

Cancer Association of South Africa (CANSA)



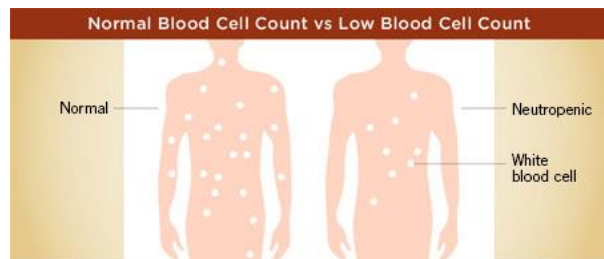
CANSA Fact Sheet on the Implications of a Low White Blood Cell Count

Introduction

Cancer patients who have a low White Blood Cell (WBC) count (neutropenia) have a greater risk of infection.

[Picture Credit: Neutropenia]

One's risk increases when one's white blood cell count gets low and stays low for a period of time.



The treating physician and care team will keep close track of a patient's white blood cell count during chemotherapy treatment. Patients should talk with their doctor and care team about possible symptoms of a low white blood count and when they should notify their care team.

Villeneuve, S. & Aftandilian, C. 2022.

Purpose of review: Pediatric oncology patients frequently experience episodes of prolonged neutropenia which puts them at high risk for infection with significant morbidity and mortality. Here, we review the data on infection prophylaxis with a focus on both pharmacologic and ancillary interventions. This review does not include patients receiving hematopoietic stem cell transplantation.

Recent findings: Patients with hematologic malignancies are at highest risk for infection. Bacterial and fungal prophylaxis decrease the risk of infection in certain high-risk groups. Ancillary measures such as ethanol locks, chlorhexidine gluconate baths, GCSF, IVIG, and mandatory hospitalization do not have enough data to support routine use. There is limited data on risk of infection and role of prophylaxis in patients receiving immunotherapy and patients with solid tumors. Patients with Down syndrome and adolescent and young adult patients may benefit from additional supportive care measures and protocol modifications. Consider utilizing bacterial and fungal prophylaxis in patients with acute myeloid leukemia or relapsed acute lymphoblastic leukemia. More research is needed to evaluate other supportive care measures and the role of prophylaxis in patients receiving immunotherapy.

Researched and Authored by Prof Michael C Herbst

[D Litt et Phil (Health Studies); D N Ed; M Art et Scien; B A Cur; Dip Occupational Health; Dip Genetic Counselling; Diagnostic Radiographer; Dip Audiometry and Noise Measurement; Medical Ethicist]

Approved by Ms Elize Joubert, Chief Executive Officer [BA Social Work (cum laude); MA Social Work]

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The International Classification of Disease 10th Version (ICD-10)

The International Classification of Diseases (ICD) is designed to promote international comparability in the collection, processing, classification, and presentation of mortality statistics. This includes providing a format for reporting causes of death on the death certificate.

ICD serves a broad range of uses globally and provides critical knowledge on the extent, causes and consequences of human disease and death worldwide via data that is reported and coded with the ICD. Clinical terms coded with ICD are the main basis for health recording and statistics on disease in primary, secondary and tertiary care, as well as on cause of death certificates. These data and statistics support payment systems, service planning, administration of quality and safety, and health services research. Diagnostic guidance linked to categories of ICD also standardizes data collection and enables large scale research.

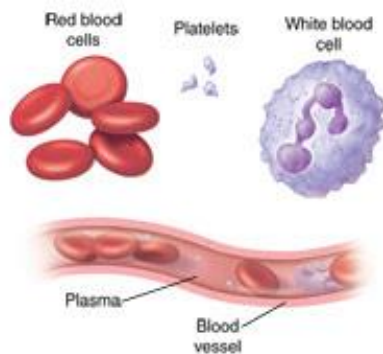
For more than a century, the International Classification of Diseases (ICD) has been the basis for comparable statistics on causes of mortality and morbidity between places and over time. Originating in the 19th century, the latest version of the ICD, ICD-11, was adopted by the 72nd World Health Assembly in 2019 and came into effect on 1st January 2022.

The ICD-10 Code for neutropenia, unspecified – D70.9.

The ICD-10 Code for neutropenia due to infection – D70.3.

White Blood Cells (Leukocytes)

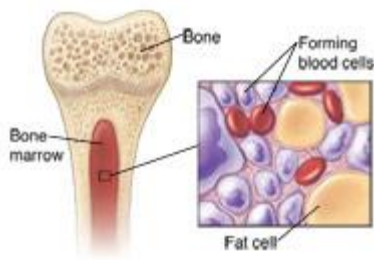
White blood cells are an important component of one's blood, which is also made up of red blood cells, platelets, and plasma.



Although white blood cells account for only about 1% of one's blood components, their impact is significant. White blood cells, also called leukocytes, are essential for good health and protection against illness and disease.

Think of white blood cells as immunity cells. In a sense, they are continually at war. They flow through the bloodstream to battle viruses, bacteria, and other foreign invaders that may threaten one's health. When the body is in distress and a particular area is under attack, white blood cells rush in to help destroy the harmful substance and prevent illness.

White blood cells are made inside the bone marrow and stored in the blood and lymphatic tissues. Because some white blood cells have a short lifespan of one to three days, the bone marrow is constantly making them.



Types of white blood cells and their function - among one's white blood cells are:

- **Monocytes.** They have a longer lifespan than many white blood cells and help to break down bacteria.
- **Lymphocytes.** They create antibodies to defend against bacteria, viruses, and other potentially harmful invaders.
- **Neutrophils.** They kill and digest bacteria and fungi. They are the most numerous type of white blood cell and one's first line of defence when infection strikes.
- **Basophils.** These small cells appear to sound an alarm when infectious agents invade the blood. They secrete chemicals such as histamine, a marker of allergic disease, that help control the body's immune response.
- **Eosinophils.** They attack and kill parasites, destroy cancer cells, and help with allergic responses.

Causes of Low White Blood Count

A low white blood cell count usually is caused by:

- Viral infections that temporarily disrupt the work of bone marrow
- Certain disorders present at birth (congenital) that involve diminished bone marrow function
- Cancer (or other diseases that damage bone marrow)
- Autoimmune disorders that destroy white blood cells or bone marrow cells
- Severe infections that use up white blood cells faster than they can be produced
- Medications, such as antibiotics, that destroy white blood cells
- Sarcoidosis - an inflammatory disease that affects multiple organs in the body, but mostly the lungs and lymph glands

Other specific causes of a low white blood cell count include:

- Aplastic anaemia
- Cancer chemotherapy
- Radiation therapy
- HIV/Aids
- Hypersplenism — a premature destruction of blood cells by the spleen
- Tuberculosis (and some other infectious diseases)
- Kostmann's syndrome — a congenital disorder involving low production of neutrophils
- Leukaemia
- Lupus
- Rheumatoid arthritis and other autoimmune disorders
- Malnutrition and vitamin deficiencies
- Myelodysplastic syndromes
- Myelokathexis — a congenital disorder involving failure of neutrophils to enter the bloodstream

Normal Full Blood Cell Count

A complete blood count (CBC) is typically not a definitive diagnostic test. Depending on the reason one's doctor recommended this test, results outside the normal range may or may not require follow-up. One's doctor may need to look at the results of a CBC along with results of other blood tests, or additional tests may be necessary.

The following are normal complete blood count results for adults:

Blood Component:	Normal Range:
Red blood cells (Erythrocytes)	Male: 4,32 – 5,72 trillion cells/L* (4,32 – 5,72 million cells/mcL**) Female: 3,90 – 5,03 trillion cells/L (3,90 – 5,03 million cells/mcL)
Haemoglobin	Male: 13,5 – 17,5 grams/dL*** (135 – 175 grams/L) Female: 12,0 – 15,5 grams/dL*** (120 – 155 grams/L)
Haematocrit	Male: 38,8 – 50,0 percent Female: 34,9 – 44,5 percent
White Blood Cells (Leukocytes)	3,5 – 10,5 billion cells/L* (3 500 – 10 500 cells/mcL)
Platelets	150 – 450 billion/L* (150 000 – 450 000/mcL**)

*L = litre

**mcL = microliter

***dL = decilitre

Erythrocyte Sedimentation Rate:

An Erythrocyte sedimentation rate (ESR) test measures how quickly red blood cells (erythrocytes) settle in a test tube. When inflammation in the body is present (such as from an infection or cancer), red blood cells may settle more slowly than normal. An ESR may help find certain inflammatory diseases when CBC results are normal.

Category:	Sedimentation Rate
Men	0 – 15 millimetres per hour (mm/hr) or 0 – 20 mm/hr for men older than 50
Women	0 o 20 mm/hr or 0 – 30 mm/hr for women older than 50
Children	0 – 10 mm/hr
Newborns	0 – 2 mm/hr

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White Blood Cell Types (WBC Differential Count)

White Blood Cell Type:	Total:
Neutrophils	50% - 62%
Band neutrophils	3% - 6%
Lymphocytes	25% - 40%
Monocytes	3% - 7%
Eosinophils	0% - 3%
Basophils	0% - 1%

How Blood Cancers (Leukaemia) Affect Blood Counts

Blood cancers can affect blood cell counts in a number of ways, either lowering or increasing measurements. If one is currently receiving cancer treatment such as chemotherapy, drug therapy or radiation therapy, one's blood counts will be affected. Blood counts usually return to normal after treatment is complete.

How to Increase One's White Blood Cell Count During Chemotherapy

A low white blood cell count, also known as neutropenia, is one of the most serious and frequent side effects of chemotherapy. It can necessitate a delay in treatment or a reduction in the dose. Even a mild infection can delay one's chemotherapy treatment, since the treating physician may wait until the infection is cleared and the blood cell counts go back up. The doctor may also recommend medication to increase the body's production of white blood cells.

There are several medications, called colony-stimulating factors, which can prevent the white blood cell count from dropping or help it recover faster. These medications are usually given by an injection. They are most effective when started the day after chemotherapy to prevent the white blood cell count from dropping too low.

How to Increase One's White Blood Cell Count with Diet

While no specific foods or diet changes are proven to increase production of white blood cells, if one has a low white blood cell (WBC) count, it is very important to practice good hygiene, hand-washing, and food safety practices. Neutrophils are the cells that fight bacterial infection. Neutropenia, which simply means low levels of neutrophils, occurs when Absolute neutrophil count (ANC) falls below 1 500. When this happens, a person is more susceptible to infections.

If one has neutropenia, one should avoid raw meat, eggs and fish, mouldy or expired food, unwashed or mouldy fruit and vegetables, and unpasteurised beverages, including fruit and vegetable juice, milk, as well as unpasteurised honey. One need not avoid fresh fruit and vegetables, because avoiding them has not been shown to reduce the number of major infections. However, one should wash these foods thoroughly before eating them.

Good quality protein is important for cancer patients to include in their diet, because one's body needs the building blocks (amino acids) from the protein one eats to make new WBCs. If possible, consult with a Registered Dietitian (RD) for an individualised nutrition plan to address one's needs during cancer treatment. The dietitian can review one's food intake and ensure one is getting adequate protein and other nutrients during and after treatment.

If one's diet is poor, or one is having a lot of trouble eating during treatment, one may benefit from taking a multivitamin and mineral supplement with vitamin B₁₂ and folate. The body needs these two vitamins to make white blood cells. However, always talk to the treating physician or Registered Dietitian before taking any dietary supplements, because some of these products should not be taken with certain chemotherapy treatments.

Food Safety During and After Cancer Treatment

Food safety is important for people both during and after cancer treatment. Cancer and cancer treatments, such as chemotherapy, radiation therapy, and stem cell/bone marrow transplantation, often weaken the immune system. This makes it harder for one's body to protect itself from foodborne illness, also called food poisoning. Foodborne illness is caused by eating food that contains harmful bacteria, parasites, viruses, or other substances.

FOOD SAFETY FOR PEOPLE WITH CANCER

1 IN 6 Americans get sick from foodborne illness each year

What are the SYMPTOMS of foodborne illness?

- FEVER
- NAUSEA & VOMITING
- DEHYDRATION
- UPSET STOMACH
- CRAMPS
- DIARRHEA

SAFE MINIMUM INTERNAL TEMPERATURES

- 145°F** Beef, Pork, Lamb, & Veal (or 3 min. rest time)
- 160°F** Ground Meat
- 165°F** All Poultry

Why Food safety is important for people with cancer because treatment can weaken the immune system. Chemotherapy and radiation therapy may cause **neutropenia**—a decrease in white blood cells that fight off infection.

Ask Your Doctor:

- Am I at increased risk for foodborne illness? How long will this risk last?
- What steps should I take to prevent foodborne illness?
- Which foods require special preparation to prevent foodborne illness?
- Whom should I contact if I think I have a foodborne illness?
- What treatment do you recommend for my foodborne illness?
- How can I prevent dehydration?
- Is there anything else I should be asking?

Foods to AVOID

- Raw or undercooked meat, poultry, or seafood
- Unpasteurized or raw milk
- Raw or undercooked eggs
- Unwashed fresh produce
- Soft cheeses made from unpasteurized (raw) milk
- Cold hot dogs & deli meats
- Raw sprouts (alfalfa, bean, etc)

Foods to EAT

- Meat, poultry, & seafood cooked to a safe internal temperature
- Pasteurized milk
- Cooked eggs with a firm yolk
- Washed fresh or cooked produce
- Hard cheeses or soft cheese made from pasteurized milk
- Reheat hot dogs & deli meat to steaming hot or 165 °F
- Cooked sprouts

CLEAN: Wash hands & surfaces often.

SEPARATE: Keep raw meat & poultry separate from ready-to-eat foods.

COOK: Cook foods to a safe internal temperature.

CHILL: Chill perishable foods within 2 hours.

USDA For more food safety tips, go to **FoodSafety.gov** Cancer.Net Doctor-Approved Patient Information from ASCO®

145°F = 65°C

160°F = 70°C

165°F = 75°C

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Ask a member of the health care team about special food safety steps. This discussion may include how to safely handle, prepare, and store food. One should also discuss which foods one should avoid and how long one should take food precautions, if needed.

Foods to avoid - some foods have a higher risk of becoming tainted with bacteria. These include:

- Unwashed fresh fruit and vegetables, especially leafy vegetables that can hide dirt and other contaminants
- Raw sprouts, such as alfalfa sprouts
- Raw or undercooked beef, especially ground beef, or other raw or undercooked meat and poultry
- Cold hot dogs or deli lunch meat (cold cuts), including dry-cured, uncooked salami. Always cook or reheat these foods until they are steaming hot.
- Refrigerated pâté
- Raw or undercooked shellfish, such as oysters.
- Smoked fish
- Some types of fish, both raw and cooked, as they may contain high levels of mercury
- Sushi and sashimi, which often contain raw fish. Commercially frozen fish, especially those labelled “sushi-grade” or “sashimi-grade,” is safer than other fish, but check with the treating physician or Registered Dietitian before eating it.
- Unpasteurised beverages, such as unpasteurised fruit juices, raw milk, raw yogurt, or cider
- Soft cheeses made from unpasteurised milk, such as blue-veined (a type of blue cheese), Brie, Camembert, feta, goat cheese, and queso fresco or blanco
- Undercooked eggs, such as soft boiled, over easy, and poached; raw, unpasteurised eggs; or foods made with raw egg, such as homemade raw cookie dough and homemade mayonnaise
- Deli-prepared salads with egg, ham, chicken, or seafood

Prepare and clean up foods carefully – this includes:

- Rinse all fresh fruits and vegetables under running water, and dry them with a clean towel or paper towel.
- Clean the top of cans before opening them.
- After preparing food, wash hands for 20 seconds with hot water and soap. Pay special attention to areas between fingers and under nails.
- Clean utensils and dishes with hot water and soap.
- Disinfect the kitchen and cutting boards using 1 teaspoon of liquid, unscented bleach mixed into 1 litre of water.

Prevent cross-contamination:

- Keep raw meat, poultry, and fish or their juices away from other food. Bacteria can spread through contact with the food or its liquid, causing cross-contamination.
- Do not rinse raw meat or poultry because it can spread bacteria to nearby surfaces.
- Wash all items used for preparing raw foods, including utensils, cutting board, and plates, before using them for other foods or cooked meat.
- Set aside a specific cutting board for preparing uncooked meat, fish, and chicken. Never use it for uncooked fruits, vegetables, or other foods.

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Dispose of old food:

- Eat canned and packaged food before its expiration date (the “use by” or “best before” date).
- Consume refrigerated leftovers within 3 to 4 days. After that time, throw out the food. Even if the food does not smell or look spoiled, it still may be unsafe. Some bacteria, such as *Listeria*, can grow even on foods stored in the refrigerator if they are kept for too long.

Take precautions when eating out:

- At restaurants, avoid buffets and salad bars where food sits out for a long time and comes in contact with many people. Food can become contaminated when someone with a virus, often a norovirus, or another “bug” handles it.
- Put any leftover food in a “to-go” container yourself, rather than having the server do it. And, refrigerate leftovers as soon as one gets home.
- Choose restaurants that are clean and that are willing to prepare food as one orders it to be cooked.

Cook food to the right temperature - use a food thermometer to check for a safe internal temperature of all poultry and meat. For instance, a hamburger should be cooked to at least medium (71°C).

Chill food promptly - refrigerate or freeze perishable food within 2 hours of cooking or buying it (sooner in warm weather.) Proper cooking destroys bacteria, but they can still grow on cooked food that is left out too long. Food stored in the refrigerator should be kept at below 4°C. And, food stored in the freezer should be kept below 0°C.

Thaw food properly - thaw frozen food in the refrigerator rather than at room temperature. You can also thaw food in frequently changed cold water or in the microwave, but cook it as soon as it thaws.

Think about the water source - some water sources, such as well water, may contain potentially harmful bacteria or chemicals. Community-supplied tap water is fine for healthy individuals, but it is not tested for safety for people with weakened immune systems. Use a water filter to remove spores and cysts, as well as trace organics and heavy metals, for food preparation and drinking. Many types of these filters are for sale in stores.

Foods That May Help Boost the Immune System

The following may help to boost one’s immune system:

CITRUS

Most people turn to vitamin C after they have caught a cold. That is because it is said to help build up the immune system. Vitamin C is thought to increase the production of white blood cells and white blood cells are key to fighting infections.

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Popular citrus fruits include:



- Grapefruit – **avoid grapefruit while still on treatment as grapefruit negatively influences the effect of chemotherapy**
- Oranges
- Tangerines
- Lemons
- Limes
- clementines

Because one's body does not produce or store it, one needs daily Vitamin C for continued health. Almost all citrus fruits are high in Vitamin C. With such a variety to choose from, it is easy to add a squeeze of this vitamin to any meal.

RED BELL PEPPERS

Red bell peppers ARE SAID TO contain twice as much Vitamin C as citrus fruit. They are also a rich source of natural beta carotene. Besides boosting the immune system, Vitamin C may help maintain healthy skin. Beta carotene helps keep eyes and skin healthy.



BROCCOLI



Broccoli is supercharged with vitamins and minerals. Packed with Vitamins A, C, and E, as well as many other antioxidants and fibre, broccoli is one of the healthiest vegetables one can put on the table. The key to keeping its power intact is to cook it as little as possible – or better yet, not at all.

GARLIC

Garlic is found in almost every cuisine in the world. It adds a little zing to food and it is a must-have for one's health. Early civilizations recognised its value in fighting infections. Garlic may also help lower blood pressure and slow down hardening of the arteries. Garlic's immune-boosting properties seem to come from a heavy concentration of sulphur-containing compounds, such as allicin.



GINGER



Ginger is said to help decrease inflammation, which can help reduce a sore throat and other inflammatory illnesses. Ginger may also help alleviate nausea. While it is used in many sweet desserts, ginger packs some heat in the form of gingerol, a relative of capsaicin. Ginger may also help decrease chronic pain and may possess cholesterol-lowering properties, according to recent animal research.

SPINACH

Spinach is rich in Vitamin C. It is also packed with numerous antioxidants and beta carotene, which may increase the infection-fighting ability of the immune system. Similar to broccoli, spinach is healthiest when it is cooked as little as possible so that it retains its nutrients. However, light cooking enhances its vitamin A and allows other nutrients to be released from oxalic acid.



UNSWEETENED YOGURT



Look for yogurts that have "live and active cultures" printed on the label, like Greek yogurt. These cultures may stimulate the immune system to help fight diseases. Try to get plain yogurts rather than the kinds that are pre-flavoured and loaded with sugar. One can sweeten plain yogurt oneself with healthy fruits instead.

Yogurt can also be a great source of Vitamin D, so try to select brands fortified with vitamin D. Vitamin D helps regulate the immune system and is thought to boost the body's natural defences against diseases.

ALMONDS

When it comes to preventing and fighting off colds, Vitamin E tends to take a backseat to vitamin C. However, Vitamin E is key to a healthy immune system. It is a fat-soluble vitamin, meaning it requires the presence of fat to be absorbed properly. Nuts, such as almonds, are packed with the vitamin and also have healthy fats. A half-cup serving, which is about 46 whole, shelled almonds, provides nearly 100 percent of the recommended daily amount of Vitamin E.



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TURMERIC



Most people know turmeric as a key ingredient in many curries. But this bright yellow, bitter spice has also been used for years as an anti-inflammatory agent in the treatment of both osteoarthritis and rheumatoid arthritis. Also, research has shown that high concentrations of curcumin, which gives turmeric its distinctive colour, can help decrease exercise-induced muscle damage. There are also claims of cancer-fighting ability of curcumin.

GREEN TEA

Both green and black teas are packed with flavonoids, a type of antioxidant. Where green tea really excels is in its levels of epigallocatechin gallate, or EGCG, another powerful antioxidant. EGCG has been shown to enhance immune function. The fermentation process black tea goes through destroys a lot of the EGCG. Green tea, on the other hand, is steamed and not fermented, so the EGCG is preserved.

Green tea is also a good source of the important amino acid L-theanine. L-theanine may aid in the production of germ-fighting compounds in the T-cells.



ROOIBOS TEA



Rooibos tea intake may be of value in prophylaxis of the diseases involving a severe defect in Th1 immune response such as cancer, allergy, AIDS, and other infections.

South African researchers (Van der Merwe, *et al.*) collaborated to compare the potential of different kinds of tea (Rooibos, Honeybush, black oolong and green tea) to suppress mutations, and thereby prevent cancer. Their results confirmed that the phenolic compounds in herbal tea extracts have a strong anti-

mutagenic effect (*in vitro* study using cell lines). '*In vitro*' means taking place in a test tube.

The ability of South African Rooibos extracts to act as 'chemopreventors' in skin cancer was highlighted by a South African research team (Marnewick, *et al.*) using an animal model. They showed that topical (external) application of tea fractions significantly suppressed tumour growth in mice with skin cancer, when using processed and unprocessed tea.

Research teams in Japan (Ichiyama, *et al.*) demonstrated that the active ingredients in a water-soluble fraction of Rooibos Tea restored immune function in immune-suppressed rats. These results hold significant potential for future research into the immune-boosting properties of Rooibos Tea that could potentially benefit people living with HIV/Aids and cancer.

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Caution Expressed Around Consumption of Foods High in Phytoestrogens by Individuals Diagnosed with a Hormone-Sensitive Cancer

The Cancer Association of South Africa (CANSA) has noted:

- A statement by Memorial Sloan Kettering Cancer Center saying that “... because compounds isolated from rooibos leaves demonstrated estrogenic activity, patients with hormone-sensitive cancers should use caution before taking rooibos.” (Memorial Sloan Kettering Cancer Center).
- That phytoestrogens were successfully isolated from rooibos leaves by scientists from the School of Pharmaceutical Sciences, University of Shizuoka, Japan (Shimamura, *et al.*, 2006).
- That according to Deng, et al., (2010), “... there are important safety concerns associated with dietary supplements and foods rich in phytoestrogens, especially for breast cancer patients with hormone-sensitive disease. Based on current evidence, we propose recommendations for advising breast cancer patients, ...”
- That, according to Nelles, Hu & Prins (2011), “Early work on the hormonal basis of prostate cancer focused on the role of androgens, but more recently estrogens have been implicated as potential agents in the development and progression of prostate cancer.”
- That, according to Reger, *et al.*, (2016), “Experimental studies suggest that phytoestrogen intake alters cancer and cardiovascular risk. Some urinary phytoestrogens were associated with cardiovascular and all-cause mortality in a representative sample of 5 179 participants. This is one of the first studies that used urinary phytoestrogens as biomarkers of their dietary intake to evaluate the effect of these bioactive compounds on the risk of death from cancer and cardiovascular disease.”

CANSA, therefore, wishes to advise individuals diagnosed with the following hormone-sensitive cancers, namely: Breast Cancer, Ovarian Cancer, Endometrial Cancer, and Prostate Cancer, to:

- use caution before taking Rooibos tea and to discuss the issue around Rooibos tea consumption with their treating Oncologist prior to consuming Rooibos tea
- also use caution before taking the following high phytoestrogen-containing foods: all soy foods (including soybeans, tofu, miso, and tempeh); legumes (especially lentils, peanuts and chickpeas) and flaxseed-containing foods. Patients are advised to discuss consumption of the listed high phytoestrogen-containing foods with their treating Oncologist prior to consuming them.

PAPAYA

Papaya is another fruit loaded with vitamin C. One can find 224 percent of the daily recommended amount of vitamin C in a single average sized papaya. Papayas also have a digestive enzyme called papain that has anti-inflammatory effects.



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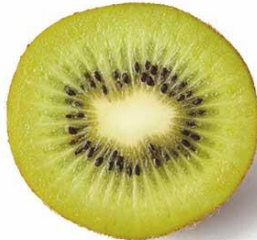
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Papayas have decent amounts of potassium, B vitamins, and folate, all of which are beneficial to one's overall health.

KIWI FRUIT



Like papayas, kiwi fruit is naturally full of essential nutrients, including folate, potassium, Vitamin K, and Vitamin C. Vitamin C boosts white blood cells to fight infection, while kiwi fruit's other nutrients keep the rest of the body functioning properly.

POULTRY

When one is sick, chicken soup is more than just a feel-good food with a placebo effect. It helps improve symptoms of a cold and also helps protect from getting sick in the first place. Poultry, such as chicken and turkey, is high in Vitamin B₆. One portion of light turkey or chicken meat contains 40 to 50 percent of one's daily recommended amount of Vitamin B₆.

Vitamin B₆ is an important player in many of the chemical reactions that happen in the body. It is also vital to the formation of new and healthy Red Blood Cells. Stock or broth made by boiling chicken bones contains gelatine, chondroitin, and other nutrients helpful for gut healing and immunity.



SUNFLOWER SEEDS



Sunflower seeds are full of nutrients, including phosphorous, magnesium, and Vitamin B₆. They are also incredibly high in Vitamin E, with 82 percent of the daily recommended amount in just a quarter-cup serving.

Vitamin E is a powerful antioxidant. It is also important in regulating and maintaining immune system function. Other foods with high amounts of vitamin E include avocados and dark leafy greens.

SHELLFISH

Shellfish is not what jumps to mind for many who are trying to boost their immune system, but some types of shellfish are packed with zinc.

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Zinc does not get as much attention as many other vitamins and minerals, but our bodies need it so that the immune cells can function as intended.

Varieties of shellfish that are high in zinc include:

- crab
- clams
- lobster
- mussels

Keep in mind that one does not want to have more than the daily recommended amount of zinc in one's diet. For adult men, the daily recommended amount is 11 milligrams (mg), and for women, it is 8 mg. Too much zinc can actually inhibit immune system function.



Additional Support

For individualised nutritional advice, consult a Registered Dietitian (RD) in your area by visiting:

<http://www.adsa.org.za/Public/FindARegisteredDietitian.aspx>

Medical Disclaimer

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Sources and References

Cancer.net

<http://www.cancer.net/survivorship/healthy-living/food-safety-during-and-after-cancer-treatment>

CANSAs Fact Sheet on Rooibos Tea

<http://www.cansa.org.za>

Chemotherapy.com

http://www.chemotherapy.com/side_effects/neutropenia/

Fact Sheet on Chemotherapy

<http://www.cansa.org.za>

Researched and Authored by Prof Michael C Herbst

[D Litt et Phil (Health Studies); D N Ed; M Art et Scien; B A Cur; Dip Occupational Health; Dip Genetic Counselling; Diagnostic Radiographer; Dip Audiometry and Noise Measurement; Medical Ethicist]

Approved by Ms Elize Joubert, Chief Executive Officer [BA Social Work (cum laude); MA Social Work]

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Fact Sheet on Garlic Use to Reduce the Risk of Cancer

<http://www.cansa.org.za>

Healthline

<http://www.healthline.com/health/food-nutrition/foods-that-boost-the-immune-system#other-options17>

International Classification of Diseases 10th version (ICD-10)

[https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2842174/#:~:text=Malignant%20rhabdoid%20tumors%20\(MRTs\)%20are,particularly%20in%20the%20soft%20tissues.](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2842174/#:~:text=Malignant%20rhabdoid%20tumors%20(MRTs)%20are,particularly%20in%20the%20soft%20tissues.)

<https://www.dana-farber.org/childhood-malignant-rhabdoid-tumor/>

<https://medlineplus.gov/genetics/condition/rhabdoid-tumor-predisposition-syndrome/>

<https://www.hindawi.com/journals/cripu/2014/950869/>

<https://jmedicalcasereports.biomedcentral.com/articles/10.1186/s13256-017-1554-2>

<http://www.cancerindex.org/ccw/guide3g.htm>

<https://www.dana-farber.org/childhood-malignant-rhabdoid-tumor/#:~:text=Diagnostic%20procedures%20for%20malignant%20rhabdoid,to%20test%20for%20genetic%20mutation.>

Jee, J., Foote, M.B., Lumish, M., Stonestrom, A.J., Wills, B., Narendra, V., Avutu, V., Murciano-Goroff, Y.R., Chan, J.E., Derkach, A., Philip, J., Belenkaya, R., Kerpelev, M., Maloy, M., Watson, A., Fong, C., Janjigian, Y., Diaz, L.A. Jr., Bolton, K.L. & Pessin, M.S. 2020. Chemotherapy and COVID-19 outcomes in patients with cancer. *J Clin Oncol.* 2020 Oct 20;38(30):3538-3546.

Leukemia and Lymphoma Society

<https://www.lls.org/managing-your-cancer/lab-and-imaging-tests/understanding-blood-counts>

Mayo Clinic

<http://www.mayoclinic.org/symptoms/low-white-blood-cell-count/basics/causes/sym-20050615>

<http://www.mayoclinic.org/tests-procedures/complete-blood-count/details/results/rsc-20257186>

Neutropenia

http://www.chemotherapy.com/side_effects/neutropenia/

Oncolink

<https://www.oncolink.org/frequently-asked-questions/cancer-treatments/chemotherapy/improving-white-blood-cell-count-during-chemotherapy>

Oncology Nutrition

<https://www.oncologynutrition.org/erfc/eating-well-when-unwell/white-blood-count-diet/>

University of Rochester Medical Center

<https://www.urmc.rochester.edu/encyclopedia/content.aspx?ContentTypeID=160&ContentID=35>

Villeneuve, S. & Aftandilian, C. 2022. Neutropenia and infection prophylaxis in childhood cancer. *Curr Oncol Rep.* 2022 Jun;24(6):671-686.

WebMD

<http://www.webmd.com/a-to-z-guides/complete-blood-count-cbc#4>

<http://www.webmd.com/a-to-z-guides/sedimentation-rate#2>

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