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Abstract: Diet & Cancer – the evidence

The proportion of non-communicable disease attributable to cancer globally is steadily rising and, because this includes economies in transition, the numbers of people affected are enormous. Most cancers are a disease of genes influenced by environment. Therefore avoiding adverse cancer trends depends on environmental interventions, especially those to do with the personal behaviours of substance abuse (with tobacco and alcohol), sexual activity, physical activity and food intake, along with the need for healthy environments. Mounting evidence about changing activity, eating and drinking patterns in relation to changing health patterns, including cancer, has encouraged the first major review of the evidence linking food, nutrition, and physical activity, and cancer risk, since the first WCRF/AICR Report in 1997.

The new Report has formulated 10 special recommendations, each with a public health goal and a personal recommendation. They cover the life-cycle from motherhood and breastfeeding, to the advent or avoidance of cancer in the general population, and survivorship from cancer. Probably because of a changing set of conditions for health, as well as better scientific methods, the key factors for cancer prevention are changing. The evidence in favour of breast-feeding for the offspring and for lactation in the mother grows stronger. The evidence increases for a plant-based diet with restrained intake of meat and meat products grows. For the moment, the evidence for cancer prevention suggests consumption of a variety of different fruits and vegetables, although some, like the allium family, may have a particular role; and the likelihood of synergy between small quantities of various plant foods needs more investigation. This is supported by the evidence for prevention of other diseases like obesity, diabetes, osteoporosis and cardiovascular disease. It is also relevant to the sustainability of healthy food systems. Food and nutrition policy-makers can draw confidently on this Report and look forward to a future plan to regularly update the evidence.

Biography: Professor Mark L Wahlqvist MD (Adelaide), MD (Uppsala), FRACP, FAFPHM

As an alumnus of Adelaide and Uppsala Universities in Australia and Sweden, respectively, Dr. Mark L. Wahlqvist has had a combined career in Internal Medicine, Nutrition Science and Public Health with Chairs in these fields; this has involved work in clinical, community, academic, governmental and commercial settings. He has held various Australian and International positions in Science, Technology, Health and Public Policy, including in Food safety and regulation. As President of the International Union of Nutritional Science, he developed a focus on the critical nutrition-health problems of Africa, whilst maintaining and evolving his life-long interests in Asia, the Pacific (especially in South-East and North-East Asia and in Australia) and Europe. His Chinese connections and interests of almost a life-time remain active and strong through family and friends. His studies have ranged over food patterns, metabolic disorders, the nature and determinants of disease, and ageing. He has several hundred peer-reviewed publications, a score of books and is the Founding Editor-in-Chief of the Asia Pacific Journal of Clinical Nutrition.



# Dietary patterns in cancer prevention and survivorship: the 2nd WCRF report and recommendations in 2007

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



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

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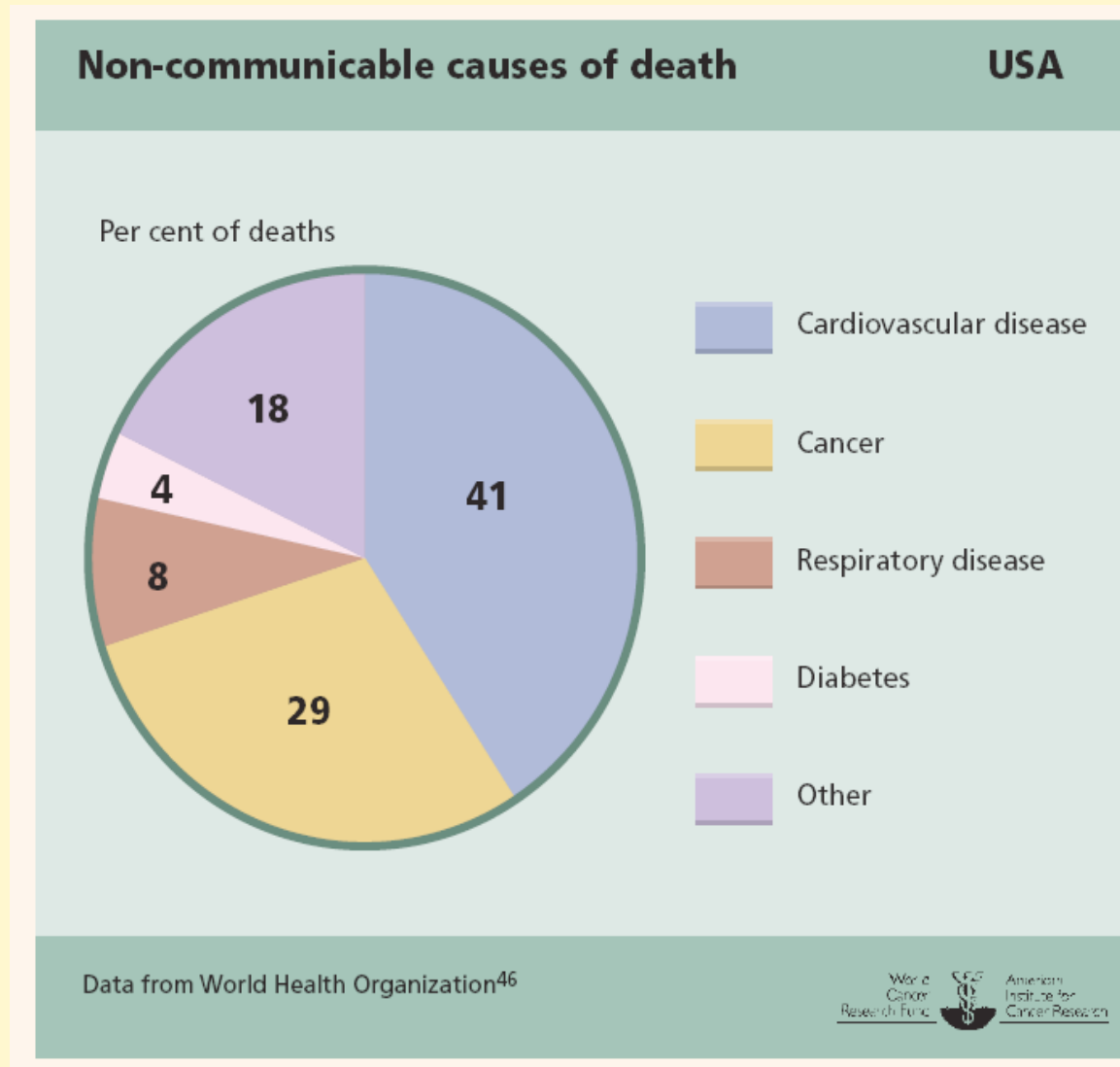
# Preventability of Cancer

- **Systematic work** has already led the United Nations and other international bodies, national governments, and **authoritative independent organizations** to be confident that **most cancers are largely preventable.**

# Avoiding Adverse Cancer Trends

- **Prevent increases in cancer incidence which occur with economic development**
- **Hasten the current declines in incidence of cancers associated with socio-economic disadvantage**

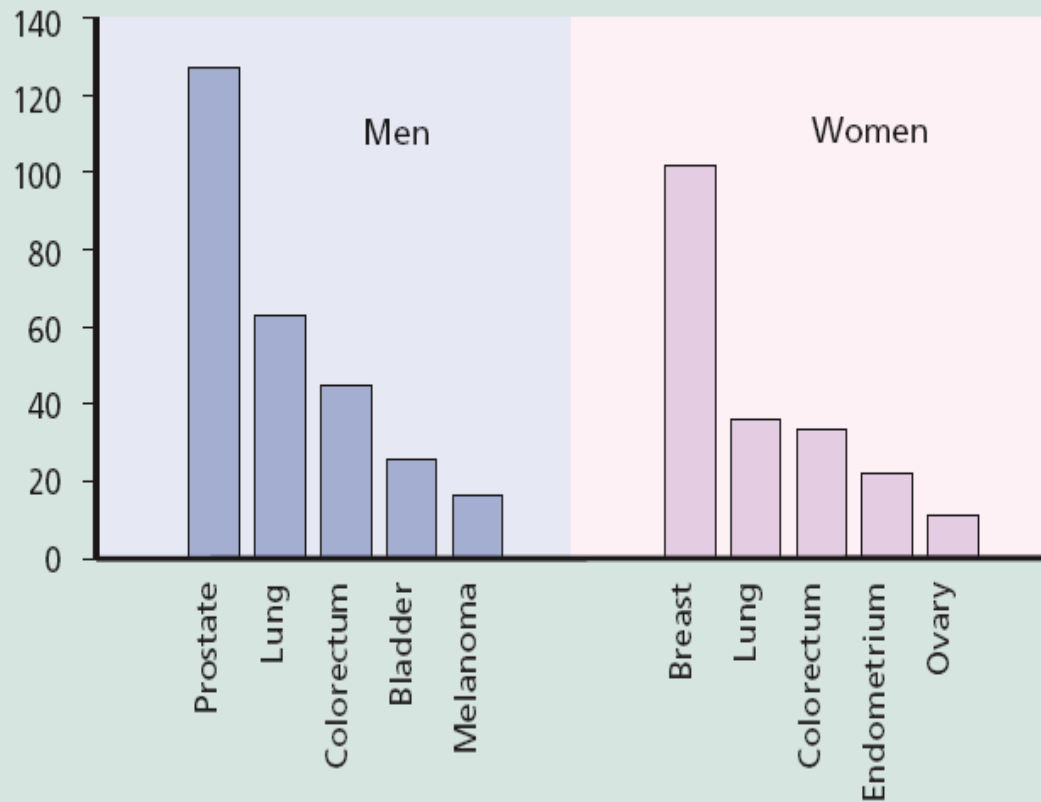
# Non-communicable causes of death with high income



## Age-standardised rates of common cancers

USA

Age-standardised rate per 100 000

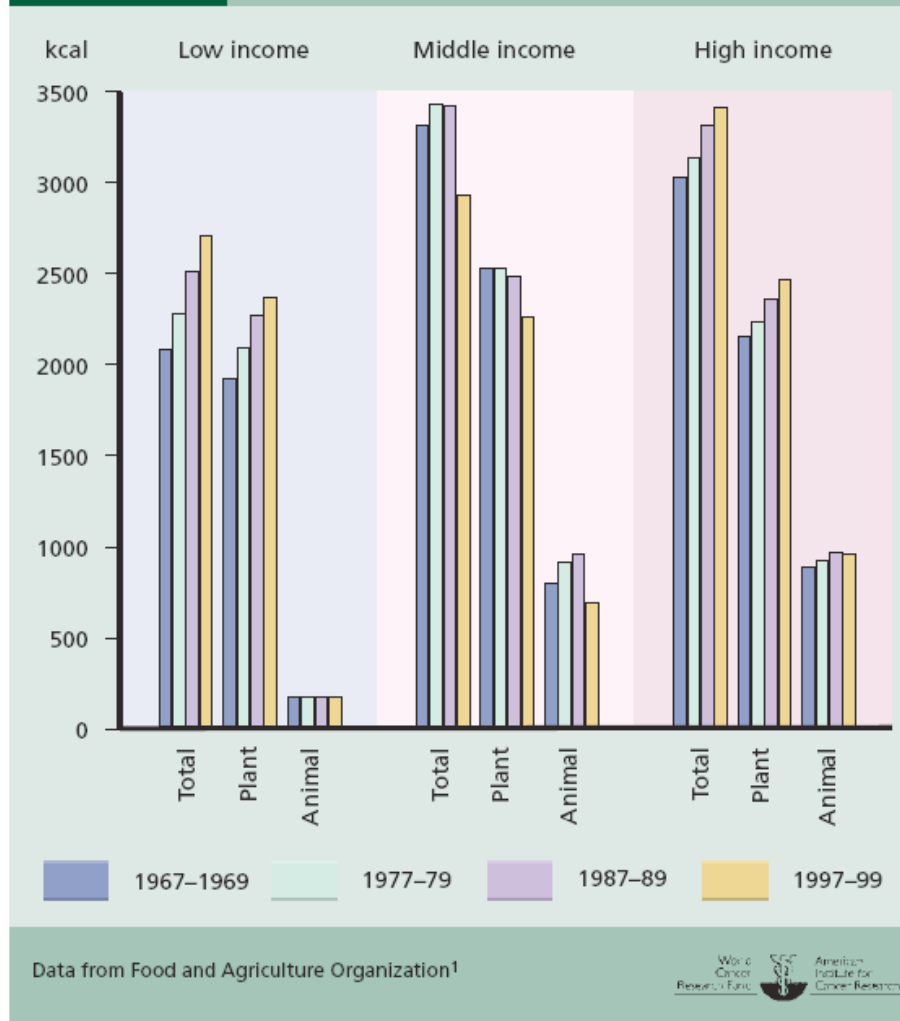


Data from International Agency for Research on Cancer<sup>20</sup>

# Cancer patterns with high income

**Figure 1.2**

**Changes in available energy from animal and plant food sources**



**Food energy from animal and plant food sources in selected low-, middle-, and high-income countries, 1967-1999**

**Changing food patterns with affluence relate to changing cancer patterns**

# Causes of Cancer

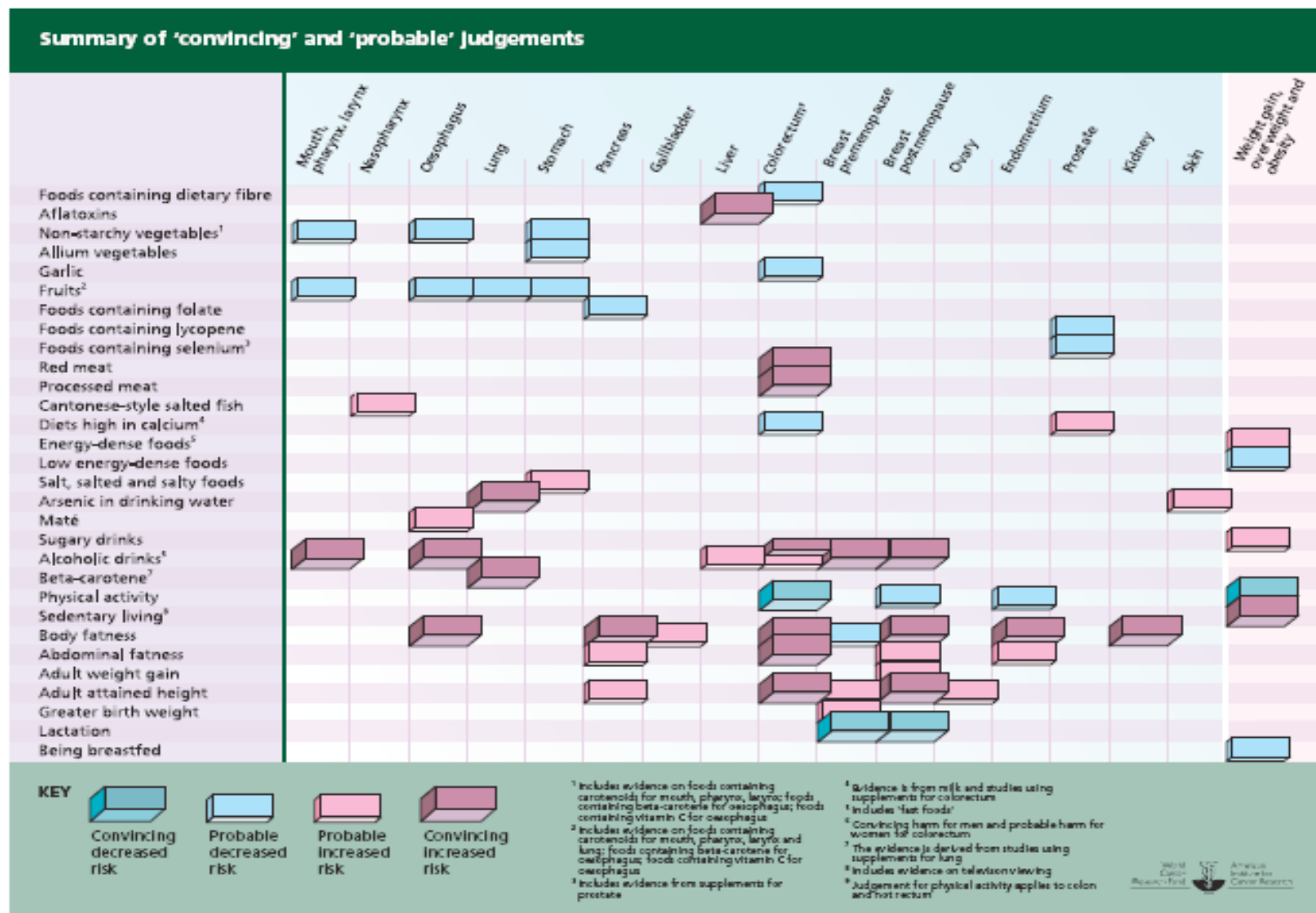
## Genes, environment & food

- **Cancer is a disease of genes, which are vulnerable to beneficial or harmful mutation, especially over the long human lifespan.**
- **Nutritional factors are important in determining the likelihood of some mutations, as well as in changing the functions of genes even without mutation.**
- **Both epidemiological and experimental evidence shows that only a small proportion of cancers are inherited.**

# Environmental factors and cancer

- Environmental factors are 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,*

# Food, nutrition, physical activity, and the prevention of cancer : overview of the panel's key judgments



# Recommendations for whole populations and those at increased risk

- Recommendations for whole populations are usually now identified as also being of importance for people who, while **not being clinically symptomatic**, have known risk factors for disease.
- **People at higher risk** of various cancers include smokers and people regularly exposed to tobacco smoke; people infected with specific micro-organisms; overweight and obese people; sedentary people; people with high intakes of alcoholic drinks; people who are immunosuppressed; and those with a family history of cancer.
- Such people are **often at higher risk of diseases other than cancer**.

# Recommendations and cancer survivors

- They also apply to cancer survivors, meaning people **living with a diagnosis of cancer**
- Including those identified as having **recovered from cancer**

# Recommendations for greatest impact

- Every case of cancer is important. But the responsibility of those concerned with **public health** is to encourage policies, programmes, and choices that will have the greatest impact.
- the **more common cancers**;
- cancers where there is the **most clearcut evidence of modification** of risk by food, nutrition, physical activity, and body composition;
- cancers that may **most readily be prevented** by achievable recommendations.
- those aspects of food and nutrition, physical activity, and body composition that seem most likely to prevent cancers of a **number of sites**.

# Recommendations have general health value

- **Prevention of other diseases taken into account**
- **A systematic review of secondary sources** — other reports — on other diseases where the risk is modified by food and nutrition and related factors.
- **These diseases are**
  - nutritional deficiencies;
  - relevant infectious diseases, especially diarrhea and respiratory infections of early childhood;
  - chronic diseases other than cancer.

# **FBDGs and cancer prevention**

- **Food-based dietary guidelines and recommendations are particularly valuable as a foundation for policies designed to improve public health.**

## RECOMMENDATIONS

### BODY FATNESS

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

### PHYSICAL ACTIVITY

Be physically active as part of everyday life

### FOODS AND DRINKS THAT PROMOTE WEIGHT GAIN

Limit consumption of energy-dense foods  
Avoid sugary drinks

### PLANT FOODS

Eat mostly foods of plant origin

### ANIMAL FOODS

Limit intake of red meat and avoid processed meat

### ALCOHOLIC DRINKS

Limit alcoholic drinks

### PRESERVATION, PROCESSING, PREPARATION

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

### DIETARY SUPPLEMENTS

Aim to meet nutritional needs through diet alone

### BREASTFEEDING

Mothers to breastfeed; children to be breastfed

### CANCER SURVIVORS

Follow the recommendations for cancer prevention



## SPECIAL RECOMMENDATION 1

### BREASTFEEDING

**Mothers to breastfeed; children to be breastfed<sup>1</sup>**

#### PUBLIC HEALTH GOAL

The majority of mothers to breastfeed exclusively, for six months<sup>2 3</sup>

#### PERSONAL RECOMMENDATION

Aim to breastfeed infants exclusively<sup>2</sup> up to six months and continue with complementary feeding thereafter<sup>3</sup>

<sup>1</sup> Breastfeeding protects both mother and child

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

<sup>3</sup> In accordance with the UN Global Strategy on Infant and Young Child Feeding

# **Breast-Feeding & Cancer Prevention over the Life-Course**

- **Protects against Obesity**
- **Likely to protect against obesity-related cancers via Post-menopausal Breast,  
Endometrium, Prostate, Oesophagus,  
CRC, Pancreas, GB, Kidney**

# Lactation and Cancer Protection

- **Breast cancer**
  - pre-menopausal
  - post-menopausal

## RECOMMENDATION 4

### PLANT FOODS

**Eat mostly foods of plant origin**

#### PUBLIC HEALTH GOALS

Population average consumption of non-starchy<sup>1</sup> vegetables and of fruits to be at least 600 g (21 oz) daily<sup>2</sup>

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

# PLANT FOODS

## Eat mostly foods of plant origin

### PERSONAL RECOMMENDATIONS

Eat at least five portions/servings (at least 400 g or 14 oz) of a variety<sup>2</sup> of non-starchy vegetables and of fruits every day

Eat relatively unprocessed cereals (grains) and/or pulses (legumes) with every meal<sup>3</sup>

Limit refined starchy foods

People who consume starchy roots or tubers<sup>4</sup> as staples also to ensure intake of sufficient non-starchy vegetables, fruits, and pulses (legumes)

<sup>1</sup> 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

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

<sup>3</sup> These foods are low in energy density and so promote healthy weight

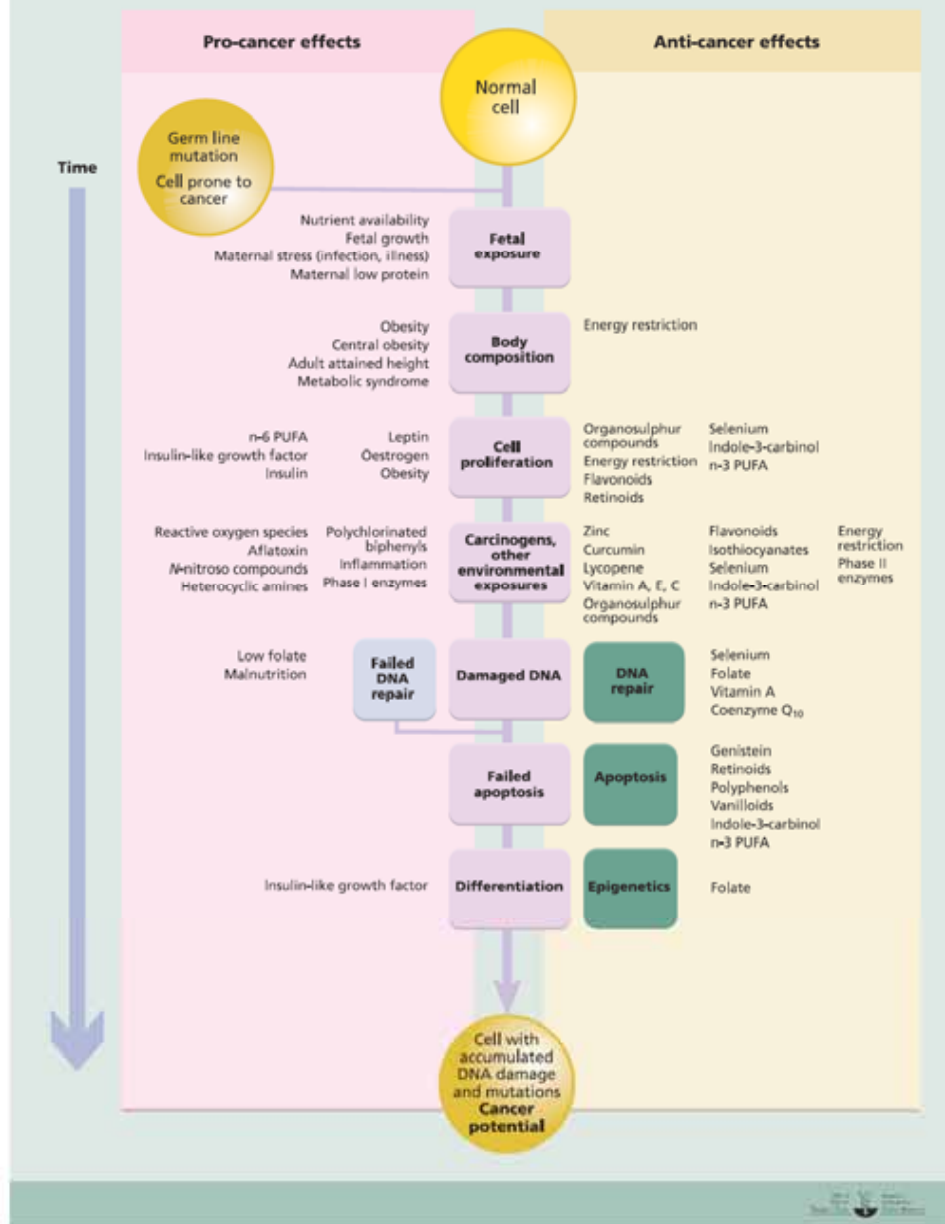
<sup>4</sup> For example, populations in Africa, Latin America, and the Asia-Pacific region



# **Plant Foods protect against GI tract, respiratory and prostate cancers**

- **As fruits: mouth, pharynx, oesophagus & gastric and larynx and lung**
- **As vegetables:**
  - garlic for CRC**
  - lycopene from foods for prostate**
- **As dietary fibre (from foods):**
  - CRC**

Figure 2.5 The influences of food, nutrition, obesity, and physical activity on the processes shown in figure 2.2



# Plant Foods can prevent cancer in various ways

# **Plant foods & cancer prevention: changing evidence**

- More cohort studies and less dependence on case-control studies**
- Impact of increased prevalence and more evidence for energy imbalance, physical inactivity and over-fatness as cancer risk factors; contends with plant food impact**

# Changing evidence in relation to plant foods in cancer protection

- **More cohort studies which provide better evidence for causality than case-control studies**
- **Increasing importance of physical inactivity, positive energy balance and obesity with time.**

# Fruit or Fruit Juice?

- **Intactness of fruit is desirable characteristic**
- **Fruit juices may resemble sugary drinks**

## PERSONAL RECOMMENDATIONS

Consume energy-dense foods<sup>1 4</sup> sparingly

Avoid sugary drinks<sup>2</sup>

Consume 'fast foods'<sup>5</sup> sparingly, if at all

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

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

<sup>3</sup> This does not include drinks

<sup>4</sup> 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

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



## RECOMMENDATION 3

### FOODS AND DRINKS THAT PROMOTE WEIGHT GAIN

**Limit consumption of energy-dense foods<sup>1</sup>**  
**Avoid sugary drinks<sup>2</sup>**

#### PUBLIC HEALTH GOALS

Average energy density of diets<sup>3</sup> to be lowered  
towards 125 kcal per 100 g

Population average consumption of sugary drinks<sup>2</sup>  
to be halved every 10 years

## RECOMMENDATION 5

### ANIMAL FOODS

**Limit intake of red meat<sup>1</sup> and  
avoid processed meat<sup>2</sup>**

#### 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



## **ANIMAL FOODS**

**Limit intake of red meat<sup>1</sup> and  
avoid processed meat<sup>2</sup>**

### PERSONAL RECOMMENDATION

People who eat red meat<sup>1</sup>  
to consume less than 500 g (18 oz) a week,  
very little if any to be processed<sup>2</sup>

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

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



# Red Meat & Cancer Risk

- **Meat as beef, lamb, pork, goat**  
**-increases risk of CRC**
- **Processed Meat**  
**-increases CRC**

# Fish

- **Cantonese-style salted fish**  
**-increases naso-pharyngeal carcinoma in EBV affected individuals**

## RECOMMENDATION 6

### ALCOHOLIC DRINKS

**Limit alcoholic drinks<sup>1</sup>**

#### PUBLIC HEALTH GOAL

Proportion of the population drinking more than the recommended limits to be reduced by one third every 10 years<sup>1 2</sup>



## ALCOHOLIC DRINKS

### Limit alcoholic drinks<sup>1</sup>

#### 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<sup>1 2 3</sup>

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

<sup>2</sup> Children and pregnant women not to consume alcoholic drinks

<sup>3</sup> One 'drink' contains about 10–15 grams of ethanol



# **Alcohol increases cancer risk in GI tract, upper respiratory tract and breast**

- **Mouth and pharynx,  
oesophagus, CRC**
- **Larynx**
- **Liver (primary)**
- **Breast**

## RECOMMENDATION 7

### **PRESERVATION, PROCESSING, PREPARATION**

**Limit consumption of salt<sup>1</sup>**  
**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)

## PRESERVATION, PROCESSING, PREPARATION

### PERSONAL RECOMMENDATIONS

Avoid salt-preserved, salted, or salty foods;  
preserve foods without using salt<sup>1</sup>

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)

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

# Food Preservation, Processing, Preparation & Cancer

- **Processed meats, gastric and CRC**
- **Salty fish and NPC**
- **Mouldy grains and legumes and hepatic cancer**

## RECOMMENDATION 8

### DIETARY SUPPLEMENTS

**Aim to meet nutritional needs  
through diet alone<sup>1</sup>**

#### PUBLIC HEALTH GOAL

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

## **DIETARY SUPPLEMENTS**

**Aim to meet nutritional needs  
through diet alone<sup>1</sup>**

### PERSONAL RECOMMENDATION

Dietary supplements are not recommended  
for cancer prevention

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

## SPECIAL RECOMMENDATION 2

### CANCER SURVIVORS<sup>1</sup>

**Follow the recommendations  
for cancer prevention<sup>2</sup>**

#### RECOMMENDATIONS

All cancer survivors<sup>3</sup> 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 activity<sup>2</sup>

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

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

<sup>3</sup> This includes all cancer survivors, before, during, and after active treatment



# Aspirational Goals

## The challenge

- *The Panel is aware* of the importance of aspirational goals and recommendations. To achieve substantial public and personal health gain, some of these need to be challenging.
  - For many populations and people, especially **in industrialised or urban settings**, achieving all of these recommendations will not be easy.
  - Levels of physical activity within **societies that are basically sedentary**, and **energy density of diets**, are often well outside the ranges recommended here

# The recommendations and enjoyment

- *The Panel emphasises* that food and life should be enjoyed.
- *The Panel recognizes* that for many people, these recommendations will involve change. People tend to enjoy ways of life that they have become used to. However, when they change, people often enjoy their new ways of life as much or more.

# Thank You !



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