



## **A GUIDE FOR CANCER PATIENTS ON NUTRITION AND PHYSICAL EXERCISE, BOTH DURING AND AFTER TREATMENT.**

This Guide had been provided by Reliable Cancer Therapies (RCT) as a service to patients, to help patients and their relatives better understand the importance of nutrition and physical exercise during and after cancer treatment. We recommend patients to ask their doctors which treatments could be useful for their situation. The information described in this document is based on scientific research and has informative purposes only.

More information about Reliable Cancer Therapies: [www.reliablecancertherapies.com](http://www.reliablecancertherapies.com)

*For words marked with an asterisk\*, a definition is provided at the end of the document.*



### TABLE OF CONTENTS

<b><u>Introduction.....</u></b>	<b><u>3</u></b>
<b><u>1. Strive for a normal body weight .....</u></b>	<b><u>4</u></b>
<b><u>2. Strive for sufficient physical activity .....</u></b>	<b><u>5</u></b>
<b><u>3. Stick to a healthy diet consisting primarily of products of plant origin.....</u></b>	<b><u>6</u></b>
<b><u>4. References .....</u></b>	<b><u>9</u></b>
<b><u>5. Glossary .....</u></b>	<b><u>11</u></b>

*This guide has been written by Lieve Vanschoubroek (RCT) and reviewed by Prof. Ellen Kampman.*



## INTRODUCTION

---

The prognosis for cancer patients is continuously improving. Many of them are motivated to change their lifestyle in the hope of optimising the results of their treatment, minimising the chances of relapse and improving their quality of life both during and after treatment. Making the right choices when it comes to nutrition and physical exercise can help them achieve these goals.

However, cancer and its treatment can also lead to cardiovascular disease, bone diseases such as osteoporosis\* and osteopenia\*, diabetes and other hormonal disorders. According to the World Cancer Research Fund (WCRF), some of these complications can be prevented or reduced by dietary modifications and physical exercise.

The number of available clinical trials on the relationship between nutrition and cancer, both during and after treatment, are relatively few in number and the results are sometimes conflicting. We will provide an overview of some important studies and of the scientifically-based guidelines compiled by specialists of the American Cancer Society (ACS), the WCRF and the American Institute for Cancer Research (AICR) concerning nutrition and physical activity in relation to the prevention of cancer.. Cancer survivors are encouraged to follow these guidelines, as they could reduce the chance of relapse and combat the development of new cancers. These guidelines could also affect the risk of developing complications (cardiovascular disease, diabetes and bone diseases) that result from cancer (and its treatment).

The recommendations all emphasise the importance of a healthy body weight, regular physical exercise, a diet that is rich in vegetables, fruit and wholegrain products and limited consumption of alcohol and red and processed meat. It is also recommended that all required nutrients be obtained from your diet and not from dietary supplements.



### 1. STRIVE FOR A NORMAL BODY WEIGHT

---

It is important to strive for a normal body weight, both during and after cancer treatment.

Excess body weight is a recognised risk factor for various types of cancer. It is also associated with increased mortality rates among patients with breast cancer and probably with other types of cancer.

There are various biological mechanisms that can explain the association between excessive body weight and the risk of cancer, including an increase in hormones and growth factors (such as oestrogens\*, androgens\*, insulin\*, insulin-like growth factors-1\*), insulin resistance (disorder in the action of insulin\*), etc. For this reason it is important that cancer patients who are obese or overweight when diagnosed are encouraged to aim for modest weight loss during their treatment (a maximum of 1kg a week), with a target body mass index (BMI) of between 18.5 and 24.9. The body mass index is calculated by dividing weight in kilograms by height in meters squared ( $BMI = \text{kg}/\text{m}^2$ ).

The weight loss must be dealt with in consultation with the treating doctor and the dietitian or nutritionist.

Losing weight safely can be achieved through a balanced diet together with increased physical exercise, in accordance with the possibilities of the patient.

There are indications that overweight (BMI between 25 and 30) and obesity (BMI more than 30) are risk factors for certain secondary cancers, as well as an increase of cardiovascular disease and diabetes.

On the other hand, cancer patients who are underweight or who lose a great deal of weight due to treatment must increase their body weight through an adjusted diet supervised by the treating doctor and/or nutritionist. Malnutrition (at the time a person is diagnosed with cancer or as a result of the treatment) can lead to serious side effects of the treatment and also increase the risk of infections, consequently reducing the chances of survival.

Nutritional problems that can result from cancer and its treatment will be discussed in a special document on the RCT website.

Nutritional screening (knowing what and how much someone eats) and follow-up are essential at the start of the treatment. Following up on individual dietary patterns can contribute to an improved appetite and food intake, retaining muscle mass and the decrease of side-effects resulting from the treatment, leading to an improved quality of life.

Using dietary supplements such as vitamins, minerals and herbal preparations taken during cancer treatment remains a controversial topic. We examine this issue in another document on our website. If you use or intend to take supplements, please inform the treating doctor because some supplements can interfere with the treatment!



## 2. STRIVE FOR SUFFICIENT PHYSICAL ACTIVITY

---

An increasing number of studies have examined the therapeutic importance of physical exercise, both during and after cancer treatment.

Evidence is mounting which shows that regular exercise positively affects the survival rate for breast and colorectal cancer, and also reduces the chances of relapse amongst survivors.

Getting regular activity may reduce your body's levels of oestrogen\* and other hormones that could promote cancer. Inflammation that may cause the kind of cellular damage that makes cancer more likely, is also reduced by physical activity.

The amount of physical activity required for it to benefit the prognosis is still unclear, and it can vary according to the type of cancer, the stage of the disease, the type of treatment and the patient's lifestyle.

Regular physical exercise also helps to treat or prevent excess weight and obesity.

There are also strong indications that physical activity is not only safe and possible during the treatment, but it will also have a positive influence upon a patient's physical, emotional and functional capacities. Moreover, it can reduce a treatment's side-effects and improve some aspects of quality of life. Cardiovascular fitness, muscular strength, and sense of well-being, all improve amongst cancer survivors who do physical exercise and feelings of fatigue, anxiety, and depression are also reduced.

Before embarking on a physical exercise routine, cancer patients must be screened (see what is possible and what not), with follow-ups conducted by their treating doctor and physiotherapist\*.

Those undergoing chemotherapy\* and radiotherapy\*, who are already following an exercise programme, might have to cut back for a while, but it is important that they continue to exercise as much as possible.

Cancer patients receiving radiotherapy\* should avoid swimming in swimming pools, as the chlorine could harm their skin.

Patients suffering from severe anaemia should be careful in doing a lot of physical activity until they have recovered from the disorder.

In expectation of further results from ongoing clinical trials\*, we advise that you follow the cancer prevention recommendations of the [ACS](#) and [WCRF](#). These guidelines may aid you in diminishing the risk of relapse and the development of some secondary cancers.



These can be summarised as:

- Adults: try to engage in moderate to vigorous physical exercise for at least 30 minutes a day, five or more times a week, over and above your normal daily activities; 45 to 60 minutes of intensive physical exercise is even better.
- Children and adolescents: try to engage in moderate to intensive physical exercise for at least 60 minutes a day no less than five times a week.
- Examples of moderate intensive exercise include walking, dancing, gardening, horseback riding, yoga, golf, mowing the lawn, etc.
- Examples of very intensive physical exercise include jogging or running, cycling, aerobic dancing, football, swimming, hockey, heavy manual labour, etc.

The American College of Sports Medicine has also drawn up exercise guidelines for cancer survivors.

It is never too late to begin incorporating physical activity into your daily routine. Doing something is better than nothing.

### 3. STICK TO A HEALTHY DIET CONSISTING PRIMARILY OF PRODUCTS OF PLANT ORIGIN

---

To date there have been few observational studies on the link between nutrition and cancer survival, and most of them were conducted with breast cancer patients. The results have not been unambiguous, but a healthy diet consisting primarily of products, derived from plants, i.e. vegetables, fruit, wholegrain products and pulses such as lentils, beans and nuts, is certainly recommended for cancer survivors. This type of diet is believed to also protect the body against cancer (and its relapse).

The lack of clinical studies\* in this regard means that the AICR and WCRF advise that the guidelines for preventing cancer can be followed. We will discuss these below.

Try to eat at least five portions (at least 400 grams) of fruit and vegetables every day. Keep a varied selection and eat them as a snack. Try to include a portion of fruit or vegetables with every meal. They hold numerous potentially beneficial vitamins, minerals, fibers, carotenoids\* and other bioactive ingredients\*, which could aid in the prevention of cancer.

Select wholegrain products instead of refined (processed) grains and sugars. Eat wholegrain bread, rice, pasta and grains, as these are rich in ingredients that play an important biological role and appear to have, hormonal and protecting (anti-oxidising) effects. They are believed to combat the risk of developing cardiovascular disease. They may play a role in preventing gastric and colon cancers and also in hormone-dependent cancers like breast and prostate cancer. Refined products have lost a large proportion of their vitamins and minerals because they are ground and the bran and seeds removed.



Limit your intake of refined carbohydrates\* and sweetened drinks (soft drinks) as well as processed food, including pastries, fast foods, sweetened cereals and other sweets. These contain a great deal of added sugars, fats and/or salt, provide no added value to your diet and can interfere with the insulin\* action (insulin\* resistance) which can lead to a greater concentration of growth factors, which in turn can result in the development of cancer.

Try to achieve the best possible energy balance, which means that the energy introduced (through your diet) must be balanced with the energy expended.

In other words, when it comes to your diet, pay attention to the total calorie intake in order to achieve and retain a healthy body weight. It is important that you are aware that some calorie-rich products are good for you and consequently can be a part of a healthy dietary regime including nuts, dried fruit, fatty fish, vegetable oils and others.

Limit red meat consumption (beef, pork and lamb) to less than 500 grams a week and cut down on processed meats. The WCRF/AICR has just released new results that indicate that red and processed meats can increase the chances of colorectal cancer. Eating 100 grams of red meat every day (700 grams a week) increases colorectal cancer risk by 17 percent compared to someone who eats no red meat. For processed meat the increase was significantly higher. Processed meat is meat preserved by smoking, curing, salting or by the addition of preservatives. Examples include ham, bacon, pastrami, and salami, as well as hotdogs and sausages. Consuming 100 grams of processed meat every day increased the risk of colorectal cancer by 36 percent when compared to someone who eats no processed meat.

Fish, poultry and beans are a good alternative to beef, pork and lamb. When eating meat, select lean cuts and eat small portions.

When preparing meat and fish, the best option is to steam, poach or bake it at a relatively low temperature. Cooking meat at a high temperature over an extended period or barbecuing it can probably release certain substances that could increase the incidence of some types of cancer.

Cut your salt intake, as excessive salt consumption increases the chance of high blood pressure and gastric cancer. Salt is used as a preservative and can be found in many processed products, like bread, snacks, breakfast cereals and ready-made products such as soups and sauces.

Many studies have demonstrated the link between alcohol consumption and the risk of developing primary cancers, including oral, pharyngeal, oesophageal, liver, breast and possibly colon cancer.

According to the WCRF prevention guidelines, males should drink no more than two glasses of alcohol a day and females one glass, while it is even better if no alcohol is consumed at all. One glass is the equivalent of 250ml of beer, 100 ml of wine or 25ml of liquor. The organisation also strongly recommends that no alcohol at all be consumed by cancer survivors suffering from mucositis and those with head and neck cancer undergoing radiotherapy\* or chemotherapy\*.

# NUTRITION AND PHYSICAL EXERCISE & CANCER

## A GUIDE FOR PATIENTS



RELIABLE CANCER THERAPIES

Try to drink as much water or other healthy liquids as possible – at least eight glasses a day, unless you have to limit your liquid intake for medical reasons. Also try to avoid hot drinks.

There is to date no evidence that organic products are better at preventing cancer than non-organic ones, but always wash or peel your vegetables or fruit before eating them.

It remains unclear whether a vegetarian diet can reduce the chances of developing cancer, but vegetarian foods do contain many healthy properties as they are high in fiber and rich in vitamins and phyto-chemicals\* and low in saturated\* fatty acids\*. Vegans – those who eat no animal products whatsoever, including milk and eggs – could supplement their diets with vitamin B12, zinc, iron and calcium, especially if they are children or pre-menopausal women. It is important for vegetarians to consume a wide variety of vegetables, fruit, legumes and wholegrain products.

The media and the internet in particular, are used to distribute information on specific diets that claim they can cure cancer. There is still no scientific evidence that can prove that these diets are effective against cancer. If you intend to follow a special diet, you have to inform your treating doctor or dietician.



### 4. REFERENCES

---

- Amling CL. The association between obesity and the progression of prostate and renal cell carcinoma. *Urol Oncol* 2004;22:478-484.
- Arends J, Bodoky G, Bozzetti F et al. ESPEN guidelines on enteral nutrition: non-surgical oncology. *Clin Nutr* 2006; 25:245-259.
- Calle EE, Rodriguez C, Walker-Thurmond K, Thun MJ. Overweight, obesity, and mortality from cancer in a prospectively studied cohort of U.S. adults. *N Engl J Med* 2003; 348:1625-1638.
- Chan DS, Lau R, Aune D, et al. Red and processed meat and colorectal cancer incidence: meta-analysis of prospective studies. *PLoS One* 2011;6:e20456.
- Chlebowski RT, Aiello E, McTiernan A. Weight loss in breast cancer patient management. *J Clin Oncol* 2002;20:1128-1143.
- Courneya KS, Friedenreich CM. Physical activity and cancer control: an overview and update. *Semin Oncol Nurs* 2007;23:242-52.
- Courneya KS, Friedenreich CM. Physical activity and cancer. Vol.186. Springer-Verlag, Heidelberg, 2011. 387p.
- Courneya KS. Exercise in cancer survivors: an overview of research. *Med Sci Sports Exerc* 2003;35:1846-1852
- Davis NJ, Batehup L and Thomas R. The role of diet and physical activity in breast, colorectal, and prostate cancer survivorship: a review of the literature. *British Journal of Cancer*, 2011; 105: S52-S73.
- Deitel M, To TB. Major intestinal complications of radiotherapy. Management and nutrition. *Arch Surg* 1987;122:1421-1424.
- Demark-Wahnefried W. Cancer survival: Time to get moving? Data accumulate suggesting a link between physical activity and cancer survival. *J Clin Oncol* 2006;24:3517-3518.
- Dewys WD, Begg C, Lavin PT, et al. Prognostic effect of weight loss prior to chemotherapy in cancer patients. Eastern Cooperative Oncology Group. *Am J Med* 1980;69:491-497.
- Doyle C, Kushi LH, Byers T et al. Nutrition and physical activity during and after cancer treatment: an American Cancer Society guide for informed choices. *CA Cancer J Clin* , 2006; 56:323-353.
- Food, nutrition, physical activity and the prevention of cancer: a global perspective, WCRF/AICR 2007
- Friedenreich, CM, Woolcott, CG, Mc Tiernan A et al. Alberta physical activity and breast cancer prevention trial: sex hormone changes in a year-long exercise intervention among postmenopausal women. *J Clin. Oncol.* 2010; 28: 1458-1466.
- Holmes MD, Chen WY, Feskanich D, Kroenke CH, Colditz GA. Physical activity and survival after breast cancer diagnosis. *JAMA* 2005;293:2479-2486.
- Holtzman J, Schmitz K, Babes G, et al. Effectiveness of behavioral interventions to modify physical activity behaviors in general populations and cancer patients and survivors. Evidence Report/Technology assessment No. 102 (prepared by the Minnesota Evidence-based Practice Center, under contract No. 298-02-0009.) AHRQ Publication No. 04-E027-2. Rockville, MD. Agency for Healthcare Research and Quality. June 2004.
- Knols R, Aaronson NK, Uebelhart D, et al. Physical exercise in cancer patients during and after medical treatment : a systematic review of randomized and controlled clinical trials. *J Clin Oncol* 2005; 23:3830-3842.
- Kushi LH, Byers T, Doyle C et al and the American Cancer Society 2006 nutrition and physical activity guidelines advisory committee. American cancer society guidelines on nutrition and physical activity for cancer prevention:reducing the risk of cancer with healthy food choices and physical activity. *CA Cancer J Clin* 2006;56:254-281.



Langstein HN, Norton JA. Mechanisms of cancer cachexia. *Hematol Oncol Clin N Am* 1991;5:103-123.

McMahon K, Brown JK. Nutritional screening and assessment. *Semin Oncol Nurs* 2000;16:106-112.

McMahon K, Decker G, Ottery FD. Integrating proactive nutritional assessment in clinical practices to prevent complications and cost. *Semin Oncol* 1998;25(Suppl 6):20-27.

Meyerhardt JA, Heseltine D, Niedzwiecki D, Hollis D, Saltz LB, Mayer RJ, Thomas J, Nelson H, Whittom R, Hantel A, Schilsky RI, Fuchs CS. Impact of physical activity on cancer recurrence and survival in patients with stage III colon cancer: Findings from CALGB 89803. *J Clin Oncol* 2006;24:3535-3541.

Mustian KM, Sprod LK, Palesh OG, et al. Exercise for the management of side effects and quality of life among cancer survivors. *Curr sports med rep.* 2009;8(6):325-330.

Nitenberg G, Raynard B. Nutrition impact symptoms in the oncology patient. *Oncology Issues* 2002;17:15-17.

Robien K, Demark-Wahnefried W, Rock CL. Evidence-based nutrition guidelines for cancer survivors: current guidelines, knowledge gaps, and future research directions. *J Am Diet Assoc* 2011;111:368-375.

Rock CL, Demark-Wahnefried W. Nutrition and survival after the diagnosis of breast cancer: a review of the evidence. *J Clin Oncol* 2002;20:3302-3316.

Schattner M, Shike M. Nutrition Support of the Patient with Cancer, in Shils ME, Shike M, Ross AC (eds). *Modern Nutrition in Health and Disease*. 10<sup>th</sup> ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2006:1290-1313.

Schmitz KH, Holtzman J, Courneya KS, et al. Controlled physical activity trials in cancer survivors : a systematic review and meta-analysis. *Cancer Epidemiol Biomarkers Prev* 2005;14:1588-1595.

Scmitz KH, Courneya KS, Matthews C, Demark-Wahnefried W, Galvao DA, Pinto BM, Irwin ML, Wolin KY, Segal RJ, Lucia A, Schneider CM, VE VONG, Schwartz AL. American college of sports medicine roundtable on exercise guidelines for cancer survivors. *Med Sci Sports Exerc.* 2010;42:1409-1426.

Siegel EM, Ulrich CM, et al. The effects of obesity and obesity-related conditions on colorectal cancer prognosis. *Cancer Control* 2010; 17:52-57.

Slavin JL. Mechanisms for the impact of whole grain foods on cancer risk. *J Am Coll Nutr* 2000;19:300S-307S.

Smith-Warner SA, Spiegelman D., Yaunn SS, et el. Alcohol and breast cancer in women: a pooled analysis of cohort studies. *JAMA* 1998;279:535-540.

Stichting Wereld Kanker Onderzoek Fonds;aanbevelingen ter preventie van kanker;Amsterdam, Nederland,2008.

Ströhle A, Zänker K, Hahn A. Nutrition in oncology: the case of micronutrients. *Oncology reports* 2010; 24:815-828.

Tiernan AM, Irwin M and VonGruenigen V. Weight, physical activity, diet, and prognosis in breast and gynaecologic cancers. *J Clin Onc.* 2010; 28: 4074-4080.



### 5. GLOSSARY

---

#### **Androgen**

A type of hormone that promotes the development and maintenance of male sex characteristics.

#### **Bioactive ingredient**

In a literal sense bioactive substances are chemicals with a specific biological or physiological activity or function. They are found in foods (occurring both naturally and artificially added) and many appear to be beneficial to our health. Some bioactive compounds can, for example, have the same effect as antioxidants and protect the body from free radicals. This means that, amongst other things, they can also assist in strengthening the immune system, keep bones strong and decrease cholesterol levels.

#### **Carotenoid**

A substance found in yellow and orange fruits and vegetables and in dark green, leafy vegetables. Some carotenoids are a source of vitamin A. Carotenoids are also antioxidants, meaning that they protect cells from certain damages.

#### **Carbohydrates**

Carbohydrates are the body's building blocks and a major source of fuel. Carbohydrates are a collective name for starch and a variety of sugars. These carbohydrates are digested in the gastrointestinal tract and are released into our blood stream in the form of glucose. Glucose gives our bodies energy and it is indispensable to our wellbeing. Excess glucose is stored in our bodies as fat.

#### **Chemotherapy**

A type of cancer treatment using drugs that kill cancer cells and/or limit their growth. These drugs are usually administered to the patient by slow infusion into a vein but can also be administered orally, by direct infusion to the limb or by infusion to the liver, according to cancer location.

#### **Clinical trial**

A type of research study that tests how well new medical approaches work in people. These studies test new methods of screening, prevention, diagnosis, or treatment of a disease. Also called clinical study.

#### **Fatty acid**

A major component of fats that is used by the body for energy and tissue development.

#### **Insulin**

A hormone made in the pancreas. Insulin controls the amount of sugar in the blood by moving it into the cells, where it can be used by the body for energy.

#### **Insulin-like growth factor 1 (IGF-1)**

Growth factors are components (polypeptides) that are stimulated by growth hormones. They play a role in cell division and the lifecycle of a cell, and are used for children with an IGF-1 deficiency in order to stimulate growth.

---

*This document is provided by Reliable Cancer Therapies. The information in this document does not replace a medical consultation. It is for personal use only and can neither be modified in any way without written permission of Reliable Cancer Therapies, nor distributed without acknowledging Reliable Cancer Therapies as the source. (Dec 2011)*



### **Oestrogen**

A group of hormones created in the body, which play an important role in the development of the female sex characteristics as the breasts, the womb and the vagina. They also regulate the menstrual cycles and pregnancy. Therefore they are also called female hormones.

### **Osteopenia**

An age-related condition in which the bone density decreases. The loss of bone mass is not as dramatic as when the person suffers from osteoporosis\* and is not associated with bone fractures.

### **Osteoporosis**

A condition that is marked by a decrease in bone mass and density, causing bones to become fragile.

### **Physiotherapist**

A rehabilitation therapist.

### **Phytochemicals**

Phyto means 'derived from plants', and plant foodstuffs can contain up to 100,000 different phytochemicals, many of which have an antioxidant effect.

### **Radiotherapy**

A therapy in which radiation is used in the treatment of cancer always oriented to the specific area of the cancer.

### **Saturated fatty acids**

Fats that have their chemical structure wholly or partially saturated with hydrogen atoms. Saturated fatty acids are primarily found in animal products, such as butter, cheese, milk, fatty beef and chocolate. Some vegetable fats also contain a high level of saturated fatty acids, including cocoa butter, palm oil and coconut fat. Saturated fatty acids are generally coagulated (solid) at room temperature. They increase cholesterol levels in the blood, which can lead to fat being deposited on the walls of the blood vessels, blocking them up. Because the flow of blood through the blood vessels is inhibited, you have a greater chance of suffering from cardiovascular diseases.