Cancer Association of South Africa (CANSA)

Research • Educate • Support

Fact Sheet
on
How to Reduce the Risk of Cancer

Introduction

Risk is the chance that any activity or action could happen and harm one. Almost everything one does has an associated risk. Living is a risky business. People will generally take risks if they feel that there is an advantage or benefit available to them. One needs to look at risks and benefits together. Normally the benefits of an action should outweigh the risks. There is no such thing as a zero risk. How one views risk depends to a large extent on one's own circumstances and 'comfort zone'.

[Picture Credit: Health Risk]

A risk factor is any attribute, characteristic or exposure of an individual that increases the likelihood of developing a disease or injury. Some examples of the more important risk factors are underweight, unsafe sex, high blood pressure, tobacco and alcohol consumption, and unsafe water, sanitation and hygiene.

Cancer Risk Factors

It is usually not possible to know exactly why one person develops cancer and another does not. But research has shown that certain risk factors may increase a person's chances of developing cancer. There are also factors that are linked to a lower risk of cancer. These are sometimes called protective risk factors, or just protective factors.

Cancer risk factors include exposure to chemicals or other substances, as well as certain behaviours. They also include things people cannot control, like age and family history. A family history of certain cancers can be a sign of a possible inherited cancer syndrome.

Many risk factors can be avoided. Others, such as family history, cannot be avoided. People can help to protect themselves by staying away from known risk factors whenever possible.

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; Dip Audiometry and Noise Measurement; Diagnostic Radiographer; Medical Ethicist]
Approved by Ms Elize Joubert, Chief Executive Officer [BA Social Work (cum laude); MA Social Work]

If one thinks one may be at risk for cancer, one should discuss this concern with one's doctor. Over time, several factors may act together to cause normal cells to become cancerous. When thinking about one's risk of getting cancer, these are some things to keep in mind:

- Not everything causes cancer.
- Cancer is not caused by an injury, such as a bump or bruise.
- Cancer is not contagious. Although being infected with certain viruses or bacteria may increase the risk of some types of cancer, no one can "catch" cancer from another person.
- Having one or more risk factors does not mean that one will get cancer. Most people who have risk factors never develop cancer.
- Some people are more sensitive than others to the known risk factors.

Reducing the Risk of Cancer

Cancer is often unpredictable, but there are things everyone can do to help reduce their cancer risk or improve their chances of beating the disease if they do get it. What is more, some of those same behaviours can also help lower one's risk for other serious diseases, and boost one's odds of living a longer, healthier life.

Be aware – one must look after oneself.

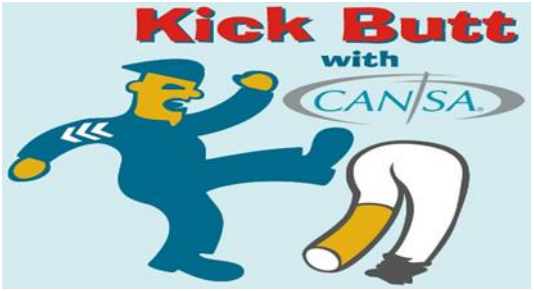
- Every individual must know his/her body and watch for signs of cancer
- Report any changes in one's health to one's healthcare provider
- Get screened and help find cancer early
- Check and know one's family's cancer history
- Understand how hormones and infections affect one's cancer risk
- Get rid of harmful substances at work and at home
- Get involved and help reduce risks for everyone
- Raise awareness about cancer prevention in every community
- Reduce cancer risks for the next generation
- Fight for public policy to make healthy living easier for everyone
- Find out how one can help the Cancer Association of South Africa (CANSA) work towards change right now

Do not use tobacco - using any type of tobacco puts one on a collision course with cancer. Smoking has been linked to various types of cancer - including cancer of the lung, mouth, throat, larynx, pancreas, bladder, prostate, cervix and kidney. Chewing tobacco has been linked to cancer of the oral cavity and pancreas. Other smokeless tobacco products like snus and snuff are evenly dangerous and carcinogenic (able to cause cancer). Even if one does not use tobacco, exposure to secondhand smoke might increase one's risk of cancer.

Tobacco has many negative side-affects that one should be aware of before using it. It is especially important to learn the inherent risks of using tobacco since it is both highly addictive and may be a huge threat to one's health.

Avoiding tobacco - or deciding to stop using it - is one of the most important health decisions one can make. It is also an important part of cancer prevention. If one needs help quitting tobacco,

contact the Cancer Association of South Africa (CANSA) about its e-KickButt programme or ask a doctor about stop-smoking products and other strategies for quitting.



[Picture Credit: CANSA e-KickButt]

Harms that can be caused by using tobacco products include:

- Addiction to nicotine
- Risks to one's Health
- Increased risk for various cancers

Nicotine in tobacco – a strong poison – is the most addictive of all drugs. It stimulates the same areas of the brain as cocaine and amphetamines, and tolerance to nicotine develops faster than to cocaine or to heroin. Neurochemically, the body adapts to the toxins in tobacco a few hours after smoking – which quickly makes smoking necessary in order to feel 'normal'.

Health risks of tobacco use include:

- Cancer of the lungs, mouth, throat, oesophagus, breast, prostate, cervix, kidneys, and more
- Chronic bronchitis
- Emphysema
- Stroke
- Heart disease

Other negatives that others (including oneself) may not like include:

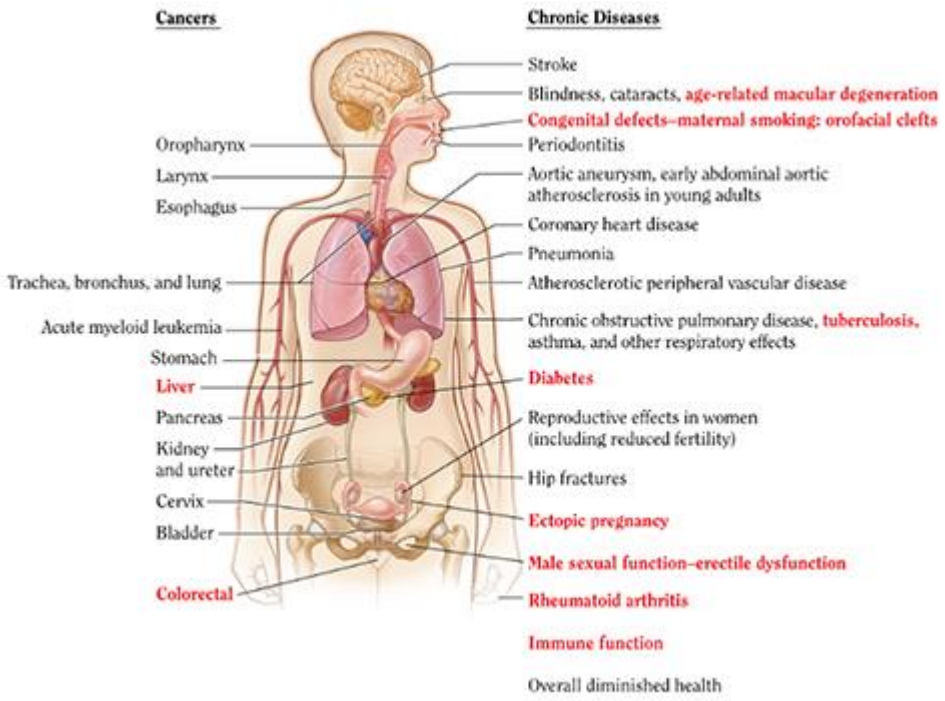
- Stained teeth
- Bad breath
- Clothes, hair, hands, room, car – all reek of smoke
- Premature face wrinkles
- Diminished sense of taste and smell
- Short of out-of-pocket cash

By smoking, one hurt others as well by polluting the air. Tobacco smoke is a serious threat to the health of non-smokers. Smoke in the air from others' cigarettes contains toxic chemicals including tar, nicotine, carbon monoxide, arsenic, and cyanide.

Non-smokers who breathe in smoke of others in the form of second-hand smoke, absorb these substances and are at risk of the same serious health consequences as smokers.

Cigarette smoking harms nearly every organ of the body, causes many diseases, and reduces the health of smokers in general. Quitting smoking lowers one's risk for smoking-related diseases and can add years to one's life.

Other health risks associated with tobacco products:



[Picture Credit: Centre for Disease Control and Prevention]

Do not be fooled – other forms of smoking are just as dangerous and bad for one's health as tobacco products.

These include:

- Hubbly Bubbly – also known as hookah, narghile, nargileh, sheesha, shisha, chicha, calean, kalian, water pipe, hubble-bubble, pipe, and tobacco pipe.

[Picture Credit: Hookah]

- Electronic cigarettes (also called e-cigarettes or electronic nicotine delivery systems or ENDS) - are battery-operated devices designed to deliver nicotine with flavourings and other chemicals to users in vapour instead of smoke. They can be manufactured to resemble traditional tobacco cigarettes, cigars or pipes, or even everyday items like pens or USB memory sticks. Newer devices, such as those with fillable tanks, may look different. More than 250 different e-cigarette brands are currently on

the market. [Picture Credit: e-Cigarettes]

While e-cigarettes are often promoted as safer alternatives to traditional cigarettes, little is actually known yet about the health risks of using these devices.

Münzel, T., Hahad, O., Kuntic, M., Keaney, J.F., Deanfield, J.E. & Daiber, A. 2020.

"Tobacco smoking is a leading cause of non-communicable disease globally and is a major risk factor for cardiovascular disease (CVD) and lung disease. Importantly, recent data by the World Health Organizations (WHO) indicate that in the last two decades global tobacco use has significantly dropped, which was largely driven by decreased numbers of female smokers. Despite such advances, the use of e-cigarettes and waterpipes (shisha, hookah, narghile) is an emerging trend, especially among younger generations. There is growing body of evidence that e-cigarettes are not a harm-free alternative to tobacco cigarettes and there is considerable debate as to whether e-cigarettes are saving smokers or generating new addicts. Here, we provide an updated overview of the impact of tobacco/waterpipe (shisha) smoking and e-cigarette vaping on endothelial function, a biomarker for early, subclinical, atherosclerosis from human and animal studies. Also their emerging adverse effects on the proteome, transcriptome, epigenome, microbiome, and the circadian clock are summarized. We briefly discuss heat-not-burn tobacco products and their cardiovascular health effects. We discuss the impact of the toxic constituents of these products on endothelial function and subsequent CVD and we also provide an update on current recommendations, regulation and advertising with focus on the USA and Europe. As outlined by the WHO, tobacco cigarette, waterpipe, and e-cigarette smoking/vaping may contribute to an increased burden of symptoms due to coronavirus disease 2019 (COVID-19) and to severe health consequences."

Madathil, S., Rousseau, M.C., Joseph, L., Coutlée, F., Schlecht, N.F., Franco, E. & Nicolau, B. 2020.

"Human papillomavirus (HPV) infection and tobacco smoking are well-known risk factors for head and neck cancers (HNC). Although an effect modification between oral HPV infection and tobacco smoking may exist, evidence is lacking on how they interact temporally. We investigated the latency and life course effects of tobacco smoking on risk of HNC among HPV-positive (HPV^{+ve}) and negative (HPV^{-ve}) individuals. We used data from 631 ever-smoker participants of a hospital-based case-control study conducted in four major hospitals in Montréal, Canada. Cases (n = 320), incident, histologically confirmed, primary squamous cell carcinomas, were frequency-matched to controls (n = 311) by age and sex. Sociodemographic and behavioral factors (e.g., tobacco and alcohol use and sexual history) were collected using a structured interview applying a life grid technique. Oral exfoliated cells were used for HPV DNA detection and genotyping. Latency effects were estimated flexibly using a Bayesian relevant exposure model and further extended with a life course approach. Retrospective smoking trajectories for HPV^{+ve} cases and controls had similar shapes. Exposure to tobacco smoking even 40 years before diagnosis was associated with an increased HNC risk among both HPV^{+ve} and HPV^{-ve} participants. The effect of smoking before the start of sexual activity compared to afterwards was higher among HPV^{+ve} individuals. This pattern of association was less profound among HPV^{-ve} participants. Temporal interactions may exists between oral HPV infection and life course smoking trajectories in relation to HNC risk."

Yoshida, K., Gowers, K.H.C., Lee-Six, H., Chandrasekharan, D.P., Coorens, T., Maughan, E.F., Beal, K., Menzies, A., Millar, F.R., Anderson, E., Clarke, S.E., Pennycuick, A., Thakrar, R.M., Butler, C.R., Kakiuchi, N., Hirano, T., Hynds, R.E., Stratton, M.R., Martincorena, I., Janes, S.M. & Campbell, P.J. 2020.

"Tobacco smoking causes lung cancer[1-3], a process that is driven by more than 60 carcinogens in cigarette smoke that directly damage and mutate DNA[4,5]. The profound effects of tobacco on the

genome of lung cancer cells are well-documented[6-10], but equivalent data for normal bronchial cells are lacking. Here we sequenced whole genomes of 632 colonies derived from single bronchial epithelial cells across 16 subjects. Tobacco smoking was the major influence on mutational burden, typically adding from 1,000 to 10,000 mutations per cell; massively increasing the variance both within and between subjects; and generating several distinct mutational signatures of substitutions and of insertions and deletions. A population of cells in individuals with a history of smoking had mutational burdens that were equivalent to those expected for people who had never smoked: these cells had less damage from tobacco-specific mutational processes, were fourfold more frequent in ex-smokers than current smokers and had considerably longer telomeres than their more-mutated counterparts. Driver mutations increased in frequency with age, affecting 4-14% of cells in middle-aged subjects who had never smoked. In current smokers, at least 25% of cells carried driver mutations and 0-6% of cells had two or even three drivers. Thus, tobacco smoking increases mutational burden, cell-to-cell heterogeneity and driver mutations, but quitting promotes replenishment of the bronchial epithelium from mitotically quiescent cells that have avoided tobacco mutagenesis."

Avoid Alcohol - when it comes to health, alcohol wields a double-edged sword. Some scientists suggest that light alcohol consumption, especially red wine, may be beneficial. The opposite is true: any alcohol consumption can raise one's risk of cancer and there is no safe level of alcohol consumption.

According to the International Agency for Research on Cancer (IARC), there is no safe level of alcohol consumption. It is a dose response: the more one drinks, the greater the risk, especially for certain cancers like those of the mouth, throat, stomach, and oesophagus. The combined effects of drinking alcohol and smoking tobacco products shoot one's risk for cancer up even higher.

Cancers linked to alcohol consumption include:

- cancer of the oral cavity
- cancer of the pharynx
- cancer of the larynx
- cancer of the oesophagus
- cancer of the colorectum and/or cancer of the colon and rectum separately
- cancer of the liver
- cholangiocarcinoma
- cancer of the stomach
- increased risk of cancer of the pancreas

Barron, K.A., Jeffriess, K.A. & Krupenko, N. 2020.
"Epidemiological evidence underscores alcohol consumption as a strong risk factor for multiple cancer types, with liver cancer being most commonly associated with alcohol intake. While mechanisms linking alcohol consumption to malignant tumor development are not fully understood, the likely players in ethanol-induced carcinogenesis are genotoxic stress caused by formation of acetaldehyde, increased oxidative stress, and altered nutrient metabolism, including the impairment of methyl transfer reactions. Alterations of sphingolipid metabolism and associated signaling pathways are another potential link between ethanol and cancer development. In particular,

ceramides are involved in the regulation of cellular proliferation, differentiation, senescence, and apoptosis and are known to function as important regulators of malignant transformation as well as tumor progression. However, to date, the cross-talk between ceramides and alcohol in cancer disease is largely an open question and only limited data are available on this subject. Most studies linking ceramide to cancer considered liver steatosis as the underlying mechanism, which is not surprising taking into consideration that ceramide pathways are an integral part of the overall lipid metabolism. This review summarizes the latest studies pointing to ceramide as an important mediator of cancer-promoting effects of chronic alcohol consumption and underscores the necessity of understanding the role of sphingolipids and lipid signaling in response to alcohol in order to prevent and/or successfully manage diseases caused by alcohol."

Knowing One's Body - it is important to know one's own body in order to recognise any potential changes that may be indicative of cancer, such as lumps or unexplained bleeding, and to get advice about whether they might be serious.

It is important to regularly examine one's whole body. Regular inspection of one's whole body is essential so that one can appreciate if something is different today than what it was like the previous week, the previous month or the previous year. Getting to now one's body is crucial as, without a baseline, one will not be able to recognise any changes.

Knowledge of one's body includes the following:

- Regular examination of one's skin. This includes the skin right from the top of one's head to the bottom of one's soles. This means that one should stand naked in front of a body length mirror and examine the front of the body. To examine the skin on one's back, one need to turn one's back to the mirror and use a smaller handheld mirror to examine the skin on the back of the body.
- Ask a friend to assist with examination of the skin on one's head.
- Regular (monthly) full and complete breast self-examination for males and females.
- Regular (monthly) testicular self-examination.
- Examination of the colour and odour of one's urine before flushing the toilet.
- Examination of one's stools, e.g. for consistency, colour, odour, presence of blood, pus, etcetera, before flushing the toilet.

Eat a healthy diet - although making healthy selections at the grocery store, inclusive of checking food labels, and at mealtime cannot guarantee cancer prevention, it will, however, help reduce one's risk for cancer.

Developing healthy eating habits is not as confusing or as restrictive as many people imagine. The essential steps are to eat mostly foods derived from plants – fresh vegetables, fresh fruit (in season), whole grains and legumes (beans, peas, and lentils) – and limit highly processed foods.

[Picture Credit: Eat Healthy]

It is scientifically proven that eating right can help one

maintain a healthy weight and avoid certain health problems, but one's diet can also have a profound effect on one's mood and sense of wellbeing. Studies have linked eating a typical Western diet - filled with processed meats, packaged meals, takeout foods, and sugary drinks and snacks - with higher rates of depression, stress, bipolar disorder, and anxiety. Eating an unhealthy diet may even play a role in the development of mental health disorders such as ADHD, Alzheimer's disease, and schizophrenia, or the increased risk of suicide in young people.

As small changes become habit, one can continue to add more healthy choices.

- Prepare more of one's own meals. Cooking more meals at home can help one take charge of what one is eating and better monitor exactly what goes into one's food.
- Make the right changes. When cutting back on unhealthy foods in one's diet, it is important to replace them with healthy alternatives. Replacing dangerous trans fats with healthy fats (such as switching chicken for grilled fish) will make a positive difference to one's health. Switching animal fats for refined carbohydrates, though, will not lower one's risk for heart disease or improve one's mood.
- Simplify - instead of being overly concerned with counting kilojoules, one should think of diet in terms of colour, variety, and freshness. Focus on avoiding packaged and processed foods and opting more for fresh ingredients.
- Read the food labels – it is important to be aware of what is in the food as manufacturers often hide large amounts of sugar, salt or unhealthy fats in packaged food, even food claiming to be healthy.
- Focus on how one feels after eating - this will help foster healthy new habits and tastes. The more healthy food one eats, the better one will feel after a meal. The more junk food one eats, the more likely one is to feel uncomfortable, nauseous, or drained of energy.
- Drink enough clean and safe water. Water helps flush the body's systems of waste products and toxins, yet many people go through life dehydrated - causing tiredness, low energy, and headaches. It is common to mistake thirst for hunger, so staying well hydrated will also help one make healthier food choices.

Consider these guidelines:

- Eat plenty of fruits and vegetables. One should base one's daily diet on 5 portions of fresh vegetables and fruit (in season) as well as other foods from plant sources - such as whole grains and beans (pulses).
  In South Africa there are many individuals who cannot afford 5 portions of fresh vegetables and seasonal fruit on a daily basis.
  To assist individuals with lower disposable income, the following may be helpful:
  Make use of the Fruit and Vegetable Colour List (Addendum A) and have wholegrain food every day with at least one vegetable and fruit from each group as follows:
  - Monday Red fruit and vegetables
  - Tuesday Yellow/Orange fruit and vegetables
  - Wednesday White and Tan/Brown fruit and vegetables
  - Thursday Green fruit and vegetables
  - Friday Blue/Purple fruit and vegetables
  - On Saturday and Sunday one can spoil oneself with whatever one has available

This will ensure that one covers the whole fruit/vegetable kingdom each week, to ensure that one consumes the best variety of available vitamins, minerals, antioxidants and other nutrients on a regular basis.

- Avoid obesity. Eat lighter and leaner by choosing fewer high-kilojoule foods, including refined sugars and fat from animal sources.
- Avoid, or at least limit, processed meats. A report from the International Agency for Research on Cancer (IARC), the cancer agency of the World Health Organization, concluded that eating large amounts of processed meat can increase the risk of certain types of cancer.
- Avoid ultraprocessed foods – consisting of food items that contain large quantities of additives such as preservatives, sweeteners, sensory enhancers, colourants, flavours and processing aids, but little or no whole food. Examples include:
  canned vegetables, fruits in syrup, processed cheeses, freshly made bread, salted/ sugared nuts or seeds. Ultra-processed food and drink products – described as 'industrial formulations' with five or more ingredients for example, ice-cream, chocolate, and candies (sweets)
- Limit the consumption of red meat.
- Limit intake of additional sugar.
- Limit intake of additional salt – do not add salt at the table.
- Try to have one vegetarian meal at least once a week.

Key to any healthy diet is moderation. But what is moderation? In essence, it means eating only as much food as one's body needs. One should feel satisfied at the end of a meal, but not stuffed. Moderation is also about balance. Despite what fad diets would have one believe, one's body needs a balance of protein, fat, fibre, carbohydrates, vitamins, and minerals to sustain a healthy body.

For many, moderation also means eating less than we do now. But it does not mean eliminating the foods one loves. Eating bacon for breakfast once a week, for example, could be considered moderation if one follows it with a healthy lunch and dinner - but not if one follows it with a box of donuts and a sausage pizza.

- Reduce portion sizes of unhealthy foods and not eating them as often. As one reduces one's intake of unhealthy foods, one may find oneself craving them less or thinking of them as only occasional indulgences.
- Think smaller portions. Serving sizes have ballooned recently. When dining out, choose a starter instead of an entree, split a dish with a friend, and do not order supersized anything.
- At home, visual cues can help with portion sizes - a serving of meat, fish, or chicken should be the size of a deck of cards and half a cup of mashed potato, rice, or pasta is about the size of a traditional light bulb. If one does not feel satisfied at the end of a meal, add more leafy green vegetables or round the meal off with fruit.
- Take time. Stop eating before feeling full. It actually takes a few minutes for one's brain to tell the body that it has had enough food, so eat slowly.
- Eat with others whenever possible. As well as the emotional benefits, this allows one to model healthy eating habits for one's kids. Eating in front of the TV or computer often leads to mindless overeating.

Eating foods high in dietary fibre can help one stay regular, lower one's risk for heart disease, stroke, diabetes and cancer. It also helps one lose weight. Depending on one's age and sex, nutrition experts

recommend one eat at least 20 to 40 grams of fibre per day for optimal health. In general, the more natural and unprocessed the food, the higher it is in fibre.

- Good sources of fibre include whole grains, wheat cereals, barley, oatmeal, beans, nuts, vegetables such as carrots, celery, and tomatoes, and fruits such as apples, berries, citrus fruits, and pears.
- There is no fibre in dairy, or sugar. Refined or 'white' foods, such as white bread, white rice, and pastries, have had all or most of their fibre removed.
- An easy way to add more fibre to one's diet is to start the day with a sugar-free whole grain cereal or add unprocessed wheat bran to one's favourite cereal.

Protein gives one the energy to get up and go - and keep going. While too much protein can be harmful to people with kidney disease, the latest research suggests that most individuals need more high-quality protein, especially as one ages. Eat plenty of fish, chicken, or plant-based protein such as beans, nuts, and soy.

- Replace processed carbohydrates from pastries, cakes, pizza, cookies and chips with fish, beans, nuts, seeds, peas, tofu, chicken, dairy, and soy products.
- Snack on nuts and seeds instead of chips. Replace baked dessert with Greek yogurt, or swap out slices of pizza for a grilled chicken breast (without skin) and a side of beans.

Despite what one may have been told, not all fats are unhealthy. While 'bad' fats can increase one's risk of certain diseases, 'good' fats are essential to physical and emotional health. Foods rich in Omega-3 fats, for example, can reduce one's risk of cancer and cardiovascular disease, improve one's mood, and help prevent dementia.

- Monounsaturated fats from avocados, nuts (like almonds, hazelnuts, and pecans), and seeds (such as pumpkin and sesame) are good for health.
- Polyunsaturated fats, including Omega-3s, found in fatty fish such as salmon, herring, mackerel, anchovies, sardines, and some cold water fish oil supplements. Good vegetarian sources of polyunsaturated fats include canola oil, flaxseed and walnuts.
- Drastically reduce intake of trans fats, found in processed foods, vegetable shortenings, margarines, crackers, candies, cookies, snack foods, fried foods, baked goods, or anything with 'partially hydrogenated' oil in the ingredients, even if it claims to be trans-fat free.

Cena, H. & Calder, P.C. 2020.
"The definition of what constitutes a healthy diet is continually shifting to reflect the evolving understanding of the roles that different foods, essential nutrients, and other food components play in health and disease. A large and growing body of evidence supports that intake of certain types of nutrients, specific food groups, or overarching dietary patterns positively influences health and promotes the prevention of common non-communicable diseases (NCDs). Greater consumption of health-promoting foods and limited intake of unhealthier options are intrinsic to the eating habits of certain regional diets such as the Mediterranean diet or have been constructed as part of dietary patterns designed to reduce disease risk, such as the Dietary Approaches to Stop Hypertension (DASH) or Mediterranean-DASH Intervention for Neurodegenerative Delay (MIND) diets. In comparison with a more traditional Western diet, these healthier alternatives are higher in plant-based foods, including fresh fruits and vegetables, whole grains, legumes, seeds, and nuts and lower in animal-based foods, particularly fatty and processed meats. To better understand the current

concept of a "healthy diet," this review describes the features and supporting clinical and epidemiologic data for diets that have been shown to prevent disease and/or positively influence health. In total, evidence from epidemiological studies and clinical trials indicates that these types of dietary patterns reduce risks of NCDs including cardiovascular disease and cancer."

Maintain a healthy weight - maintaining a healthy weight might lower the risk of various types of cancer, including cancer of the breast, prostate, lung, colon and kidney.

[Picture Credit: Healthy Weight]

Riuzzi, F., Chiappalupi, S., Arcuri, C., Giambanco, I., Sorci, G. & Donato, R. 2020.
"Obesity is an endemic pathophysiological condition and a comorbidity associated with hypercholesterolemia, hypertension, cardiovascular disease, type 2 diabetes mellitus, and cancer. The adipose tissue of obese subjects shows hypertrophic adipocytes, adipocyte hyperplasia, and chronic low-grade inflammation. S100 proteins are Ca^{2+}-binding proteins exclusively expressed in vertebrates in a cell-specific manner. They have been implicated in the regulation of a variety of functions acting as intracellular Ca^{2+} sensors transducing the Ca^{2+} signal and extracellular factors affecting cellular activity via ligation of a battery of membrane receptors. Certain S100 proteins, namely S100A4, the S100A8/S100A9 heterodimer and S100B, have been implicated in the pathophysiology of obesity-promoting macrophage-based inflammation via toll-like receptor 4 and/or receptor for advanced glycation end-products ligation. Also, serum levels of S100A4, S100A8/S100A9, S100A12, and S100B correlate with insulin resistance/type 2 diabetes, metabolic risk score, and fat cell size. Yet, secreted S100B appears to exert neurotrophic effects on sympathetic fibers in brown adipose tissue contributing to the larger sympathetic innervation of this latter relative to white adipose tissue. In the present review we first briefly introduce S100 proteins and then critically examine their role(s) in adipose tissue and obesity."

Tips on Healthy Grocery Shopping – buying groceries to improve health can be a daunting task, simply because there are so many choices. The process starts even before one heads to the grocery store.

- Before setting out for the market, plan meals for the week, and create a list to shop from. It takes a few minutes, but saves time in running back to the store for missing ingredients.
- To save money, use coupons, check the weekly grocery advertisements, and incorporate sale foods into meal planning.
- Never shop to buy groceries when hungry: an empty stomach often results in impulse purchases that may not be the healthiest.

Read labels. Look for trans fat, hydrogenated oils, high amounts of sugar, saturated fat, lots of sodium, and cholesterol. Then avoid them like the plague. Look instead for fibre, good fats, protein, vitamins, calcium.

Keep a list on the fridge, and write things down immediately. When running out of something, do not leave it to memory. Jot it down immediately, and then one will never have to run back to the store.

[Picture Credit: Healthy Shopping]

Stick to the shopping list. Avoid impulse buys. They are almost always bad, and even if it is just a couple of Rands, they will add up for a trip. Over the course of a year, that can mean thousands of Rands. Do not buy anything that is not on the list unless it is an absolute necessity (why is toilet paper not on the darn list?).

Buy in bulk, but only when it makes sense. If one can save money, over the course of a month or two by buying in bulk, plan to do so. But one must be sure that one will use all of it before it gets bad - it is not cheaper to buy in bulk if it is not used.

Cut back on red meat. Red meat is expensive. Have vegetarian meals at least once a week and for other meals, one could just use a little meat as a kind of seasoning instead of the main ingredient - think Asian, Indian and other such cultural foods.

Try the store brands. Brand names are often no better than generic brands, and one pays for all the advertising they do to have a brand name. Give the store brand a try, and often one will not notice a difference. Especially if it is an ingredient in a dish where one cannot taste the quality of that individual ingredient.

Do not buy junk food. Junk food not only costs a lot of money for about zero nutrition, it makes one and one's family overweight and obese. Opt for fresh seasonal fruits and vegetables instead.
Go for whole foods. The processed kind is lacking in nutrition and will add to make one fat. Look for things in their least processed form - whole grain instead of white or wheat bread, fresh fruit instead of canned fruit or juice, whole grain cereal or oatmeal instead of all other kinds of cereal.

Examples of whole foods include:

- **Grains** – Wheat, wholegrain **rice**, quinoa, bulgur wheat, rolled **oats**, faro and barley.
- **Beans** and **legumes** – **lentils**, kidney **beans**, **lima beans**, **split peas**, chick **peas**.
- **Nuts** and **seeds** (not salted) – peanuts, **almonds**, cashews, sunflower **seeds**, linseeds, pumpkin **seeds**.
- **Fresh seasonal fruits** and **vegetables.**

Protection from the harmful UV rays of the sun - skin cancer is one of the most common kinds of cancer - and one of the most preventable. According to the South African National Cancer Registry (2011) a total of 20 364 cases of non-melanoma skin cancers were recorded in 2011.

Try these tips:

- Avoid midday sun. Stay out of the sun between 10:00 and 15:00, when the sun's rays are strongest. Stay in the shade. When outdoors, stay in the shade as much as possible. Sunglasses and a broad-brimmed hat will help too.

[Picture Credit: Sunlight]

- Cover exposed skin areas. Wear tightly woven, loose fitting clothing that covers as much of the skin as

possible. Opt for bright or dark colours, which reflect more ultraviolet radiation than pastels or bleached cotton.

- Do not skimp on sunscreen. Use generous amounts of sunscreen according to skin type when outdoors, and reapply often – at least 2-hourly – depending on whether one sweats, etc.
- Avoid tanning beds and sunlamps. These are more damaging than natural sunlight.

Jones, O.T., Ranmuthu, C.K.I., Hall, P.N., Funston, G. & Walter, F.M. 2020.
"Skin cancer, including melanoma, basal cell carcinoma and cutaneous squamous cell carcinoma, has one of the highest global incidences of any form of cancer. In 2016 more than 16,000 people were diagnosed with melanoma in the UK. Over the last decade the incidence of melanoma has increased by 50% in the UK, and about one in ten melanomas are diagnosed at a late stage. Among the keratinocyte carcinomas (previously known as non-melanoma skin cancers), basal cell carcinoma is the most common cancer amongst Caucasian populations. The main risk factor for all skin cancer is exposure to ultraviolet radiation-more than 80% are considered preventable. Primary care clinicians have a vital role to play in detecting and managing patients with skin lesions suspected to be skin cancer, as timely diagnosis and treatment can improve patient outcomes, particularly for melanoma. However, detecting skin cancer can be challenging, as common non-malignant skin lesions such as seborrhoeic keratoses share features with less common skin cancers. Given that more than 80% of skin cancers are attributed to ultraviolet (UV) exposure, primary care clinicians can also play an important role in skin cancer prevention. This article is one of a series discussing cancer prevention and detection in primary care. Here we focus on the most common types of skin cancer: melanoma, squamous cell carcinoma and basal cell carcinoma. We describe the main risk factors and prevention advice. We summarise key guidance on the symptoms and signs of skin cancers and their management, including their initial assessment and referral. In addition, we review emerging technologies and diagnostic aids which may become available for use in primary care in the near future, to aid the triage of suspicious skin lesions."

<u>Get immunised</u> - cancer prevention includes protection from certain viral infections. Talk to a doctor about immunisation against:

- Hepatitis B - Hepatitis B can increase the risk of developing liver cancer. The Hepatitis B vaccine is recommended for certain high-risk adults - such as adults who are sexually active but not in a mutually monogamous relationship, people with sexually transmitted infections, intravenous drug users, men who have sex with men, and health care or public safety workers who might be exposed to infected blood or body fluids.

[Picture Credit: Immunisation]

Lin, C-L. & Kao, J-H. 2020.
"Enhancing host immunity by vaccination to prevent hepatitis B virus (HBV) infection remains the most important strategy for global control of hepatitis B. Currently, 187 countries have in place infant hepatitis B vaccination programs. Hepatitis B surface antigen prevalence has decreased to less than 1% in children after successful implementation of universal HBV vaccination in newborns. The incidence of primary liver cancer in children, adolescents, and young adults has drastically decreased to near zero in birth cohorts receiving hepatitis B vaccination. Elimination of chronic hepatitis B by 2030 is not a mission impossible."

- Human papillomavirus (HPV). HPV is a sexually transmitted virus that can lead to cervical and other genital cancers as well as squamous cell cancers of the head and neck. The HPV vaccine is recommended for girls and boys ages 8 to10. It is also available to both men and women age 26 or younger who did not have the vaccine as adolescents. It is preferable to get HPV vaccines before becoming sexually active.

Athanasiou, A., Bowden, S., Paraskevaidi, M., Fotopoulou, C., Martin-Hirsch, P., Paraskevaidis, E. & Kyrgiou, M. 2020.
"Prophylactic vaccines have been found to be highly effective in preventing infection and pre-invasive and invasive cervical, vulvovaginal and anal disease caused by the vaccine types. HPV vaccines contain virus-like particles that lack the viral genome and produce high titres of neutralising antibodies. Although the vaccines are highly effective in preventing infections, they do not enhance clearance of existing infections. Vaccination programmes target prepubertal girls and boys prior to sexual debut as efficacy is highest in HPV naïve individuals. School-based programmes achieve higher coverage, although implementation is country specific. Vaccination of older women may offer some protection and acceleration of impact, although this may not be cost-effective. HPV-based screening will continue for vaccinated cohorts, although intervals may increase."

Staples, J.N. & Duska, L.R. 2019.
"The Pap smear is the only proven screening intervention in the field of gynecologic oncology. Women should receive treatment for precancerous conditions of the cervix, vulva, vagina, and endometrial lining. Women with inherited conditions should consider having a risk-reducing surgery once they have finished childbearing. The human papilloma virus vaccination should be offered to all girls and boys aged 11 to 12 years, and can also be given as early as age 9 and through 26 years of age."

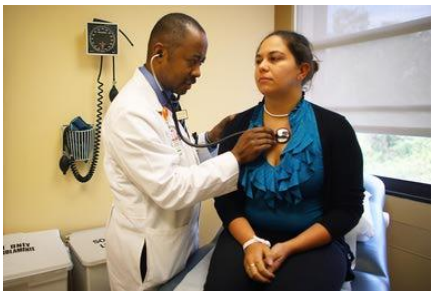
<u>Avoid risky behaviours</u> - another effective cancer prevention tactic is to avoid risky behaviours that can lead to infections that, in turn, might increase the risk of cancer.

For example:

- Practice safe sex. Limit the number of sexual partners, and use a condom when having sex. The more sexual partners one has in one's lifetime, the more likely one is to contract a sexually transmitted infection - such as HIV or HPV. People who have HIV or AIDS have a higher risk of cancer of the anus, liver, lung, as well as head-and-neck cancers. HPV is most often associated with cervical cancer, but it might also increase the risk of cancer of the anus, penis, throat, vulva and vagina.

- Do not share needles. Sharing needles with an infected drug user can lead to HIV, as well as Hepatitis B and Hepatitis C - which can increase the risk of liver cancer. If concerned about drug abuse or addiction, seek professional help.

[Picture Credit: Risky Behaviour]



Get regular medical care - regular self-examinations and screenings for various types of cancers - such as cancer of the skin, colon, testicles, cervix and breast - can increase one's chances of discovering cancer early, when treatment is most likely to be successful. Ask a doctor about the best cancer screening schedule.

[Picture Credit: Medical Examination]

Be physically active - in addition to helping one control one's weight, physical activity on its own assists in lowering the risk of breast cancer and colon cancer.

- Adults who participate in any amount of physical activity gain health benefits. But for substantial health benefits, one should strive to get at least 150 minutes a week of moderate aerobic activity or 75 minutes a week of vigorous aerobic physical activity. One can also do a combination of moderate and vigorous activity. As a general goal, include at least 30 minutes of physical activity in one's daily routine - and if one can do more, even better.

[Picture Credit: Physical Activity]

- Children and teens – should get at least 1 hour of moderate to vigorous intensity activity each day, with at least 2,5 hours of moderate intensity aerobic activity each week.
- Limit sedentary behaviour such as sitting, lying down, watching TV, and other forms of screen-based entertainment. Doing some physical activity over and above usual activities, no matter what one's level of activity, can have many health benefits.

Go for Regular Screening - many screening tests for various cancers, like mammograms and prostate-specific antigen (PSA) testing, do not actually prevent cancer -- they just catch it at a very early stage, when it may be more treatable.

Other tests, like Pap tests, HPV tests, and colonoscopies, can help detect pre-cancerous changes that, if left untreated, can turn into cervical cancer, head-and-neck cancers, or colorectal cancer.

There are many confusing messages about what screening tests different people should use, and when. Instead of trying to figure it out on one's own, talk to a doctor or health professional about individual situations.

Take screening mammograms, for instance. The question is not 'Should women under 40 get mammograms?' but 'Should I, given my own personal situation and family health history, start mammograms before age 40?'

[Picture Credit: Screening]

Screening for prostate cancer includes:

- Digital rectal examination (DRE) by a doctor where the doctor inserts a lubricated, gloved finger into the rectum to examine the prostate
- Urine test to check for the presence of blood
- Measurement of Prostate Specific Antigen (PSA) which is discussed in more detail below. The prostate normally secretes small amounts of PSA, A higher level may indicate a problem with the prostate. It may be cancer or merely an enlarged prostate caused by infection

The above tests can only detect whether there is a problem in the prostate. They cannot show whether the problem is cancer or a less serious condition.

Shake Off Stress - people always want to know if stress can raise one's cancer risk. There is no convincing evidence that, by itself, stress is an independent risk factor for cancer. But what it can do is lead people to engage in unhealthy behaviour in an effort to cope with stress. If one is overeating, drinking, or smoking to self-medicate one's stress away, those behaviours all raise one's cancer risk.

[Picture Credit: Stress]

Knowledge of Family Health History – it is advised to learn one's family health histories in detail. Family history is where one can really create a personalised strategy for cutting cancer risk and catching it early.

So, next time at a family reunion, make it a project to gather information on who's had what health condition and when.

[Picture Credit: Family History]

Medical Disclaimer

This Fact Sheet is intended to provide general information only and, as such, should not be considered as a substitute for advice, medically or otherwise, covering any specific situation. Users should seek appropriate advice before taking or refraining from taking any action in reliance on any information contained in this Fact Sheet. So far as permissible by law, the Cancer Association of South Africa (CANSA) does not accept any liability to any person (or his/her dependants/ estate/heirs) relating to the use of any information contained in this Fact Sheet.

Whilst CANSA has taken every precaution in compiling this Fact Sheet, neither it, nor any contributor(s) to this Fact Sheet can be held responsible for any action (or the lack thereof) taken by any person or organisation wherever they shall be based, as a result, direct or otherwise, of information contained in, or accessed through, this Fact Sheet.

Sources and References Consulted or Utilised

American Institute for Cancer Research
http://www.aicr.org/reduce-your-cancer-risk/?referrer=https://www.google.co.za/

Athanasiou, A., Bowden, S., Paraskevaidi, M., Fotopoulou, C., Martin-Hirsch, P., Paraskevaidis, E. & Kyrgiou, M. 2020. HPV vaccination and cancer prevention. *Best Pract Res Clin Obstet Gynaecol.* 2020 May;65:109-124.

Barron, K.A., Jeffriess, K.A. & Krupenko, N. 2020. Sphingolipids and the link between alcohol and canceer. *Chem Biol Interact*. 2020 May 1;322:109058.

Berkeley Wellness, University of California
http://www.berkeleywellness.com/healthy-eating/food/slideshow/14-keys-healthy-diet

Canadian Cancer Society
http://www.cancer.ca/en/cancer-information/cancer-101/how-to-reduce-cancer-risk/?region=on

Cena, H. & Calder, P.C. 2020. Defining a healthy diet: evidence for the role of contemporary dietary patterns in health and disease. *Nutrients*. 2020 Jan 27;12(2):334.

Centers for Disease Control and Prevention (CDC)
https://www.cdc.gov/tobacco/data_statistics/fact_sheets/health_effects/effects_cig_smoking/

Comprehensive Cancer Center
http://www.mcancer.org/cancer-prevention

Eat Healthy
https://fitbytrazy.wordpress.com/2015/03/25/letstalk-health-is-a-right-so-eat-healthy-its-as-simple-as-that/

e-Cigarette
https://www.google.co.za/search?q=e-cigarette&source=lnms&tbm=isch&sa=X&ei=ODzVUdzAH8TZtQavyICgAg&sqi=2&ved=0CAcQ_AUoAQ&biw=942&bih=464#facrc=_&imgdii=h6vyIPlN0eRcIM%3A%3BIH4rdOekUxu-tM%3Bh6vyIPlN0eRcIM%3A&imgrc=h6vyIPlN0eRcIM%3A%3BVHoHGXSAUMZ2JM%3Bhttp%253A%252F%252Fatlantablackstar.com%252Fwp-content%252Fuploads%252F2012%252F08%252F3.jpg%3Bhttp%253A%252F%252Fatlantablackstar.com%252F2012%252F08%252F27%252Felectronic-cigarettes-are-not-linked-to-heart-disease%252Fattachment%252F28918%252F%3B3264%3B2448

Family History
http://www.bushfamilysociety.org.au/society-news/2015-family-reunion/

Health Risk
https://www.medicinehow.com/heart-health-risk/

Healthy Shopping
http://www.trimdownclub.com/shopping-the-smart-and-healthy-way/

Healty Weight
https://healthychoices4life.wordpress.com/2011/04/06/maintain-a-healthy-weight/

HelGuide.Org
http://www.helpguide.org/articles/healthy-eating/healthy-eating.htm

Hookah
https://www.google.co.za/search?q=hookah+smoking&source=lnms&tbm=isch&sa=X&ei=OzrVUYnmEMSFhQfEiYDYAg&sqi=2&ved=0CAcQ_AUoAQ&biw=942&bih=464#facrc=_&imgdii=_&imgrc=W-Z7ADo8uLejbM%3A%3BLIt-

International Agency for Research on Cancer (IARC)
http://monographs.iarc.fr/ENG/Monographs/vol100E/mono100E-11.pdf
http://www.aicr.org/assets/docs/pdf/healthykids/healthy-grocery-shopping-lesson-plan.pdf

Jones, O.T., Ranmuthu, C.K.I., Hall, P.N., Funston, G. & Walter, F.M. 2020. Recognising Skin Cancer in Primary Care Adv Ther. 2020 Jan;37(1):603-616.

Lin, C-L. & Kao, J-H. 2020. Hepatitis B: immunization and impact on natural history and cancer incidence. *Gastroenterol Clin North Am*. 2020 Jun;49(2):201-214.

Madathil, S., Rousseau, M.C., Joseph, L., Coutlée, F., Schlecht, N.F., Franco, E. & Nicolau, B. 2020. Latency of tobacco smoking for head and neck cancer among HPV-positive and HPV-negative individuals. *Int J Cancer*. 2020 Jul 1;147(1):56-64.

Mayo Clinic
http://www.mayoclinic.org/healthy-lifestyle/adult-health/in-depth/cancer-prevention/art-20044816?pg=2

Medical Examination
http://www.jcsimmigration.com/uscis-medical-exam/

MedicineNet
http://www.medicinenet.com/cancer_causes/article.htm

Münzel, T., Hahad, O., Kuntic, M., Keaney, J.F., Deanfield, J.E. & Daiber, A. 2020. Effects of tobacco cigarettes, e-cigarettes, and waterpipe smoking on endothelial function and clinical outcomes. *Eur Heart J*. 2020 Nov 1;41(41):4057-4070.

National Cancer Institute
https://www.cancer.gov/about-cancer/causes-prevention/risk

NHS Choices
http://www.aicr.org/reduce-your-cancer-risk/?referrer=https://www.google.co.za/

Palo Alto Medical Foundation
http://www.pamf.org/teen/risk/smoking/risks.html

Physical Activity
https://sph.umd.edu/department/knes/lab/67296

Risky Behaviour
https://kidshelpline.com.au/teens/tips/risky-behaviours-the-facts/

Riuzzi, F., Chiappalupi, S., Arcuri, C., Giambanco, I., Sorci, G. & Donato, R. 2020. S100 proteins on obesity: liaisons dangereuses. *Cell Mol Life Sci*. 2020 Jan;77(1):129-147.

Royal College of Obstetricians and Gynaecologists
https://www.rcog.org.uk/en/patients/patient-leaflets/understanding-how-risk-is-discussed-in-healthcare/

Screening
http://www.lasvegasthermography.com/breast-cancer/mammography-vs-thermography/

Staples, J.N. & Duska, L.R. 2019. Cancer screening and prevention highlights in gynecologic cancer. *Obstet Gynecaol Clin North Am*. 2019 Mar;46(1):19-36. doi: 10.1016/j.ogc.2018.09.002.

Stress
http://www.allouteffort.com/2013/09/the-upside-to-stress.html

Sunlight
http://upsmash.com/story/how-to-take-care-of-skin-in-summer

WebMD
http://www.webmd.com/cancer/features/8-ways-to-lower-cancer-risk#3

World Health Organization
http://www.who.int/topics/risk_factors/en/

Yoshida, K., Gowers, K.H.C., Lee-Six, H., Chandrasekharan, D.P., Coorens, T., Maughan, E.F., Beal, K., Menzies, A., Millar, F.R., Anderson, E., Clarke, S.E., Pennycuick, A., Thakrar, R.M., Butler, C.R., Kakiuchi, N., Hirano, T., Hynds, R.E., Stratton, M.R., Martincorena, I., Janes, S.M. & Campbell, P.J. 2020. Tobacco smoking and somatic mutations in human bronchial epithelium. *Nature*. 2020 Feb;578(7794):266-272.

ADDENDUM A

Fruit and Vegetable Colour List

RED Fruit and Vegetables	
Red apples	Beets
Blood oranges	Red Peppers
Cherries	Radishes
Cranberries	Radicchio – looks like purple cabbage with white veins
Red Grapes	Red onions
Red/Pink grapefruit	Red potatoes
Read pears	Rhubarb
Pomegranates	Tomatoes
Raspberries	
Strawberries	
Watermelon	
YELLOW/ORANGE Fruit and Vegetables	
Yellow apples	Yellow beets
Apricots	Butternut squash
Cape gooseberries	Carrots
Cantaloupe – Spanspek	Yellow peppers
Yellow figs	Yellow potatoes
Grapefruit	Pumpkin
Golden Kiwifruit	Rutabagas – looks like turnip but flesh is yellow
Lemons	Yellow summer squash
Mangoes	Sweet corn
Nectarines	Sweet potatoes
Oranges	Yellow tomatoes
Papayas	Yellow winter squash
Peaches	
Yellow pears	
Persimmons	
Pineapples (berries)	
Tangerines	
Yellow watermelon	

WHITE or TAN/BROWN Fruit and Vegetables	
Bananas	Cauliflower
Dates	Garlic
White nectarines	Ginger
White peaches	Jerusalem artichokes
Brown pears	Jicama – Mexican turnip
	Kohlrabi
	Mushrooms
	Onions
	Parsnips
	Potatoes (white flesh)
	Shallots
	Turnips
	White corn

GREEN Fruit and Vegetables	
Avocados	Artichokes
Green apples	Arugula – rocket
Green grapes	Asparagus
Honeydew	Broccoflower – Brassica
Kiwifruit	Broccoli
Limes	Broccoli rabe
Green peas	Brussels sprouts
	Chinese cabbage
	Green beans
	Green cabbage
	Celery
	Chayote squash or Chaote squash
	Cucumbers
	Leafy greens
	Leeks
	Lettuce
	Okra (ladies fingers)
	Green onions
	Peas
	Green peppers
	Snow peas
	Spinach
	Sugar snap peas
	Watercress
	Zucchini (baby marrow)
BLUE/PURPLE Fruit and Vegetables	
Blackberries	Black olives
Blueberries	Purple asparagus
Black currants	Purple cabbage
Concord grapes	Purple carrots
Dried plums	Eggplant
Elderberries	Purple Belgian Endive
Purple figs	Potatoes (purple flesh)

Purple grapes	Black salsify
Plums	
Raisins	