

World
Cancer
Research Fund



American
Institute for
Cancer Research

SUMMARY

**Food, Nutrition,
Physical Activity,
and the Prevention
of Cancer:
a Global Perspective**





WORLD CANCER RESEARCH FUND GLOBAL NETWORK

OUR VISION

We help people make choices that reduce their chances of developing cancer

OUR HERITAGE

We were the first cancer charity

To create awareness of the relationship between diet and cancer risk

To focus funding on research into diet and cancer prevention

To consolidate and interpret global research to create a practical message on cancer prevention

OUR MISSION

Today the World Cancer Research Fund global network continues

Funding research on the relationship of nutrition, physical activity and weight management to cancer risk

Interpreting the accumulated scientific literature in the field

Educating people about choices they can make to reduce their chances of developing cancer

The World Cancer Research Fund global network consists of the following charitable organisations: The American Institute for Cancer Research (AICR); World Cancer Research Fund (WCRF UK); Wereld Kanker Onderzoek Fonds (WCRF NL); World Cancer Research Fund Hong Kong (WCRF HK); Fonds Mondial de Recherche contre le Cancer (FMRC FR) and the umbrella association, World Cancer Research Fund International (WCRF International).

Introduction

This summary provides an abbreviated version of the full Report. It highlights the wealth of information and data studied by the Panel and is designed to give readers an overview of the key issues contained within the Report, notably the process, the synthesis of the scientific evidence, and the resulting judgements and recommendations.

The first and second Reports

Food, Nutrition and the Prevention of Cancer: a global perspective, produced by the World Cancer Research Fund together with the American Institute for Cancer Research, has been the most authoritative source on food, nutrition, and cancer prevention for 10 years. On publication in 1997, it immediately became recognised as the most authoritative and influential report in its field and helped to highlight the importance of research in this crucial area. It became the standard text worldwide for policy-makers in government at all levels, for civil society and health professional organisations, and in teaching and research centres of academic excellence.

Since the mid-1990s the amount of scientific literature on this subject has dramatically increased. New methods of analysing and assessing evidence have been developed, facilitated by advances in electronic technology. There is more evidence, in particular on overweight and obesity; on physical activity; and on whole life course events. Also, cancer survivors is a new field. The need for a new report was obvious; and in 2001 WCRF International in collaboration with AICR began to put in place a global process in order to produce and publish the Report in November 2007.

How this Report has been achieved

The goal of this Report is to review all the relevant research, using the most meticulous methods, in order to generate a comprehensive series of recommendations on food, nutrition, and physical activity, designed to reduce the risk of cancer and suitable for all societies. This process is also the basis for a continuous review of the evidence.

Organised into overlapping stages, the process has been designed to maximise objectivity and transparency, separating the collection of evidence from its assessment and judgement. First, an expert task force developed a method for systematic review of the voluminous scientific literature. Second, research teams collected and reviewed the literature based upon this methodology. Third, an expert

Panel has assessed and judged this evidence and agreed recommendations. The results are published in the full Report and summarised here. A more detailed explanation of this process is given in Chapter 3 of the Report and the research teams and investigators involved are listed on pages viii–xi.

The Report is a guide to future scientific research, cancer prevention education programmes, and health policy around the world. It provides a solid evidence base for policy-makers, health professionals, and informed and interested people to draw on and work with.

The World Cancer Research Fund (WCRF) global network

Since its foundation in 1982, the World Cancer Research Fund global network has been dedicated to the prevention of cancer. All the members of the global network have the same goal: to prevent cancer worldwide.

The WCRF global network consists of WCRF International and its member organisations. These are national charities based in the USA, the UK, the Netherlands, France, and Hong Kong.

Each member organisation is supported by donations from the public and is independent of government. Each is a separate legal entity, responsible to its own board and accountable to the donors who support it. All member organisations determine their own programmes, which are designed to be most effective in national and local environments. Through national education and research programmes, a primary goal of the WCRF global network is to help promote changes that will decrease rates of cancer incidence. WCRF International provides each member with financial, operational and scientific services and support.

From its beginnings in the early 1980s, the WCRF global network has consistently been a pioneer and a leader of research and education on food, nutrition, physical activity and the prevention of cancer. The network has a special commitment to creation of the most reliable science-based recommendations, and their translation into messages that form the basis for action by professionals, communities, families and individuals. This work is being done for these organisations in the USA, the UK, the Netherlands, France, and Hong Kong, and on behalf of people in all countries. The global network will remain one of the leaders of the international cancer prevention movement, in the broader context of better personal and public health, worldwide.

The Expert Report Panel

The Report is the result of a five year process. This has included examination of the world's literature by a panel of the world's leading scientists, supported by observers from United Nations and other international organisations. Here they are.



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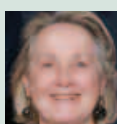
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Overview of the second expert Report

The Report of which this is a summary has a number of inter-related general purposes. One is to explore the extent to which food, nutrition, physical activity, and body composition modify the risk of cancer, and to specify which factors are most important. To the extent that environmental factors such as food, nutrition, and physical activity influence the risk of cancer, it is a preventable disease. The Report specifies recommendations based on solid evidence which, when followed, will be expected to reduce the incidence of cancer.

Part 1 — Background

Chapter 1 shows that patterns of production and consumption of food and drink, of physical activity, and of body composition have changed greatly throughout human history. Remarkable changes have taken place as a result of urbanisation and industrialisation, at first in Europe, North America, and other economically advanced countries, and increasingly in most countries in the world. Notable variations have been identified in patterns of cancer throughout the world. Significantly, studies consistently show that patterns of cancer change as populations migrate from one part of the world to another and as countries become increasingly urbanised and industrialised. Projections indicate that rates of cancer in general are liable to increase.

Chapter 2 outlines current understanding of the biology of the cancer process, with special attention to the ways in which food and nutrition, physical activity, and body composition may modify the risk of cancer. Cancer is a disease of genes, which are vulnerable to mutation, especially over the long human lifespan. However, evidence shows that only a small proportion of cancers are inherited. Environmental factors are most important and can be modified. These include smoking and other use of tobacco; infectious agents; radiation; industrial chemicals and pollution; medication; and also many aspects of food, nutrition, physical activity, and body composition.

Chapter 3 summarises the types of evidence that the Panel has agreed are relevant to its work. No single study or study type can prove that any factor definitely is a cause of, or is protective against, any disease. In this chapter, building on the work of the first report, the Panel shows that reliable judgements on causation of disease are based on assessment of a variety of well-designed epidemiological and experimental studies.

The prevention of cancer worldwide is one of the most pressing challenges facing scientists and public health

policy-makers, among others. These introductory chapters show that the challenge can be effectively addressed and suggest that food, nutrition, physical activity, and body composition play a central part in the prevention of cancer.

Part 2 — Evidence and Judgements

The judgements made by the Panel in Part 2 are based on independently conducted systematic reviews of the literature commissioned from academic institutions in the USA, UK, and continental Europe. The evidence has been meticulously assembled and, crucially, the display of the evidence was separated from assessments derived from that evidence. Seven chapters present the findings of these reviews. The Panel's judgements are displayed in the form of matrices that introduce five of these chapters, and in the summary matrix on the fold-out page inside the back cover.

Chapter 4, the first and longest chapter in Part 2, is concerned with types of food and drink. The judgements of the Panel are, whenever possible, food- and drink-based, reflecting the most impressive evidence. Findings on dietary constituents and micronutrients (for example foods containing dietary fibre) are identified where appropriate. Evidence on dietary supplements, and on patterns of diet, is included in the two final sections of this chapter.

Chapters 5 and 6 are concerned with physical activity and with body composition, growth, and development. Evidence in these areas is more impressive than was the case up to the mid-1990s; the evidence on growth and development indicates the importance of an approach to the prevention of cancer that includes the whole life course.

Chapter 7 summarises and judges the evidence as applied to 17 cancer sites, with additional briefer summaries based on narrative reviews of five further body systems and cancer sites. The judgements shown in the matrices in this chapter correspond with the judgements shown in the matrices in the previous chapters.

Obesity is or may be a cause of a number of cancers. Chapter 8 identifies what aspects of food, nutrition, and physical activity themselves affect the risk of obesity and associated factors. The judgements, which concern the biological and associated determinants of weight gain, overweight, and obesity, are based on a further systematic literature review, amplified by knowledge of physiological processes.

The relevance of food, nutrition, physical activity, and body composition to people living with cancer, and to the prevention of recurrent cancer, is summarised in Chapter 9.

Improved cancer screening, diagnosis, and medical services are, in many countries, improving survival rates. So the number of cancer survivors — people living after diagnosis of cancer — is increasing.

The Panel agreed that its recommendations should also take into account findings on the prevention of other chronic diseases, and of nutritional deficiencies and nutrition-related infectious diseases, especially of childhood. Chapter 10, also based on a systematic literature review, is a summary of the findings of expert reports in these areas.

The research issues identified in Chapter 11 are, in the view of the Panel, the most promising avenues to explore in order to refine understanding of the links between food, nutrition, physical activity, and cancer, and so improve the prevention of cancer, worldwide.

Part 3 — Recommendations

Chapter 12, the culmination of the five-year process, presents the Panel's public health goals and personal recommendations. These are preceded by a statement of the principles that have guided the Panel in its thinking.

The goals and recommendations are based on 'convincing' or 'probable' judgements made by the Panel in the chapters in Part 2. These are proposed as the basis for public policies and for personal choices that, if effectively implemented, will be expected to reduce the incidence of cancer for people, families, and communities.

Eight general and two special goals and recommendations are detailed. In each case a general recommendation is followed by public health goals and/or personal recommendations, together with further explanation or clarification as required. Chapter 12 also includes a summary of the evidence, justification of the goals and recommendations, and guidance on how to achieve them.

The process of moving from evidence to judgements and to recommendations has been one of the Panel's main responsibilities, and has involved discussion and debate until final agreement has been reached. The goals and recommendations in the Report have been unanimously agreed.

The goals and recommendations are followed by the Panel's conclusions on the dietary patterns most likely to protect against cancer. In order to discern the 'big picture' of healthy and protective diets, it is necessary to integrate a vast amount of detailed information. The Panel used a broad, integrative approach that, while largely derived from conventional 'reductionist' research, has sought to find patterns of food and drink consumption, of physical activity, and of body fatness, that enable recommendations designed to prevent cancer at personal and population levels.

The goals and recommendations are designed to be generally relevant worldwide and *the Panel recognises* that in national settings, the recommendations of the Report will be best used in combination with recommendations, issued by governments or on behalf of nations, designed to prevent

chronic and other diseases. In addition, the Panel cited three specific cases where the evidence is strong enough to be the basis for goals and recommendations, but which currently are relevant only in discrete geographical regions: maté in Latin America, Cantonese-style salted fish particularly in the Pearl River Delta in Southern China, and arsenic contaminating water supplies in several locations. Further details on nutritional patterns and regional and special circumstances can be found in section 12.3.

The main focus of the full Report is on nutritional and other biological and associated factors that modify the risk of cancer. *The Panel is aware* that as with other diseases, the risk of cancer is also modified by social, cultural, economic, and ecological factors. Thus the foods and drinks that people consume are not purely because of personal choice; likewise opportunities for physical activity can be constrained. Identifying the deeper factors that affect cancer risk enables a wider range of policy recommendations and options to be identified. This is the subject of a separate report to be published in late 2008.

The public health goals and personal recommendations of the Panel that follow are offered as a significant contribution towards the prevention and control of cancer throughout the world. On the following pages of this summary, the recommendations themselves are shown, together with key passages from the whole text in the full Report.

The Panel's recommendations

The Panel's goals and recommendations that follow are guided by several principles, the details of which can be found in Chapter 12. The public health goals are for populations, and therefore for health professionals; the recommendations are for people, as communities, families, and individuals.

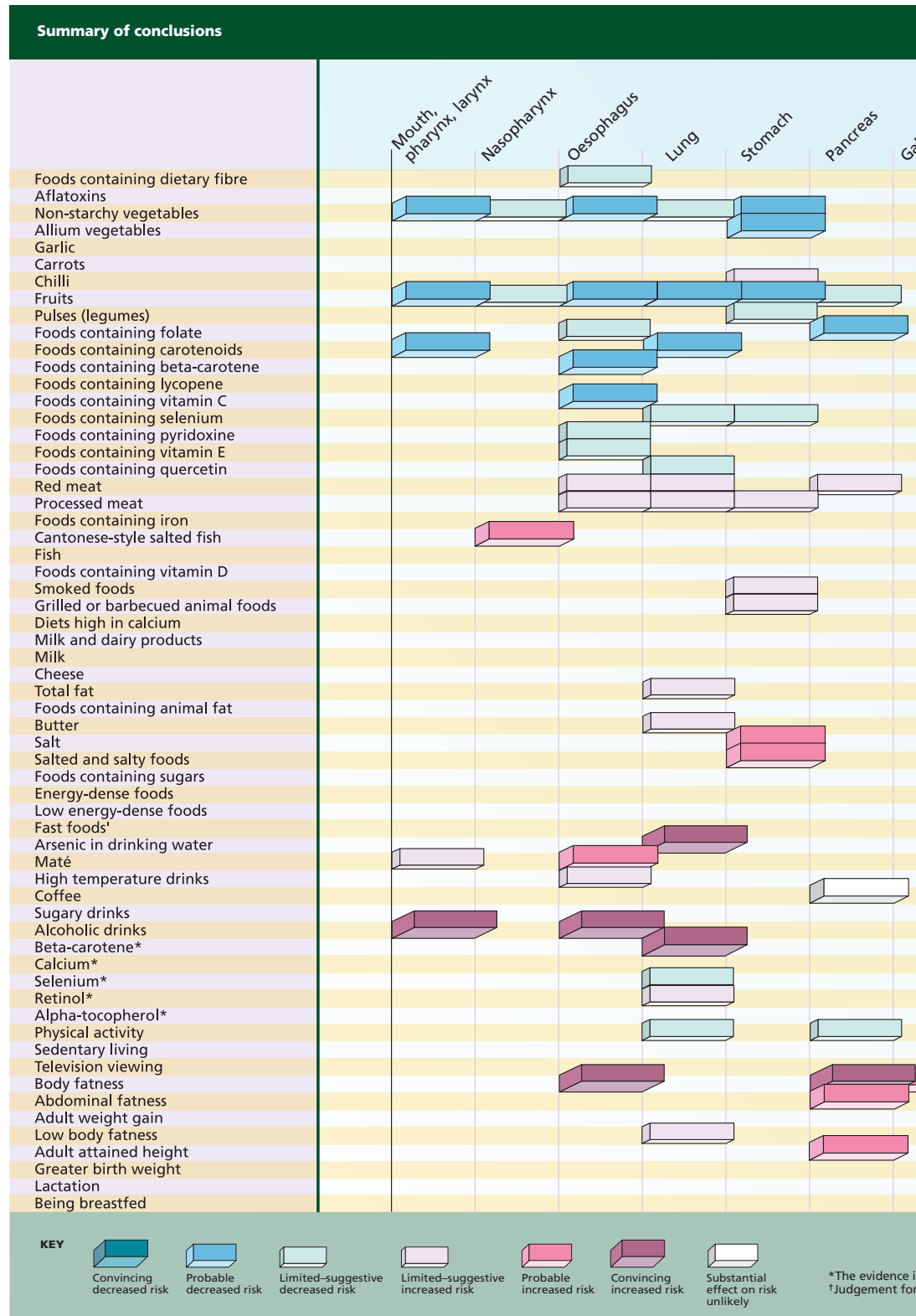
The Panel also emphasises the importance of not smoking and avoiding exposure to tobacco smoke.

Format

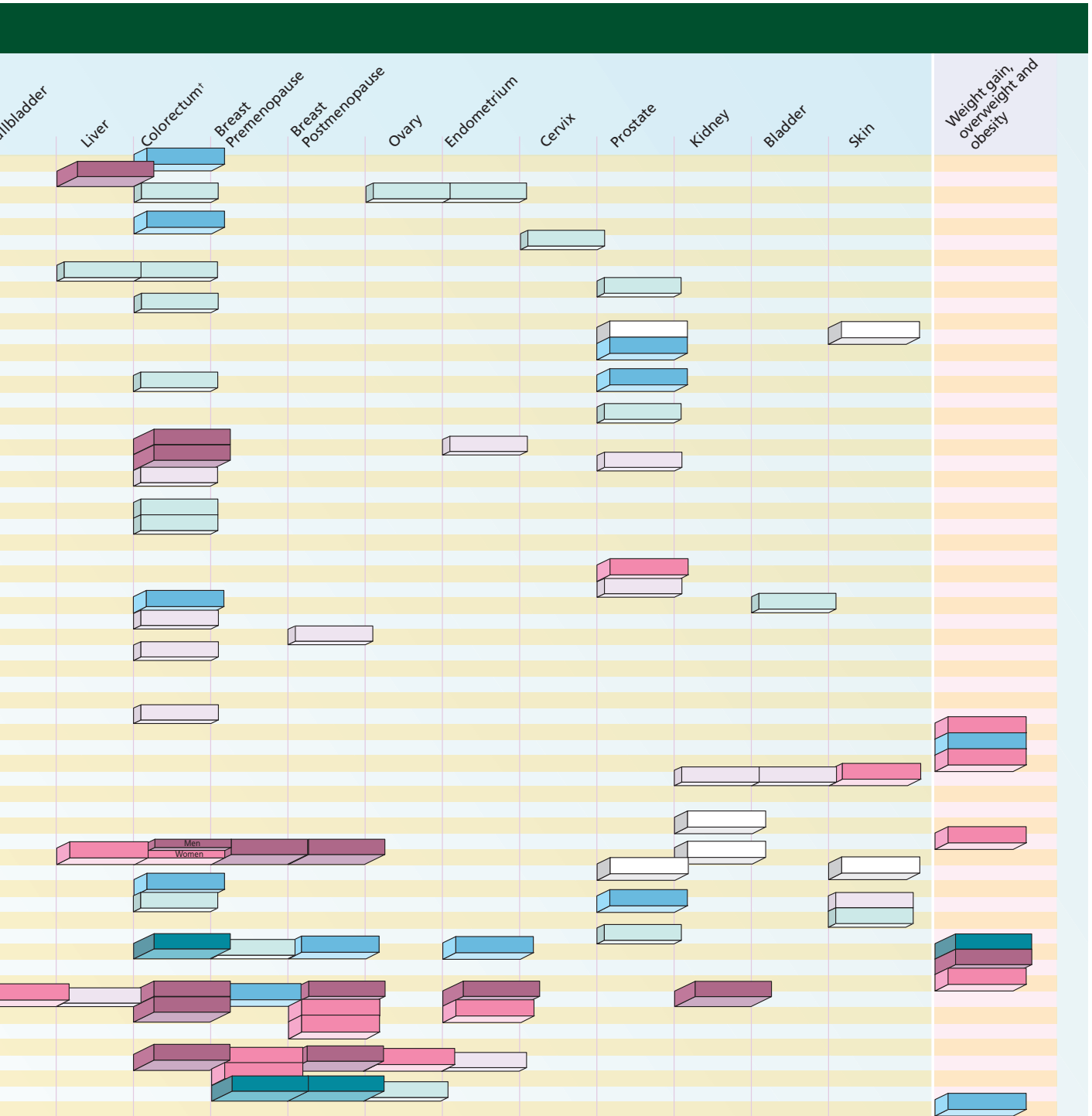
The goals and recommendations begin with a general statement. This is followed by the population goal and the personal recommendation, together with any necessary footnotes. These footnotes are an integral part of the recommendations. The full recommendations, including further clarification and qualification, can be found in Chapter 12 of the full Report.

The Panel's judgements

This matrix displays the Panel's judgements of the strength of the evidence causally relating food, nutrition and physical activity with the risk of cancer of the sites reviewed, and with weight gain, overweight and obesity. It is a synthesis of all the matrices introducing the chapters in Parts 1 and 2 of the Report, and shows judgements of "convincing", "probable", "limited - suggestive", and "substantial effect on risk unlikely", but not "limited - no conclusion". Usually judgements of convincing and probable generate public health goals and personal recommendation. These are shown on the following pages.



SUMMARY



derived from studies using supplements
physical activity applies to colon and not rectum

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RECOMMENDATION 1

BODY FATNESS

Be as lean as possible within the normal range¹ of body weight

PUBLIC HEALTH GOALS

Median adult body mass index (BMI) to be between 21 and 23, depending on the normal range for different populations²

The proportion of the population that is overweight or obese to be no more than the current level, or preferably lower, in 10 years

PERSONAL RECOMMENDATIONS

Ensure that body weight through childhood and adolescent growth projects³ towards the lower end of the normal BMI range at age 21

Maintain body weight within the normal range from age 21

Avoid weight gain and increases in waist circumference throughout adulthood

¹ 'Normal range' refers to appropriate ranges issued by national governments or the World Health Organization

² To minimise the proportion of the population outside the normal range

³ 'Projects' in this context means following a pattern of growth (weight and height) throughout childhood that leads to adult BMI at the lower end of the normal range. Such patterns of growth are specified in International Obesity Task Force and WHO growth reference charts

Justification

Maintenance of a healthy weight throughout life may be one of the most important ways to protect against cancer. This will also protect against a number of other common chronic diseases.

Weight gain, overweight, and obesity are now generally much more common than in the 1980s and 1990s. Rates of overweight and obesity doubled in many high-income countries between 1990 and 2005. In most countries in Asia and Latin America, and some in Africa, chronic diseases including obesity are now more prevalent than nutritional deficiencies and infectious diseases.

Being overweight or obese increases the risk of some cancers. Overweight and obesity also increase the risk of conditions including dyslipidaemia, hypertension and stroke, type 2 diabetes, and coronary heart disease. Overweight in childhood and early life is liable to be followed by overweight and obesity in adulthood. Further details of evidence and judgements can be found in Chapters 6 and 8. Maintenance of a healthy weight throughout life may be one of the most important ways to protect against cancer.

RECOMMENDATION 2

PHYSICAL ACTIVITY

Be physically active as part of everyday life

PUBLIC HEALTH GOALS

The proportion of the population that is sedentary¹ to be halved every 10 years

Average physical activity levels (PALs)¹ to be above 1.6

PERSONAL RECOMMENDATIONS

Be moderately physically active, equivalent to brisk walking,² for at least 30 minutes every day

As fitness improves, aim for 60 minutes or more of moderate, or for 30 minutes or more of vigorous, physical activity every day^{2,3}

Limit sedentary habits such as watching television

¹ The term 'sedentary' refers to a PAL of 1.4 or less. PAL is a way of representing the average intensity of daily physical activity. PAL is calculated as total energy expenditure as a multiple of basal metabolic rate

² Can be incorporated in occupational, transport, household, or leisure activities

³ This is because physical activity of longer duration or greater intensity is more beneficial

Justification

Most populations, and people living in industrialised and urban settings, have habitual levels of activity below levels to which humans are adapted.

With industrialisation, urbanisation, and mechanisation, populations and people become more sedentary. As with overweight and obesity, sedentary ways of life have been usual in high-income countries since the second half of the 20th century. They are now common if not usual in most countries.

All forms of physical activity protect against some cancers, as well as against weight gain, overweight, and obesity; correspondingly, sedentary ways of life are a cause of these cancers and of weight gain, overweight, and obesity. Weight gain, overweight, and obesity are also causes of some cancers independently of the level of physical activity. Further details of evidence and judgements can be found in Chapters 5, 6, and 8.

The evidence summarised in Chapter 10 also shows that physical activity protects against other diseases and that sedentary ways of life are causes of these diseases.

RECOMMENDATION 3

FOODS AND DRINKS THAT PROMOTE WEIGHT GAIN

**Limit consumption of energy-dense foods¹
Avoid sugary drinks²**

PUBLIC HEALTH GOALS

Average energy density of diets³ to be lowered towards 125 kcal per 100 g

Population average consumption of sugary drinks² to be halved every 10 years

PERSONAL RECOMMENDATIONS

Consume energy-dense foods^{1,4} sparingly

Avoid sugary drinks²

Consume 'fast foods'⁵ sparingly, if at all

¹ Energy-dense foods are here defined as those with an energy content of more than about 225–275 kcal per 100 g

² This principally refers to drinks with added sugars. Fruit juices should also be limited

³ This does not include drinks

⁴ Limit processed energy-dense foods (also see recommendation 4). Relatively unprocessed energy-dense foods, such as nuts and seeds, have not been shown to contribute to weight gain when consumed as part of typical diets, and these and many vegetable oils are valuable sources of nutrients

⁵ The term 'fast foods' refers to readily available convenience foods that tend to be energy-dense and consumed frequently and in large portions

Justification

Consumption of energy-dense foods and sugary drinks is increasing worldwide and is probably contributing to the global increase in obesity.

This overall recommendation is mainly designed to prevent and to control weight gain, overweight, and obesity. Further details of evidence and judgements can be found in Chapter 8.

'Energy density' measures the amount of energy (in kcal or kJ) per weight (usually 100 g) of food. Food supplies that are mainly made up of processed foods, which often contain substantial amounts of fat or sugar, tend to be more energy-dense than food supplies that include substantial amounts of fresh foods. Taken together, the evidence shows that it is not specific dietary constituents that are problematic, so much as the contribution these make to the energy density of diets.

Because of their water content, drinks are less energy-dense than foods. However, sugary drinks provide energy but do not seem to induce satiety or compensatory reduction in subsequent energy intake, and so promote overconsumption of energy and thus weight gain.

RECOMMENDATION 4

PLANT FOODS

Eat mostly foods of plant origin

PUBLIC HEALTH GOALS

Population average consumption of non-starchy¹ vegetables and of fruits to be at least 600 g (21 oz) daily²

Relatively unprocessed cereals (grains) and/or pulses (legumes), and other foods that are a natural source of dietary fibre, to contribute to a population average of at least 25 g non-starch polysaccharide daily

PERSONAL RECOMMENDATIONS

Eat at least five portions/servings (at least 400 g or 14 oz) of a variety² of non-starchy vegetables and of fruits every day

Eat relatively unprocessed cereals (grains) and/or pulses (legumes) with every meal³

Limit refined starchy foods

People who consume starchy roots or tubers⁴ as staples also to ensure intake of sufficient non-starchy vegetables, fruits, and pulses (legumes)

¹ This is best made up from a range of various amounts of non-starchy vegetables and fruits of different colours including red, green, yellow, white, purple, and orange, including tomato-based products and allium vegetables such as garlic

² Relatively unprocessed cereals (grains) and/or pulses (legumes) to contribute to an average of at least 25 g non-starch polysaccharide daily

³ These foods are low in energy density and so promote healthy weight

⁴ For example, populations in Africa, Latin America, and the Asia-Pacific region

Justification

An integrated approach to the evidence shows that most diets that are protective against cancer are mainly made up from foods of plant origin.

Higher consumption of several plant foods probably protects against cancers of various sites. What is meant by 'plant-based' is diets that give more emphasis to those plant foods that are high in nutrients, high in dietary fibre (and so in non-starch polysaccharides), and low in energy density. Non-starchy vegetables, and fruits, probably protect against some cancers. Being typically low in energy density, they probably also protect against weight gain. Further details of evidence and judgements can be found in Chapters 4 and 8.

Non-starchy vegetables include green, leafy vegetables, broccoli, okra, aubergine (eggplant), and bok choy, but not, for instance, potato, yam, sweet potato, or cassava. Non-starchy roots and tubers include carrots, Jerusalem artichokes, celeriac (celery root), swede (rutabaga), and turnips.

Continued on next page

RECOMMENDATION 5

ANIMAL FOODS

Limit intake of red meat¹ and avoid processed meat²

PUBLIC HEALTH GOAL

Population average consumption of red meat to be no more than 300 g (11 oz) a week, very little if any of which to be processed

PERSONAL RECOMMENDATION

People who eat red meat¹ to consume less than 500 g (18 oz) a week, very little if any to be processed²

¹ 'Red meat' refers to beef, pork, lamb, and goat from domesticated animals including that contained in processed foods

² 'Processed meat' refers to meat preserved by smoking, curing or salting, or addition of chemical preservatives, including that contained in processed foods

Justification

An integrated approach to the evidence also shows that many foods of animal origin are nourishing and healthy if consumed in modest amounts.

People who eat various forms of vegetarian diets are at low risk of some diseases including some cancers, although it is not easy to separate out these benefits of the diets from other aspects of their ways of life, such as not smoking, drinking little if any alcohol, and so forth. In addition, meat can be a valuable source of nutrients, in particular protein, iron, zinc, and vitamin B12. *The Panel emphasises* that this overall recommendation is not for diets containing no meat — or diets containing no foods of animal origin. The amounts are for weight of meat as eaten. As a rough conversion, 300 g of cooked red meat is equivalent to about 400–450 g raw weight, and 500 g cooked red meat to about 700–750 g raw weight. The exact conversion will depend on the cut of meat, the proportions of lean and fat, and the method and degree of cooking, so more specific guidance is not possible. Red or processed meats are convincing or probable causes of some cancers. Diets with high levels of animal fats are often relatively high in energy, increasing the risk of weight gain. Further details of evidence and judgements can be found in Chapters 4 and 8.

Recommendation 4, continued from previous page

The goals and recommendations here are broadly similar to those that have been issued by other international and national authoritative organisations (see Chapter 10). They derive from the evidence on cancer and are supported by evidence on other diseases. They emphasise the importance of rela-

RECOMMENDATION 6

ALCOHOLIC DRINKS

Limit alcoholic drinks¹

PUBLIC HEALTH GOAL

Proportion of the population drinking more than the recommended limits to be reduced by one third every 10 years^{1,2}

PERSONAL RECOMMENDATION

If alcoholic drinks are consumed, limit consumption to no more than two drinks a day for men and one drink a day for women^{1,2,3}

¹ This recommendation takes into account that there is a likely protective effect for coronary heart disease

² Children and pregnant women not to consume alcoholic drinks

³ One 'drink' contains about 10–15 grams of ethanol

Justification

The evidence on cancer justifies a recommendation not to drink alcoholic drinks. Other evidence shows that modest amounts of alcoholic drinks are likely to reduce the risk of coronary heart disease.

The evidence does not show a clear level of consumption of alcoholic drinks below which there is no increase in risk of the cancers it causes. This means that, based solely on the evidence on cancer, even small amounts of alcoholic drinks should be avoided. Further details of evidence and judgements can be found in Chapter 4. In framing the recommendation here, the Panel has also taken into account the evidence that modest amounts of alcoholic drinks are likely to protect against coronary heart disease, as described in Chapter 10.

The evidence shows that all alcoholic drinks have the same effect. Data do not suggest any significant difference depending on the type of drink. This recommendation therefore covers all alcoholic drinks, whether beers, wines, spirits (liquors), or other alcoholic drinks. The important factor is the amount of ethanol consumed.

The Panel emphasises that children and pregnant women should not consume alcoholic drinks.

tively unprocessed cereals (grains), non-starchy vegetables and fruits, and pulses (legumes), all of which contain substantial amounts of dietary fibre and a variety of micronutrients, and are low or relatively low in energy density. These, and not foods of animal origin, are the recommended centre for everyday meals.

RECOMMENDATION 7

PRESERVATION, PROCESSING, PREPARATION

**Limit consumption of salt¹
Avoid mouldy cereals (grains) or pulses (legumes)**

PUBLIC HEALTH GOALS

Population average consumption of salt from all sources to be less than 5 g (2 g of sodium) a day

Proportion of the population consuming more than 6 g of salt (2.4 g of sodium) a day to be halved every 10 years

Minimise exposure to aflatoxins from mouldy cereals (grains) or pulses (legumes)

PERSONAL RECOMMENDATIONS

Avoid salt-preserved, salted, or salty foods; preserve foods without using salt¹

Limit consumption of processed foods with added salt to ensure an intake of less than 6 g (2.4 g sodium) a day

Do not eat mouldy cereals (grains) or pulses (legumes)

¹ Methods of preservation that do not or need not use salt include refrigeration, freezing, drying, bottling, canning, and fermentation

Justification

The strongest evidence on methods of food preservation, processing, and preparation shows that salt and salt-preserved foods are probably a cause of stomach cancer, and that foods contaminated with aflatoxins are a cause of liver cancer.

Salt is necessary for human health and life itself, but at levels very much lower than those typically consumed in most parts of the world. At the levels found not only in high-income countries but also in those where traditional diets are high in salt, consumption of salty foods, salted foods, and salt itself is too high. The critical factor is the overall amount of salt. Microbial contamination of foods and drinks and of water supplies remains a major public health problem worldwide. Specifically, the contamination of cereals (grains) and pulses (legumes) with aflatoxins, produced by some moulds when such foods are stored for too long in warm temperatures, is an important public health problem, and not only in tropical countries.

Salt and salt-preserved foods are a probable cause of some cancers. Aflatoxins are a convincing cause of liver cancer. Further details of evidence and judgements can be found in Chapter 4.

RECOMMENDATION 8

DIETARY SUPPLEMENTS

Aim to meet nutritional needs through diet alone¹

PUBLIC HEALTH GOAL

Maximise the proportion of the population achieving nutritional adequacy without dietary supplements

PERSONAL RECOMMENDATION

Dietary supplements are not recommended for cancer prevention

¹ This may not always be feasible. In some situations of illness or dietary inadequacy, supplements may be valuable

Justification

The evidence shows that high-dose nutrient supplements can be protective or can cause cancer. The studies that demonstrate such effects do not relate to widespread use among the general population, in whom the balance of risks and benefits cannot confidently be predicted. A general recommendation to consume supplements for cancer prevention might have unexpected adverse effects. Increasing the consumption of the relevant nutrients through the usual diet is preferred.

The recommendations of this Report, in common with its general approach, are food based. Vitamins, minerals, and other nutrients are assessed in the context of the foods and drinks that contain them. *The Panel judges* that the best source of nourishment is foods and drinks, not dietary supplements. There is evidence that high-dose dietary supplements can modify the risk of some cancers. Although some studies in specific, usually high-risk, groups have shown evidence of cancer prevention from some supplements, this finding may not apply to the general population. Their level of benefit may be different, and there may be unexpected and uncommon adverse effects. Therefore it is unwise to recommend widespread supplement use as a means of cancer prevention. Further details of evidence and judgements can be found in Chapter 4.

In general, for otherwise healthy people, inadequacy of intake of nutrients is best resolved by nutrient-dense diets and not by supplements, as these do not increase consumption of other potentially beneficial food constituents. *The Panel recognises* that there are situations when supplements are advisable. See box 12.4.

SPECIAL RECOMMENDATION 1

BREASTFEEDING

Mothers to breastfeed; children to be breastfed¹

PUBLIC HEALTH GOAL

The majority of mothers to breastfeed exclusively, for six months^{2 3}

PERSONAL RECOMMENDATION

Aim to breastfeed infants exclusively² up to six months and continue with complementary feeding thereafter³

¹ Breastfeeding protects both mother and child

² 'Exclusively' means human milk only, with no other food or drink, including water

³ In accordance with the UN Global Strategy on Infant and Young Child Feeding

SPECIAL RECOMMENDATION 2

CANCER SURVIVORS¹**Follow the recommendations for cancer prevention²**

RECOMMENDATIONS

All cancer survivors³ to receive nutritional care from an appropriately trained professional

If able to do so, and unless otherwise advised, aim to follow the recommendations for diet, healthy weight, and physical activity²

¹ Cancer survivors are people who are living with a diagnosis of cancer, including those who have recovered from the disease

² This recommendation does not apply to those who are undergoing active treatment, subject to the qualifications in the text

³ This includes all cancer survivors, before, during, and after active treatment

Justification

The evidence on cancer as well as other diseases shows that sustained, exclusive breastfeeding is protective for the mother as well as the child.

This is the first major report concerned with the prevention of cancer to make a recommendation specifically on breastfeeding, to prevent breast cancer in mothers and to prevent overweight and obesity in children. Further details of evidence and judgements can be found in Chapters 6 and 8.

Other benefits of breastfeeding for mothers and their children are well known. Breastfeeding protects against infections in infancy, protects the development of the immature immune system, protects against other childhood diseases, and is vital for the development of the bond between mother and child. It has many other benefits. Breastfeeding is especially vital in parts of the world where water supplies are not safe and where impoverished families do not readily have the money to buy infant formula and other infant and young child foods. This recommendation has a special significance. While derived from the evidence on being breastfed, it also indicates that policies and actions designed to prevent cancer need to be directed throughout the whole life course, from the beginning of life.

Justification

Subject to the qualifications made here, *the Panel has agreed that its recommendations apply also to cancer survivors. There may be specific situations where this advice may not apply, for instance, where treatment has compromised gastrointestinal function.*

If possible, when appropriate, and unless advised otherwise by a qualified professional, the recommendations of this Report also apply to cancer survivors. The Panel has made this judgement based on its examination of the evidence, including that specifically on cancer survivors, and also on its collective knowledge of the pathology of cancer and its interactions with food, nutrition, physical activity, and body composition. In no case is the evidence specifically on cancer survivors clear enough to make any firm judgements or recommendations to cancer survivors. Further details of evidence and judgements can be found in Chapter 9.

Treatment for many cancers is increasingly successful, and so cancer survivors increasingly are living long enough to develop new primary cancers or other chronic diseases. The recommendations in this Report would also be expected to reduce the risk of those conditions, and so can also be recommended on that account.

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SUMMARY

Food, Nutrition, Physical Activity, and the Prevention of Cancer: a Global Perspective

The most definitive review of the science to date, and the most authoritative basis for action to prevent cancer worldwide.

- ◆ *Recommendations based on expert judgements of systematic reviews of the world literature.*
- ◆ *The result of a five-year examination by a panel of the world's leading scientists.*
- ◆ *Includes new findings on early life, body fatness, physical activity, and cancer survivors.*
- ◆ *Recommendations harmonised with prevention of other diseases and promotion of well-being.*
- ◆ *A vital guide for everybody, and the indispensable text for policy-makers and researchers.*

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