



Body Weight, Nutrition, Alcohol and Physical Activity:

Key Messages for The Cancer Council Australia

Prepared by:

Helen Dixon, Kathy Chapman, Allison Hodge and Terry Slevin
on behalf of the Nutrition and Physical Activity Committee of the
Public Health Committee, The Cancer Council Australia.

Last updated: 4th August 2005

Table of Contents

1: INTRODUCTION.....	1
2: USEFUL SUMMARY STATEMENTS.....	2
3: BODY WEIGHT	1
3.1 NHMRC DIETARY GUIDELINES.....	1
3.1.1 <i>Adults</i>	1
3.1.2 <i>Children (guideline does not refer specifically to body weight)</i>	1
3.2 DEFINITIONS	1
3.3 CANCER COUNCIL RECOMMENDATIONS	1
3.4 EPIDEMIOLOGY	1
3.5 POPULATION TRENDS IN AUSTRALIA.....	2
3.5.1 <i>Adults</i>	2
3.5.2 <i>Children</i>	2
4: PHYSICAL ACTIVITY.....	3
4.1 NATIONAL PHYSICAL ACTIVITY GUIDELINES FOR AUSTRALIANS	3
4.1.1 <i>Adults & Children (Commonwealth Department of Health & Aged Care, 1999)</i> 3	
4.2 CANCER COUNCIL RECOMMENDATIONS	3
4.3 EPIDEMIOLOGY	4
4.4 POPULATION TRENDS IN AUSTRALIA.....	4
4.4.1 <i>Adults</i>	4
4.4.2 <i>Children</i>	4
5: VEGETABLES & FRUIT.....	5
5.1 NHMRC DIETARY GUIDELINES.....	5
5.1.1 <i>Adults</i>	5
5.1.2 <i>Children</i>	5
5.2 CANCER COUNCIL RECOMMENDATIONS	5
5.3 EPIDEMIOLOGY	6
5.4 POPULATION TRENDS IN AUSTRALIA.....	7
5.4.1 <i>Adults</i>	7
5.4.2 <i>Children</i>	7
6: BREADS & CEREALS	9
6.1 NHMRC DIETARY GUIDELINES.....	9
6.1.1 <i>Adults</i>	9
6.1.2 <i>Children</i>	9
6.2 CANCER COUNCIL RECOMMENDATIONS	9
6.3 EPIDEMIOLOGY	9
6.4 POPULATION TRENDS IN AUSTRALIA.....	10
6.4.1 <i>Adults</i>	10
6.4.2 <i>Children</i>	10
7: MEAT.....	11
7.1 NHMRC DIETARY GUIDELINES.....	11
7.1.1 <i>Adults & Children</i>	11

7.2	CANCER COUNCIL RECOMMENDATIONS	11
7.3	EPIDEMIOLOGY	11
7.4	POPULATION TRENDS IN AUSTRALIA.....	11
7.4.1	<i>Adults</i>	11
7.4.2	<i>Children</i>	12
8:	DIETARY FAT	13
8.1	NHMRC DIETARY GUIDELINES	13
8.1.1	<i>Adults</i>	13
8.1.2	<i>Children</i>	13
8.2	CANCER COUNCIL RECOMMENDATIONS	13
8.3	EPIDEMIOLOGY	13
8.4	POPULATION TRENDS IN AUSTRALIA.....	14
8.4.1	<i>Adults</i>	14
8.4.2	<i>Children</i>	14
9:	SALT	15
9.1	NHMRC DIETARY GUIDELINES	15
9.1.1	<i>Adults & Children</i>	15
9.2	CANCER COUNCIL RECOMMENDATIONS	15
9.3	EPIDEMIOLOGY	15
9.4	POPULATION TRENDS IN AUSTRALIA.....	15
10:	ALCOHOL.....	16
10.1	NHMRC GUIDELINES	16
10.1.1	<i>Adults</i>	16
10.2	CANCER COUNCIL RECOMMENDATIONS	16
10.3	EPIDEMIOLOGY	16
10.4	POPULATION TRENDS IN AUSTRALIA.....	17
10.4.1	<i>Adults</i>	17
11:	SHARED GOALS: PREVENTION OF CHRONIC DISEASES IN GENERAL....	18
11.1	BACKGROUND	18
11.2	DIABETES	18
11.3	CARDIOVASCULAR DISEASES	18
11.4	CONCLUSION	18
12:	USEFUL CONTACTS	20
12.1	ACTIVE AUSTRALIA.....	20
12.2	THE CANCER COUNCIL AUSTRALIA	20
12.3	DIABETES AUSTRALIA.....	20
12.4	NATIONAL HEALTH & MEDICAL RESEARCH COUNCIL (NHMRC).....	20
12.5	NATIONAL HEART FOUNDATION	20
12.6	STRATEGIC INTER-GOVERNMENT FORUM ON PHYSICAL ACTIVITY AND HEALTH (SIGPAH)	20
12.7	STRATEGIC INTER-GOVERNMENTAL NUTRITION ALLIANCE (SIGNAL).....	20
13:	REFERENCES.....	21

1: Introduction

The Cancer Council recommends maintaining a healthy body weight, regular physical activity and eating a healthy diet to lower the risk of certain cancers.

There is accumulating evidence that body weight and physical activity influence the risk of some types of cancers. The effect of diet is less clear, but over-consumption of energy is likely to be a determinant of some types of cancer and there are some other aspects of diet that are associated with cancer risk.

These factors are also associated with other common chronic diseases of mid to late life, including type 2 diabetes and cardiovascular disease. Fortunately, there tends to be convergence on the public health recommendations that can be made on the basis of epidemiological evidence in relation to various chronic diseases. Thus, encouraging healthy body weight, increased consumption of fruits and vegetables, and increased physical activity should help in prevention and treatment of type 2 diabetes and heart disease, and prevention of some cancers.

This document summarises current national recommendations and population trends concerning body weight, nutrition, and physical activity. Where special recommendations apply in relation to cancer that differ from the general recommendations, these are also presented. Epidemiological evidence on the associations between body weight, physical activity, diet and cancer risk is also summarised. Much of the material presented is quoted directly from the publication sources cited.

2: Useful Summary Statements

Body Weight

- To achieve and maintain a healthy weight, The Cancer Council recommends regular physical activity and eating according to your energy needs. Making fruit, vegetables, cereals and other low fat foods the basis of your diet may assist with achieving and maintaining healthy body weight.
- Obesity increases the risk of cancer of the endometrium, kidney, breast (postmenopausal), colon and oesophagus (IARC, 2002; WHO, 2003).
- 3% of cancer deaths in Australia are attributable to a Body Mass Index (or "BMI") greater than 25 (Mathers, Vos & Stevenson, 1999).
- The prevalence of obesity in Australia has more than doubled in the past 20 years (Cameron, Welborn, Zimmet, et al., 2003).
- In 1997, over 1 in 5 children in Victoria and NSW were overweight or obese (Booth et al, 2003).
- The prevalence of overweight and obesity among Australian children has increased rapidly over recent years (Booth et al, 2003).

Physical Activity

- Put together at least 30 minutes of moderate-intensity physical activity on most, preferably all, days (Commonwealth Department of Health & Aged Care, 1999)
- 30 mins/day of moderate intensity activity is recommended for good general health, although some evidence suggests 60mins/day including some vigorous intensity exercise is more likely to reduce the risk of cancer (Cerin et al., 2005; IARC, 2002)
- The highest levels of activity may be associated with a 40% lower risk of colon cancer and 20-40% lower risk of breast cancer (IARC, 2002).
- It is estimated that 14% of all cases of colon cancer are attributable to physical inactivity (IARC, 2002).
- It is estimated that 11% of postmenopausal breast cancer is due to physical inactivity (IARC, 2002).

Vegetables & Fruit

- Eat plenty of vegetables, legumes and fruits (NHMRC, 2003a).
- Vegetables and fruit are recommended for their important role as a low energy density source of nutrients (vitamins, minerals, phytochemicals and fibre) and their contribution to weight management as well as for the probable cancer protective effect.
- The evidence supporting a probable protective effect of fruit and vegetables is strongest in relation to cancers of the digestive tract, in particular of the oesophagus and colon-rectum (IARC 2003).
- There is also evidence for fruit probably being associated with reduced risk of cancer of the stomach and lung (IARC 2003).
- Adults should eat at least 2 serves of fruit and 5 serves of vegetables each day (NHMRC, 2003a).
- Promoting increased vegetable consumption is of particular importance, as people are further from achieving recommended levels of consumption than they are for fruit (Marks et al, 2001).
- It is estimated that 5-12% of cancers are due to low vegetable and fruit intake (IARC 2003).

- Australian data suggests that 11% of cancers are attributable to low consumption of vegetables and fruit (Mathers et al, 1999).
- 1995 National Nutrition Survey results show that on the day of the survey less than 1 in 5 adults met the “5 or more serves of vegetables per day” recommendation and around 1 in 2 met the “2 serves per day” recommendation for fruit (Marks et al, 2001). This means that most adults did not eat enough vegetables, and around half did not eat enough fruit.
- On the day of the 1995 National Nutrition Survey, approximately 1 in 10 adults did not eat any vegetables, let alone achieve the recommended 5 serves of vegetables per day (McLennan & Podger, 1999).
- On the day of the 1995 National Nutrition Survey, around 4 out of 10 Australian adults did not eat any fruit, let alone achieve the recommended 2 serves of fruit per day (McLennan & Podger, 1999).
- Approximately 1 in 5 children and teenagers did not eat any vegetables on the day of the 1995 National Nutrition Survey (McLennan & Podger, 1999).

Breads & Cereals

- As part of an overall healthy diet eat plenty of cereals (including breads, rice, pasta and noodles), preferably wholegrain (NHMRC, 2003a).
- There has been considerable research into the link between fibre consumption and a reduction in bowel cancer risk. While the evidence is not consistent, the current weight of evidence suggests a diet high in fibre could reduce bowel cancer risk (WCRF & AICR, 1997).

Meat

- The Cancer Council supports the NH&MRC Dietary Guidelines to include lean meat, fish, poultry or alternatives (NHMRC, 2003a & b) as part of an overall healthy diet.
- Red meat is an important contributor to dietary iron, zinc, vitamin B12 and protein in the Australian diet (NHMRC, 2003a & b).
- However, research suggests that red meat consumption and in particular processed meat consumption is associated with a modest increase in bowel cancer risk (Norat et al., 2005; Chao et al, 2005; Norat, Lukanova, Ferrari, Riboli, 2002; Sandhu et al, 2001).
- Some research shows higher intakes of fish and chicken may reduce the risk of developing bowel cancer (Norat et al., 2005; Chao et al, 2005).
- The Cancer Council recommends only eating moderate amounts of red meat. A moderate serve of meat is 65-100g of cooked red meat, 3-4 times a week, as specified in the Australian Guide to Healthy Eating (Children’s Health Development Foundation and Deakin University, 1998). Alternatives to red and processed meat include fish, poultry, eggs, legumes, nuts and some seeds.
- The Cancer Council recommends people limit consumption of processed meats, which are high in fat and sodium (sodium chloride and sodium nitrate). Processed meats include sausages, frankfurts, bacon and ham.
- Some research suggests that consumption of burnt or charred meat may increase cancer risk. However, the evidence is not conclusive (Norat & Riboli, 2001).

Dietary Fat

- As part of an overall healthy diet, limit saturated fat and moderate total fat intake (NHMRC, 2003a).

- Current evidence does not indicate a direct link between fat intake and cancer at any site (Kushi & Giovannucci, 2002; Willett, 1998).
- However, high fat consumption probably contributes to obesity (NHMRC, 2003a), and obesity is a risk factor for several cancers (IARC, 2002).

Salt

- Evidence for increased incidence of stomach cancer in association with high salt diets comes from countries where salting of foods is a common preserving method. In countries where refrigeration is commonly used for storage of perishable forms of food, stomach cancer has a relatively low incidence (Cohen & Roe, 1997; Roder, 2002).
- The Cancer Council Australia supports the Dietary Guidelines suggesting adults and children choose foods low in salt (NHMRC 2003a&b).

Alcohol

- The Cancer Council recommends that, to reduce the risk of cancer, alcohol consumption should be limited or avoided.
- There is convincing evidence that alcohol is an important risk factor for some cancers, particularly mouth, pharynx, larynx, oesophagus, liver and breast (IARC, 1988; WCRF & AICR, 1997; WHO, 2003).
- The Cancer Council Australia acknowledges that small quantities of alcohol may protect against coronary heart disease.

3: BODY WEIGHT

3.1 NHMRC Dietary Guidelines

3.1.1 Adults

- Prevent weight gain: be physically active and eat according to your energy needs (NHMRC, 2003a).

3.1.2 Children (guideline does not refer specifically to body weight)

- Children and adolescents need sufficient nutritious foods to grow and develop normally. Growth should be checked regularly for young children. Physical activity is important for all children and adolescents (NHMRC, 2003b).

3.2 Definitions

- People's body weight can be assessed using the Body Mass Index or "BMI". The BMI is calculated as weight in kilograms divided by height in metres squared.
- According to World Health Organization (2000) definitions:
 - people with a BMI under 18.5 kg/m² are classified as underweight
 - people with a BMI of 18.5 to 25.0 kg/m² are classified as healthy weight
 - people with a BMI of 25.1 to 29.9 kg/m² are classified as overweight
 - people with a BMI of 30.0 kg/m² or higher are classified as obese
- The above definitions of overweight and obesity have been used in children. However, some researchers have developed more detailed assessments for children of different age levels (e.g. Cole, Bellizzi, Flegal & Dietz, 2000).

3.3 Cancer Council Recommendations

- The Cancer Council Australia supports the NHMRC recommendations in relation to body weight.
- The Cancer Council recommends adults maintain a healthy weight within a BMI range of 18.5 - 25.
- To achieve and maintain a healthy weight, The Cancer Council recommends regular physical activity and eating according to your energy needs. Making fruit, vegetables, cereals and other low fat foods the basis of your diet may assist with achieving and maintaining healthy body weight.

3.4 Epidemiology

- Obesity is linked to an increased risk of cancer of the endometrium, kidney, breast in postmenopausal women, colon and oesophagus (IARC, 2002; WHO, 2003).
- 3% of cancer deaths in Australia are attributable to BMI>25 (Mathers, Vos & Stevenson, 1999).
- It is estimated that 11% of all cases of colon cancer are attributable to obesity (IARC, 2002).
- It is estimated that 10% of postmenopausal breast cancer is due to obesity (IARC, 2002).

3.5 Population trends in Australia

3.5.1 Adults

- The 1995 National Nutrition Survey found that the proportion of overweight and/or obesity increases with age for both males and females (Marks et al, 2001). Among 19-24 year olds, 1 in 3 males and 1 in 4 females are overweight or obese. Among 45 to 64 year olds, this rises to 3 out of 4 males and almost 2 out of 3 females.
- The AusDiab Survey in 1999-2000 found that the prevalence of overweight and obesity was almost 60% among Australian adults aged 25 and over (Cameron, Welborn, Zimmet, et al., 2003).
- The prevalence of obesity in Australia has more than doubled in the past 20 years (Cameron, Welborn, Zimmet, et al., 2003).
- Weight increased significantly for both men and women between 1983 and 1995. For men, mean weight increased by 5.2kg. For women, mean weight increased by 6.9kg (Cook, Rutishauser, Seelig, 2001). During this period, there was no significant change in men's height. However, women's mean height increased slightly by an average of 0.8cm (Cook, Rutishauser, Seelig, 2001).
- As would be expected from the height and weight data, body mass index increased significantly between 1983 and 1995 for both men and women (Cook, Rutishauser, Seelig, 2001).

3.5.2 Children

- Survey data for NSW and Victoria indicate that in 1997, over 1 in 5 children were overweight or obese (Booth et al, 2003).
- A recent study looking at weight changes among Australian children over three decades found that between 1985-1997, the prevalence of overweight and obesity combined doubled, and that of obesity trebled among young Australians, but the increase over the previous 16 years was far smaller (Booth et al, 2003). These findings suggest that the prevalence of overweight and obesity among Australian children has increased rapidly over recent years.
- Overall there was a statistically significant increase in children's mean energy intake between 1983 and 1995. For boys, there was an increase of 1,400kJ per day; for girls, there was an increase of 900kJ per day. These increases are much greater than those seen in adults (Cook, Rutishauser, Seelig, 2001).
- Children's mean weight increased significantly between 1985 and 1995. For boys the mean increase was 4.8kg and for girls 6.5kg. This increase is only partly due to the increase in height since 1985 and is much greater than has been observed previously in Australian children of this age over longer intervals of time (Rutishauser, 1997)

4: PHYSICAL ACTIVITY

4.1 National Physical Activity Guidelines for Australians

4.1.1 National Physical Activity Guidelines for Adults (Australian Government, Department of Health & Ageing, 1999)

- Think of movement as an opportunity, not an inconvenience.
- Be active every day in as many ways as you can.
- Put together at least 30 minutes of moderate-intensity physical activity on most, preferably all, days.
- If you can, also enjoy some regular, vigorous exercise for extra health and fitness.

4.1.2 Physical Activity Recommendations for Children and Young People Children (Australian Government, Department of Health & Ageing, 2004)

- Children and young people should participate in at least 60 minutes (and up to several hours) of moderate- to vigorous-intensity physical activity every day.
- Children and young people should not spend more than 2 hours a day using electronic media for entertainment (eg computer games, Internet, TV), particularly during daylight hours.

4.2 Definitions

- Moderate-intensity activity:
Includes brisk walking, mowing the lawn, digging in the garden, medium-paced swimming or cycling.
- Vigorous activity:
Makes you “huff and puff”
Is exercise at a heart rate of 70-85% of maximum heart rate (MHR), where MHR is calculated as 220 minus your age.
Can come from active sports such as football, squash, netball and basketball, and activities such as aerobics, circuit training, jogging, fast cycling or brisk rowing.

4.3 Cancer Council Recommendations

- The Cancer Council endorses the national guidelines.
- In relation to cancer prevention, available evidence suggests a higher level of physical activity may be most beneficial (IARC, 2002; Slattery, 2004):
30 mins/day of moderate intensity activity is recommended for good general health
60 mins/day of moderate-intensity or 30 mins/day of vigorous activity is more likely to reduce the risk of cancer.

- The Cancer Council recommends people increase both their incidental and recreational activity levels.
- The Cancer Council recognises the high levels of sedentary behaviour in the Australian population and supports messages that promote gradual increases in activity levels.

4.4 Epidemiology

- Lack of physical activity is a risk factor for colon cancer, breast cancer and possibly prostate cancer (IARC, 2002).
- Studies have shown a 40% reduction in risk of colon cancer with increasing levels of activity. Studies for breast cancer have shown a 20-40% reduction in risk (IARC, 2002).
- It is estimated that 14% of all cases of colon cancer are attributable to physical inactivity (IARC, 2002).
- It is estimated that 11% of postmenopausal breast cancer is due to physical inactivity (IARC, 2002).
- To achieve significant reductions in cancer risk, 3.5-4 hours/week of vigorous activity or more than 7 hours/week of moderate-intensity activity is required (Slattery, 2004; Cerin et al., 2005)
- Less than half (46.1%) of Australian adults meet the national physical active recommendations. The proportion of Australian adults that meet the recommendations for cancer prevention is even lower:

26.0% of adults reported 420 min/week of at least moderate intensity

10.3% of adults reported 210 min/week vigorous-intensity

4.5 Population trends in Australia

4.5.1 Adults

- National participation in 'sufficient physical activity' declined between 1997 and 1999, from 63% to 57% (Bauman, Armstrong, Davies et al, 2003).
- The proportion of physically inactive Australians increased between 1997 and 1999 (13% to 15%). This increase was greatest for people aged 30-44 years, and among people with tertiary education (Armstrong, Bauman & Davies, 2000).
- In 1999, 15% of Australian adults were classified as "completely sedentary" (no reported physical activity in the past week) (Bauman, Armstrong, Davies et al, 2003).

4.5.2 Children

- A 1985 national survey found that girls had significantly lower aerobic fitness than boys, and that 15 year old girls were the least fit of all children (Gliksman & Dwyer, 1991).
- There is a lack of recent national data on physical activity levels among children.

5: VEGETABLES & FRUIT

5.1 *NHMRC Dietary Guidelines*

5.1.1 *Adults*

- Eat plenty of vegetables, legumes and fruits (NHMRC, 2003a).
- Adults should eat at least 2 serves of fruit and 5 serves of vegetables each day. (The number of serves recommended for women who are pregnant or breastfeeding is higher.)
- The following are examples of 1 serve of vegetables:
 - ½ cup of dark-green leafy vegetables (e.g. spinach, broccoli), or
 - ½ cup of orange-yellow vegetable (e.g. carrot), or
 - ½ cup of legumes or other vegetables (e.g. beans), or
 - 1 medium sized starchy vegetable (e.g. potato) or
 - 1 cup lettuce or salad vegetables.
- The following are examples of 1 serve of fruit:
 - 1 piece of medium sized fruit (e.g. apple or orange)
 - 1 cup of diced pieces or canned fruit
- Choose a variety of vegetables and legumes: starchy vegetables (e.g. potato), dark-green leafy vegetables (e.g. spinach, broccoli), orange-yellow vegetables (e.g. carrot, pumpkin), legumes (e.g. lentils, kidney beans and chickpeas), and other vegetables (e.g. beans, peas, tomatoes, sweet corn).

5.1.2 *Children*

- Children and adolescents should be encouraged to eat plenty of vegetables, legumes and fruits (NHMRC, 2003b).
- It is recommended that children aged (NHMRC, 2003b):
- 4-7 years should eat at least 1 serve of fruit and 2 serves of vegetables or legumes each day.
- 8-11 years should eat at least 1 serve of fruit and 3 serves of vegetables or legumes each day.
- 12-18 years should eat at least 3 serves of fruit and 4 serves of vegetables or legumes each day.

5.2 *Cancer Council Recommendations*

- The Cancer Council supports the NHMRC Dietary Guidelines for fruits, vegetables and legumes.
- Promoting increased vegetable consumption is of particular importance, as people are further from achieving recommended levels of consumption than they are for fruit (Marks et al, 2001).
- Vegetables and fruit are recommended for their important role as a low energy density source of nutrients (vitamins, minerals, phytochemicals and fibre) and their contribution to weight management as well as for the probable cancer protective effect.

- An easy way to think about serve sizes is “handfuls”. For example, adults should try to eat 2 handfuls of fruit and 5 handfuls of vegetables every day.
- The Cancer Council recommends people eat a variety of vegetables and fruit. Fruit and vegetables can be eaten raw or cooked. They may be fresh, frozen, tinned, or dried.

5.3 Epidemiology

- Table 1 summarises the findings from several major reviews on the state of the evidence for fruit and vegetable consumption decreasing the risk of cancer at a range of body sites. The most recent review is from the International Agency for Research on Cancer, published in 2003 (IARC 2003).
- Vegetables and fruit are an important source of micronutrients, dietary fibre and essential non-nutrients (WHO 2003). A diet rich in vegetables and fruit reduces obesity risk (WHO 2003) as well as conferring a reduction in cardiovascular disease risk and a probable cancer protective effect. (Hung 2004)
- The evidence supporting a probable protective effect of fruit and vegetables is strongest in relation to cancers of the digestive tract, in particular of the oesophagus and colon-rectum (IARC 2003). There is also evidence for fruit probably being associated with reduced risk of cancer of the stomach and lung (IARC 2003).
- Whilst earlier reviews concluded fruit and vegetable consumption probably reduces the risk of cancers of the gastro-intestinal tract (see Table 1), the evidence from some recent prospective studies have not found results to support this (Michels et al, 2000; Bingham et al, 2003; Hung et al, 2004).
- IARC concluded that the population attributable risk for low fruit and vegetable intake would fall into the range 5-12% (IARC 2003). Australian data suggests that 11% of cancers are attributable to low consumption of vegetables and fruit (Mathers et al, 1999).

Table 1. Conclusions of IARC Regarding the Cancer Protective Effect of Vegetables and Fruit (and comparisons with WCRF/AICR,. UK COMA,. WHO/FAO)

Organisation review	Highest evidence	Moderate evidence	Lower evidence
IARC 2003		Probable Oesophagus (fruit and vegetables) Stomach (fruit) Lung (fruit) Colon-rectum (vegetables)	Possible Mouth (fruit and vegetables) Pharynx (fruit and vegetables) Colon-rectum (fruit) Larynx (fruit and vegetables) Kidney (fruit and vegetables) Bladder (fruit) Stomach (vegetables) Lung (vegetables) Ovary (vegetables)

WCRF/AICR 1997	Convincing Mouth Pharynx Oesophagus Stomach Colon Rectum Lung	Probable Larynx Pancreas Breast Bladder	Possible Ovaries Cervix Endometrium Thyroid Liver Prostate Kidney
UK COMA 1998	Strongly consistent Oesophagus	Moderate Association Stomach Colon Rectum	Weak Breast cancer
WHO/FAO 2003		Probable Oral cavity Oesophagus Stomach Colo-rectum	

- Despite many attempts, research cannot identify which specific component of vegetables or fruit provides a cancer protective effect – whole foods appear to be most beneficial (WCRF/AICR, 1997). For that reason, the Cancer Council recommends people eat a variety of vegetables and fruit.

5.4 Population trends in Australia

- On average, Australians do not consume enough vegetables and fruit for optimal health (Strategic Inter-Governmental Nutrition Alliance, 2001).

5.4.1 Adults

- 1995 National Nutrition Survey results show that on the day of the survey less than 1 in 5 adults met the “5 or more serves of vegetables per day” recommendation and around 1 in 2 met the “2 serves per day” recommendation for fruit (Marks et al, 2001). This means that most adults did not eat enough vegetables, and around half did not eat enough fruit.
- In 1995, 89% of adults reported eating a vegetable product on the day of the National Nutrition Survey (McLennan & Podger, 1999). This suggests that approximately 1 in 10 adults did not eat any vegetables that day, let alone achieve the recommended 5 serves of vegetables per day.
- In 1995, only 51% of men and 61% of women reported eating fruit on the day of the National Nutrition Survey (McLennan & Podger, 1999). This suggests that around 4 out of 10 Australian adults did not eat any fruit that day, let alone achieve the recommended 2 serves of fruit per day.
- National Nutrition Survey data show that the percentage of the adult population who ate a vegetable product or a fruit product on the day of the survey declined between 1983 and 1995 (Cook, Rutishauser, Seelig, 2001).

5.4.2 Children

- In 1995, 4 out of 5 children and teenagers reported eating vegetables on the day of the National Nutrition Survey (McLennan & Podger, 1999). This means, approximately 1 in 5 did not eat any vegetables on the day of the survey.

- In 1995, 6 out of 10 children and teenagers reported eating fruit on the day of the National Nutrition Survey (McLennan & Podger, 1999). This suggests that just under half the children surveyed did not eat any fruit on the day of the survey.
- National Nutrition Survey data show that the percentage of children consuming vegetable products or dishes on the day of the survey declined between 1985 and 1995 for boys, and remained unchanged for girls (Cook, Rutishauser, Seelig, 2001).
- The percentage of children consuming fruit products or dishes on the day of the survey declined between 1985 and 1995 (Cook, Rutishauser, Seelig, 2001). A similar decrease was seen for adults.

6: BREADS & CEREALS

6.1 NHMRC Dietary Guidelines

6.1.1 Adults

- Eat plenty of cereals (including breads, rice, pasta and noodles), preferably wholegrain (NHMRC, 2003a).
- The Australian Guide to Healthy Eating recommends adults aged 19-60 years eat the following number of serves of cereals per day: 4 to 9 serves for women; 5 to 12 serves for men (NHMRC, 2003a).
- The following are examples of 1 serve =
 - 2 slices of bread
 - 1 cup cooked rice, pasta or noodles
 - 1 cup breakfast cereal flakes
 - ½ cup of muesli (NHMRC, 2003a).
- Cereal-based foods such as cakes, biscuits and pastries – which can have high levels of added fats and sugars – are not included in this recommendation and should be regarded as occasional treats only (NHMRC, 2003a).

6.1.2 Children

- Children and adolescents should be encouraged to eat plenty of cereals (including breads, rice, pasta and noodles), preferably wholegrain (NHMRC, 2003b).
- It is recommend that children (NHMRC, 2003b):
 - aged 4-7 years eat 3 to 7 serves of cereals per day
 - aged 8-11 years eat 4 to 9 serves of cereals per day
 - aged 12-18 years eat 4 to 11 serves of cereals per day
- The same definitions of a serve, and recommendations about treats (e.g. cakes) made for adults apply to children.

6.2 Cancer Council Recommendations

- The Cancer Council supports the NHMRC Dietary Guidelines for breads and cereals.

6.3 Epidemiology

- There has been considerable research into the link between fibre consumption and a reduction in colorectal cancer risk. While the evidence is not consistent, the current weight of evidence suggests a diet high in fibre could reduce colorectal cancer risk (WCRF & AICR, 1997).
- It is important to note that fruit and vegetables are also an important source of dietary fibre.

6.4 Population trends in Australia

6.4.1 Adults

- In 1995, most adults (94% of men and 95% women) reported eating a cereal product (such as breakfast cereal, rice, bread or pasta) on the day of the National Nutrition Survey (McLennan & Podger, 1999).
- However, even among those adults with the highest cereal product intakes (18-34 year olds), only 1 in 3 men and 1 in 5 women met the recommended core food group target of 7 servings per day in 1995 (NHMRC, 2003a).
- There was a slight decline in the number of people eating cereals each day between the 1983 and 1995 National Nutrition Surveys. Yet, among those people who did eat cereal, the average amount of cereal eaten per day increased (Cook, Rutishauser, Seelig, 2001).

6.4.2 Children

- In 1995, over 95% of boys and girls reported eating a cereal product on the day of the National Nutrition Survey (McLennan & Podger, 1999). That is, most children ate a food such as breakfast cereal, rice, breads or pasta on the day of the survey.
- Between 1983 and 1995, there were no significant changes in the proportion of children who ate foods in this food group, or in the mean intake of these foods (Cook, Rutishauser, Seelig, 2001).
- However, for other less healthy cereal-based products (e.g. cakes, biscuits, pies), there was a significant increase in mean intake between 1985 and 1995.

7: MEAT

7.1 NHMRC Dietary Guidelines

7.1.1 Adults & Children

- Include lean meat, fish, poultry and/or alternatives (NHMRC, 2003a & b).
- The following are examples of one serve:
 - 65-100g cooked meat or chicken (eg. ½ cup mince, 2 small chops or 2 slices roast meat)
 - 80-120g cooked fish fillet
 - 2 small eggs
 - 1/3 cup cooked (dried) beans, lentils, chick peas, split peas or canned beans
 - 1/3 cup peanuts or almonds
- The Australian Guide to Healthy Eating recommends inclusion of red meat three to four times a week (Children's Health Development Foundation & Deakin University, 1998).

7.2 Cancer Council Recommendations

- The Cancer Council recognises that red meat is an important contributor to dietary iron, zinc, vitamin B12 and protein in the Australian diet.
- The Cancer Council recommends eating only moderate amounts of red meat. A moderate serve of meat is 65-100g of cooked red meat, 3-4 times a week (as specified in the Australian Guide to Healthy Eating (Children's Health development Foundation & Deakin University, 1998)). Alternatives to red and processed meat include fish, poultry, eggs, legumes, nuts and some seeds.
- The Cancer Council recommends people limit consumption of processed meats, which are high in fat and sodium (sodium chloride and sodium nitrate). Processed meats include sausages, frankfurts, bacon and ham.

7.3 Epidemiology

- Research suggests that red meat consumption and in particular processed meat consumption is associated with a modest increase in colorectal cancer risk (Norat et al., 2005; Chao et al, 2005; Norat, Lukanova, Ferrari, Riboli, 2002; Sandhu et al, 2001).
- Some research suggests that consumption of burnt or charred meat may increase cancer risk. However, the evidence is not conclusive (Norat & Riboli, 2001).
- Some research shows higher intakes of fish and chicken may reduce the risk of developing bowel cancer (Norat et al., 2005; Chao et al, 2005).

7.4 Population trends in Australia

7.4.1 Adults

- National Nutrition Survey data show that most adults (85% of men and 77% of women) ate some meat, poultry or game on the day of the 1995 survey (McLennan & Podger, 1999).

- National Nutrition Survey data show that approximately 20% of adults ate a fish or seafood product on the day of the survey in both 1983 and 1995 (McLennan & Podger, 1999).
- On the day of the 1995 National Nutrition survey, adults' mean intake of red meat was consistent with the recommendations of the Australian Guide to Healthy Eating. Also, around two-thirds of red meat cuts eaten were reported to be either trimmed of fat or lean when eaten (Baghurst, Record & Leppard, 2000).
- Between 1983 and 1995, mean daily intake of red meat and pork declined for both men and women; whereas mean daily intake of poultry and seafood increased (Baghurst, Record & Leppard, 2000).

7.4.2 *Children*

- National Nutrition Survey data show that 8 out of 10 children ate some meat, poultry or game on the day of the 1995 survey (McLennan & Podger, 1999).
- National Nutrition Survey data show that approximately 1 out of 10 children ate a fish or seafood product on the day of the survey in both 1983 and 1995 (McLennan & Podger, 1999).
- Children's mean intake of meat rose slightly between 1985 and 1995 (Cook, Rutishauser, Seelig, 2001).
- Between 1983 and 1995, mean intake of seafood increased by about 8 grams per day for boys and 7 grams per day for girls (Cook, Rutishauser, Seelig, 2001).

8: DIETARY FAT

8.1 NHMRC Dietary Guidelines

8.1.1 Adults

- Limit saturated fat and moderate total fat intake (NHMRC, 2003a).
- The dietary guidelines also recommend that lean meat and reduced fat varieties of dairy foods should be chosen where possible (NHMRC, 2003a).
- A common recommendation has been that total fat should comprise about 30% of total energy intake, with a maximum of 10% of total energy intake coming from saturated fat (NHMRC, 2003a).

8.1.2 Children

- Care should be taken to limit saturated fat and moderate total fat intake (NHMRC, 2003b).
- Low-fat diets are not suitable for infants (NHMRC, 2003b).
- It is recommended that in children aged (NHMRC, 2003b):
 - 0-12 months: fat intake makes up roughly 50% of energy intake
 - 2-5 years: fat intake makes up roughly 30% of energy intake
 - 5-14 years: fat intake makes up roughly 30% of energy intake – with no more than 10% energy coming from saturated fat for this age group

8.2 Cancer Council Recommendations

- The Cancer Council Australia supports the Dietary Guidelines concerning dietary fat.

8.3 Epidemiology

- Fat is the most energy dense of all the nutrients and there is evidence to suggest that high fat intakes and the resulting high-energy intakes are important in the causation of obesity (Marks et al, 2001).
- Obesity is a risk factor for cancer of endometrium, kidney, breast (postmenopausal), colon and oesophagus (IARC, 2002).
- The WCRF report concluded that total fat possibly increased risk of cancer of the lung, colon, rectum, breast and prostate (WCRF & AICR, 1997), although the UK review did not find sufficient evidence to make any recommendations about fat and cancer (COMA, 1998).
- Current evidence does not indicate a direct link between fat intake and cancer at any site (Kushi & Giovannucci, 2002; Willett, 1998). However, high fat consumption probably contributes to obesity (NHMRC, 2003a), and obesity is a risk factor for several cancers (IARC, 2002).

8.4 Population trends in Australia

8.4.1 Adults

- The 1995 Nutrition Survey indicated that for adults the mean contribution of total fats to energy intake (33%) (McLennan & Podger, 1998) slightly exceeded the recommended 30% of total energy intake.
- In the 1995 National Nutrition Survey, saturated fat accounted for 13% of the total energy intake (McLennan & Podger, 1998), which is slightly higher than the target of 10% (NHMRC, 2003a).
- The 1995 National Nutrition Survey showed that those who consumed whole milk had a higher contribution of both total fat and saturated fat to energy intake than those who used reduced fat/skim milk (Rutishauser et al., 2001, cited in Marks et al, 2001). Choosing low or reduced fat milk would decrease the intake of both total and saturated fats assuming the rest of the diet remained unchanged (Marks et al, 2001).
- Among adults, mean intake of total fats fell significantly between 1983 and 1995 (Cook, Rutishauser, Seelig, 2001). The decrease was 6g per day for men and 3g per day for women (equivalent to 100 to 200kJ per day)

8.4.2 Children

- National Nutrition Survey data show that in 1995, fat contributed to 33% of energy intake in 2 to 18 year olds (McLennan & Podger, 1998). This figure does not grossly exceed the recommendation for total fat intake.
- However, at all ages, saturated fats accounted for the highest proportion of children's fat intake in 1995 (McLennan & Podger, 1998).
- The proportion of total energy from saturated fat exceeded 10% (McLennan & Podger, 1998), contrary to the current recommendation for children aged 5-14 years,.
- Total fat intake did not change significantly for boys and girls between 1985 and 1995 (Cook, Rutishauser, Seelig, 2001).
- Between 1985 and 1995 there appeared to be reduced fat intake from fats added to prepared foods (eg. butter). However this was balanced out by an increased intake of fat from other sources such as cereal-based food and confectionery and 'health' bars (Cook, Rutishauser, Seelig, 2001).

9: SALT

9.1 NHMRC Dietary Guidelines

9.1.1 Adults & Children

- Choose foods low in salt (NHMRC, 2003a&b).

9.2 Cancer Council Recommendations

- The Cancer Council Australia supports the Dietary Guidelines concerning salt.

9.3 Epidemiology

- Diets high in salted foods have been linked to an increased risk of stomach cancer (WCRF & AICR, 1997).
- Evidence for increased incidence of stomach cancer in association with high salt diets comes from countries where salting of foods (meats) is a common preserving method. In countries where refrigeration is commonly used for storage of perishable forms of food, stomach cancer has a relatively low incidence (Cohen & Roe, 1997; Roder, 2002).

9.4 Population trends in Australia

- 1995 National Nutrition Survey data showed that about 1 in 4 adults usually added salt to their food during cooking, with a similar proportion adding salt after cooking (Marks et al, 2001).
- National data from 1993 indicate that mean intakes of sodium were 3144mg/day for men and 2430mg/day for women (Baghurst, Record, Syrette & Powis, 1996), which is higher than the recommended maximum level of 2,300 mg/day. This includes sodium contained in foods as well as that added at the table.
- A Tasmanian study found only 6% of men and 36% of women had intakes below the recommended maximum level of 100 mmol/day (2,300 mg/day) (Beard et al, 1997, as cited in Marks et al, 2001).
- Little is known about current intakes of salt in Australian children and adolescents (NHMRC, 2003b).

10: ALCOHOL

10.1 NHMRC Guidelines¹

10.1.1 Adults

- Limit your alcohol intake if you choose to drink (NHMRC, 2003a).
- Because of alcohol's effect on both short- and long-term health, and because of the additional kilojoules it provides in the diets of a society with increasing rates of obesity, adults – if they drink at all – should limit their average daily intake of alcohol to no more than 2 standard drinks a day for men and 1 standard drink a day for women (NHMRC, 2003a).
- A standard serve is:
 - 285 ml regular strength beer
 - 100 ml wine
 - 30 ml spirits (NHMRC, 2001).

10.2 Cancer Council Recommendations

- The Cancer Council recommends that, to reduce the risk of cancer, alcohol consumption should be limited or avoided.
- For people who do drink alcohol, the recommended amounts are: for men – an average of no more than 2 standard drinks a day; for women – an average of no more than 1 standard drink a day.

10.3 Epidemiology

- There is no evidence from studies in human populations that any alcoholic beverage consumption provides any protection against cancer.
- There is convincing evidence that alcohol is an important risk factor for some cancers, particularly mouth, pharynx, larynx, oesophagus, liver and breast (IARC, 1988; WCRF & AICR, 1997; WHO, 2003)
- Smoking and alcohol together have a synergistic effect on upper gastrointestinal and aerodigestive cancer risk. This means the combined effects of smoking and alcohol greatly exceed the risk from either one of these factors alone. (Doll et al, 1999)
- Alcohol is one dietary factor where there is “conflict” between risks and benefits for different chronic diseases. Whilst alcohol is a risk factor for cancer, the evidence in relation to cardiovascular disease is mixed. High intake of alcohol is associated with higher blood pressure and death from stroke; however, a small amount of alcohol taken regularly may be protective against coronary heart disease (NHMRC, 2001). Thus, from a cancer point of view, alcohol consumption is undesirable; whereas from a heart disease point of view, low alcohol consumption may be beneficial.

¹ There are two sets of NHMRC guidelines concerning alcohol: NHMRC (2001) and NHMRC (2003). In this document, we report the most recently published recommendations for men and women, which appear in the *Dietary Guidelines for Australian Adults* (NHMRC, 2003).

10.4 Population trends in Australia

10.4.1 Adults

- In 1995, 42% of men and 24% of women reported drinking an alcoholic beverage on the day of the National Nutrition Survey (McLennan & Podger, 1999).
- In 1998, 59% of males and 39% of females over 14 years drank alcoholic beverages at least once a week (Higgins et al, 2000, cited in NHMRC, 2003a).
- National Nutrition Survey data show that the percentage of the adult population who drank an alcoholic beverage on the day of the survey decreased between 1983 and 1995 (Cook, Rutishauser, Seelig, 2001).
- Between 1983 and 1995, mean intake of pure alcohol declined for men (from 6.4g/day to 4.5g/day) and women (from 3.5g/day to 2.6g/day) (Baghurst, Record, Syrette & Powis, 1996).
- In 2001, Australia ranked 23rd in the world in terms of per capita consumption of pure alcohol with 7.4L per person. In 2001 Australians consumed 93L of beer (9th in the world), 20L of wine (17th in the world) and 1.2L of spirits (35th in the world) (World Drink Trends 2003).

11: Shared Goals: Prevention of Chronic Diseases in General

11.1 Background

Whilst our primary focus is on cancer prevention, we recognise that diet and physical activity patterns relate to other chronic diseases. Promoting healthy dietary and physical activity patterns may help prevent the burden of disease related to obesity, diabetes, cardiovascular disease, several forms of cancer, osteoporosis and dental disease (WHO, 2003).

11.2 Diabetes

Excess weight gain, overweight and obesity and physical inactivity contribute to the escalating rates of type 2 diabetes, worldwide. Diabetes leads to increased risk of heart disease, kidney disease, stroke, infections and blindness. Increased physical activity and maintaining a healthy weight play critical roles in the prevention and treatment of diabetes (WHO, 2003).

11.3 Cardiovascular diseases

Cardiovascular diseases are to a great extent due to unbalanced diets and physical inactivity. Risk of their main forms, heart disease and stroke, is reduced by eating less saturated and trans fats, and sufficient amounts of (n-3 and n-6) polyunsaturated fats, fruits and vegetables, eating less salt, as well as by physical activity and controlling weight. Reduction of salt intake helps reduce blood pressure, a major cause of cardiovascular diseases (WHO, 2003).

11.4 Conclusion

In Australia, collaborating with other public health agencies in promoting healthy body weight, healthy dietary practices, and physical activity makes sense because:

- These lifestyle factors are protective in relation to cancer and other chronic diseases affecting many Australians, so we have many shared objectives in this area.
- Surveys indicate that Australians are falling short of recommendations for diet and physical activity, and the prevalence of overweight and obesity is increasing.
- Most of the recommendations of the Australian Dietary Guidelines are consistent with what The Cancer Council Australia recommends on the basis of evidence on associations between cancer and body weight, physical activity and diet. (The exceptions are that to reduce the risk of cancer, more intense levels of physical activity and avoidance of alcohol are likely to be beneficial.)
- The public is likely to understand and respond to repeated, consistent advice, rather than conflicting, or inconsistent advice. Collaboration between public health groups, in promoting the National Dietary Guidelines, should help present the public with consistent and coherent advice.
- There are already a number of established players in the field of public health nutrition (eg. Heart Foundation, Diabetes Australia, Dietitians Association Australia, Nutrition

Australia; SIGNAL) and physical activity (eg. Active Australia, SigPah). We share a lot of common territory with these groups, and can build on existing strengths.

- With limited resources, collaboration on shared objectives may facilitate greater progress in addressing these lifestyle factors among the Australian population, than would isolated initiatives conducted by disparate groups.

12: Useful Contacts

12.1 Active Australia

Website – <http://www.activeaustralia.org/>

12.2 The Cancer Council Australia

Website – <http://www.cancer.org.au/>

12.3 Diabetes Australia

Website – www.diabetesaustralia.com.au

Freecall helpline – 1300 136 588

12.4 National Health & Medical Research Council (NHMRC)

Website – <http://www.nhmrc.gov.au>

12.5 National Heart Foundation

Website – www.heartfoundation.com.au

Heartline – 1300 36 2787

12.6 Strategic Inter-Government forum on Physical Activity and Health (SIGPAH)

Website – <http://www.nphp.gov.au/sigpah/>

12.7 Strategic Inter-Governmental Nutrition Alliance (SIGNAL)

Website – <http://www.nphp.gov.au/signal/index.htm>

13: References

- Armstrong T, Bauman A, & Davies J. (2000). Physical activity patterns of Australian adults. Canberra: Australian Institute of Health and Welfare (CVD-10).
- Baghurst K, Record S, & Leppard P. (2000). Red meat consumption in Australia: intakes, nutrient contribution and changes over time. *Nutrition and Dietetics* 57(4) Supplement: S3-S36.
- Baghurst K, Record S, Syrette J, Powis G. (1996). Food and nutrition in Australia: does five years make a difference? Adelaide: CSIRO.
- Bauman A, Armstrong T, Davies J, Owen N, Brown W, Bellew B, & Vita P. (2003). Trends in physical activity participation and the impact of integrated campaigns among Australian adults, 1997-1999. *Australian and New Zealand Journal of Public Health*, 27(1): 76-9.
- Bauman, A., Bellew, B., Booth, M., Hahn, A., Stoker, L. & Thomas, M. (1996). Towards best practice for the promotion of physical activity in the areas of NSW. Sydney: NSW Health Department, Centre for Disease Prevention & Health.
- Bingham SA, Day NE, Luben R, Ferrari P, Slimani N, Norat T, Clavel-Chapelon F, Kesse E, Nieters A, Boeing H, Tjonneland A, Overvad K, Martinez C, Dorransoro M, Gonzalez CA, Key TJ, Trichopoulou A, Naska A, Vineis P, Tumino R, Krogh V, Bueno-de-Mesquita HB, Peeters PH, Berglund G, Hallmans G, Lund E, Skeie G, Kaaks R, Riboli E (2003). Dietary fibre in food and protection against colorectal cancer in the European Prospective Investigation into Cancer and Nutrition (EPIC): an observational study. *Lancet*, 361: 1496-1501.
- Booth ML, Chey T, Wake M, Norton K, Hesketh K, Dollman J, Robertson I. (2003). Change in the prevalence of overweight and obesity among young Australians, 1969-1997. *Am J Clin Nutr*, 77(1): 29-36.
- Cameron, A., Welborn, T., Zimmet, P., Dunstan, D., Owen, N., Salmon, J., Dalton, M., Jolley, D., & Shaw, J.E. (2003). Overweight and obesity in Australia: the 1999-2000 Australian Diabetes, Obesity and Lifestyle Study (AusDiab). *Medical Journal of Australia*, 178(9): 427-432.
- Chao A, Thun MJ, Connell CJ, McCullough ML, Jacobs EJ, Flanders WD, et al. Meat consumption and risk of colorectal cancer. *Jama* 2005;293(2):172-82.
- Cerin, E., Leslie, E., Bauman, A., & Owen, N. (2005). Levels of physical activity for colon cancer prevention compared with generic public health recommendations: population prevalence and sociodemographic correlates. *Cancer Epidemiol Biomarkers Prev*, 14(4), 1000-1002.
- Children's Health Development Foundation & Deakin University. (1998). The Australian guide to healthy eating. Canberra: AGPS.
- Cohen AJ, & Roe FJ. (1997). Evaluation of the aetiological role of dietary salt exposure in gastric and other cancers in humans. *Food Chem Toxicol*, 35(2): 271-93.

Cole, T., Bellizi, M., Flegal, K., Dietz, W. (2000). Establishing a standard definition for child overweight and obesity worldwide: international survey. *BMJ*, 320: 1240-3.

Commonwealth Department of Health and Aged Care. (1999). National physical activity guidelines for Australians. Canberra: Australian Government Publishing Service.

Cook, T., Rutishauser I., & Seelig, M. (2001). Comparable data on food and nutrient intake and physical measurements from the 1983, 1985 and 1995 national nutrition surveys. Canberra: National Food and Nutrition Monitoring and Surveillance Project, funded by the Commonwealth Department of Health and Aged Care.

Department of Art, Sport, the Environment and Territories. (1992). Pilot survey of the fitness of Australians. Canberra: Australian Government Printing Service.

Department of Human Services. (1998). Active for life: physical activity patterns and health impacts in Victoria. Melbourne: Department of Human Services.

Doll, R., Forman, D., La Vecchia, C. & Woutersen, R. (1999). Alcoholic beverages and cancers of the digestive tract and larynx. In Macdonald, I. (ed) Health Issues Related to Alcohol Consumption. 2nd ed. Oxford:ILSI Europe, Blackwell Science Ltd, pp. 351-393.

Gliksman, M., Dwyer, T., Wlodarczyk, J. (1990). Differences in modifiable cardiovascular disease risk factors in Australian schoolchildren: the results of a nationwide survey. *Prev Med*, 19(3):291-304.

Hsin-Chia Hung, Kaumudi J. Joshipura, Rui Jiang, Frank B. Hu, David Hunter, Stephanie A. Smith-Warner, Graham A. Colditz, Bernard Rosner, Donna Spiegelman, and Walter C. Willett Fruit and Vegetable Intake and Risk of Major Chronic Disease. *J National Cancer Institute* 2004 96: 1577-1584.

IARC. (2003). IARC Handbooks of Cancer Prevention. Vol 8. Fruit and vegetables. Lyon: WHO.

IARC. (2002). IARC Handbooks of Cancer Prevention. Vol 6. Weight control and physical activity. Lyon: WHO.

International Agency for Research on Cancer (1988). IARC Monographs on the evaluation of carcinogenic risks to humans. Alcohol drinking. Volume 44. Lyon: IARC.

Kushi L, Giovannucci E (2002) Dietary fat and cancer. *Am J Med*, 113 Suppl 9B: 63S-70S.

Marks, G., Rutishauser, H., Webb, K., Picton, P. (2001). Key Food and nutrition data for Australia 1990-1999. Downloaded June 19, 2003, from: <http://www.sph.uq.edu.au/NUTRITION/monitoring/p5.htm>

Mathers C, Vos T, Stevenson C. (1999). The burden of disease and injury in Australia. AIHW cat. No. PHE 17. Canberra: Australian Institute of Health and Welfare.

McIntosh G. (2001). Cereal foods, fibres and the prevention of cancers. *Australian Journal of Nutrition and Dietetics*, 58(S2): 35-48.

- McLennan W & Podger A. (1998). National nutrition survey: nutrient intakes and physical measurements. Canberra: Australian Bureau of Statistics, Catalogue 4805.0.
- McLennan W & Podger A. (1999). National nutrition survey: foods eaten. Canberra: Australian Bureau of Statistics, Catalogue 4804.0.
- Michels KB, Giovannucci E, Joshipura KJ, Rosner BA, Stampfer MJ, Fuchs CS, Colditz GA, Speizer FE (2000) Prospective study of fruit and vegetable consumption and incidence of colon and rectal cancers. *J Natl Cancer Inst* 92: 1740-1752.
- NHMRC (1997). Acting on Australia's Weight: a strategic plan for the prevention of overweight and obesity. Canberra: Australian Government Publishing Service.
- NHMRC (2001). Australian alcohol guidelines: health risks and benefits. Canberra; Commonwealth of Australia.
- NHMRC (2003a). Dietary Guidelines for Australian Adults: A guide to healthy eating. Canberra; Commonwealth of Australia.
- NHMRC (2003b). Dietary Guidelines for Children & Adolescents in Australia: a guide to healthy eating. Canberra; Commonwealth of Australia.
- Norat, T., Lukanova, A., Ferrari, P., & Riboli, E. (2002). Meat consumption and colorectal cancer risk: dose-response meta-analysis of epidemiological studies. *Int J Cancer*, 98(2), 241-256.
- Norat T, Lukanova A, Ferrari P, Riboli E. (2002). Meat consumption and colorectal cancer risk: dose-response meta-analysis of epidemiological studies. *International Journal of Cancer*, 98(2): 241-56.
- Norat, T. & Riboli, E. (2001). Meat consumption and colorectal cancer: a review of epidemiologic evidence. *Nutrition Reviews*, 59(2): 37-47.
- Riboli, E. & Norat, T. (2001). Cancer prevention and diet: opportunities in Europe. *Public Health Nutrition*, 4: 475-484.
- Roder, D. (2002). The epidemiology of gastric cancer. *Gastric Cancer*, 5 Suppl 1: 5-11.
- Rutishauser, I. (1997). Monitoring food and nutrition status at the population level. In *Food and Nutrition: Australasia, Asia & the Pacific*. M Wahlqvist (Ed.), St Leonards: Allen & Unwin.
- Sandhu MS, White IR, McPherson K. (2001). Systematic review of the prospective cohort studies on meat consumption and colorectal cancer risk: a meta-analytical approach. *Cancer Epidemiology, Biomarkers & Prevention*, 10: 439-446.
- Strategic Inter-Governmental Nutrition Alliance. (2001). Eat Well Australia: a strategic framework for public health nutrition. Canberra: National Public Health Partnership.

The World Cancer Research Fund and American Institute for Cancer Research. (1997). Food, nutrition and the prevention of cancer: a global perspective. New York: American Institute for cancer Research.

Vainio, H., Kaaks, R. & Bianchini, F. (2002). Weight control and physical activity in cancer prevention: international evaluation of the evidence. *Eur J Cancer Prev*, 11 Suppl 2: S94-100.

Willett WC (1998) Dietary fat intake and cancer risk: a controversial and instructive story. *Semin Cancer Biol*, 8: 245-53.

Working Group on Diet and Cancer of the Committee on Medical Aspects of Food and Nutrition. (1998). Nutritional aspects of the development of cancer. London: The Stationery Office.

World Drink Trends 2003. International beverage alcohol consumption and production trends. Henley-on-Thames, UK, NTC Publications Ltd.

World Health Organization. (2000). Obesity: preventing and managing the global epidemic. Report of a WHO consultation. *Who Technical Report Series no. 894*. Geneva: World Health Organization.

World Health Organization. (2003). Diet, nutrition and the prevention of chronic diseases: report of a joint WHO/FAO expert consultation. *WHO Technical Report Series; 916*. Geneva: World Health Organization. Downloaded August 2003 from: http://www.who.int/hpr/NPH/docs/who_fao_expert_report.pdf