

# Physical activity and nutrition

## The size of the problem

*It has been estimated that 40 percent of all deaths in New Zealand may be attributable to suboptimal diet and physical activity levels.<sup>1</sup> Improved nutrition and physical activity could help prevent many of the 7600 cancer deaths in New Zealand each year.<sup>2</sup> Nutrition may play a role in approximately 2,500 of these cancer deaths; food intake is considered important in both promoting the development of certain cancers or protecting against them.*

Excess body weight and lower levels of physical activity together are estimated to account for approximately one-fifth to one-third of several of the most common cancers, specifically cancers of the breast (postmenopausal), colon, endometrium, kidney and adenocarcinoma of the oesophagus.<sup>3</sup> Overweight/obesity, second only to tobacco, appears to be the most important known preventable cause of cancer.<sup>4</sup>

Most cancers occur with increased frequency with increased age. Life expectancy is extending, giving more opportunity for cancers to develop and manifest themselves. Behavioural factors, such as smoking, diet, weight control and physical activity, can effect individuals' risk of developing cancer.<sup>5,6</sup>

This Update reflects the current state of scientific evidence on the role of nutrition, physical activity and weight in cancer prevention. For

many issues the evidence is not definitive, either because findings are inconsistent or because studies are not yet available. Randomised controlled trials for many dietary factors associated with cancer risk are not available and may never become available. Therefore, no diet can guarantee full protection against any disease.

Research on dietary factors and cancer are often widely reported in the media. The public should be made aware that no one study provides the last word, and that reports may overemphasise what appears to be conflicting results. It is not normally advisable to change dietary habits or activity levels based on any single study. The totality of evidence available should be considered.

These guidelines are consistent with guidelines for coronary heart disease prevention as well as general health promotion.

### Key messages

- Cancer is a major cause of mortality throughout the world.
- Dietary factors are estimated to account for approximately 30 percent of cancers in industrialised countries (making diet second only to tobacco as a theoretically preventable cause of cancer).
- There is convincing evidence that being overweight or obese increases the risk of developing some cancers.
- There is convincing evidence that being regularly physically active reduces the risk of developing some cancers.
- There is convincing evidence that alcohol consumption increases the risk of developing some cancers.
- It is likely that increasing fruit and vegetable intake will reduce the risk of developing some cancers.

The guidelines for reducing cancer risk are consistent with guidelines for coronary heart disease prevention, diabetes prevention as well as general health promotion.

Regular physical  
activity and  
good nutrition  
can prevent  
cancer



## Obesity

Obesity increases the risk of cancers of the oesophagus, breast in postmenopausal women, kidney and endometrium.<sup>3,4,7</sup> In a recent prospective study involving more than 900,000 participants, body mass index (BMI) was significantly associated with higher cancer death rates due to cancer of the oesophagus, colon and rectum, liver, gallbladder, pancreas and kidney. The same is true for non-Hodgkin's lymphoma and multiple myeloma. Significant trends for increasing risk with higher BMI were observed for cancer of the stomach and prostate in men. These trends were also observed for breast, uterus and cervix and ovaries in women. This study estimates that being overweight and obese is associated with 14 percent of male cancer deaths and 20 percent of female cancer deaths in the US.<sup>8</sup>

The best way to achieve a healthy body weight

is to balance energy intake (food intake) with energy expenditure (physical activity).

BMI provides the most widely accepted measure of the degree of how overweight or obese a person is.<sup>3</sup> It is an expression of weight for height calculated as body weight in kilograms divided by height in metres squared.<sup>9</sup>

The IARC Handbook (International Agency for Research on Cancer – World Health Organization (WHO)) recommends maintaining body weight in the lower part of the desirable range (BMI 18.5-25), avoiding more than a 5kg weight gain during adult life and decreasing weight (5-10 percent) if already overweight or obese.<sup>3</sup> It is important to be realistic when setting weight loss goals for overweight and obese people.

Individuals with excess abdominal fat deposition or 'android obesity' have a greater risk of type 2 diabetes, coronary heart disease, strokes and other obesity related diseases than individuals with gynoid fat distribution, ie fat that is more evenly and peripherally distributed around the body.<sup>11</sup> Waist circumference is an appropriate index of abdominal fat accumulation.<sup>12</sup>

Obesity is a major risk not only for cancer, but also for diabetes, strokes and coronary heart disease.

**Table 1: Categories for BMI**

Maori and Pacific People <sup>10</sup>		Europeans <sup>11</sup>	
Healthy Weight Range	18.5-25.9	Healthy Weight Range	18.5-24.9
Overweight	26-31.9	Overweight	25-29.9
Obese	32 plus	Obese	30 plus

*Sources: Ministry of Health, 2003 and WHO, 2000.*

## Physical activity

**Table 2: Examples of moderate and vigorous intensity physical activities**

Moderate Intensity Activities	Vigorous Intensity Activities
Brisk walking	Jogging
Leisurely bicycling	Fast bicycling
Yoga	Circuit weight training
Golf	Aerobic dance
Mowing the lawns	Rugby
Gardening	Netball
Dance	

*Source: Cancer Society of New Zealand, 2004.*

In addition to the beneficial effects of physical activity on maintaining a healthy body weight, there is a growing body of evidence to suggest that physical activity alone is associated with a reduced risk of some cancers, for example colon cancer and breast cancer in premenopausal women and perimenopausal women.<sup>3,4</sup>

The benefits of physical activity go far beyond reducing the risk of cancer and include reducing the risk of other chronic disease, such as heart disease, diabetes, osteoporosis and hypertension.

Current recommendations are for people of all ages to include at least 30 minutes of physical activity of moderate intensity, such as brisk walking, on most days of the week.<sup>12,13</sup> However, the amount of physical activity needed to confer benefit of weight loss and cancer risk reduction is closer to 60 minutes per day, including some vigorous activity.<sup>3</sup>

## Alcohol

Of all the dietary factors shown to increase the risk of cancer, the evidence is strongest for alcohol. In general, the risk increases with increasing alcohol consumption. Alcohol is linked with cancers of the oral cavity, pharynx, larynx, oesophagus, liver, and breast.<sup>7</sup> The risk of these cancers is greater if the person smokes as well.<sup>14,15</sup>

While alcohol is an acknowledged cause of some cancers, at modest levels it has a protective effect against coronary heart disease in both men and women from middle age onwards.<sup>16, 17, 18</sup> When compared with total abstinence, an alcohol intake of up to two drinks a day has reduced all cause mortality.<sup>19</sup> However, light to moderate alcohol intake has not been shown to have any beneficial affect in reducing the risk of cancer. Increased breast cancer risk is evident in women who regularly consume two or more standard drinks per day. Above four drinks daily the risk increases by 7 percent for each additional drink per day.<sup>20</sup>

The Cancer Society supports the Alcohol Advisory Council (ALAC) advice on the upper limit for responsible drinking.<sup>21</sup> The upper limit advise men to drink no more than 21 standard drinks in any one week, and no more than six standard drinks on any one drinking occasion. They advise women to drink no more than 14 standard drinks in any one week and no more than four standard drinks on any one drinking occasion. However, to further reduce the risk of developing cancer, the Cancer Society of New Zealand recommends that individuals should drink even less, if at all. It is important to note that a standard drink is smaller than what is usually poured.

*For further information, refer to the Cancer Society of New Zealand's, Position Statement: Alcohol and Cancer, 2004, which is available to read on the Cancer Society's website: [www.cancernz.org.nz](http://www.cancernz.org.nz).*

## Cereals; vegetables and fruit; meat

### Cereals

Wholegrains and fibre are the two components of the cereal group to have the greatest impact in cancer prevention.

A large prospective study (European Prospective Investigation into Cancer and Nutrition (EPIC) Study) across<sup>10</sup> European countries found dietary fibre in food was inversely related to incidences of large bowel cancer (the protective effect being least in the rectum).<sup>22</sup> This supports other studies and reviews.<sup>23, 24, 25</sup> However, the association between fibre and cancer risk has been challenged.<sup>26, 27</sup>

The Cancer Society of New Zealand recommends the consumption of wholemeal and wholegrain breads and cereals.

### Vegetables and Fruit

The majority of reviews support a positive association between vegetables and fruit consumption and the prevention of cancer at various sites. Prevention of oesophageal, oral cavity, pharynx, stomach, lung, rectum, and larynx cancer, albeit to varying degrees, is supported in most review articles.<sup>5, 7, 28-31</sup>

It is presently unclear which of the many components of fruit and vegetables are most protective against cancer. Overall, the form (fresh, frozen, canned, dried or juiced) is not important.<sup>29</sup>

The Cancer Society recommends that people should eat at least five servings of vegetables and fruit each day. Variety is important. A serving

includes one medium potato, kumera or similar root vegetable, 135g or half a cup of cooked vegetables, eg corn, peas or beans 50-80g or one apple, pear or banana, 130g or one cup of juice (although juice should only make up one serving per day). In most cases, vegetables and fruit should be eaten raw or lightly cooked by steaming or using a little cooking water.

### Meat

It is controversial whether there is any link between high consumption of meat, especially red and processed meat, and higher risk of colorectal and other major cancers.<sup>32</sup>

Some reviews support the association,<sup>33</sup> while others conclude the evidence is too weak.<sup>34</sup> Most studies have not observed a positive relationship with poultry or fish.<sup>5</sup>

The evidence is not yet conclusive but high consumption of preserved meat probably increases the risk of colorectal cancer.<sup>4</sup>

The Report of the Workshop: Red Meat and Colorectal Cancer, 2000 stated that there was no convincing evidence that moderate intakes of lean meat increases the risk of colorectal cancer when eaten as part of a healthy mixed diet.<sup>35</sup>

Heavily charred meat can contain carcinogens in the blackened portion. The significance of these in the aetiology of cancer is unclear. It is, therefore, recommended not to overcook or blacken meat on the grill, barbecue or frying pan.<sup>5</sup>

## The strength of evidence

Table 3 summarises the strength of evidence of the role of various risk factors and cancer provided by the The Food and Agricultural Organization (FAO)/WHO Expert Consultation 2003.<sup>4</sup>

The Cancer Society of New Zealand recommends that New Zealanders:

- Maintain a healthy body weight.
- Be physically active for at least 30 minutes on most days, preferably more, including some vigorous activity.
- If drinking alcohol do so in moderation.
- Eat plenty of vegetables and fruit.
- Choose wholemeal and wholegrain breads, cereals or grain products.
- Choose foods low in salt, sugar and fat, especially animal fat.

These recommendations are consistent with the New Zealand Food and Nutrition Guidelines statements and recommendations for the prevention of ischemic heart disease and diabetes.

Table 3. Summary of strength of evidence on dietary factors, physical activity and the risk of developing cancer

Evidence	Decreased Risk	Increased Risk
Convincing	Physical activity (colorectum)	Being overweight and obesity (oesophagus, colorectum, breast, endometrium, kidney)
Probable	Fruit/vegetables (oral cavity, stomach, colorectum*) Physical activity (breast)	Preserved meat (colorectum), salt-preserved foods and salt (stomach)
Possible / Insufficient	Fibre,** soya, fish, n-3 fatty acids, carotenoids, vitamin B2, B6, folate B12, C, D, E, calcium, zinc, selenium, non-nutrient plant constituents (eg allium compounds, flavonoids, isoflavones, lignans)	Animal fats, heterocyclic amines, polycyclic aromatic hydrocarbons, nitroamines

Source: Draft WHO Technical Report Series 916. Geneva: WHO/FAO, 2003.

\* For colorectal cancer, a protective effect of fruit and vegetable intake has been suggested by many case controlled studies but was not supported in several large prospective studies, suggesting that if a benefit does exist it is likely to be modest.

\*\* The WHO Technical Report was produced prior to the publication of the EPIC Study<sup>21</sup>

## Common questions about cancer and diet

### Do food additives or preservatives cause cancer?

Flavours, colours, sweeteners, emulsifiers, stabilisers, and solvents and preservatives are all classified as food additives.

The World Cancer Research Fund and the American Institute for Cancer Research concluded that there is no evidence that additives will increase the risk of cancer, providing additive levels meet manufactured food and drink regulatory requirements.<sup>5</sup> Specifically, the World Cancer Research Fund/American Institute for Cancer Research reported that there is probably no relationship between the artificial sweetener Saccharin, and cancer, and possibly no relationship between cyclamates and cancer. There is insufficient epidemiological evidence to determine such a relationship with other additives.

### Will organic foods be more effective in lowering my cancer risk?

A New Zealand-based literature review compared organic versus conventional grow-

ing systems in terms of nutrition value, sensory quality and food safety. The authors concluded that a valid comparison was difficult to make due to lack of well-controlled studies. From the information available they found, apart from nitrates, that there was no strong evidence of any nutritional differences between organic and conventional foods. There was no evidence that organic foods were more susceptible to microbiology contamination, and there was very little documentation comparing the residue levels in the two growing systems.<sup>36</sup>

In terms of cancer prevention, no research exists to demonstrate whether such foods are more effective in reducing cancer risk than for similar foods produced by other farming methods.<sup>4</sup>

### Are genetic modified foods safe?

The examination and testing of genetically modified (GM) foods by Food Standards Australia-New Zealand (FSANZ) is rigorous, and ensures that GM food available in New Zealand is safe to consume.<sup>37</sup>

The American Cancer Society<sup>29</sup> has stated that there is no evidence that the substances found in currently available bio-engineered foods are harmful, or that they will increase or decrease cancer risk because of the added genes.

### Do pesticides and herbicides in food cause cancer?

Although pesticides and herbicides can be toxic when used improperly in industrial or agricultural settings, the American Cancer Society concludes that there is no evidence that residues of pesticides and herbicides at the low doses found in foods increase the risk of cancer.<sup>29</sup> In New Zealand, the 1997/98 Total Diet Survey<sup>38</sup> found that pesticide residue levels in New Zealand foods were well within internationally established health standards, and many times below the acceptable daily intake.

References available on request from the Cancer Society of New Zealand, PO Box 10847, Wellington