



CANCER - PREVENTION IS BETTER THAN CURE

The information explosion in the science of nutrition very often creates the impression that available information is contradictory. Consequently, it is no longer easy to distinguish between fact, misinformation and fiction. The Nutrition Information Centre of the University of Stellenbosch (NICUS) was established to act as a reliable and independent source of nutrition information.

WE ARE WHAT WE EAT

Research is confirming that the small choices we make each day have an important impact on our cancer risk. What we eat, how we prepare our food, whether or not we exercise, manage our weight, drink alcohol or smoke - these simple decisions make an important difference.

South Africa faces a high burden of infectious diseases (such as HIV/AIDS and tuberculosis) existing alongside diseases of lifestyle (non-communicable diseases) such as undernutrition, over nutrition, diabetes, hypertension and **cancer**. The rise of diet-related non-communicable diseases accounts for 28% of the burden of disease in South Africa, and is thought to be linked to the process of societal transition, urbanisation and westernisation from a traditional rural lifestyle – this phenomenon is known as the South African “nutritional transition”. The specific dietary and lifestyle changes observed are in the consumption patterns of food, alcohol and tobacco, reduction in physical activity, and a shift to a diet high in sugar, salt and saturated (animal) fat.

Evidence has shown that the risk for developing heart disease, cancer, diabetes, osteoarthritis and chronic kidney disease increase when a person’s weight-to-height ratio, also called a body mass index (BMI), exceeds 23. After heart disease, cancer is currently the second leading cause of death in the developed world. In South Africa, more than a 100 000 people are diagnosed with cancer each year and six out of every 10 cancer patients survive the disease.

There were an estimated 14.1 million cancer cases around the world in 2012, of these 7.4 million cases were in men and 6.7 million in women. This number is expected to increase to 24 million by

2035. Lung cancer was the most common cancer worldwide contributing for 13% of the total number of new cases diagnosed in 2012. Breast cancer (women only) was the second most common cancer with nearly 1.7 million new cases in 2012. Colorectal cancer was the third most common cancer with nearly 1.4 million new cases in 2012.

Breast cancer is the most common cancer in women worldwide, with nearly 1.7 million new cases diagnosed in 2012. This represents about 12% of all new cancer cases and 25% of all cancers in women.

The World Cancer Research Fund analysis of global research shows that about a third of the most common cancers can be prevented by following a good diet, maintaining a healthy weight and regular physical activity. Certain dietary factors are protective against cancer, while others can contribute to its development.

A series of small adjustments in what we eat and what we do can make a big difference. The relationship between diet and cancer risk is complex and multifaceted.

The evidence that body fatness causes a number of cancers is convincing. Some of the mechanisms by which body fatness increases the risk of cancer are well understood. Obesity influences the levels of a number of hormones and growth factors. Insulin-like growth factor 1 (IGF-1), insulin, and leptin are all elevated in obese people, and can promote the growth of cancer cells. In the case of abdominal fatness, insulin resistance is increased and the pancreas compensates by increasing insulin production. This condition is known as hyperinsulinaemia and it increases the risk of developing cancer of the colon and endometrium, and possibly of the pancreas and kidney.

Undernutrition also poses problems. Cancers caused by infectious agents, such as those of the liver and cervix are more common in low-income countries where undernutrition may impair people's immune responses. Undernutrition, with deficiencies in specific micronutrients such as vitamin A, riboflavin, vitamin B12, folic acid, vitamin C, iron, selenium, and zinc, suppresses most immune functions and may fail to control chronic inflammation, resulting in an increased risk for these cancers.

HOW SHOULD WE ADJUST OUR DIET TO PREVENT CANCER IN GENERAL?

The initial approach for identifying dietary factors linked to cancer development focussed mainly on potentially dangerous aspects of the diet. Over the last three or so decades, however, there is an increasing realisation that many factors in the diet actually also have cancer preventive effects.

Current Dietary Recommendations to prevent cancer include:

Be as lean as possible – attain and maintain a healthy body weight

Avoid sugar-containing beverages and processed meat

Limit energy-dense foods

Limit alcohol

Limit salty food and red meat

Eat mostly food of plant origin, with a variety of non-starchy vegetables and fruit every day and with unprocessed cereals and/or pulses with every meal”.

This coincides with the basic Mediterranean diet characteristics.

The Mediterranean Diet

- Eating primarily plant-based foods, such as fruits and vegetables, whole grains, legumes and nuts
- Replacing butter with healthy fats, such as olive oil
- Using herbs and spices instead of salt to flavour foods
- Limiting red meat to no more than a few times a month
- Eating fish and poultry at least twice a week
- Drinking red wine in moderation (optional)

The diet also recognizes the importance of being physically active and enjoying meals with family and friends.

Red meat and bowel cancer

Processed meat increases the risk of bowel cancer. According to the most recent estimates by the Global Burden of Disease Project, an independent academic research organisation, annually about 34 000 cancer deaths worldwide are attributable to diets high in processed meat. The strongest, but still limited, evidence for an association with eating red meat is for colorectal cancer. There is also

evidence of links to pancreatic- and prostate cancer. There are several potential reasons to explain how red- and processed meat may cause bowel cancer. Red meat contains a compound which gives it its red colour, haem, which promotes the formation of potentially carcinogenic *N*-nitroso compounds. When red meat is cooked at high temperature, it results in the production of compounds (heterocyclic amines and polycyclic aromatic hydrocarbons) that can cause bowel cancer in people with a genetic predisposition. Processed red meat contains nitrites, as well as nitrates added to it as preservatives and these are thought to cause cancer. Processing also changes the nature of the meat, which may play a role in its link to cancer.

The World Cancer Research Fund recommends that you eat no more than 500g (cooked weight) of red meat, such as beef, pork and lamb a week, and that you eat little, or no processed meat such as ham and bacon. The evidence suggests that eating 500g or less of red meat a week does not significantly increase the risk for bowel cancer. Red meat is also a good source of valuable nutrients, such as protein, iron, zinc and vitamin B12, so it can contribute to a healthy, balanced diet. Processed meat on the other hand has less valuable nutrients and can be high in fat and salt, so if you eat red meat it's best to choose fresh, unprocessed meat.

Red meat refers to beef, pork, lamb, and goat from domesticated animals including that contained in processed foods. Processed meat refers to meat preserved by smoking, curing or salting, or addition of chemical preservatives, including that contained in processed foods.

Cooking at high temperatures or with the food in direct contact with a flame or a hot surface, as in barbecuing or pan-frying, produces more carcinogenic chemicals (such as polycyclic aromatic hydrocarbons and heterocyclic aromatic amines). However, there were not enough data to reach a conclusion about whether the way meat is cooked affects the risk of cancer.

Our South African Food-Based Dietary Guidelines recommend that diets should include:

- Two to three servings of fish per week, preferably oily fish such as sardines, pilchards, tuna and mackerel (including tinned versions).
- Approximately four eggs per week.
- A serving of lean meat can be eaten daily, but should be limited to 90 g/day. Trim the visible fat from red meat and remove the skin and fat from chicken. Prepare the meat with little or no added fat and salt.

BREAST CANCER

Dietary factors associated with a higher incidence of breast cancer

Weight gain (obesity)	Adult weight gain is probably a cause of postmenopausal breast cancer. The evidence that body fatness is a cause of postmenopausal breast cancer is convincing, and abdominal body fatness is probably also a cause. On the other hand, body fatness probably protects against breast cancer diagnosed in premenopausal women. The role of fat intake in weight gain is an important aspect to consider, as well as changes in metabolic rate, physical activity and overall dietary intake.
Dietary fat intake	As a major contributor to total energy, dietary fat can also increase the risk for breast cancer. Saturated fat (animal fat) increase breast cancer risk.
Alcohol intake	Women who have one alcoholic drink per day have a small (11%) increased risk compared to those who have two drinks per day (25%) compared to the risk of non-drinkers.
Dietary factors associated with a lower risk of breast cancer	
Mediterranean diet	Adherence to this diet is associated with lower breast cancer risk.
Dairy Products	Low-fat milk and fermented dairy or yogurt consumption was associated with a lower breast cancer risk in post-menopausal women. Dairy consumption was inversely associated with the risk of breast cancer in a manner that appears to be dose-dependent, time-dependent, and dairy-type dependent.

PROSTATE CANCER

Following a typical Western diet high in animal (saturated) fat is associated with a higher risk of prostate cancer.

GASTROINTESTINAL CANCERS

Alcohol consumption increases the risk for a number of cancers of the gastrointestinal tract. The evidence that alcoholic drinks are a cause of cancers of the mouth, pharynx, and larynx, oesophagus and colorectum (men) is convincing. It is probably a cause of liver cancer, and of colorectal cancer in women. The available evidence does not show any safe limit of alcohol intake, irrespective of the type of drink. A dose-response relationship is apparent and absolute moderation is advised. The risk is multiplied when people that consume alcohol also smoke tobacco. Non-starchy vegetables, fruits, and also foods containing carotenoids probably protect against these cancers.

COLORECTAL CANCER

Colorectal cancer affects the colon and the rectum.

Cancer promoting dietary factors

Although many dietary factors have been associated with colon cancer, there is convincing evidence that red meat, processed meat, excessive alcohol consumption (in men), body- and abdominal fatness, and other factors that lead to greater adult attained weight, or its consequences, are causes of colorectal cancer.

Overweight in men, and low levels of physical activity in men and women are linked to a higher risk, which has been found to increase with age. Excessive alcohol consumption has also been linked to an increased risk (convincing evidence for men and probable evidence for women). It is thus wise to follow the recommendation of no more than two drinks per day for men and one for women.

Patients with chronic ulcerative colitis have a high risk of developing colon cancer and frequently have low levels of folate. Folate supplements result in a 60% lower incidence of colon cancer in these patients.

Protective dietary factors

Foods containing dietary fiber, and also garlic, milk, and calcium, probably protect against this cancer.

Physical activity protects against colorectal cancer, however the evidence is stronger for the colon than for the rectum.

LUNG CANCER

Dietary factors:

- Fruits and food containing carotenoids have repeatedly been found to have a protective effect against lung cancer.
- Clinical trials done to test the hypothesis of the benefit of beta-carotene supplementation as a possible protective factor, particularly focussing on lung cancer, have shown that high pharmaceutical doses of beta-carotene (supplements) are not beneficial in reducing cancer risk, and increase lung cancer risk among high-risk individuals such as smokers or those who have a history of occupational exposure to known lung carcinogens.

DIETARY AND LIFESTYLE GUIDELINES FOR CANCER PREVENTION

- ◆ Maintain ideal body weight - avoid being underweight or overweight and limit weight gain during adulthood to less than 5 kg. Ensure that body weight through childhood and adolescence projects towards the lower end of the normal BMI range. Aim for ideal body weight at the age of 21. Avoid weight gain and an increase in waist circumference in the adult years.
- ◆ Limit energy-dense foods such as sweets and fast foods and avoid sugary drinks such as carbonated drinks and fruit concentrates. Avoid fatty foods.
- ◆ Always use fat in moderation. Eat more canola margarine and –oil, olive oil, olives, nuts and avocado.
- ◆ Breastfeeding protects both mother and child against cancer. Mothers should aim to breastfeed infants exclusively for up to six months and to continue with complimentary foods thereafter.
- ◆ Eat less red meat (beef, pork, lamb and goat – limit to no more than 500 g per week), limit processed meat, and eat more white meat (chicken and fish). Also eat more seeds, nuts, legumes, eggs, cottage cheese and tinned fish. These are a great source of fibre and protein; nuts and seeds also provide healthy fats and antioxidants.
- ◆ Avoid highly salted, smoked, cured and mouldy foods. Limit salt intake to no more than 6g per day (2.4 g sodium). Do not eat mouldy cereals or pulses.
- ◆ Eat **at least** five portions of fruit (600g) and non-starchy vegetables per day (fresh rather than preserved) including a variety of green leafy vegetables, tomatoes and tomato products, cruciferous vegetables (e.g. cabbage, Brussel sprouts) and dark orange vegetables.
- ◆ Eat a variety of cereal foods, mainly in an unprocessed form such as whole wheat bread and breakfast cereals as well as whole grain pasta and rice.
- ◆ Enjoy two to three servings of milk or yogurt daily. Include dairy from cultured milk (kefir, yogurt, fresh curd cheeses like ricotta); it's easier to digest and supplies beneficial bacteria that contribute to digestive health.
- ◆ Dietary supplements are not recommended for cancer prevention. Aim to meet nutritional needs through diet alone. Avoid high dose vitamin supplements (more than 150% of the RDA).
- ◆ Limit alcohol consumption. If alcoholic drinks are consumed, a maximum of one drink a day for women and two for men is recommended. One drink equals one beer (340 ml), 120 ml wine, 25 ml spirits (such as brandy and whiskey) or 60 ml sherry or martini.
- ◆ Do not smoke.
- ◆ Exercise regularly. Be moderately physically active for at least 30 minutes every day (equivalent to

brisk walking). Limit sedentary habits such as watching television. Aim to improve fitness and to increase daily activity to 60 minutes or to more vigorous activity.

More tips on how to eat five portions of fruit and vegetables per day:

- ◆ Include one or two with each meal
- ◆ "Snack" on them when you are hungry between meals
- ◆ Choose a variety of fresh, frozen, dried and canned products
- ◆ One glass of fruit juice equals two portions of fruit
- ◆ Make your own fruit or vegetable juice or "smoothies" using fresh fruit/vegetables and low fat or skimmed milk
- ◆ Be adventurous - add them to pasta, rice, soup and stews
- ◆ Prepare stewed fruit for breakfast or pudding
- ◆ Experiment with stir-fries using a variety of vegetables
- ◆ Make a veggie-spread with finely chopped vegetables and Bulgarian yoghurt
- ◆ Make fruit crumbles with thin layers of crumble and lots of fruit underneath

For further, personalised and more detailed information, please contact NICUS or a dietitian registered with the Health Professions Council of South Africa

References from the scientific literature used to compile this document are available on request.

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