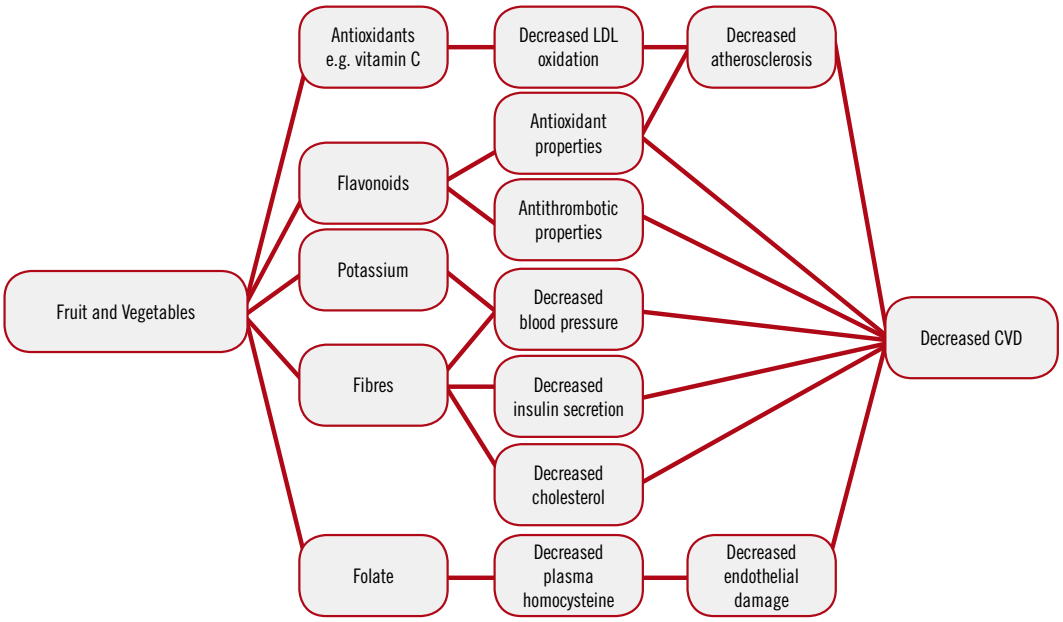
3.2.5 Fruit and vegetables

> ***Population goals***
>
> Interim target: More than 400 g of fruit and vegetables per day.
>
> More ambitious longer-term goal: More than 600 g of fruit and vegetables per day.

Evidence from seven relevant reviews published since 2002 show that eating more fruit and vegetables will decrease the risk of cardiovascular disease, with particular reference to coronary heart disease and stroke.[63-69] The benefit of fruit and vegetable consumption has been found to be linear, with no upper limit as yet found. The exact risk reduction varies between papers—however, there seems to be a 17-21% reduction in the risk of CHD if an individual eats five portions of fruit or vegetables per day. Similarly this quantity of fruit and vegetables is also reflected in a 25-26% reduction in the risk of stroke. When divided into categories of either fruit or vegetables the range becomes much larger, and the data less reliable due to the smaller size of data available for analysis.

There are various potential mechanisms by which fruit and vegetable intake could influence the risk of cardiovascular disease, and a summary of these is presented in Figure 8. As these mechanisms are still not well understood it is difficult to say what the essential protective ingredients of a diet rich in fruits and vegetables might be.

Figure 8 Possible mechanisms of fruit and vegetable consumption and CVD



At present it is not clear if fruits or vegetables, or specific fruits or vegetables, confer greater benefits. More information needs to be gathered as to the mechanisms of action, and perhaps into individual fruit or vegetable benefits.

It is important to recognise the limitations of the studies reviewed. There will be many confounding factors and publication bias may also play a role. As a result, there may have been some overestimation of the effects of fruit and vegetable consumption. In addition, there is an inherent problem in getting accurate data on the classification and exact amounts of fruits and vegetables eaten.

Due to the nature of the study designs it is impossible to say from these reviews that there is a definite causal link between fruit and vegetable intake and cardiovascular risk—there is only evidence of a correlation. However, despite this lack of trial data, the current body of scientific literature provides a strong and consistent evidence base for a relationship between increased intake of fruits and vegetables being protective for CVD.

For this paper, the evidence relating to fruits, vegetables and cardiovascular disease which has been published since 2002 was reviewed by Karen Lock and Lydia Collingridge of the London School of Hygiene and Tropical Medicine. For more detail, see the review in the full length version of this paper, available in PDF format from **www.ehnheart.org**.

3.2.6 Obesity and overweight

Population goals

Interim target: Average body mass index (BMI) of less than 23 in adults.

More ambitious longer-term goal: Average BMI of 21 in adults.

Body mass index (BMI), waist-hip ratio (WHR) and waist circumference (WC) are all used as predictors of cardiovascular diseases. Studies to investigate which measure more accurately reflects CVD risk suggest that health professionals—in addition to measuring BMI—should incorporate the use of waist circumference as a simple additional measurement in their routine clinical examination of adult patients.

The multi-factorial nature of cardiovascular disease is well recognised and weight gain plays an important role in the burden of premature death and disability caused by CVD. Abdominal obesity accounted for 36% and 20% of heart attacks in male and female heart attack survivors participating in the 52-country INTERHEART study.[70,71] Similarly, it accounted for 26% of strokes among male and female stroke survivors in the 22-country INTERSTROKE study.[72] Major prospective studies also confirm the importance of excess weight.[73,74] One analysis of studies involving 900,000 adults found that a five unit BMI increase was accompanied by a 30% increase in total death rates and a 40% increase in cardiovascular mortality.[73]

It is difficult to ascertain the degree to which it is the weight gain itself—the way in which excess weight alters blood pressure, blood cholesterol and glucose levels—or the dietary factors and physical inactivity that promote weight gain which modify cardiovascular risk. Because these factors are so interdependent, cause and effect is hard to establish. Nonetheless, it appears that the association between coronary heart disease risk and BMI is, at least in part, mediated by the effect of weight gain on high blood pressure, dyslipidemia, and impaired glucose tolerance. This reinforces the important preventive health strategy of preventing excess weight gain by focusing on the provision of a high quality diet—high in whole grain cereals, fruit and vegetables and low in fats, sugars and salt—and physically active lives for the prevention of cardiovascular disease in Europe.

The population goals for mean body mass index should be set at a level which induces minimum health problems in a country. This means that the average optimum body mass index for adults is far lower than the standard cut-off of BMI 25+ which is used to classify adults as overweight.

This paper proposes an average BMI of <23 as an intermediate target and a longer-term goal for a BMI of 21. These recommendations are in line with WHO recommendations for a population median BMI range BMI of 21-23.[14] WHO's report on obesity concluded that 'adults in affluent societies with a more sedentary lifestyle are likely to gain greater benefit from a median BMI of 21.'[21]

For this paper, Professor Philip James, Rachel Jackson Leach and Caroline Small of the International Association for the Study of Obesity reviewed the recent evidence in relation to overweight and obesity. For more detail, see the review in the full length version of this paper, available in PDF format from **www.ehnheart.org**.

3.2.7 Physical activity

Population goals

Interim target: 150 minutes of at least moderate-intensity physical activity per week.

More ambitious longer-term goal: At least moderate activity for an hour a day (60 minutes daily).

The quantity and quality of scientific data on the cardiovascular and other health-related effects of physical activity (PA) has increased greatly during the past decade.[75-82] The evidence now shows convincingly that insufficient physical activity is one of the key causal risk factors of cardiovascular diseases, particularly of the most prevalent of them, CHD and stroke.

Because of the high prevalence of insufficient physical activity, the CVD burden caused by it is great. The effects of insufficient physical activity are mediated partly through the traditional major risk factors—such as overweight—and partly they are independent. This rather recently shown fact emphasises the essential, irreplaceable role of PA for cardiovascular health. Physical activity in all areas of life, during leisure time, in domestic chores, in transport, and in occupational work has been shown to be effective.

Strong epidemiological evidence indicates that a major part of the preventive effect of PA can be attained by activity that is applicable in large scale in all European populations: moderate-intensity endurance or aerobic activity such as brisk walking on several days during the week, for, in total, approximately 150 minutes per week.

Higher, but still attainable, amounts of moderate-intensity PA would further increase the cardiovascular and other health benefits. Furthermore, there is increasing evidence that overall levels of physical activity, from general activity such as brisk walking or cycling, need to be higher—an extra 60-90 minutes daily, for example—to improve the chances of maintaining body weight given the prevailing dietary patterns in Europe.

Thus more modest exercise patterns may be compatible with lower energy density diets, but in current dietary circumstances there will be a need to promote higher levels of physical activity if the benefits from the decline in cardiovascular risk factors are not to be wiped out by rising levels of obesity. Thus, a further goal of one hour of at least moderate-intensity activity on most days (around 300 minutes/week) is appropriate in sedentary populations to avoid overweight and obesity, and the associated health consequences. In the longer term, moderate activity for an hour a day (60 minutes daily) should be the target.

Prevention of CVD through increased PA also brings several other health benefits by decreasing substantially the risk of several of the most common chronic diseases and by improving and maintaining physical, mental, and cognitive functions. PA also decreases—and in overweight (BMI 25-29.9) persons may even totally counterbalance—the risk of CVD as well as some of the other health hazards of overweight and obesity. It is clear that sufficient physical activity is an essential factor in attaining and maintaining health and functional capacity at all ages.

Rapidly increased scientific evidence indicates that complete sedentariness, especially sitting, increases the risk of overweight and obesity, and of metabolic and cardiovascular diseases even independently of PA. Thus, sedentariness is a domain of its own that has to be tackled by efficient policies and actions.

Prevention of CVD through PA by increasing opportunities and motivation to be active as well as limiting sitting during leisure and occupational time and using active modes of transport also give strong support to other important societal goals such as fighting against obesity, traffic congestion and accidents, air pollution, excess use of energy, and climate change.

For this paper, Professor Ilkka Vuori from Finland reviewed the recent evidence in relation to physical activity and cardiovascular disease. For more detail, see Professor Vuori's review in the full length version of this paper, available in PDF format from **www.ehnheart.org**.

3.2.8 Alcohol

> ***Recommendation:***
>
> If alcohol is consumed at all, it should be limited to not more than two drinks a day (20 g) in men and not more than one drink (10 g) per day in women.

A protective effect of regular and moderate alcohol consumption in coronary heart disease and ischaemic stroke has been consistently shown in many epidemiological studies.[83,84,85,86] The association between alcohol consumption and CHD mortality is described as a J-shape relationship, where teetotallers and heavy drinkers are at the highest risk whereas light-moderate drinkers are at the lowest risk. However, if low alcohol intake is inversely related to CHD, the other side of the coin shows an increased risk for certain cancers, cirrhosis and death from accidents mainly associated with increasing alcohol consumption.[87,88,89] Total mortality was also reduced in moderate drinkers; however, excess drinking is definitely harmful.[88] Thus, available epidemiologic data—derived at present from a large number of prospective observational studies—confirm the hazards of excess drinking, but also indicate the existence of potential windows of alcohol intake which may confer a net beneficial effect of drinking, in terms of survival, both in men and in women.

Definitions of standard drinks vary between countries, but in this paper a standard drink is considered to contain 10 g of alcohol (ethanol), which is equivalent to 250ml (half a pint) of beer, a small glass of wine or a 40 ml measure of spirits.

In spite of a large number of experimental studies suggesting a protective role of wine-derived polyphenols on cardiovascular risk, epidemiological evidence of a greater effect of wine versus beer has not been established. Whether wine is better than beer or spirits remains therefore to be elucidated, but it seems likely that the ethanol component of different beverages is a major factor that reduces the cardiovascular risk.[90]

Excess alcohol intake and binge drinking must be avoided by everybody, and in particular in patients with CVD in whom it can have more serious consequences for health, such as exacerbation of existing pathological conditions. Alcohol abuse and binge drinking are major causes of hyperlipidaemia, vasoconstriction, increased clotting activity and a lower threshold for ventricular fibrillation.[85,90] The hazards of excess or binge drinking should be always highlighted and heavy or binge drinkers advised to cut their consumption.

There is no reason to discourage adults who are already regular light-moderate alcohol consumers from continuing. Although low-moderate, non-binging alcohol consumption—in the absence of contraindications and in the context of healthy eating and a healthy lifestyle—reduces the risk of coronary heart disease, it is not recommended that adult abstainers begin drinking. This is because even moderate alcohol intake is also associated with increased risk of other harm and there is a risk that some of those who start to drink will consume more than the low-risk drinking limits.

Cardiovascular patients in whom alcohol consumption is not contraindicated should not exceed one drink/day for women (10 g) or up to two drinks/day (20 g) for men as a component of a balanced cardio-protective dietary pattern, with appropriate energy intake levels. At present, a cardiovascular patient who is teetotal should neither be recommended, nor "prescribed" to start drinking alcohol for health gain.[91,92]

The main message for an adult general population can be summarised as follows: heavy or binge drinkers should be urged to cut and modify their consumption. There is no reason to discourage people who already regularly consume small to moderate amounts of alcohol—no more than one drink (10 g) per day for women or two drinks per day (20 g of alcohol) for men—from continuing.

For this paper Simona Costanzo, Augusto Di Castelnuovo, Maria Benedetta Donati, Licia Iacoviello and Giovanni de Gaetano of the Università Cattolica del Sacro Cuore, Campobasso, Italy reviewed the evidence. For more detail, see their review in the full length version of this paper available in PDF format from **www.ehnheart.org**.

3.2.9 Folate

Population goal:

The evidence is not currently sufficient to justify inclusion of a population dietary goal for folate specifically targeted at preventing CVD.

In recent years there has been much interest in the potential protective effect of folate (or folic acid, the synthetic vitamin form) in cardiovascular disease. Such an effect may or may not be mediated via the role of folate (and the metabolically-related vitamins B12, B6 and B2) in maintaining healthy plasma homocysteine concentrations.

In addition, about 10% of people worldwide (and up to 26% of some European populations) have a particular genetic make-up (the MTHFR 677TT genotype) which means that they metabolise folate differently, leading to higher plasma homocysteine levels and a raised CVD risk. Apart from ensuring adequate folate intakes, riboflavin (vitamin B2) has also been shown to be important in preventing homocysteine accumulation specifically in people with the TT genotype.

A number of recent secondary prevention trials in at-risk patients have failed to show a benefit of homocysteine-lowering therapy on CVD events generally.[93-97] Given that all of these trials were performed in patients with well established pathology, current evidence suggests that the administration of high dose folic acid (with or without related B-vitamins) to CVD patients is of no benefit in preventing another event, at least in the case of heart disease.

The evidence supporting a beneficial role for these B-vitamins at this time is somewhat stronger for stroke, with one meta-analysis of randomised trials showing that homocysteine-lowering with folic acid reduced the risk of stroke by an overall 18%, and by 25% in patients with no history of stroke (but with pre-existing cardiovascular or renal diseases).[98] The decline in stroke-related mortality in the North American population that relates to the timing of introduction of mandatory folic acid fortification, adds further support to the potential benefit of enhancing folate status and/or lowering homocysteine in the prevention of stroke.[99] Evidence supporting a causal relationship between elevated homocysteine concentrations (or sub-optimal folate) and CVD also comes from genetic studies, showing that people with increased homocysteine owing to a genetic variant in folate metabolism have a 14 to 21% higher risk of CVD compared to those that do not have this genetic factor, particularly if they also have a low folate intake.[100,101,102]

There remains interest therefore in the question of whether optimal folate status and/or maintenance of lower homocysteine will have a role in the primary prevention of stroke, but further research is needed to establish this. Furthermore, preliminary evidence indicates that optimising riboflavin status may have a role in preventing hypertension specifically in people with the common MTHFR 677TT genotype. This is potentially of great interest given that hypertension is a major risk factor for stroke. This finding needs to be confirmed in much larger trials.

In order to offer maximal protection against elevated homocysteine in all individuals, including those genetically predisposed to impaired folate metabolism, an optimal status of all four relevant B-vitamins should be ensured. Optimal B-vitamin status can be achieved with a heart healthy diet that includes leafy green vegetables, whole grain foods, lean meat and low fat dairy products. In practice, however, achieving an optimal B-vitamin status can be problematic for some groups due to poor stability and bioavailability of folate from natural food sources, difficulties with B12 absorption from foods in older people and low riboflavin intakes particularly in populations that avoid milk (eg some Asian populations).

For this paper Professor Helene McNulty and Dr Mary Ward from the Northern Ireland Centre for Food and Health (NICHE), University of Ulster, Northern Ireland contributed a review on folate and cardiovascular health. For more detail, see their review in the full length version of this paper available in PDF format from **www.ehnheart.org**.

3.2.10 Antioxidants (including polyphenols)

Population goal:

There is not currently sufficient conclusive evidence to justify making any public health recommendation in relation to antioxidants.

There has been a great deal of scientific interest in 'antioxidant' compounds that can prevent damaging oxidation reactions that occur in the body. Dietary antioxidants fall into several groups, two of the main being antioxidant vitamins and polyphenols.

Antioxidant vitamins: There has been a longstanding theory that the antioxidant vitamins—E, C and beta carotene (a form of vitamin A)—may be protective against CVD. While observational data comparing the health of people on antioxidant-rich diets with those with lower antioxidant intakes give support to this hypothesis, the results of clinical studies of high doses of antioxidant supplements have been contradictory.[103] Further research is needed on the associations between oxidation and chronic disease, and the extent to which antioxidants may protect health.

Polyphenols are the most abundant dietary antioxidants and are widely distributed in plants and are also present in significant amounts in a wide range of plant-derived foods and beverages. Flavonoids, phenolic acids, tannins, lignans and stilbenes are the most common classes of polyphenols in plant foods. Flavonoids are further classified as flavonols, flavones, flavanols (flavan-3-ols, catechins), flavanones, anthocyanidins and isoflavones. Proanthocyanidins (also called condensed tannins) are oligomers and polymers of flavanols.

Although polyphenols are not required for growth and development or for maintaining vital body functions throughout life, they may be essential for maintaining body functions and health through the adult and later phases of life.

Research on the role of dietary flavonoids and other polyphenols in the prevention of chronic diseases truly began after 1995.[104] A variety of different potential mechanisms by which polyphenols may reduce the risk of CVD have been proposed. It is unlikely that the protective effects of polyphenols on cardiovascular health are caused by direct antioxidant functions.[105]

Although an extensive amount of information has been published on flavonoids and polyphenols, the overall evidence is still insufficient—not conclusive but promising. The studies that have been done to-date remain relatively small and short-term and do not always measure final health outcomes. The data reviewed suggest the following conclusions:

- Reviews and meta-analyses of epidemiological studies suggest that dietary flavonols may be associated with a reduced risk of CHD and stroke;[106,107,108] for other flavonoids the evidence is more limited.
- Human intervention studies have shown that several biomarkers of CVD risk (endothelial function, blood pressure, and platelet function) are influenced by consumption of flavonoid-rich foods.
- Epidemiological studies have demonstrated that both black and green tea consumption may be associated with a reduced risk of CVD, especially stroke.[109-113] Beneficial effects from RCTs are less evident.[112,114,115,116] Habitual consumption of green tea may have a small favourable effect on LDL cholesterol.
- Recent meta-analyses of RCTs have provided evidence that regular consumption of flavanol-rich dark chocolate (10-100 g/day) or other cocoa products may improve endothelial function, reduce blood pressure, and inhibit platelet function.[114-118] There are, however, other constituents in chocolate already known to reduce blood pressure (including potassium, calcium and magnesium). Chocolate and other cocoa products are usually high in sugar, fat, and energy, so further investigation of the optimal dose to avoid long-term side effects (such as weight gain and adverse metabolic changes) is needed.
- There is epidemiological evidence on the inverse association between wine consumption and cardiovascular risk, but the evidence is weaker from RCTs.[84,115,119,120,121] This association may be nothing to do with polyphenols but may reflect other factors, such as alcohol.
- It should be noted that the polyphenols in dark chocolate or red wine can be obtained also from many commonly consumed fruits, berries, and vegetables with no adverse effects on nutrition.

Despite the interesting evidence that is emerging in relation to polyphenols, there is not currently sufficient conclusive evidence to justify a specific public health recommendation on polyphenols in relation to cardiovascular disease prevention.

For this paper Dr Riitta Törrönen, Department of Clinical Nutrition, University of Eastern Finland, Kuopio, Finland contributed a review of the evidence on polyphenols and cardiovascular disease. In addition, Dr Vardis Dilis of the Hellenic Health Foundation provided some material on antioxidants. For more detail, see the antioxidants section in the full length version of this paper available in PDF format from **www.ehnheart.org**.

3.3 DIETARY IMPLICATIONS OF THE POPULATION GOALS

The population goals should be translated into meaningful food-based dietary guidelines at the country level, taking the local context into account. There are, however, some broader principles that can be applied.

Nutrient-dense vs energy-dense foods: A diet rich in nutrient-dense foods—rather than one that is rich in foods which are energy-dense and nutrient poor—is important to ensure that the diet can provide essential nutrients and is appropriate for healthy weight maintenance.

Towards a plant-based diet: In many countries, a diet that meets these population goals favours a shift towards a predominantly plant-based diet from an animal-based diet with higher meat and dairy intakes.

Fish consumption: The population goal for an intake of 250-500mg/day of very long chain n-3 polyunsaturated fatty acids is consistent with twice weekly consumption of oily fish. Despite good nutritional reasons for this recommendation, the European Heart Network is aware of the potential consequences for the current state of the world's fish stocks.

Although this report gives population goals for individual nutrients, foods or food components, it is also worth considering one dietary pattern that has been the subject of intense interest: the traditional Mediterranean diet of southern Europe.

What is the Mediterranean diet?

Traditional diets vary across the Mediterranean region but tend to be largely plant-based—meat being consumed in small amounts and relatively infrequently—with high intakes of vegetables, fruits, fish, nuts, grains, pulses and with olive oil as the principal contributor to fat intakes.

Recent meta-analyses[122,123] found that the Mediterranean diet appears to be protective against cardiovascular disease and total mortality. The Mediterranean diet is currently under threat and the diet observed by Keys and colleagues in the early 1960s is vanishing.

Despite recent advances in medicine, including the now widespread use of statins to manage cholesterol levels, lifestyle strategies have the greatest potential to reduce cardiovascular risk in the general population. EHN continues to advocate a population-wide approach to preventing cardiovascular disease through diet and physical activity.

It is increasingly clear that sustainable long-term solutions require serious changes in the food system and the foods it produces. Too much of a focus on functional foods—generating hopes for a technical "quick fix" to these problems—may divert attention from the real dietary changes needed.

4 Changing patterns of diet and physical activity in Europe

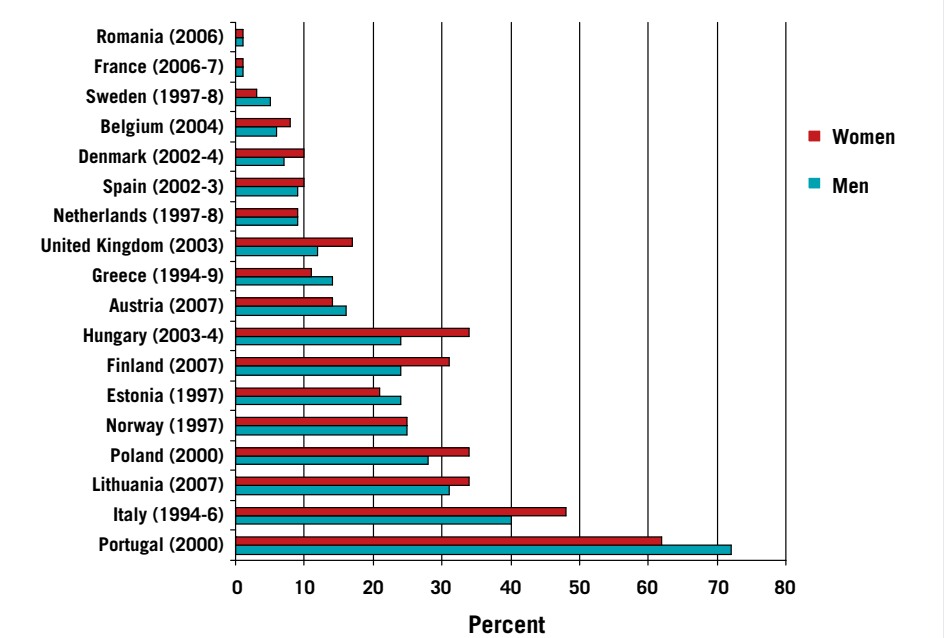
It is very difficult to say with certainty who is eating what in Europe, how active they are or how things have changed in recent decades.[xii] There are, however, important indicators that can provide some guidance on what is happening.

4.1 Food components

Saturated fat

A review of surveys of adult diets in 18 EU member states, found that average population intake ranged from 8.8% to 26.3% of dietary energy for men, and 9.4% to 24.8% of dietary energy for women, compared to this paper's interim population goal for less than 10% dietary energy for both population groups.[124]

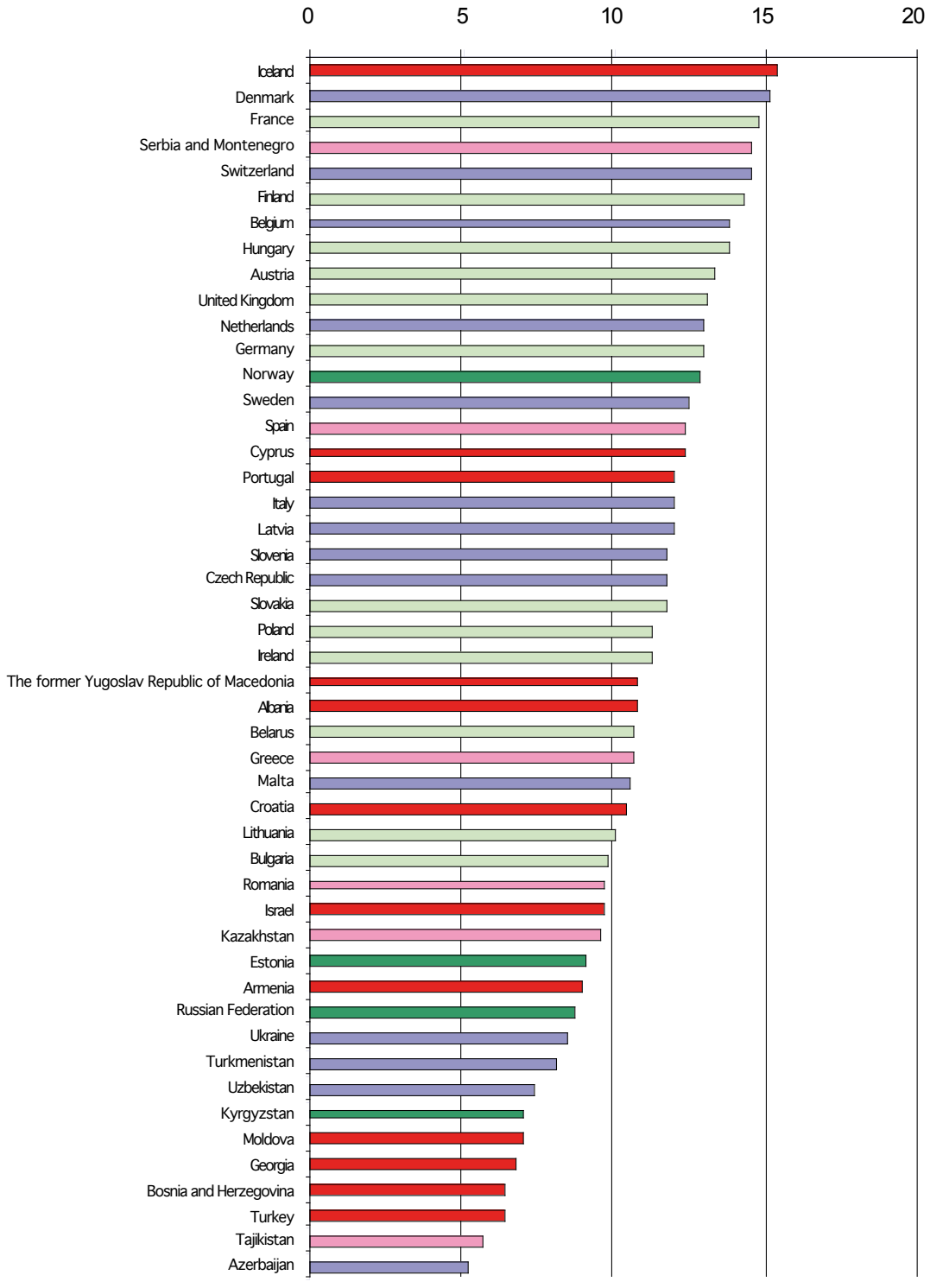
Figure 9 Percent of adult population consuming the interim population goal in this paper of less than 10% energy from saturated fat[xiii]
Re-calculated from dietary survey data reported in Elmadfa 2009[124]



In terms of food supplies, a rough calculation of the saturated fat content as a percentage of the total food energy can be made. (See Figure 10).

xii This section uses dietary survey material where the surveys are sufficiently comparable to bear detailed examination, as well as indirect evidence (largely from food production and supply statistics) to illustrate the patterns and trends. See the chapter contributed by Dr Tim Lobstein of the International Association for the Study of Obesity in the full-length version of this European Heart Network paper for a discussion on the methodological issues and more detail on diet and activity trends.
xiii It should be noted that these figures rely on relatively small sample sizes and relatively crude assumptions about the saturated fat content of the foods being eaten.

Figure 10 Saturated fat as a percentage of energy and changes (illustrated by the colour code[xiv]) in saturated fat in the food supply between 1992/3 and 2006/7



Source: calculated from FAO food supply tables (http://faostat.fao.org).

xiv The bars illustrate supply levels in 2006/7, the colour coding illustrates the change since 1992/3. Pink = more then 5% increase. Red = more than 10% increase. Pale green = more than 5% decrease. Dark green = more than 10% decrease. Purple = stable. Less than 5% increase or decrease.

Trans fats

There is no known safe level of consumption of trans fatty acids—this report sets out an interim population goal for less than 1% of food energy from trans fatty acids.

Few surveys of trans fat content or dietary intakes have been reported. One 2004-5 survey of fast food outlets in 13 cities in Europe found dramatic differences in the trans fat contents of standard meals.[125] Follow-up research in the same places in 2009 found that the amount of trans fatty acids had decreased dramatically since 2005 but that popular foods with high amounts of trans fatty acids were still easily available in eastern Europe.[126]

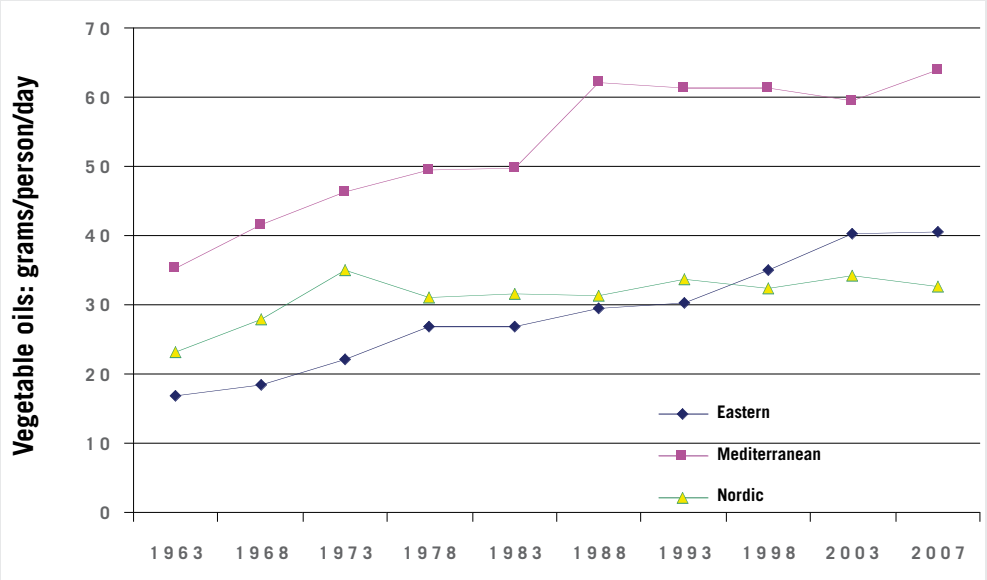
There are also particular concerns about independent fast food outlets and about higher exposure to trans fatty acids among lower income groups—particularly young men in these groups who more likely to be higher users of fast food outlets.

Vegetable oils

Of all the food ingredients which can be mapped in production trends world wide, vegetable oils have risen most significantly in the last half-century with the arrival of mass-produced, cheap vegetable oils including soy, sunflower and rape.

In northern Europe, vegetable oils have largely replaced animal fats in domestic cooking. In Mediterranean countries it seems that oils from crops other than olives are being consumed in addition to the traditional consumption of olive oil. In all regions, vegetable oils are used in a wide range of processed foods and fast food cooking processes (see Figure 11).

Figure 11 European regional trends in vegetable oil supplies in Europe

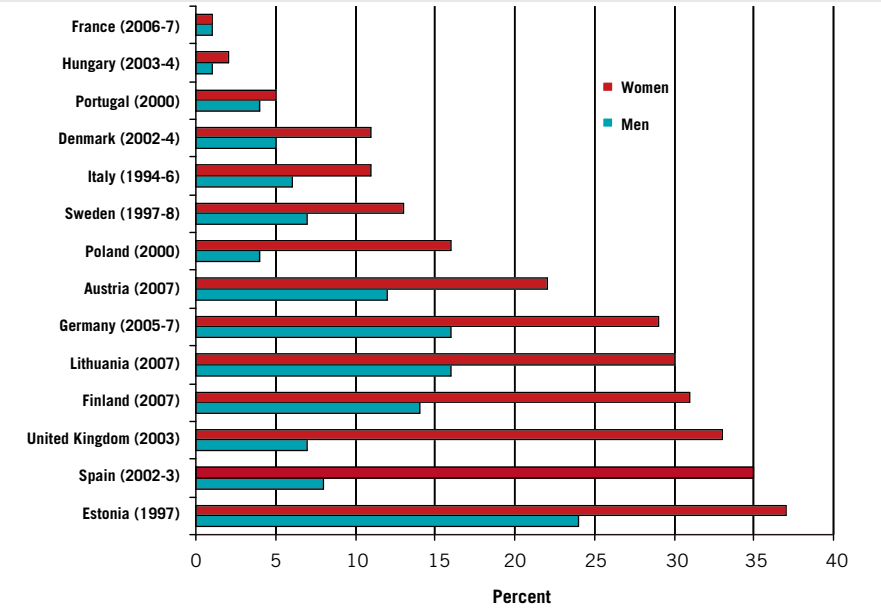


Source: calculated from FAO food supply tables (http://faostat.fao.org).
Eastern = Bulgaria, Hungary, Poland, Romania
Nordic = Denmark, Finland, Norway, Sweden
Mediterranean = Greece, Portugal, Spain, Turkey

Salt

Dietary surveys indicate continuing high intakes compared with existing national and international goals. A review of dietary surveys of salt consumption in 14 EU member states found average population intakes varied across countries from 6.5 to 18.3 grams per day for men and 4.3 to 14.0 grams per day for women and that the majority of the population were failing to meet the recommended consumption levels (Figure 12).

Figure 12 Percent of adult population consuming less than the interim population goal in this paper of 5 g salt per day[xv]



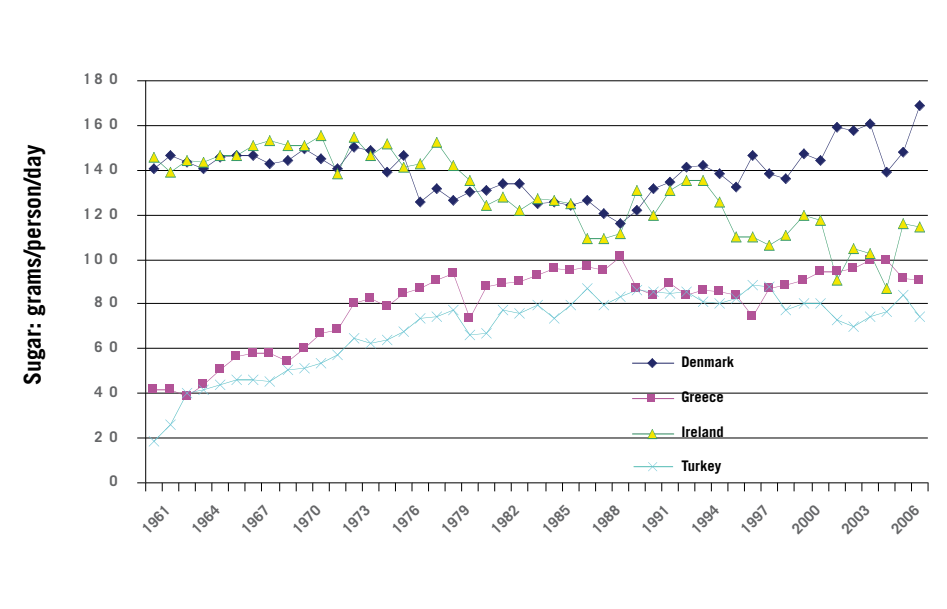
Re-calculated from dietary survey data reported in Elmadfa 2009.[124]

xv It should be noted that the data are derived from national surveys undertaken at different times, using different dietary intake estimation methods.

Sugar

Consumption of sugar has been high in northern Europe for many decades, but has also increased in southern Europe in recent years. Armenia, Montenegro and Georgia have seen sugar supplies increase between 1992-3 and 2006-7, and overall in European countries sugar supplies are generally above our interim recommended levels of less than 10% of food energy.[xvi] The trends can be illustrated using two typical countries from each region (see Figure 13).

Figure 13 Four cases studies: trends in the supply of sugar in Denmark, Ireland, Greece and Turkey



Source: calculated from FAO food supply tables (http://faostat.fao.org).

Household purchases of sugar have dropped dramatically in recent years, but the amount present in the food supply has continued at high levels—reflecting the "hidden" sugar present in processed foods and the sugar in drinks and foods eaten outside the home.

4.2 FOODS AND DRINKS

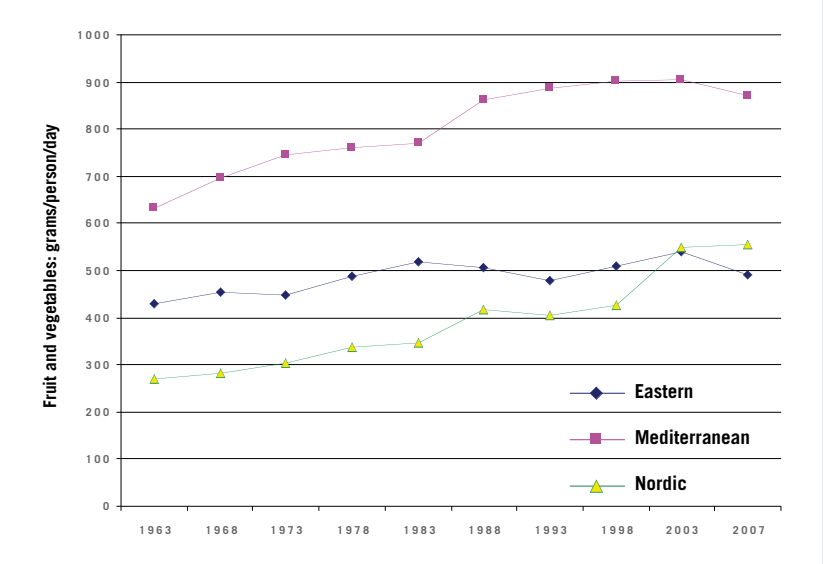
Fruit and vegetables

Recent trends indicate a continuing increase in fruit and vegetable supplies in much of Europe with Mediterranean countries continuing to enjoy the highest consumption levels (Figure 14). However, specific country analyses indicate that the Mediterranean region may be increasing its vegetable consumption, while northern European countries increase their fruit consumption (Figures 15 and 16).

The supply figures do not distinguish fruits and vegetables eaten in relatively unprocessed form, or as juices, syrups, purees and other processed forms. Nor do the figures for food supplies account for waste—it has been estimated that, in order to account for waste, over 700 g of fruit and vegetables may need to be supplied for 400 g to be consumed.[127]

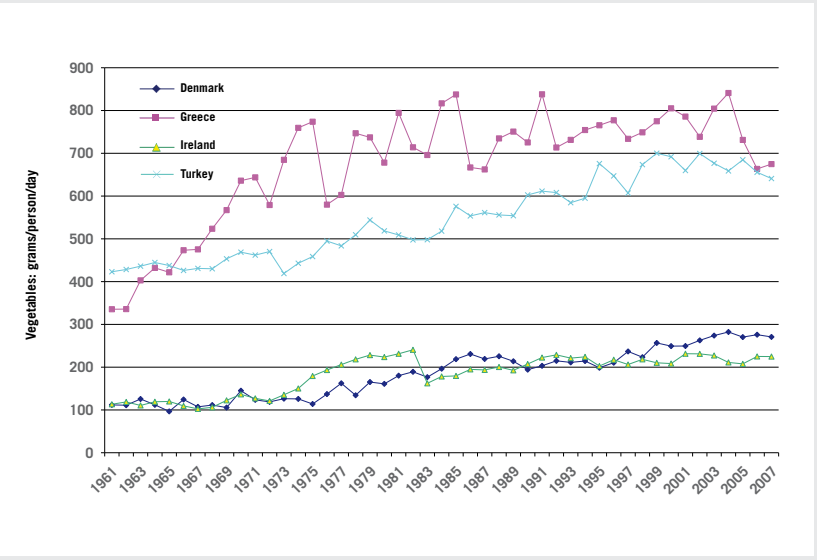
xvi Based on calculations from FAO food supply tables (http://faostat.fao.org).

Figure 14 Regional trends in fruit and vegetable supplies



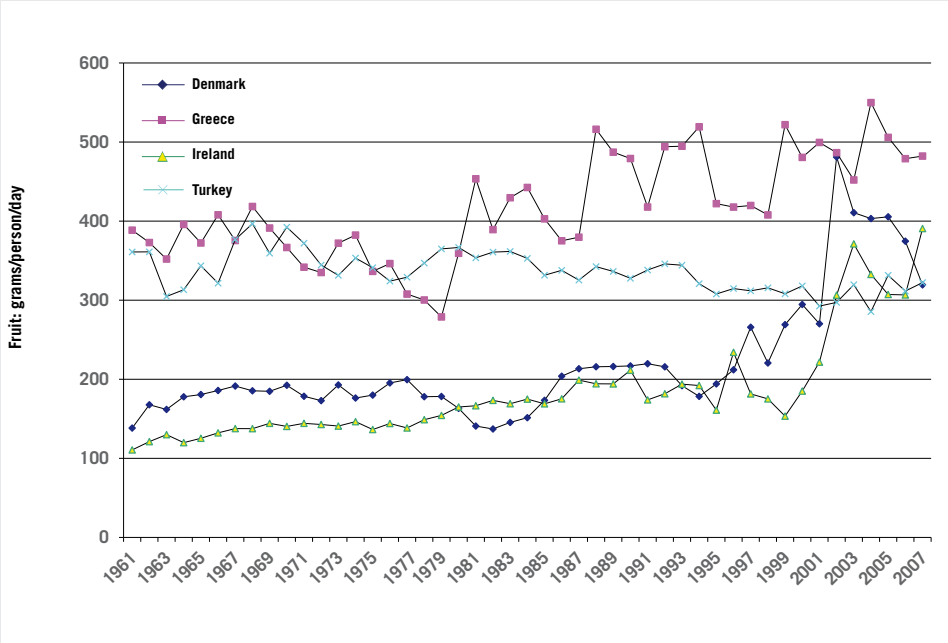
Source: calculated from FAO food supply tables (http://faostat.fao.org).
Eastern = Bulgaria, Hungary, Poland, Romania
Nordic = Denmark, Finland, Norway, Sweden
Mediterranean = Greece, Portugal, Spain, Turkey

Figure 15 Four cases studies: trends in the supply of vegetables (and pulses) in Denmark, Ireland, Greece and Turkey



Source: calculated from FAO food supply tables (http://faostat.fao.org).

FIGURE 16 FOUR CASES STUDIES: TRENDS IN THE SUPPLY OF FRUIT (AND NUTS) IN DENMARK, IRELAND, GREECE AND TURKEY

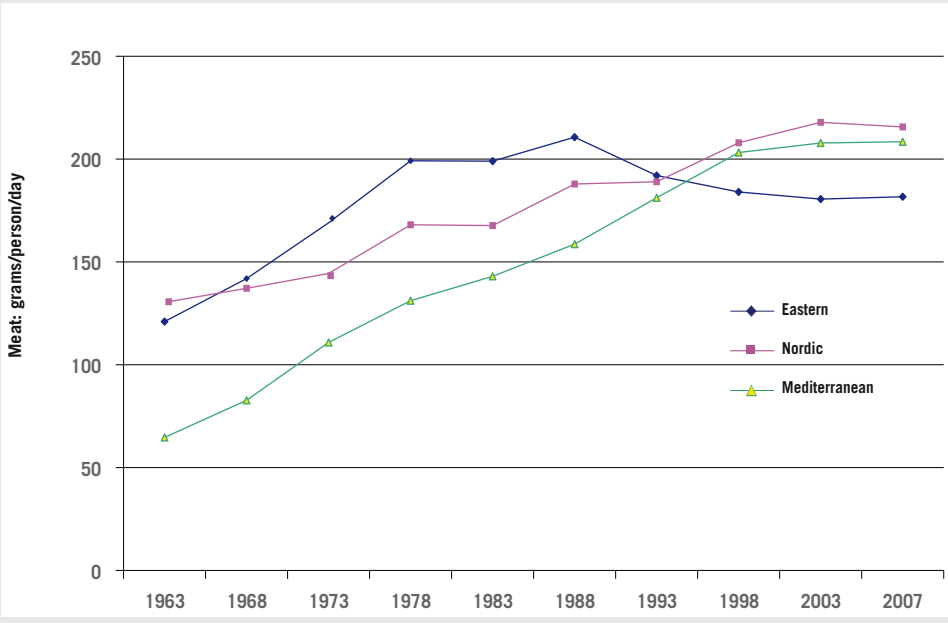


Source: calculated from FAO food supply tables (http://faostat.fao.org).

MEAT, MILK AND BUTTER

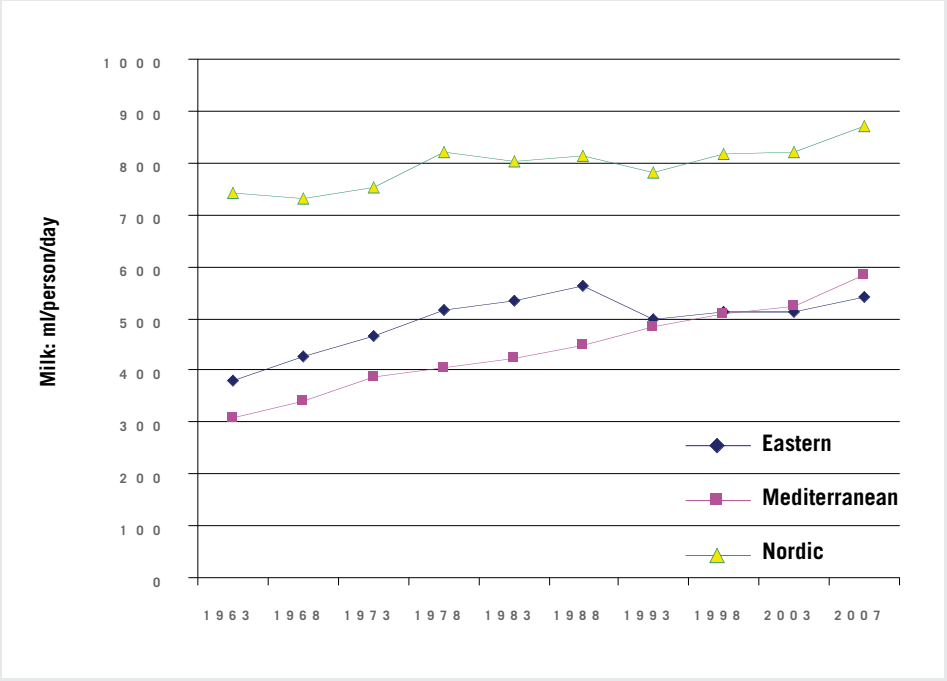
Strong support for meat and milk producers from the Common Agricultural Policy (CAP) has increased meat supplies and maintained high levels of supplies of milk and dairy foods in northern European countries. In southern Europe, especially the Mediterranean region, meat supplies have increased nearly four-fold in a generation and fresh whole milk has also seen a strong increase (Figures 17 and 18).

FIGURE17 EUROPEAN REGIONAL TRENDS IN MEAT SUPPLIES



Source: calculated from FAO food supply tables (http://faostat.fao.org).
Eastern = Bulgaria, Hungary, Poland, Romania
Nordic = Denmark, Finland, Norway, Sweden
Mediterranean = Greece, Portugal, Spain, Turkey

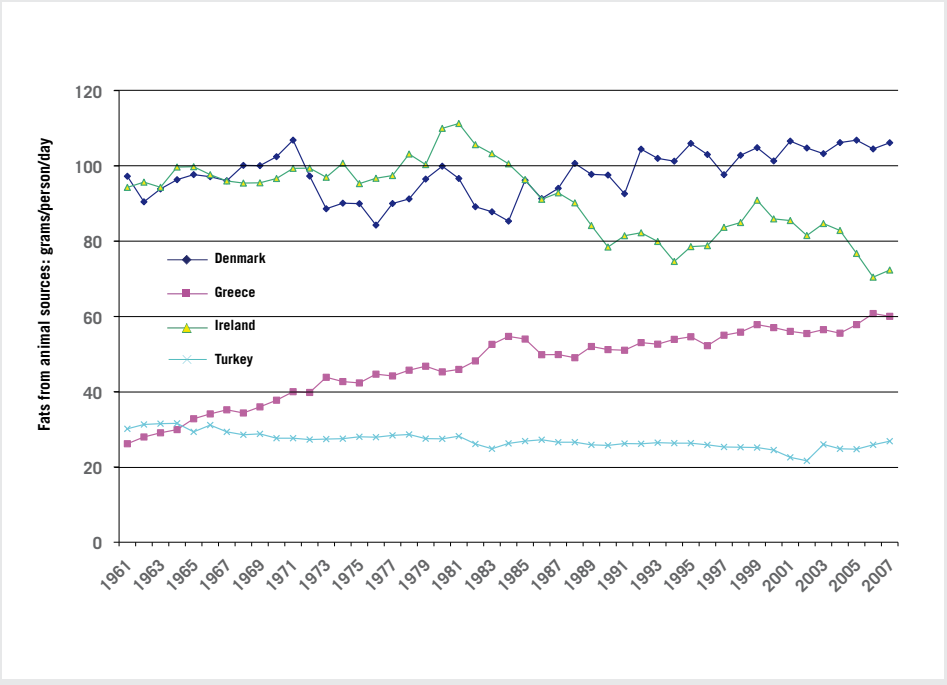
Figure 18 European regional trends in fresh whole milk supplies



Source: calculated from FAO food supply tables (http://faostat.fao.org).
Eastern = Bulgaria, Hungary, Poland, Romania
Nordic = Denmark, Finland, Norway, Sweden
Mediterranean = Greece, Portugal, Spain, Turkey

The examination of four case study countries supports this picture of increasing meat supplies and maintenance of milk and dairy supplies for northern European countries, while a rapid increase is seen for southern Europe (Figure 19). In Turkey, however, animal fat consumption appears to have remained remarkably low, possibly as a result of Turkey remaining outside the CAP.

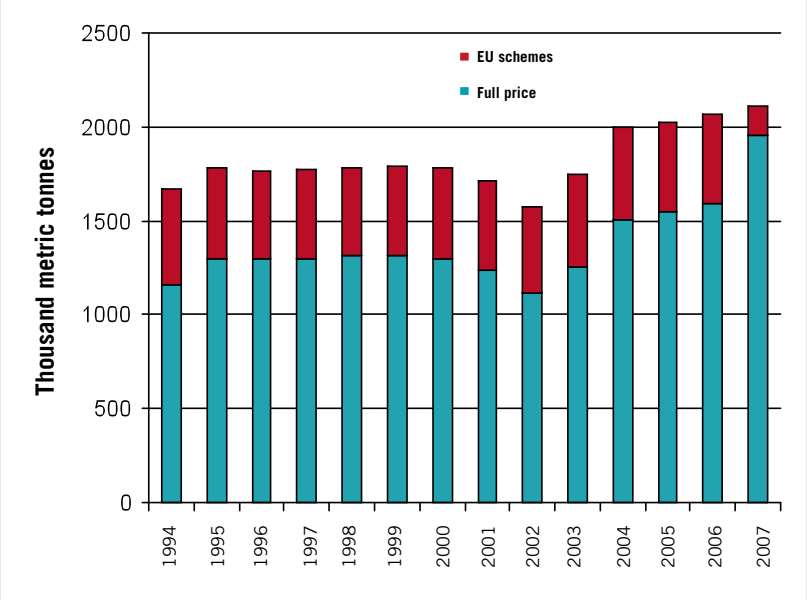
Figure 19 Four cases studies: trends in the supply of animal fat in Denmark, Ireland, Greece and Turkey



Source: calculated from FAO food supply tables (http://faostat.fao.org).

Further evidence of the CAP's role in introducing high levels of animal fat into the food supply can be shown in the case of butter. Despite declining consumer demand for butter, CAP measures have subsidised the use of surplus butter in a variety of processed foods. At its peak, more than 30% of butter production was being subsidised in this way, and this level has only recently been significantly reduced (Figure 20).

FIGURE 20 BUTTER SUPPLIES IN THE EU SHOWING THE AMOUNT ENTERING THE FOOD CHAIN THROUGH THE REGULAR MARKET AND THROUGH THE CAP 'SPECIAL SCHEMES'



Source: European Commission annual accounts.

SNACKS, BISCUITS, CONFECTIONERY AND SOFT DRINKS

Information on the consumption of foods such as snacks, biscuits, sweets and soft drinks are hard to obtain.[xvii] Market data show that sales of savoury snacks have shown significant growth in recent years throughout the region.

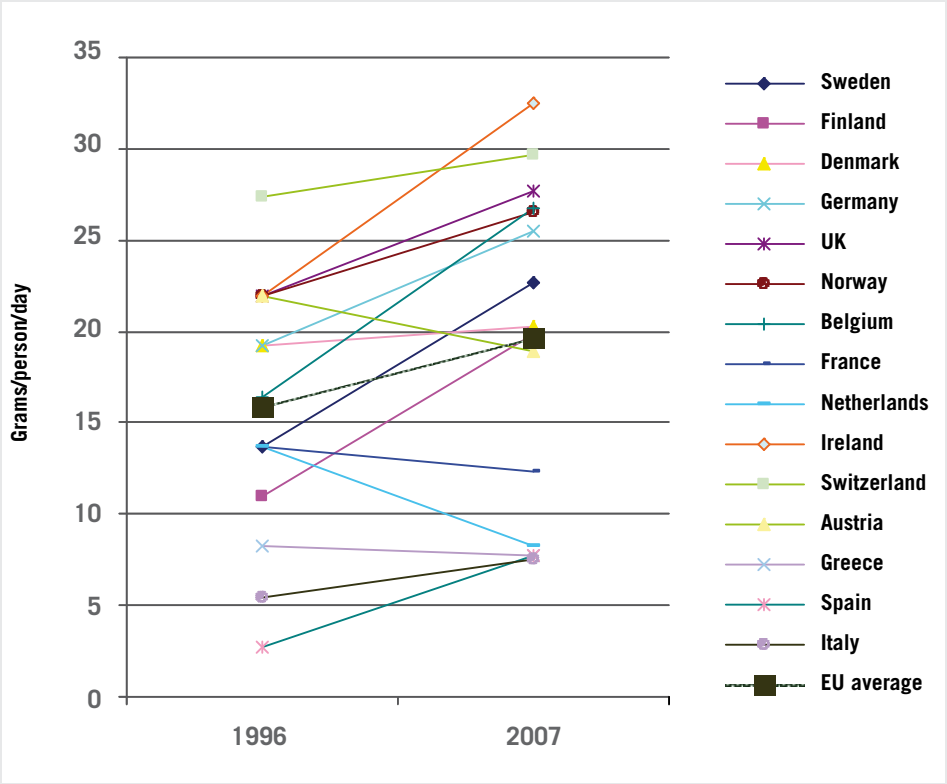
THE GROWING SNACK MARKET IN EASTERN EUROPE

Since the markets opened in the 1990s, 60% of inward investment in eastern Europe by western food companies went to building production capacity for confectionery and soft drinks.[128] The region has seen an average of 7.4% annual growth every year for the five years to 2008 in the savoury snacks market.[129] In Poland, for example, chocolate confectionery sales rose 26% over the period 1999-2004, while sugar confectionery rose 22% and soft drinks consumption rose over 50%.[130,131] Similarly, in Russia, snack sales, by volume, trebled between1998 and 2000, and grew a further 85% in 2001.[132]

xvii Snacks, biscuits, sweets and soft drinks are not recorded in the food supply statistics from FAO, which focus on primary, single ingredient products. They often fail to be recorded in shopping basket surveys of household expenditure because they are frequently consumed outside the home, while travelling, shopping or in the workplace. They are notoriously under-reported in dietary intake surveys as they appear to be easily 'forgotten' when diaries are filled in or interviewers ask for recent food recollections. The data presented here have been obtained from manufacturers' statistics and market intelligence reports.

In western Europe the markets for sweetened snacks are relatively mature, with only small growth in some sectors over the last two decades.

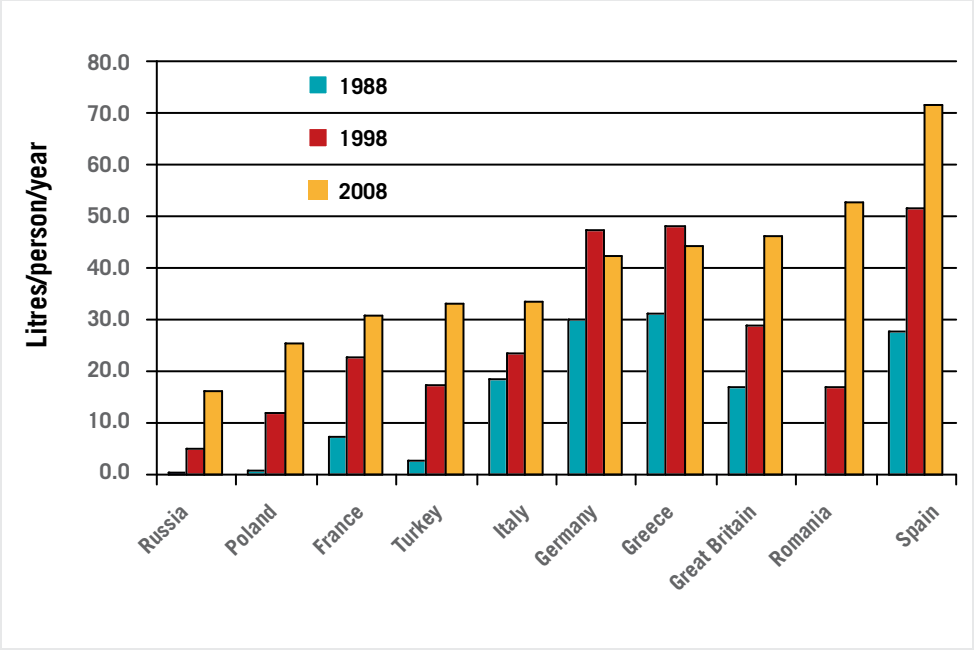
FIGURE 21 CHOCOLATE CONSUMPTION PER PERSON, 1996-2007



Source: Collated from CAOBISCO (www.caobisco.com)

Soft drink consumption is also difficult to monitor using supply figures, household purchases and dietary intake surveys. Industry sales figures from the leading company, Coca-Cola, indicate a substantial rise in soft drinks consumption over the last few decades (Figure 22).

FIGURE 22 AVERAGE SALES OF COCA-COLA PRODUCTS, 1988, 1998, 2008[xviii]



Source: Company reports.

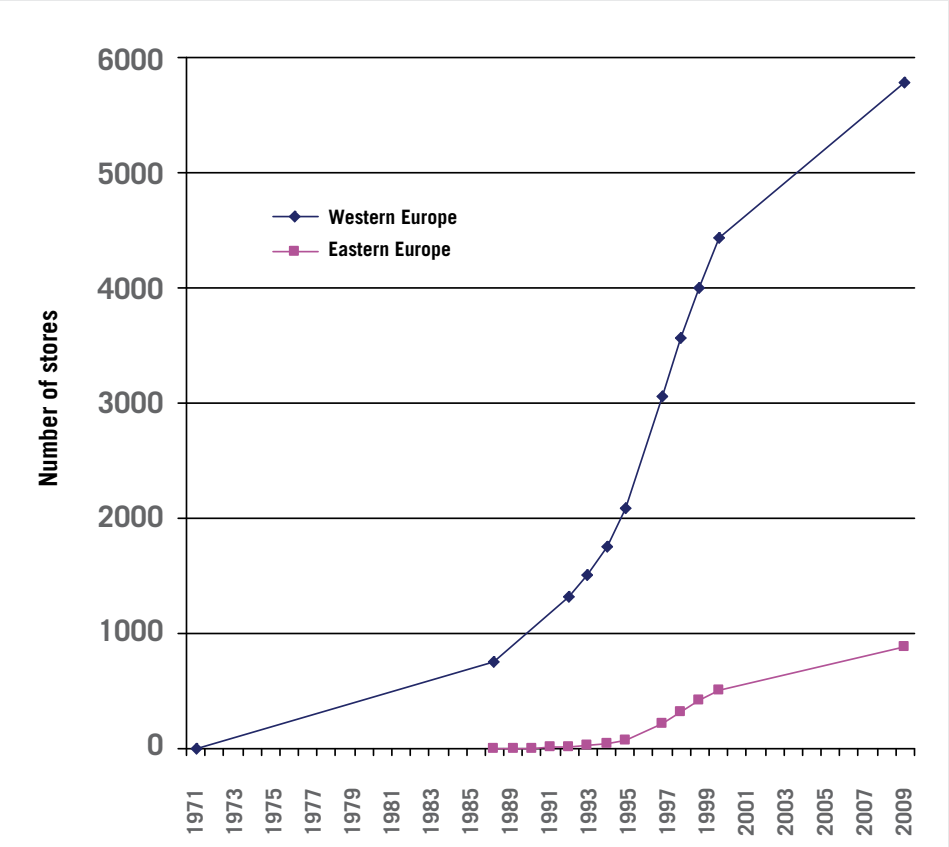
xviii Note: Not all this consumption will be sweetened soft drinks, however, as the sales figures include other product lines from this company.

Fast food outlets

In many ways the changing diets of a population are reflected in their consumption of fast-service foods. The rise in fast food chains alters the purchasing patterns from primary producers, raising demand from farmers and suppliers for particular commodities, such as a certain type of potato, intensively reared chickens, cheaply produced beef, white buns, soft drink ingredients etc. This in turn reduces the wholesale prices, making it easier for others to enter the market and expand the fast food sector, easier for caterers in the public sector to follow the same types of menu, and easier for retailers to supply similar foods to shoppers for home consumption.

Data for the whole sector are not easily found. Data for the leading investor in fast foods in Europe, the US company McDonald's, illustrate the rise in the company's activity in Europe since it opened its first outlet in the region in 1971 (Figure 23).

Figure 23 Number of McDonald's stores in the European region, 1971-2009

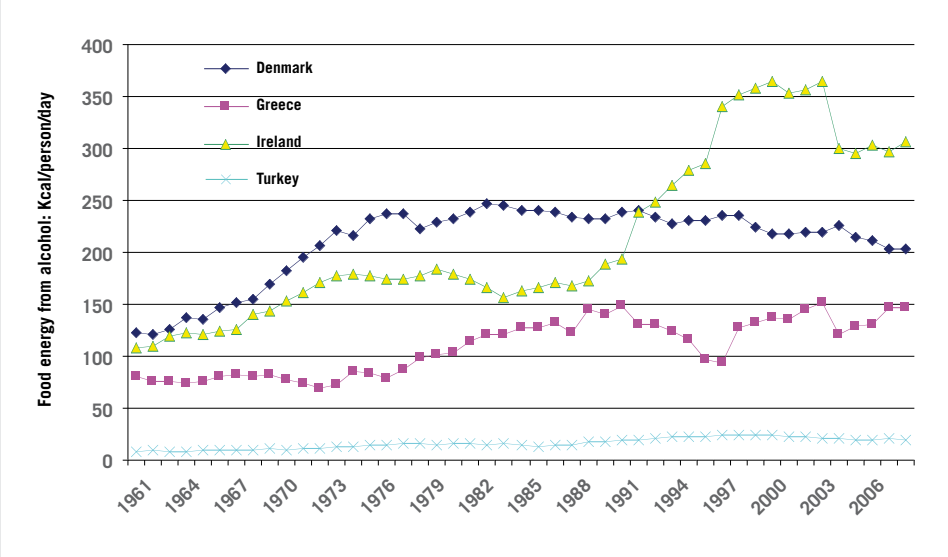


Source: Company reports, websites archives.

Alcoholic drinks

Consumption levels range considerably across Europe, from under 5 litres of alcoholic drinks per year (Albania) to over 200 litres per year (Italy) per person. It is also clear that patterns of consumption have been changing dramatically in recent decades in some countries and not in others (see Figure 24 case studies).

Figure 24 Four cases studies: trends in the supply of alcoholic drinks in Denmark, Ireland, Greece and Turkey



Source: calculated from FAO food supply tables (http://faostat.fao.org).

4.3 VANISHING TRADITIONAL DIETS

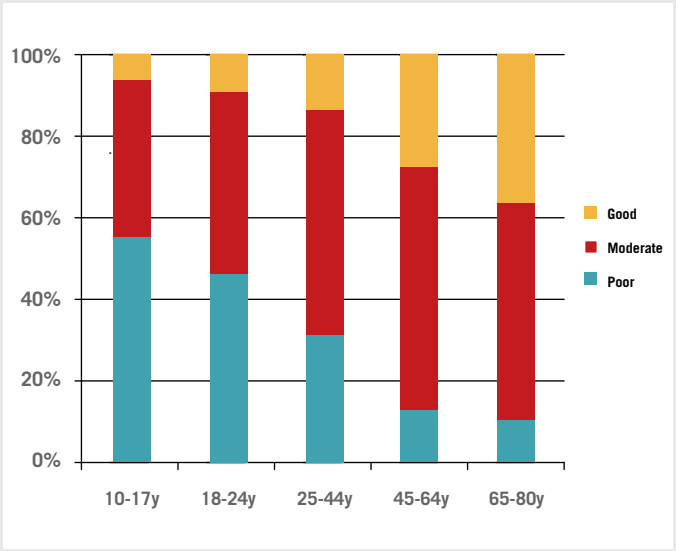
The trends shown in the figures above indicate that, especially in southern Europe, there have been some significant changes in the nutritional quality of the diets.

One aspect of concern is the possible changes in the quality of high value foods, such as fruits, vegetables, lean meats and fish. The changing patterns of fruit and vegetable consumption, for example, might be reducing carotenoid intakes.[133] The promotion of high-cropping, easy-storing varieties of apple, to take another example, could have a negative impact on vitamin C levels.[134] There are also concerns about farming methods changing the fatty acid profiles of farmed fish and poultry.[135,136]

This implies that the previous recommended population average intake of a minimum of 400 g fruit and vegetables per day may need to be raised. This report recognises that the goal of 400 g of fruit and vegetables per day remains a reasonable interim target, but also proposes a more ambitious longer-term goal of 600 g per person per day.

A second area of concern is the larger changes in the patterns of food eaten, and especially the loss of traditional diets in the Mediterranean region and their replacement with soft drinks, confectionery, snack foods and fast food meals. The changes have been very rapid in much of Europe, and especially so in recent years in the Mediterranean region.

FIGURE 25 ADHERENCE TO A TRADITIONAL MEDITERRANEAN-TYPE DIET IN CATALONIA, SPAIN



Source: Serra-Majem et al (2007)[137]

Research indicates a rapid transition between the generations, with very few younger people adhering to the traditional Mediterranean diet (Figure 25). This move from healthier diets to less healthy ones across the generations is also seen in non-Mediterranean regions.

4.4 PHYSICAL ACTIVITY TRENDS

In our increasing industrialised and urbanised societies, it is easier for many Europeans to live largely sedentary lives. A shift away from more physically active occupations, lower energy expenditure levels within various occupations, fundamental changes in travel and transport, along with increasing mechanisation in the home are some of the factors involved.[138]

It is, however, difficult to make any definitive statements about how physical activity patterns have evolved in Europe, because there is very little monitoring and surveillance of physical activity levels. Furthermore, the data which do exist on physical activity are usually based on subjective measures of physical activity.

A global systematic review[139] concluded that current data suggest that leisure-time physical activity (LTPA) has been increasing over time for adults in high income countries, while occupational physical activity has been declining. Many countries have also seen a drop in physically active forms of travel.[140]

WHO estimates that at least two thirds of the adult population of the EU countries are insufficiently physically active for optimal health.[141]

4.5 CONCLUDING COMMENTS ON DIET AND PHYSICAL ACTIVITY PATTERNS

The important trends in food supply, food consumption and physical activity patterns highlighted here have profound implications for chronic disease risk. While fruit and vegetable consumption has increased in most countries, the nutritional quality may have deteriorated. Greater opportunities for food purchasing and falling prices for many foods have helped stimulate the demand for food and thereby raised the levels of intake.

A significant generation shift is also apparent especially in southern Europe. The traditional foods are increasingly being replaced by a more 'modern' diet with a greater proportion of calories from oils and fats, sugars and processed starches, and for some sections of the population, alcohol.

5 Policy Options in a Rapidly Changing World

There has been a series of major food, nutrition and physical activity policy initiatives at the global, European and EU levels (see box) reflecting the growing understanding that comprehensive and integrated policies are needed to bring about changes in diet and physical activity patterns.

This recent policy progress inspires belief that governments of all shapes and sizes can take action. It is encouraging that some policy makers are now thinking in much broader terms and governments have shown that they can come together and cooperate internationally.

There is still, however, much to be done. There are examples of innovative, progressive policies, but these often relate to isolated examples of single national or regional actions. Only a few countries have, for example, yet to follow Denmark and Austria in regulating trans fat content. Other issues, such as simplified front-of-pack nutrition labelling, have been on the policy agenda for decades, yet there is a frustrating lack of progress.

Major developments since 2002 in food, nutrition and physical activity policy and strategy

A new global framework: World Health Organization (WHO) issued Diet, Nutrition and the Prevention of Chronic Diseases (WHO Technical Report Series 916) in 2003 and the WHO Global Strategy on Diet, Physical Activity and Health was endorsed by the World Health Assembly in 2004. This was followed by the WHO Action Plan for the Prevention of Non-Communicable Diseases in 2008.

European action plans: WHO Europe issued an Action Plan for Food and Nutrition Policy, 2000 – 2005, and followed up with second European action plan for 2007-2012. European health ministers signed the WHO Europe Charter on Counteracting Obesity in November 2006. WHO is developing a new regional health policy Health 2020, due to be launched in September 2012.

An EU strategy: In October 2007, the European Commission adopted Together for Health: a strategic approach 2008-2013 followed by a White Paper A Strategy for Europe on Nutrition, Overweight and Obesity-related health issues in 2007. In relation to physical activity, EU sports ministers endorsed the EU Physical Activity Guidelines in November 2008. The Lisbon Treaty—now ratified in all EU member states—reiterates and somewhat strengthens the role of the EU in protecting public health.

The EU has established a High Level Group of member states' representatives and the EU Platform for Action on Diet, Physical Activity and Health, which aims to provide a forum for all interested actors.

These major developments go some way towards answering EHN's call in our 2002 paper for "a comprehensive and integrated European food and nutrition policy". Further progress is needed, however, in translating these strategic documents into concrete and effective action, with practical measures being implemented.

5.1 ADDRESSING THE WIDER ENVIRONMENT

Until relatively recently the policy response to diet- and inactivity-related ill-health focused on educating the public and providing information to enable people to make healthier food choices and become more active. It is now widely acknowledged, however, that—while education and information remain fundamental—it is not enough to focus on this approach alone to induce the necessary changes.

This shift away from responsibility being placed exclusively on individuals points to a need for broader thinking about chronic disease prevention. The solutions need to come predominantly from making changes to the environment in terms of the food supply and other factors which influence what people eat and how physically active they are.

Addressing Inequality

Policies to improve diet and to promote active living should recognise that health education proposals for behaviour change are more difficult for the disadvantaged to implement whereas pervasive change in the environment can be non-discriminatory. These measures should include actions to improve the:

- Affordability of healthy foods and physical activity
- Accessibility of healthy foods
- Accessibility and affordability of physical activity opportunities
- Infrastructure to encourage physical activity

When factors ranging from European farming policy to the portion size of an individual meal can affect nutrition, it is easy to understand why policy makers may feel daunted at the prospect of trying to improve diets and promote physical activity. Local communities may wonder how they can bring about positive change in face of the marketing might of multinational food companies or the effects of the EU Common Agricultural Policy.

Yet, because there are so many different factors affecting what people eat and how active they are there are also a multitude of opportunities for action.

Although international cooperation is important—both at WHO and European levels—and the private sector can play a critical role, national and local governments are key policy players. Civil society at both national and local levels has a key role in interacting with policy makers and industry to help promote change. It can also help sustain political pressure for governments to show real leadership and may hold them to account if they fail to deliver.

5.2 AREAS FOR POLICY DEVELOPMENT

The following sections use the "4Ps of marketing" to outline possible areas for policy development and action. Marketers use this model, also known as the "marketing mix", to assess how well products match their target market by considering factors to do with **product, price, promotion** and **place**.

5.2.1 Product

It is obvious that the nutritional quality of the food that is sold or served in Europe affects the health impact of the diet. This has, however, been a neglected area for any action until relatively recently. Only now are policy makers starting to look at changing the nutritional quality of mainstream food and drink products rather than just producing special "healthy" foods.

Using this analysis, we can also think of "physical activity opportunities" as a product. In this sense it is important that people have access to, and information about, a range of opportunities for physical activity, both in ways that integrate into daily routines and as leisure activities. The "opportunity" should also include changes in our physical urban environment which automatically allow movement rather than simply requiring a conscious decision to behave differently.

Reformulation of food products to reduce the salt, saturated fat, and added sugar content of foods and portion size.

- Efforts to reduce the fat, sugar and salt content and portion sizes of mainstream food and drink products should be a key priority for Europe.

- EHN has supported the European Commission's efforts in this area, but questions whether the proposed voluntary approach will be adequate. There are particular concerns that some sectors of the population may miss out on the benefits if reformulation is limited to voluntary private sector efforts.

- The Commission and national governments should, therefore, set firm targets for progress in product reformulation and should set a priority list of products for reformulation (e.g. bread and bakery, ready prepared meals, breakfast cereals) and progressive and time-bound levels for each category. If the collaborative

voluntary approach does not deliver results within that timescale, the Commission or national governments should introduce legislation setting maximum levels of these nutrients/ingredients for different foodstuffs.

- Reformulation efforts should be accompanied by government information campaigns that help to create consumer demand for lower salt/fat/sugar products with a higher fibre (non-starch polysaccharide) content.

- Agricultural production methods that improve the nutritional quality of foods should be promoted with specific measures being taken to increase the production of vegetables and fruit and its ease of access to publicly-funded facilities.

- The food manufacturing, retail and catering industries should build on the progress that has already been made, and collaborate fully with national and European authorities to reduce the fat, sugar and salt content of foods and to reduce portion sizes.

Legislation to introduce strict limits on industrially produced trans fatty acids

- A legislative approach to reducing industrially-produced trans fatty acid has been shown to be effective. Given the variations in trans fat intakes, policy should be guided by actual intake data of vulnerable groups and not on population averages. Measures are also needed to ensure that trans fats are not replaced with saturated fat.

- The European Commission should bring forward a proposal for an EU-wide regulation to eliminate industrially produced trans fats in foodstuffs marketed in the EU. Action at the EU level will support the functioning of the internal market while at the same time ensuring a high level of health protection for all.

- In the absence of proposed EU legislation, or for countries outside the EU, national legislation to limit the presence of industrially-produced trans fatty acids in foodstuffs is recommended and consideration should be given to using the public health provisions in international trade law to limit trade in products containing industrially produced trans fats.

- In many countries, food sold in catering outlets is regulated and inspected at the local level. In the absence of national legislation, this presents the opportunity for local authorities to ban trans fats from foods served in restaurants, fast food chains, pub, cafés and other catering outlets.

- EHN favours the regulatory approach in this case, as it has been shown to be more effective. Nonetheless, voluntary approaches in some countries (UK, The Netherlands, Norway) have yielded some progress and—pending any national or European legislation—the food industry should work collaboratively with food authorities to reduce the presence of trans fatty acids in foods. In particular, multi-national companies have a responsibility to ensure and demonstrate that the low levels of trans fats that they can achieve in countries where there is regulatory or policy pressure are applied uniformly across the countries where they operate.

Ensuring that consumers have easy access to meaningful information about the nutritional quality of foods

- Mandatory, legible, back-of-pack and front-of-pack labelling should receive first priority at the European level.

- EHN continues to call for a simplified front of pack scheme. This should be a "sign posting" scheme that would enable consumers to identify healthier choices at a glance. It should only contain key elements: energy, fat, saturated fat, sugars and salt. The front-of-pack scheme should be colour coded with red, yellow and green indicating high, medium and low levels of these elements (based on percentage GDAs per serving).

- National governments must be able to provide meaningful nutrition labelling to consumers in their countries over and above the minimum guarantees stipulated in EU legislation.

- Urgent action is needed to improve the provision of nutrition information in restaurants, cafés and other catering outlets. Authorities should consider a mandatory requirement to provide nutrition information (in the form of a traffic light labelling scheme covering key nutrients) for all chains with more than 10 outlets.

Ensuring availability of fresh drinking water

- Policies to ensure the provision of safe unsweetened normal drinking water, particularly in schools, workplaces, public places and public institutions should be introduced.

5.2.2 Promotion

There are two different aspects to promotion and both are important. On the one hand, there are measures relating to the impact of modern marketing and promotional techniques on food choices, and particularly on children. On the other hand, promotional campaigns and other techniques have tremendous potential to promote healthier diet and physical activity choices.

The report issues recommendations relating to policy issues on both sides of this coin: controls on marketing to children, rules on nutrition and health claims, and the use of marketing techniques and mass media campaigns to promote healthy options.

Given the huge imbalance in resources—the communication budget of the French national nutrition programme, for example, is equivalent to only 0.5% of the food industry's expenditure on TV advertising in France[142] —policy action

to promote healthier choices will only be successful if it is combined with efforts to neutralise the marketing power of nutritionally inappropriate products directed at children.

Controlling advertising of unhealthy foods aimed at children

- Measures to protect children from audiovisual commercial communication concerning unhealthy food and drinks should be a priority at European level.
- There should be no audiovisual commercial communication for foods high in fat, sugar or salt broadcast between 06h00 and 21h00. Nutrient profiling schemes can be used to identify affected food products. Audiovisual commercial communication includes surreptitious advertising, sponsorship and product placement.
- Restrictions on marketing of unhealthy foods to children should also encompass non-broadcast marketing techniques (eg online media etc) and the use of toy promotions to promote unhealthy foods. Controls should be introduced to prevent the promotion of links between sports or celebrities and unhealthy foods.
- An international code should be developed—under the auspices of WHO—to reduce substantially the extent and impact of marketing of unhealthy foods and beverages, particularly to children.
- Pending the introduction of an international code or EU legislation, national governments should introduce their own restrictions to protect children from advertising for unhealthy foods.
- Local authorities—including, for example, health, education and recreation departments—can also take action to protect children from commercial messages about unhealthy foods in or near schools, play areas and other places where children gather.

Mass media educational campaigns to increase demand for healthy foods and to promote physical activity

- There is a role for the national and local governments in developing campaigns to increase demand for healthy foods and to promote physical activity. There may also be a role for the European Union to support government initiatives. It is important that any campaigns to promote healthy eating or physical activity are:
  - solidly embedded in a broader, multi-sectoral food and nutrition policy;
  - take into account research identifying criteria associated with campaigns that have been effective; and
  - are backed by supportive policies and broader environmental changes.

Promoting healthy options

- At the European level, sufficient funds should be made available for interventions to increase fruit and vegetable consumption. The agriculture and health sectors, which both stand to benefit from increases in fruit and vegetable consumption, should coordinate efforts to promote fruit and vegetables.
- CAP promotion budgets should give preference to foods of high nutritional value and incentive given to create synergies with the EU School Fruit Scheme and Most Deprived Persons Scheme. Unused promotion funds should be made available for public campaigns focusing on healthy diets. Funds should not be used to promote products that are not otherwise promoted as part of healthy eating.
- Authorities at the national and local levels should explore options to promote healthier food and drink products. This should include working with the food manufacturing, retailing and catering sectors, as well as the creative industries, to harness the potential of marketing and promotional techniques to promote health.
- The food manufacturing, retail and catering sectors should use their know-how and the promotional techniques at their disposition—including product position and price promotions—to promote healthier foods. This private sector involvement should only follow on after the public health messages have been developed by the competent authorities/government.

Rules on nutrition and health claims

- EHN proposes that the Commission stop seeking to develop its own model and adopts the model developed by Food Standards Australia New Zealand—this model would be fit for purpose in the European context. A model with fewer food categories, more nutrients and nutrient scoring is recommended.

Promotion of breastfeeding and ensuring appropriate marketing of breastmilk substitutes

- The EU must ensure that international conventions on infant feeding are adhered to.
- Europe can also play an important role in supporting member states in the implementation of sound infant and young child feeding strategies. There is also an important role for Europe in setting a framework for social and employment policies that protect breastfeeding by improving parental leave provision, requiring facilities for breastfeeding etc.
- EU policies must be informed by and based on evidence, which includes independently reviewed and independently funded research. Notably, EU policy

should support member states' right to adopt legislative measures setting the highest levels of protection, including, but not restricted to, banning the promotion of breastmilk substitutes (BMS) (including follow-on formula and specialised formulas) and banning all health and nutrition claims on foods for infants, young children, pregnant women and nursing mothers.

- Governments should devise and implement national strategies for infant and young child feeding, which incorporate wide-ranging measures to protect, support and promote breastfeeding and reviewing on a regular basis national implementation of the International Code of Marketing of Breast Milk Substitutes and subsequent relevant WHA Resolutions.

Taxing unhealthy food: an important debate

There has been growing interest in, and debate about, the potential for governments to use economic instruments—such as taxes or subsidies—to make healthier foods more affordable and less healthy foods more expensive.

We know that taxes on unhealthier foods are likely to have the greatest impact on poorer families because they spend a larger proportion of their income on food and often tend to eat more of the unhealthy foods that would be targeted. This has prompted researchers and public health advocates to explore ways of mitigating the potentially negative impact of such taxes on poorer groups, while maximising the public health gains. One option is to ensure that taxes are always used in combination with subsidies on healthier foods. Another is to focus taxes on products—such as sugary soft drinks—where very similar alternative products exist as replacements. Mechanisms to make adjustments to welfare payments and benefits to reduce the economic impact of the higher taxes also merit exploration. It is clear that solutions need to be tax revenue neutral for governments.

5.2.3 Price

Policy issues relevant to the price category include the use of taxes, subsidies and pricing policies to make healthier choices more affordable and less healthy choices more expensive, the impact of agricultural policy and measures to ensure that vulnerable groups have access to affordable healthy foodstuffs. Relative prices of transport, parking and leisure facilities may affect physical activity levels.

The use of economic tools (taxes and subsidies) to make healthier foods more affordable and less healthy foods more expensive

- Economic instruments, such as taxes and subsidies, could play an important role in promoting healthier eating. In relation to taxes, further work is needed to explore ways of mitigating the impact on poorer groups, while maximising the public health benefits. Mechanisms to explore include the combined use of taxes and subsidies, as well as compensatory welfare payments or tax exemptions. The price elasticity of food operates in all socioeconomic groups except the richest, so changing the relative cost of healthier vs unhealthy products still has an impact, even when measures are taken to reduce the economic differences between social groups in society.

- The introduction of subsidies on healthy foods should be a priority for European action. The options for use of value added tax (VAT) as an economic instrument to improve health should also be explored—such as allowing member states the possibility of levying a negative VAT rate.

- National governments should explore the potential for subsidies on healthy foods, which may be used in conjunction with higher taxes on unhealthy foods. Although EU member states are bound by EU rules on Value Added Tax (VAT), there is still considerable scope for action.

Pricing strategies to promote healthier food choices

- There is considerable potential for pricing strategies to be used to promote healthier eating at both macro and micro levels—from Europe-wide to local education or health authorities to individual schools or hospitals.

Use of the Common Agricultural Policy to promote a healthy diet across Europe

- The objectives of the Common Agricultural Policy urgently need to be brought into line with EU-wide nutritional population goals. This should be one of the key priorities for action.

- Food surpluses should be targeted for human consumption, especially disadvantaged communities, in line with nutritional requirements. Market intervention for saturated fat (butter) should be phased out and intervention stocks should not be sold at sub-market prices to commercial operators.

- The future CAP should be based on a sound impact assessment, as a precondition for meeting future objectives. Health, social and environmental impact

should be a central measure of the assessment process and identify policy measures that can improve diets and public health across Europe.

- An integrated European Food and Agriculture Policy, which works towards improving European diets in a sustainable way, should be developed. This policy should provide incentives for production of more plant-based foods and promote a shift towards more plant-based diets, with reduced consumption of meat and saturated fat and increased consumption of fruit, vegetables and whole grains.

Improving access to affordable healthy foodstuffs for vulnerable and disadvantaged groups

- European strategy and national action plans to improve diets should place particular emphasis on improving access to affordable healthy foodstuffs for lower socioeconomic groups. There may be a role for the Commission to support member states by mapping retailers' locations.

Economic tools (taxes, subsidies and pricing strategies) to promote physical activity

- Governments—at national, local and regional levels—should pursue policies and interventions which remove financial barriers to sports and leisure facilities, and to forms of active travel. These may include reducing prices, subsidising facilities, providing vouchers and/or prescribing physical activity. It should also include ensuring that appropriate facilities are provided in areas of disadvantage, built and natural environments are designed to promote physical activity and that useable and affordable transport to travel to physical activity opportunities is offered.

5.2.4 Place

The physical locations where we buy or eat our food can have an important impact on our diets. Similarly, features of the environments where we live, work and play can affect how active we are.

The array of products on offer in shops and markets where we buy foods obviously has an impact on what we eat. Less obvious, perhaps, is the importance of products that are not on the shelves—access to fresh fruit and vegetables, for example, is known to be problematic in many disadvantaged communities in Europe.

An ever-growing proportion of meals in Europe are eaten outside the home. The potential influence of the wide variety of settings where people eat meals or snacks—including schools, workplaces, hospitals, leisure facilities, restaurants, pubs and cafés—is enormous.

Place is also tremendously important in determining physical activity levels. Environments to promote active living require an adequate infrastructure for walking, cycling and public transport.

Improving access to affordable healthy food and physical activity opportunities

- EU, national and local policies should encourage and facilitate retailers to locate in under-served areas. Planning and zoning rules and incentives—such as tax benefits, loan guarantees, grants to cover start-up costs—should be used.

- Strategies that include creation of incentives for existing retailers to offer healthier choices in areas that have poor access should be explored.

- Health considerations should also be taken into account in planning decisions relating to the location of and density of fast-food outlets and other catering establishments.

- European agricultural policy, along with national and local governments, should aim to increase access to mechanisms for people to buy directly from farms and to support community food growing. Options include farmers' markets, community-supported agriculture, pick your own, farm-to-school initiatives, community allotments, school growing schemes, temporary leases to allow growing on unused land and a community land bank to act as a broker between landowners and groups wanting land for growing food.

- The EU should also facilitate, encourage and support policies and interventions to ensure access to affordable physical activity opportunities.

Improving the nutritional quality of food served and/or sold in public institutions (sports and leisure facilities, government offices, universities, facilities for older people, prisons, detention centres, hospitals and other public services)

- Ensuring that food sold or served in public institutions is coherent with population-wide dietary goals should be a key priority. This should apply to all foods served in public institutions, whether it is sold directly or by an external provider under contract. These efforts should be consistent with other policies towards a sustainable food supply—promoting procurement of local and sustainable produce—and could be an important economic driver for an improved food supply.

- The Commission should support and encourage member states in the application of nutritional standards for food sold or served in public institutions. A first step could be a Europe-wide review of the existing quality standards and procurement practices for food in public institutions. This could be done, for example, under the auspices of the High Level Group as a cooperative measure.

- Authorities at the national and/or local level should act to introduce nutritional standards for foods sold or served in public institutions. Public procurement guidelines should ensure that health criteria are taken into account.

- The application of nutritional standards should be accompanied by pricing strategies to improve the relative affordability of healthier items, introduction of smaller portion sizes, restrictions on commercial information relating to foods high in fat, sugar or salt and rules requiring public institutions to provide safe drinking water.

Schools and pre-school facilities as health-promoting environments that encourage and facilitate healthy eating and active living

- The creation of health-promoting schools, that adopt a whole-school approach to health, should be encouraged.

- In relation to food, this should include:
  - ensuring that children have the necessary education and practical skills by including both nutrition and food skills in the school curriculum;
  - ensuring that food provided in schools complies with high nutritional quality standards (whether meals, or from vending machines or other outlets);
  - ensuring that energy dense and high-salt snacks, high-sugar soft drinks and confectionery that is high in fat or sugar are not available in schools;
  - the development of policies (whether by schools, education departments or local authorities) which limit children's access to outlets selling unhealthy foods during the school day;
  - ensuring access to free drinking water for all pupils;
  - a prohibition on commercial communications for foods high in fat, sugar or salt aimed at children and young people in schools, as elsewhere.

- The impact of these measures could be greatly enhanced by introducing policies to provide free school meals to all pupils.

- In terms of promoting physical activity, the whole-school approach should encompass:
  - increasing the number of hours of physical education and activity in the school day, with a recommended minimum number of hours per week;
  - establishing guidance and incentives for schools and local government to improve the environment around schools to encourage walking and cycling;
  - establishing safe routes to schools from neighbouring communities;
  - facilitating and improving the quality of physical education;
  - promoting opportunities and practices to build activity in and around the school day (including before and after school clubs);
  - establishing safe zones around all schools where walking and cycling are prioritised and car travel is much more difficult.

Measures to enable people to make healthier choices when they eat out (in the commercial catering sector)

- Improving provision of nutrition information on food eaten outside the home should be a priority for action in European countries (See 5.2.1 above on Product).

- National and/or local authorities throughout Europe should work with the catering sector—from major fast-food chains to small local restaurants—to encourage and support them in the provision of healthier choices, to encourage the use of oils high in polyunsaturated or monounsaturated fats rather than hard fats high in saturated fats, introducing smaller serving sizes and providing clear nutrition information. National governments should consider requiring catering establishments to follow the Finnish example of making vegetables and a salad bar an intrinsic cost of the main meal.

- For smaller catering establishments (with fewer than 10 outlets) where a regulatory approach may not be appropriate, incentive approaches (such as award schemes) should be used to encourage them to provide healthier menu items and to provide nutrition information.

Actions in the workplace to improve diet and physical activity

- WHO, the European Commission and national governments should continue to encourage and support employers, trade unions and other employees' organisations to work together to promote and facilitate healthy eating and physical activity in the workplace.

- Every workplace should have a healthy work-life balance policy, developed collaboratively with employees and their representatives. This policy should ensure that food served or sold in the workplace is of a high nutritional quality and that employees have access to clear information on the nutritional composition of all food sold or served in the workplace.

- Employers should introduce measures to encourage employees to incorporate physical activity into their daily life. These could include:
  - encouraging employees to walk, cycle or use other forms of active transport to travel part or all of the way to and from work;
  - helping employees to be physically active during the day (eg providing prompts to encourage stair use, encouraging short walk breaks etc);
  - providing information about cycling and walking routes.

Creation of environments that promote active living

- The EU should ensure that European development or structural funding is conditional on projects being able to enhance the infrastructure for promoting active living.

- Authorities at the national and local levels should implement a wide range of measures to encourage and facilitate walking, cycling and other forms of physical activity as part of people's daily routines. These can include:
  - development of an integrated transport strategy that emphasises walking and cycling;
  - improving provision of local parks and green places;
  - provision of maps and guides on good places to walk and cycle;
  - provision of clear signs to enable people to measure the distance they walk/cycle;
  - improving access to sports and leisure facilities for all sectors of the community (eg free childcare facilities, discounted access, late night sessions etc);
  - ensuring stairs are prominent, accessible and well-lit in new buildings;
  - encouraging town planners to provide facilities that can be walked to and around, and to promote development of areas which have a mixture of residential, commercial and public services;
  - taking action to enhance personal safety in areas where people could be physically active.

Health service involvement in promoting healthy lifestyles

- The European Commission should take steps to improve and enhance the role of health services in prevention and early detection of cardiovascular diseases, including a review of how effective health services across the EU are in promoting prevention and disease detection and a review of the inclusion of healthy lifestyle promotion in the curricula of health professionals across the EU.

- Developing the training and further education opportunities for health professionals is an important aspect of capacity building in central and eastern European countries, where such opportunities are sparse currently.

5.3 ENSURING A HEALTHY, SUSTAINABLE FOOD SUPPLY

It is no longer possible to consider food, nutrition and physical activity in isolation of today's major social and environmental challenges. As we advocate policies to bring about changes in diet and physical activity levels, we must ensure that these policies do not undermine efforts to protect the environment and the planet's scarce resources.

Some national government bodies in Europe have sought to outline what constitutes a sustainable diet and level of physical activity—notably the Swedish National Food Administration in 2009,[143] the German Council for Sustainable Development in 2010[144] and the UK Sustainable Development Commission in 2011.[145]

The UK's Sustainable Development Commission (SDC) produced a series of recommendations for attaining a sustainable diet:

- reducing consumption of meat and dairy products (highest priority);

- reducing consumption of food and drink of low nutritional value, i.e. fatty and sugary foods (and tea, coffee and alcohol) (highest priority);

- reducing food waste (highest priority).

- increasing consumption of fruit and vegetables, particularly seasonal and field grown (medium priority);

- consuming fish from sustainable stocks only (medium priority);

- increasing consumption of foods produced with respect for wildlife and the environment e.g. organic food (medium priority).

- reducing energy input by shopping on foot or over the internet, and cooking and storing food in energy-conserving ways (lower priority);

- drinking tap water instead of bottled water (lower priority).

There is some common ground between these recommendations and the population goals proposed in this paper. The diet and physical activity population goals proposed in this paper are formulated from the perspective of preventing cardiovascular diseases but we have sought to take some note of environmental perspectives e.g. in setting the goals for n-3 fatty acids and making recommendations about fish. EHN is mindful that we can no longer consider diet and physical activity in isolation of the major environmental challenges facing our planet. We anticipate that future editions of this report will need to take more note of this evidence base.

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