

# A Practical Guide to Nutrition

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## Maintaining Your Nutritional Health

Good nutrition is the foundation of good health. When you are HIV+, good nutrition is important. Many studies have shown that HIV+ people who are malnourished are likely to get sick more often, and have shorter survival times than other HIV+ people. (1) Poor nutrition has also been observed to weaken the immune system. (2)

You need to balance the amount of energy you eat as food with the amount of energy your body needs to maintain itself, and to conduct your daily activities. If you take in more food energy than is necessary, you will gain weight; if you take in less, you lose weight. If you are HIV+ there may be a number of reasons why you take in less food energy. Drugs or opportunistic illnesses may cause symptoms that make eating unappealing. Your energy level may be low and you may not be active enough to stimulate your appetite or to feel like preparing complete meals. Some drugs also alter your sense of taste or smell, and this may, in turn, affect your diet.

Your body may also be less capable of taking in nutrients and therefore energy. (3) This is called malabsorption. Malabsorption may be caused by bacterial or parasitic infections in your intestines. It may be caused by changes in your intestines due to HIV. Malabsorption may occur when you have diarrhea caused by drugs you are taking.

People with HIV need to pay attention to their diet to get the best possible nutrient balance. They may also need to supplement certain specific nutrients. If a person with HIV does not take in enough nutrients, their energy intake is decreased and they may begin to lose weight. We will discuss the problem of weight loss and how to deal with it later in this guide. First, let's talk about eating to stay healthy and get the nutrients you need.

### Making Nutrition Decisions

There is some conflicting advice about how people with HIV should eat, and even more around what nutrients they should supplement. HIV is a relatively new disease and there are many uncertainties about how to treat it. As well, research into nutrition has often been of lower priority than research into drugs that can be patented and sold. Lastly and probably most significantly, there are many differences between individuals with HIV. The immune destruction seen in HIV leaves people vulnerable to different diseases. Different disease processes will change your body's nutritional needs in different ways. This phenomenon means many of the studies done on HIV+ people have produced conflicting results.

So how do you find out what is right for you? First, we encourage you to do as much research as you can. It is useful to get information from many sources, and not to trust just one article or person for all of your information. Talk to other people living with HIV/AIDS about what works for them. Discuss what's right for you with your doctor. There are a number of existing tests that your doctor can use to help assess your nutritional health and some new tests on the horizon that may provide more insights in the future. You may want to call CATIE, toll free at 1-800-263-1638, and ask us to help you find the information you need. You can also use the information at the end of this guide to find out more about HIV and your nutritional needs.

In the case of nutrition-related questions, you may also wish to seek the help of a registered dietitian. Dietitians specialize in nutrition and can help you figure out the diet and supplements that are appropriate for your specific health needs. They are educated in nutritional sciences and are registered with provincial regulatory bodies. In British Columbia, Quebec, and Nova Scotia, the term nutritionist also indicates that a person has specialized training in nutrition, and is registered with the province. In other provinces this is not the case. If you choose to see an unregistered nutritionist, it is wise to ask for references and to speak to other clients whom the nutritionist has worked with.

Most hospitals employ dietitians, so if your doctor is associated with a hospital he or she may be able to help you make an appointment. Call your local health unit; they may also be able to refer you to a

dietitian. If you have access to the Internet, the Dietitians of Canada have a web site at <http://www.dietitians.ca/> which includes a "Find a Dietitian" feature. You can find Dietitians who deal with particular health issues including HIV/AIDS/Immune disorders.

Trained naturopaths are also educated about nutrition and nutritional counselling. Naturopaths are registered and regulated in BC, Manitoba, Ontario and Saskatchewan. Call the Canadian Naturopathic Association at (416) 233-1043 for more information on finding a qualified naturopath.

## Eating Well

The foods we eat are made up of three components: proteins, fat, and carbohydrates. One of the goals of good nutrition is to take in the right balance of protein, fat, and carbohydrates. Another frequent challenge for HIV+ people is to take in enough food to maintain their body weight, muscle mass and energy.

Our bodies must take in protein to make protein. Many important functions of our body are carried out by proteins. Proteins make up our muscles, skin, and hair. They also make up parts of our immune system and the connective tissues that hold our bodies together.

Our bodies must also take in fat to create fat. Fat cushions our internal organs, and stores energy for future use. Fats act as carriers for the fat-soluble vitamins A, D, E, and K. Fats are also used to make our cell membranes and many of our hormones.

Our bodies also need carbohydrates. Carbohydrates provide quick energy for day to day activities.

### Proteins

Proteins are made up of building blocks called amino acids. You build the proteins your body needs by combining the amino acids you eat, with amino acids created by your body. Most people get the majority of their protein from meat including fish and poultry, although vegetarians rely solely on plant proteins - particularly beans and peas. Vegetarians need to derive protein from a variety of sources to ensure that all the amino acids which their bodies don't make are available in their food. Vegetarians also need to ensure that their diets contain adequate iron and vitamin B12, which may be limited in a strict vegetarian diet. **Canada's Food Guide to Healthy Eating** (4) recommends that Canadians have 2-3 servings of meat or meat alternatives daily. One serving is a fist-sized piece of meat, 2 tablespoons of peanut butter, ½ cup of beans, 1/3 cup of tofu or 2 eggs.

Protein is important to HIV+ people because it is the primary component of muscle, and plays a crucial part in many of our metabolic processes. When HIV+ people lose weight, they often lose muscle. This is called muscle wasting. It is important to eat enough food to prevent your body from using the energy stored in your body as muscle. Research also suggests that a high protein diet and regular exercise may help people with HIV avoid muscle wasting. (5) Eating more protein may also help you regain lost muscle mass. For this reason, if you can, you may want to exceed the **Canada's Food Guide** protein requirements. Foods that are high in protein include red meat, poultry, fish, eggs, nuts, beans, peas, grains, and other seeds. Try to take in protein from many different foods, so that you get a variety of amino acids. A few studies have shown that some people with HIV have low levels of some amino acids. (6)

Because many of the weight loss problems seen in HIV are related to low food intake, (7) dietitians often suggest you eat many small meals throughout the day, rather than 2 or 3 large ones, to help you take in enough food. Make sure to include some protein-containing food in each of these meals. You can also buy protein powders at drug and health food stores to increase your protein intake.

### Fats

Fat is a vital part of the human diet. Fats are part of every food group in **Canada's Food Guide to Healthy Eating** but are found primarily in butter, vegetable oil, and the animal fat present in meat. Because the North American diet is very high in fat, we are often taught that fat is bad. In truth, like most things, fat is really only a problem when eaten in excess. There are a number of different types of fat. These are explained in the table xxx. Use the table to help you decide which fats you want to eat and which ones you don't. Although you may wish to modify what you eat, there is no increased need for fats when you are HIV+.

Some HIV+ people have difficulty absorbing fats. This condition is called steatorrhea. It may be due to intestinal damage caused by opportunistic infections, or by HIV itself. Steatorrhea can cause diarrhea, bloating, or changes in the colour of your stool. If you have steatorrhea, you are probably absorbing very little of the fat you eat. Since it is still important to have some fat in your diet, you may want to drink liquid supplements or other products that contain a type of fat called MCT (medium-chain triglycerides). This type of fat is easy to absorb. Liquid supplements are discussed in the weight loss section of this guide. You can find liquid supplements and other MCT containing products in many drug or health food stores.

### Types of Fat

**Saturated Fats** are animal fats like those found in butter, or as part of red meat. Many North Americans try to avoid animal fats because excessive amounts can raise the body's cholesterol levels. High triglyceride and cholesterol levels are associated with a higher risk of heart attacks and stroke. Until recently, this was not too much of a concern for HIV+ people, because people with HIV had been observed to have low cholesterol levels. (8) Cholesterol is necessary for your body. It is used to create cell membranes, and to make your body's hormones. (9) Because of this, people with HIV may want to take advantage of their low cholesterol levels, and eat animal fats both as a source of cholesterol and energy. Recently, both high triglyceride and cholesterol levels have been observed in some HIV+ people on antiretroviral therapy. The nutritional concerns of these individuals are discussed in the section on "Body Shape Changes Associated with Protease Inhibitors." If your cholesterol and triglycerides are both high, you should consider limiting your saturated fat intake.

**Polyunsaturated Fats** are found in some vegetable oils such as corn and peanut oil, and in most margarines. In some studies, polyunsaturated fats been shown to reduce T-cells, and with them the functioning of the immune system. (10) While these studies were not HIV-specific, it may still be wise for HIV+ people to avoid eating a lot of polyunsaturated fat. Polyunsaturated fats are much less likely to increase cholesterol than saturated fats.

**Monounsaturated Fats** are also found in vegetable oils like olive oil and canola oil. These are not suspected of being immune suppressive. Monounsaturated fats do not normally increase your cholesterol levels like saturated fats, but they are sometimes modified when heated during processing. For this reason, many people look for olive oil that is "cold pressed."

**Omega-3 Fatty Acids** are called essential fatty acids because they must be present in your diet. Your body can't manufacture them. They are found in the oils of most fish and seafood, as well as in flaxseed and some beans and peas. Eating foods rich in omega-3 fatty acids has been shown to reduce the risk of heart attack, and to have a positive influence on cell-mediated immunity (the part of the immune system most damaged by HIV infection). Health Canada has recommended that all Canadians increase the amount of omega-3 fatty acids in their diet. (11) The only clear study (12) of omega-3 acids to date, in people with HIV who were experiencing wasting, used very extreme dosages. Using omega-3 fatty acids reduced their triglyceride levels and, if they had no new opportunistic illnesses during the study, it helped them gain weight. Many people with HIV who wish to supplement their food intake of omega-3 fatty acids take omega-3 fish oil supplements (about 3 g daily).

Warning: These fish oil supplements are not cod liver oil, or any other fish oil containing vitamins A and D. Vitamins A and D should be removed from omega-3 fatty acid supplements because the usual doses may result in an excessive intake of these vitamins.

## Carbohydrates

Carbohydrates make up most of an average Canadian's diet. Carbohydrates can be simple sugars like the sugar you put in your coffee. They can also be complex carbohydrates, which are long strings of sugar molecules linked together. Complex carbohydrates are found in breads, cereals, and pastas, as well as in fruits and vegetables. Because foods rich in complex carbohydrates are often rich in vitamins and minerals, they are usually the most desirable sources of carbohydrates. Most people also include some simple sugars in their diet just because they taste good. Simple sugars are fine in moderation, especially if they help increase your food intake of other nutrients by making your meals more appealing.

**Canada's Food Guide to Healthy Eating** suggests that you eat 5-12 servings of grain products per day, and 5-10 servings from the fruit and vegetable group. This should be the source of most of the carbohydrates in your diet. Although it sounds like a lot, "servings" are actually quite small. For example, a bagel represents two servings of a grain product. One serving of grain is a slice of bread, half of a bagel, or half a cup of pasta or rice. A serving of a fruit or vegetable is usually about half a cup of fruit or tomato sauce or one medium sized fresh fruit or vegetable.

Carbohydrates are important because they provide the body with quick, easily used energy. Carbohydrates help you maintain the energy balance we talked about in the introduction, so that your body does not have to draw on stored energy sources like fat and muscle.

## Fluids

Our bodies are primarily water. Regardless of HIV status, people should drink 8 glasses (8 oz) of water a day. (13) This helps replace water lost in sweat and urine. Water also transports nutrients throughout the body and keeps your kidneys functioning in a health way. For people taking particular drugs, like indinavir, fluid intake can be critical. If you are sweating a lot or losing fluid in other ways, like vomiting or diarrhea, you also lose important minerals. If you have become dehydrated you should consider drinks like Gatorade and other sports drinks, which also replace these minerals.

Alcoholic drinks are fine in moderation, (14) if they don't interfere with any medications you are taking. This is something you should discuss with your doctor. Unlike most fluids, alcohol actually removes water from your system instead of increasing it; therefore, alcoholic drinks "don't count" as part of the 8 glasses of water you need every day.

## Eating Safely

People with HIV are vulnerable to many infections because their immune system is damaged. This includes food poisoning infections like Salmonella. The following very practical list of suggestions for avoiding food poisoning comes from the Test Positive Aware Network in the US.

### Food safety tips

#### Shopping

- Buy only pasteurized milk and cheese.
- Avoid ripe, imported, and moldy cheeses like blue or Roquefort. Hard cheeses, such as cheddar and parmesan, can be kept for up to six months. Soft cheeses should not be kept for more than seven days.
- Never buy products whose "sell by" or "best used by" labels have passed.
- Put packaged meats into a plastic bag before placing in your shopping cart. This prevents meat drippings from touching other foods.
- Put chilled or frozen foods in the refrigerator as soon as possible.
- Leave eggs in their original containers. The egg rack in your refrigerator door may have a higher temperature.

#### Food preparation

- Wash hands with soapy water frequently.
- Carefully wash all cutting boards after chopping raw meats or vegetables.
- Never thaw frozen foods by letting them sit out at room temperature. Thaw in the refrigerator, under cold water, or defrost in the microwave.
- Cook all meats to 160 degrees F or higher at the thickest point. Poultry should be cooked to 185 degrees F.
- Keep your refrigerator temperature 40 degrees F or lower.
- Wrap and cover foods in refrigerator. Use air-tight containers when possible.
- Store hot leftovers in a shallow, small container. Reheat until hot to touch throughout.
- Don't keep leftovers for more than three days. When in doubt, throw it out.

#### Foods

- Never consume raw meat, poultry, or fish. Avoid steak tartare, carpaccio, raw oysters, sushi, sashimi.
- Avoid raw eggs or foods that contain raw eggs such as Caesar salad dressing, Hollandaise sauces, homemade eggnogs, and mayonnaise. When cooking eggs, make sure yolk and whites are not runny. Egg substitutes (like Eggbeaters) or pasteurized egg products are available at grocery stores.
- Wash all fruits and vegetables. Peeling eliminates some risk of bacteria.

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## Antioxidants

The process of breaking food down into energy involves a chemical reaction called oxidation. Food break down is one of many oxidative processes in our bodies. During this process, molecules called free radicals are produced. Although free radicals are a normal part of the oxidation process, they can damage the membranes of our body's cells in much the same way that rust damages the body of a car. To control this process our body produces an antioxidant, called glutathione, in the walls of our cells. Other antioxidants like beta-carotene, selenium and vitamins A, C and E are present in what we eat.

During HIV infection, many researchers have observed an increase in free radicals. (15) The cause of this increase is not completely understood. A decrease in antioxidants in general and glutathione in particular, has also been observed. (16) Having low levels of glutathione in your body is associated with a lower survival time for people living with HIV. (17)

Many people living with HIV choose to supplement their body's supply of glutathione by taking NAC (N-acetyl-cysteine). NAC is converted to glutathione by the body, and has been recommended by some researchers and dietitians. Supplementation with NAC has been shown to increase survival time in HIV+ people, (18) and to increase CD4+ counts in healthy volunteers. (19) Most people living with HIV who take NAC take around 1.5-2 grams. NAC has no significant side effects at this dosage although it is quite acidic and may be irritating to the stomach. It is probably wise to take it with food, and to avoid taking it at the same time as drugs like aspirin that irritate the stomach. (20) Acidic beverages like orange juice will help absorption. At very high dosages of 6-8 g, NAC can cause diarrhea, nausea, and other gastrointestinal problems. (21)

## Vitamins and Minerals

Vitamins and minerals play many important roles in our bodies. They help us break down other foods, keep our skin, bones and eyes healthy, and help our immune system function properly. Although many people think of vitamins as pills, the best and cheapest way to take in vitamins and minerals is in the food you eat. One simple way to get a variety of vitamins and minerals is to eat a variety of foods. Choose as many different colours of fruits and vegetables as possible. This insures a variety of vitamins and minerals in your diet.

Many studies have shown vitamin and mineral deficiencies among people with HIV. Significant deficiencies in vitamins A, B1, B6, B12, C, E and folate have been observed in some people, as well as deficiencies in the minerals iron, selenium, magnesium and zinc. (22) HIV+ people who are deficient in vitamins A, (23) the B vitamins, (24) E (25) and the mineral selenium (26) have been observed to get ill more quickly than those without deficiencies.

It may not be possible for some HIV+ people to take in enough vitamins and minerals from their food. This is particularly true if you are having problems eating enough in general. You may also be having problems absorbing vitamins, and this may not be obvious. For these reasons, many people with HIV choose to take supplements.

There are no studies which prove a cause and effect relationship between vitamin supplements and improved health in HIV+ people who have no signs of deficiency. Only in cases of deficiency have supplements been proven beneficial. However, studies surveying HIV+ people who take nutritional supplements show that these people live longer and have more signs of a healthy immune system. (27) Virtually all dietitians now recommend a multivitamin with minerals to their HIV+ clients.

Larger amounts of vitamin and mineral supplements (beyond what is contained in a standard multivitamin) are expensive, and may involve taking many more pills every day in addition to any prescription medications you are taking. You will also need to be careful about interactions between vitamins and prescription drugs (see xxx). For both of these reasons, it is a good idea to get as many of your vitamins and minerals from food as possible.

### Foods rich in vitamins

**Vitamin A** -liver, milk, and cheese  
**Beta-carotene (converted to Vitamin A)** -dark green vegetables, and orange fruits such as apricots, mango and papaya.  
**Vitamin B1 (Thiamine)** - meat, liver, nuts, whole grains  
**Vitamin B2 (Riboflavin)** - dairy products, beans, leafy green vegetables  
**Vitamin B6** - meats, beans, nuts, leafy green vegetables, bananas  
**Vitamin B12** - meats, fortified soy products  
**Biotin** - egg yolks, fish, beans  
**Folate** - meats, beans, liver, broccoli, leafy green vegetables, cantaloupe  
**Niacin** - chicken, fish, peanuts, dried beans  
**Vitamin C** - citrus fruits, dark green vegetables, bell peppers, tomatoes  
**Vitamin D**- sunshine, also added to milk  
**Vitamin E** - plant oils, leafy green vegetables, nuts  
**Copper** - oysters, peas, beans, organ meats  
**Iron** - meat, liver, peas, beans, whole grains, eggs  
**Selenium** - seafood, egg yolks, whole grains  
**Magnesium** - nuts, whole grains, dark green vegetables  
**Zinc** - liver, sea food, whole grains

**A few noteworthy interactions between vitamins, minerals and medications**

- iron supplements may decrease the absorption of tetracyclines and other antibiotics
- zinc and copper interact; when taking large quantities, take separately
- isoniazid (a TB drug) increases the need for Vitamin B6
- the antibiotic ciprofloxacin should not be taken within 2 hours of calcium, iron magnesium or aluminum supplements because absorption is decreased

*This is not an exhaustive list. Be aware of the possibility of vitamin drug interactions.*

If you do choose to take additional vitamin and mineral supplements, there is a great deal of debate about the appropriate choices and amounts. The recommended daily amounts (RDA) provided by the US government and their Canadian equivalents (which are much harder to find) list the minimum amount of a particular vitamin or mineral that healthy people need. The amounts listed in the RDA are maintenance amounts and would not be enough to restore the deficiencies seen in some people with HIV. For this reason, some researchers, dietitians, and people living with HIV believe it is necessary for people with HIV to take in amounts of vitamins and minerals that are many times higher than the RDAs. To avoid deficiencies, they use a "just in case" strategy, supplementing large amounts of many nutrients. The table xxx shows the range of amounts recommended in the literature for people with HIV, and then tries to narrow it to a most commonly recommended amount(s). Again, this includes both the amount you eat in

your food and the amount included in supplements.

**Vitamin and Mineral Supplements in HIV**

Information for this table was derived from the book, *Nutrition and HIV* by M Romeyn, *The Carter Index* by George Carter available at: <http://www.critpath.org/aric/rtrp/nutrient.htm>, *Vitamin Update* from the Bookman Home Library available at: <http://home.hyperlink.net.au/~bookman/>, *Nutrition Information Statements* of the American Society for Nutritional Sciences at <http://www.faseb.org/ain/intro.html> and the relevant studies on supplementation referenced in the main text.

| Vitamin/ Mineral         | Possible range of doses (daily unless stated)                 | Most commonly suggested dose  | Potentially toxic level   |
|--------------------------|---|---|---|
| Vitamin A                | 0-15,000 IU<br>Vitamin A or 0-180 mg beta (or mixed) carotene | 8000-10,000 IU Vitamin A or 15 mg beta (mixed) carotene   | No toxic dose for beta carotene<br>25,000 IU of Vitamin A for adult<br>10,000 IU for child / pregnant woman |
| Vitamin B1<br>Thiamine   | 1-100 mg  | 10 mg   | Side effects have appeared at 5 mg - most people can tolerate higher doses                                  |
| Vitamin B2<br>Riboflavin | 1-100 mg  | 10 mg   | None. Urine turns bright yellow with any large dose but toxic doses aren't absorbed.                        |
| Vitamin B6               | 1-100 mg  | 25 mg   | more than 150 mg over time may cause neuropathy   |
| Vitamin B12              | 1 cc or 1 mg none - 3 times/week                              | 1 cc injection - most commonly suggested once every 2-3 weeks but a significantly sub-group advocate 1-3 times a week | No clear toxic level -anxiety may be a sign of excessive intake.  |
| Biotin                   | 0-15 g  | 0.25 g  | None  |
| Folate                   | 1-5 mg  | 1 mg -more if on "the pill" or pregnant   | 15 mg   |
| Niacin                   | 5-100 mg  | 20 mg   | 300 mg High doses cause flushing, "burning" in the hands and feet.  |
| Vitamin C                | 0-12 g orally   | 1-3 g -more if you have a cold or viral infection?  | Doses over 6 g a day probably not advisable for extended use.   |

|           |  |                     |   |
|-----------|--|---------------------|---|
| Vitamin D | Amount found in any multi-vitamin sufficient                   |                     | greater than 1000 IU daily over an extended time  |
| Vitamin E | 400-800 IU   | 400-800 IU          | greater than 1000 IU  |
| Copper    | 0-5 mg   | 2 mg if taking zinc | 10 mg daily   |
| Iron      | Supplement only when deficient, iron overload also seen in HIV |                     | 75 mg (less in those with kidney disease or existing iron overload). High doses may cause constipation or darkened stool. |
| Selenium  | 0-1000 mcg   | 50 mcg              | greater than 800 microgram  |
| Magnesium | 400-1000 mg  | 500 mg              | Very rare except in kidney disease, then magnesium should be avoided  |
| Zinc      | 0-100 mg**   | ??? 50-75 mg**      | 150 mg (doses over 50 mg may cause copper deficiencies)   |

\*\* very controversial - some studies have found zinc supplementation a benefit and some a detriment

It is possible to take too much of a vitamin, either as an overdose (too much all at once) or by taking to

**(Picture of healthy food)**

A diet with lots of variety and many different colours of vegetables

If you wish

**(picture of a pill capsule)**

a multi-vitamin taken once or twice a day with meals

If you wish

**(picture of 2 pill bottles)**

NAC and higher doses of vitamin B

If you wish

**picture of a syringe**

Regular injections of vitamin B12

If you wish

**picture of 2 pill bottles**

Higher doses of other vitamins like C, E, and the mineral selenium

If you wish

**picture of a tin and bottle (dropper)**

Other supplements as listed in the chart xxx

In addition to the vitamins and minerals we have talked about, some people with HIV take other supplements for a variety of purposes. Some of them are to help deal with specific problems and some are prevention oriented. Some general information about a few relatively common supplements is provided in the following table. (29) These may, or may not, be available in your area.

**The label says what?**

Vitamin labels can be very confusing. Here are some pointers.

**Natural or organic**

In most cases whether a vitamin is man-made or from a natural source doesn't matter. One exception is the natural/organic version of vitamin E also known as d-alpha-tocopherol which is more easily absorbed.

**Buffered**

Buffering is used to protect your stomach from acidity. If you take a lot of a very acidic vitamin, like vitamin C, this might be a good idea.

**Chelate or chelated**

This means that a mineral is attached to an amino acid. Again this makes them easier to absorb. Chelated minerals usually end in "ate." For example, magnesium picolinate.

**Stress combinations**

These are high doses of B complex vitamins plus vitamins C and E. They are marketed for people experiencing stress but they are also a good way to get fairly high doses of these vitamins economically. Vitamins labelled B-50, B-75, and B-100 are a good way to bump up the B vitamin component of your regimen and are usually even cheaper than the stress combos.

**Time released** may sound like a good thing, but multi-vitamins are best taken and absorbed after meals. Time released vitamins are probably less well absorbed.

**Commonly Used Dietary Supplements - Only Anecdotal and Theoretical Data Available**

**Alpha-lipoic Acid** - an antioxidant which may have particular applications for people experiencing body shape changes related to antiretroviral therapy. People usually take about 300 mg daily; 600 mg if they are trying to correct metabolic problems associated with unusual fat distribution.  
**L-carnitine** - may reduce muscle wasting. Normally produced by the body, studies conflict about its deficiency in HIV. It may also affect the cellular messengers that prompt HIV related metabolic disruptions. People usually take 1-3 grams with food.

**L-Glutamine** - is also normally produced by the body. Liver damage may make the body less able to produce glutamine, possibly leading to deficiency. Glutamine may help with diarrhea, as well as slowing muscle wasting. Dosages vary widely from 1.5 g to 30 g but taking less than 10 g is probably advisable for long term use. People with kidney problems or high liver enzymes might want to be cautious about their use of l-glutamine.

**Whey protein** - derived from milk, whey protein may help combat muscle wasting. People usually take about 20 g of powder daily dissolved in liquid.

## Exercise

Several studies have shown aerobic exercise improves quality of life for people with HIV. (30) Some studies have also suggested exercise has beneficial effects on the immune system such as increasing CD4+ cells. (31) Exercising to the point of exhaustion, however, has been shown to be immune suppressive. (32) The biggest benefit of exercise for HIV+ people may be the building and retention of muscle mass. Exercise, including working out with weights, and swimming, has been shown to improve muscle function and to build lean muscle mass in HIV+ people. (33) Any type of exercise also has the benefit of releasing stress, and may help increase your appetite.

## The Role of Nutrition in various HIV-related Conditions

### Weight Loss

Although weight loss is a common symptom of HIV, there are things you can do to prevent it. Because HIV-related weight loss has many causes, different solutions may be appropriate at different times.

When is weight loss serious? The answer for HIV+ people is that almost any weight loss is serious. Everybody's weight fluctuates by a few pounds but if you lose 3-5% of your normal body weight, it is time to start talking to your doctor about what might be causing your weight loss, and what you might do to stop it. Equally important, if you have not lost weight but you are experiencing signs of muscle wasting - thinning in the arms, legs, buttocks, and face - it is probably time to start discussing your options with your doctor. This means examining your diet to ensure that you are taking in adequate calories to prevent your body from using its stored resources. It may mean increasing the amount of calories or protein in your diet and the amount of exercise that you do. Some people living with HIV have also had success with nutritional supplements like those listed in the chart xxx. When you and your doctor decide the time is right you might want to consider pharmaceutical solutions like anabolic steroids or appetite stimulants.

To deal with weight loss in HIV, it is important for you and your doctor to identify the underlying problems. Do you have an intestinal infection which is preventing you from absorbing food properly? Are the drugs you take making you feel nauseous? Do you just not feel hungry? By identifying the underlying problem, you and your doctor can do a much better job of treating it. If your problem is an intestinal infection, your doctor may be able to give you drugs to treat it. If the side effects of your drugs are causing problems, you may be able to switch drugs or treat the side effects caused by the drugs you are taking. If appetite is a problem, your doctor may be able to prescribe an appetite stimulant. In the last sections of this guide there are tips for dealing with specific conditions like nausea and diarrhea. Sometimes modifying your diet to deal with these conditions may not stop your weight loss. Sometimes no treatable underlying infections will be found. If this happens, you and your doctor may need to treat your weight loss directly.

If your weight loss can not be attributed to any specific problem, your doctor may still be able to prescribe some treatments that might help. Anabolic agents, including human growth hormone and the anabolic steroids: testosterone, nandrolone and oxandrolone, may help you reverse weight loss and rebuild muscle

mass. CATIE has fact sheets on human growth hormone and anabolic steroids if you want more information.

Omega-3-fatty acids and thalidomide have both been proposed for the treatment of HIV-related weight loss. Although there is promising information on both, neither have been studied in large scale trials. Thalidomide is not readily available in Canada but omega-3-fatty-acids are part of many common nutritional supplements. See the discussion of these fatty acids on xxx. CATIE also has a fact sheet on Thalidomide.

### **Liquid Food Supplements**

If you are not taking in enough calories to maintain your body weight, you may wish to consider using liquid supplements. These allow you to get a large amount of calories in one glass of liquid. Supplements which contain MCT (medium chain triglycerides) may be preferable because they are easier to absorb than those that contain the more common long chain triglycerides. Look for a liquid supplement that is as high in protein as possible. Some people increase the protein content of a liquid supplement by sprinkling whey protein or other protein powder into the supplement. Other people choose to take just whey protein or protein powder to increase their protein intake thus avoiding the diarrhea that may be caused by the long chain fats in many liquid supplements. Liquid supplements can be found in most drug and health food stores. Some provincial and private insurers cover the cost of a limited selection of liquid supplements.

### **Enteral and Parenteral Nutrition**

Enteral nutrition involves ingesting liquid supplements through a tube directly into the stomach. This is a fairly uncommon way of dealing with HIV related weight loss. It is generally done via a nose tube if a person is having trouble swallowing or breathing, or if someone is too sick to eat. If the treatment is expected to be long term, a tube may be inserted through the abdominal wall directly into the stomach. This allows a person who cannot eat an adequate diet to use enteral nutrition on an ongoing basis, probably at home. This procedure is of more limited value in the case of severe malabsorption, however special formulas of an elemental diet are available for people experiencing malabsorption or diarrhea.

Often called TPN, Total Parenteral Nutrition allows nutrients to be delivered directly into the blood stream with an interavenous tube. This is an uncommon way to treat HIV+ people because it is extremely expensive, however it may be useful during periods of serious illness. This is particularly appropriate for illnesses that affect the gastrointestinal tract and prevent normal food intake. Severe malabsorption with uncontrollable diarrhea may be treated in this way in rare instances.

## **Nutrition and other HIV-related conditions**

In addition to the problem of weight loss, there are a number of other HIV-related conditions where nutritional strategies may be of benefit. We will discuss these strategies in the following sections. Please remember that this is not an exhaustive discussion of the therapeutic options for these conditions. While we have tried to mention the most common pharmaceutical and complementary treatments, more information on all of these conditions can be obtained by calling CATIE at: 1-800-263-1638.

### **Lack of Appetite**

If you and your doctor have ruled out all the possible causes for weight loss, it may be that you just don't feel like eating. Your doctor may be able to offer some pharmaceutical solutions, and changing your diet may help.

Rather than pushing yourself to eat a whole dinner, eat small snack-like meals. Maximize your protein and nutrient intake with high protein snacks like nuts, seeds, puddings, cheese or peanut butter and crackers. Try to take walks before meals or do other exercise to stimulate your appetite. Finally, keep

your favourite foods on hand and you are likely to eat more.

Your doctor can prescribe drugs which are appetite stimulants. These drugs may make you feel like eating more. Megestrol acetate, nabilone and dronabinol are appetite stimulants that can be prescribed in Canada. If you want more information, CATIE has fact sheets on these drugs. Dronabinol and nabilone are chemically related to marijuana. Many people with HIV believe using marijuana helps stimulate their appetite and control nausea. Several small studies of marijuana as an appetite stimulant are now underway. Legal battles are happening in Canada to give people living with HIV and other illnesses legal access to this drug.

## **Lactose Intolerance**

A large percentage of people with HIV seem to become lactose intolerant. One study found that 70% of HIV+ participants were lactose intolerant. (34) This means that dairy products like milk, cheese, and ice cream may cause diarrhea, gas, and bloating. Lactose is also added into a lot of processed foods. There are products especially designed for lactose intolerant people, including lactase capsules you can take before eating. Many people find these capsules helpful, particularly if taken on an occasional basis, so they don't have to worry when they go out to dinner. As well, there are lactose reduced dairy products.

For many people, being lactose intolerant may mean you want to avoid eating dairy products altogether. Since dairy products are good sources of protein you will have to be particularly careful to get more protein from other sources. If you must avoid dairy products you may also wish to supplement calcium and vitamin D so you do not become deficient. Whey protein, which some people take to supplement their protein intake, is derived from dairy products. Although the more expensive whey protein formulas are often lactose reduced, you may want to check and make sure this is true if you suspect you are lactose intolerant.

## **Diarrhea**

Diarrhea is a common side effect of HIV-related infections and HIV-related medications. Everybody ends up coping with it at one time or another but that doesn't mean that it is unimportant. You should tell your doctor when you have had diarrhea and call her/him if unexplained diarrhea lasts for more than three days. Diarrhea can be a sign of an infection in your intestine. Intestinal infections are often caused by the same bacteria and parasites that cause food poisoning. They can be serious for people with HIV and need to be treated.

It probably comes as no surprise to you that many of the drugs HIV+ people take also cause diarrhea. If the diarrhea is severe, you and your doctor may wish to discuss switching to different drugs. Otherwise, over the counter anti-diarrhea drugs like Imodium may help. If they don't, your doctor may be able to prescribe anti-diarrhea drugs like Lomotil or Novo-Loperamide. Psyllium husk, an herbal treatment for diarrhea, has also been shown to effectively treat diarrhea (not HIV-specific) in several small studies. (35) It is available in capsule or powder form from some health food stores and is also the major component of metamucil.

There are changes you can make in your diet to help with diarrhea. (36) Earlier, we discussed the problems some HIV+ people have with fat absorption. Because of this, diarrhea may be worse if you eat a lot of fatty food. Dairy products in your diet may also contribute to diarrhea because of lactose intolerance (see

above). Avoid caffeine, carbonated beverages, and strong spices, which can all cause diarrhea or gas and bloating. High fibre foods such as brown rice and whole grain bread contain lots of nutrients, but they can also contribute to diarrhea. You may want to replace them with white bread and rice during bouts of diarrhea. Barley is one grain which tends to reduce diarrhea and can be included in soups and stews. Some fruits and vegetables are also high in fibre (like corn for example) and may contribute to diarrhea. Other fruits and vegetables are easily tolerated and some may even help stop diarrhea. They include bananas, mangos, papayas, applesauce, zucchini, and green beans. Don't forget that you lose a lot of water and minerals when you have diarrhea so make sure to drink extra water and/or sports drinks like Gatorade.

## **Nausea**

Nausea has many causes and is a common side effect of many HIV drugs. It is important to determine what is making you nauseous. Nausea can be a sign of gastrointestinal infections or other intestinal problems. You should tell your doctor about unexplained nausea. If nausea or vomiting last more than 2-3 days you should call your doctor. Call within 48 hours if you can't eat solid foods at all. There are some anti-nausea medications that you may be able to purchase over the counter like Gravol. Your doctor can also prescribe some. Some PHAs have found that smoking marijuana helps them deal with nausea. Ginger, as in ginger ale, has been shown to decrease nausea in several small studies (not HIV specific). (37)

Again, some changes in your diet may help. (38) If you are extremely nauseous you will not want to eat anything. Try taking small frequent sips of flat ginger ale or soup broth (just what mom would have said!). Even if you are not eating you need to replace your body fluids. You can also try sipping liquid supplements like those discussed above. Again, don't go without solid foods for two days without calling your doctor. When you are ready to try and eat start with bland, dry foods like toast or crackers. Generally, cold foods without much of an odour are easier to take when you are feeling nauseous. Don't push it. Several small meals will be easier to take than one large one. Eat slowly and don't lie down immediately. If you are feeling nauseous it is probably easier to let someone else prepare the food for you, if possible.

## **Neuropathy**

Neuropathy is another common symptom of HIV disease. It is usually experienced as a numbness or tingling in the hands and feet and can be very painful. Neuropathy is also a side effect of drugs such as ddC, ddI and d4T. The simplest solution to drug related neuropathy is to avoid drugs known to cause it. However, this is not always an option. Drug treatments for peripheral neuropathy include the epilepsy drugs carbamazepine and phenytoin and the anti-depressant amitriptyline. These successfully treat the symptoms of neuropathy for some people to varying degrees.

The use of nutritional therapies for neuropathy in HIV, particularly the use of B vitamins, has not been studied extensively. Small preliminary studies have produced mixed results with some studies showing no response to B vitamin supplementation. (39) There are some similarities between the neuropathy seen in HIV and that seen in diabetes. Confusingly, the use of B vitamins and other nutrients has been widely studied in diabetic neuropathy and has been successful, (40) particularly supplementation with the B vitamins biotin, B6 and B12. Promising results have also been shown with some of the other B vitamins including thiamine, niacin and folic acid. People with HIV who experience neuropathy might want to consider taking a B-50 complex vitamin once a day to reach the levels studied. You may also wish to approach your doctor about regular injections (at least weekly; 2-3 times weekly was most often studied) of B12. Other nutrients which have seemed helpful in diabetic neuropathy included choline, inositol, caritine, magnesium, and chromium. All of these would be contained in a good quality multi-vitamin with minerals. Finally, linolenic acid found in evening primrose oil was found in at least one study to improve the symptoms of diabetic neuropathy. (41)

## **Neurological disorders**

Neurological problems such as memory loss and more serious problems like dementia occur in HIV. Although dementia is not that common, lesser problems like forgetting faces and names can be annoying irritants for people with HIV. At least one study has connected these type of memory problems in HIV to deficiencies in vitamin B12. (42) Although some studies have questioned the usefulness of B12 supplements in outright neurological disease like dementia, (43) case studies have been reported of improvements in dementia when injections of B12 are given. (44) Nutrition scientists like Lark Lands and Chester Meyers (45) have suggested that 1 cc shots of B12 given 1-3 times a week, may help prevent some memory problems and even improve symptoms of dementia in some cases.

## **Headaches**

Deficiencies in magnesium have been tied to headaches and particularly, migraines. HIV negative people experiencing migraines have been successfully treated with infusions of magnesium in at least one small study. (46) People with HIV who are experiencing headaches or migraines might want to take multi-vitamins which include this mineral, or eat plenty of magnesium-rich food like nuts and spinach, since magnesium deficiency has been observed in HIV.

## **Oral Conditions**

Oral conditions may have an impact on your food intake. Mouth or throat infections like thrush, dental problems, or mouth ulcers can all be painful barriers to eating. The best way to resolve this problem is to treat the infection or have the necessary dental work. When these problems can not be quickly resolved, there are strategies to help you eat appropriate nutrients over the short term. (47) Drink apple juice or milk (if you are not lactose intolerant). These low-acid beverages also have significant nutrients. Choose soft moist foods like casseroles or mashed potatoes. Dunk bread or other foods in liquids including gravy or melted butter. These animal fats will not only soften foods but are also a good source of energy. Use a straw for liquids and/or liquid supplements if most of the problems are located in the mouth. Avoid heating your food too much as hot foods can cause pain, especially for those with dental problems.

Changes in the tissues of the mouth are associated with deficiencies in some vitamins, particular B complex vitamins and vitamin C. (48) Since these deficiencies have been observed in people with HIV, a B complex supplement or a vitamin C supplement (maybe one of the "stress" formulas that contain both) might help ward off oral problems. The role of B complex vitamins and vitamin C in preventing oral conditions has never been studied.

## **Body Shape Changes Associated with Protease Inhibitors**

Although weight loss is usually seen as the primary nutritional challenge faced by HIV+ people, a new problem involving fat accumulations in specific areas of the body is now being observed. These fat accumulations seem to be associated with the use of protease inhibitors. Fat accumulations are usually seen across the belly or between the shoulder blades of HIV+ men. Women may also experience increases in breast size. Fat accumulation is often accompanied by tissue loss in the arms, legs, buttocks, and face, the pattern typical of muscle wasting. As of yet there are no concrete explanations of this problem and no treatments have been studied. Several theories of why this happens have been proposed but there is no documented evidence for any of them at this point. (49) High triglycerides, which have previously been observed in people with HIV, and high cholesterol levels which were previously uncommon, have been observed in conjunction with these patterns of fat distribution in some cases. (50)

What can you do if you are experiencing these symptoms? Encourage your doctor to report your symptom to the drug company. The larger the number of reported cases, the more pressure on drug companies to research solutions.

Anecdotally, people are experimenting with a number of possible treatments, including nutritional supplements, although none of these has more than theoretical evidence to support it. (51) Alpha lipoic acid (discussed on xxx) is being used by some people with HIV. Alpha lipoic acid is naturally produced by our cells and is part of our normal cellular metabolism. (52) Some people believe it helps compensate for both liver damage and metabolic deficiencies in HIV. Carnitine (mentioned on xxx) is also being used, as it has been shown to lower triglycerides in people with HIV and may also help prevent muscle wasting. People who use this often take very high doses of 3-4 grams a day. Fish oil, containing omega-three fatty acids, has also been shown to lower triglycerides in HIV+ men, as discussed on xxx. Theoretically this might be useful. Finally, supplements that may help to prevent muscle wasting like l-glutamine and whey protein might be useful.

## **Paying for it all**

This is one of the most difficult sections of this guide in which to provide any sort of useful advice. For

many people with HIV, having enough money to follow the healthy eating suggestions in this guide are a problem, let alone buying vitamins or expensive supplements. Food banks are offered by AIDS Service Organizations and other community groups in many major centres, but these programs are not consistently available across Canada.

Provincial drug plans across Canada fail to cover any nutritional therapy except a few liquid supplements used for wasting. Even basic multi-vitamins are not covered. This continues to be an area where much advocacy is needed to improve the quality of life for people living with HIV.

Some AIDS Service Organizations collect vitamins and other nutrient supplements that can be distributed to people in need, or provide funds for the purchasing of such nutrients. Unfortunately, this type of service is not widely available across the country and is too expensive for many smaller organizations. Contact your local AIDS service organization to see what is available in your area and what you can do to help.

Careful comparison shopping may help to reduce your costs somewhat. Where no-name or store brands of vitamins provide adequate nutrients these may be a savings, but be careful that you are not required to take two or three tablets to get the same amount of nutrient that one tablet of a more expensive brand will provide. Several friends buying bulk products, which are split among them, may help control costs. This basic idea has expanded into the idea of buyers clubs. Buyers clubs are organizations people join to buy nutritional and complementary therapies in bulk. These are then sold to members at a reduced price, often by mail. Although buyers clubs have flourished in the US, they are much less common in Canada. Joining a US based buyers club may involve hassles with importing treatments across the border.

### Buyers Clubs

|   |             |                |
|---|-------------|----------------|
| Global Vitamins (Canadian Nutrition Buyers Club)      | Smith Falls | 1-800-996-8466 |
| DAAIR (Direct AIDS Alternative Information Resources) | New York    | (212) 725-6994 |
| PWA Health Group                                      | New York    | (212) 255-0520 |
| Supplements Plus (mail order service)                 | Toronto     | (416) 977-3088 |

## Further Reading

In the course of researching this guide we have read a number of books and articles that would be good resources for anyone researching nutrition information for HIV+ people. In addition to the specific references on the following page, these are a few general texts where you can find more information. Call CATIE at 1-800-263-1638 if we can help you with any of your questions.

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