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# nutrition

seventh edition 2006



## acknowledgments

### **Edited by Michael Carter** **Seventh edition 2006**

NAM is a charity that publishes information for people affected by HIV and those working with them. We believe information helps people to make decisions about, and be in control of, their lives, health and treatment options.

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### **Funders**

NAM is grateful to the funders of this booklet series:

NHS London HIV Consortium,  
Department of Health, NHS South  
West London HIV & GUM  
Commissioning Consortium, Derek  
Butler Trust and Healthsure  
Charitable Trust.



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# nutrition

**This booklet is intended to answer some of the most commonly asked questions about food, nutrition and HIV infection. It outlines how to eat well if you are HIV-positive and the sort of foods you should eat to keep well if you experience changes in your metabolism whilst taking anti-HIV medication. Information on the sort of food you need to eat to maximise absorption of anti-HIV drugs is included. It also gives advice on how to prevent weight loss and food-borne infections.**

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## Healthy eating

Your existing diet may already meet all your nutritional needs. Having HIV is unlikely to mean that you have to make drastic changes to your diet. However, if you are taking anti-HIV drugs it is important to eat a healthy diet as HIV medication can cause changes to the way the body metabolises, uses and stores fat.

A good diet will consist of a balance of the following items:

**Starchy foods** such as bread, cassava, cereals, green banana, millet, maize meal, potatoes, pasta, rice, and yam. Starchy foods form the basis of your diet and provide carbohydrates for energy, as well

as minerals, vitamins and fibre. Try and eat these at every meal and to have four to six portions every day. One portion is equal to one slice of bread, one medium sized potato, one bowl of cereal, a cup of pasta or rice.

**Fruit and vegetables** provide vitamins, minerals and fibre. Try and eat five or more portions of fruit or vegetables each day. A portion is equal to one whole piece of fruit, a heaped serving spoon of vegetables, a handful of dried fruit or a small glass of fresh fruit juice. Research has shown that a diet containing lots of fruit and vegetables can help protect against certain cancers and heart disease.

**Meat, poultry, fish, eggs, beans, nuts**

provide protein, mineral, and vitamins (particularly B12 from meat). Try and eat two or three portions of these foods each day. A portion is equal to two medium eggs, 100g/4oz meat, 150g/6oz piece of fish, or a small tin of baked beans.

**Dairy products** such as milk, cheese and yoghurt, to provide vitamins, minerals and especially calcium. Three portions should be eaten a day. A portion is equal to a third of a pint of milk, a small pot of yoghurt, or a match-box sized piece of cheese. If you cannot tolerate milk, then fortified soya milk, dark green leafy vegetables, dried figs, apricots and nuts are all good sources of calcium.

**Fat from cooking oils, butter and margarine, meat and other protein-based foods**

provide energy, essential fatty acids and fat-soluble vitamins (A,D,E,K). They also provide calcium and phosphate. It is recommended that 30%-35% of your daily calorie intake comes from fats, however you should note that eating too much fat could lead to weight gain, which can increase the chances of developing cardiovascular disease and certain cancers.

If you are having difficulty affording food, or buying food which you are used to eating or need for a special diet, a member of your healthcare team can put you into contact with someone who can help.

## Your diet and lipodystrophy

It has become clear that some anti-HIV drugs can cause a syndrome called lipodystrophy, which is a disturbance in the way the body processes, uses and stores fat. Some people taking HIV drugs have seen their body shape change and blood tests indicate that there are increased levels of fats in their blood, possibly increasing their chances of developing heart disease or diabetes.

There is good evidence that diet can help control metabolic changes seen in people taking anti-HIV medication. In particular, it is recommended that people taking anti-HIV drugs who have high cholesterol should cut down on their intake of saturated

fats. These come from animal products such as red meat (beef, lamb, oxtail and pork), and dairy products such as butter, cream, whole milk, cheese and full-fat yoghurt, and the vegetable fats palm oil and coconut cream or oil. It is particularly important that people taking anti-HIV drugs, especially if your blood tests indicate that you have high levels of blood fats, eat at least five portions of fruit and vegetables a day. A dietitian can give you advice about this. There is also evidence that cardiovascular exercise, such as running, swimming and cycling, can help reduce levels of blood fats, and resistance training (lifting weights) can help with some of the body changes. For more information see the NAM booklet *Lipodystrophy* in this series.

## Dietitians

You can obtain advice on nutrition from dietitians. Most HIV clinics have specialist dietitians who can:

- Make sure your diet is fulfilling all your individual nutritional requirements.
- Give you advice about your diet if you are experiencing metabolic changes due to your anti-HIV medication.
- Regularly check your body weight and ensure that the proportion of fat to muscle is appropriate.
- Advise you on any dietary changes you may need to make if you become ill.
- Help you avoid food poisoning.
- Recommend the prescription of sip or drip-feeds and protein or vitamin supplements if these are needed.
- Offer advice on symptom control, such as how to manage changes in taste caused by medication.
- Give therapeutic advice for conditions such as diabetes, obesity, hyperlipidaemia (high levels of fat in the blood) and poor absorption of food.
- Give advice on your nutritional requirements during pregnancy.
- Look at your food allergies and intolerances.

- Advise you on sports nutrition.
- Provide information and advice on the use of vitamins and minerals and complementary therapies.

Some dietitians may be able to use a variety of tests to assess how much muscle and fat there is in your body. If these tests are done regularly your dietitian may be able to spot changes in weight and body composition before you do. However, you may be the first to notice changes in your weight or body shape, for instance if your clothes become too loose or tight. These may be important times to talk to your dietitian about making changes to your diet or exercise.

## Supplements

Many people with HIV decide to supplement their diet with additional vitamins, nutrients, and herbal remedies in the hope of protecting or strengthening their immune system, or maintaining or promoting their general health, weight or body shape. Evidence that they have any effect is controversial and some evidence has emerged that certain supplements can stop HIV drugs working properly.

Most HIV specialists would advise that a healthy, balanced diet is enough.

Research in Africa recently showed that taking a cheap, over-the-counter multivitamin tablet slowed HIV disease

progression. Although taking multivitamins are not a replacement for anti-HIV drugs, you may wish to discuss with your HIV doctor, pharmacist, or dietitian the value of taking them to delay HIV disease progression.

Megadosages of any nutritional supplement are not, however, recommended.

If you are using B12, which can protect against nerve damage, nuggets that dissolve under the tongue are preferable to tablets that you swallow as they are more readily absorbed. Alternatively you could speak to your HIV doctor or GP about having B12 injections.

Many people use herbal remedies to supplement their diet. It is always important to do this with caution and to tell your doctor what you are taking. Garlic capsules, which are frequently taken because they are believed to protect the heart, stop the protease inhibitor saquinavir (*Invirase*) working properly and it is thought that they could have a similar effect on other protease inhibitors. St John's wort, the herbal antidepressant, was also shown to be inappropriate for people on protease inhibitors and non-nucleoside analogues (NNRTIs). The herb was shown to lower levels of the protease inhibitor indinavir (*Crixivan*) and

researchers concluded that it could have the same effect on all other PIs and NNRTIs. Test tube studies have also shown that African potato and *Sutherlandia*, two herbs widely used to treat HIV in Africa, interfere with the body's ability to metabolise protease inhibitors and NNRTIs.

There is also a theoretical risk of an interaction between anti-HIV drugs and aloe vera, borage oil, DHEA, ginkgo, liquorice, milk thistle and valerian.

It is very important that you tell your doctor, pharmacist and dietitian exactly what supplements you are taking.

## High doses of vitamins and minerals

Some people take high doses of certain vitamins and minerals because they believe that they may boost their immune system. Research has shown that large doses of many vitamins may in fact be harmful. Particular toxicities to be aware of include:

- **Vitamin A:** large amounts can cause liver and bone damage, vomiting and headache. Doses above 9,000 micrograms (for men) or 7,500 micrograms for women, may be harmful. Pregnant women should not take supplements containing vitamin A without consulting their doctor, as high intake can be harmful to the developing baby.

- **Vitamin C:** doses above 1,000mg per day may lead to kidney stones, diarrhoea and hardening of the arteries; special care is needed if you are taking indinavir. Large doses of vitamin C have been shown to reduce concentrations of indinavir in the blood.
- **Vitamin E:** doses above 800mg per day are associated with adverse effects; special care is needed if you are taking amprenavir, or an anti-coagulant if you have haemophilia.
- **Zinc:** doses above 75mg per day have been linked to copper deficiency, neutropenia and anaemia.
- **Selenium:** more than 750 micrograms per day is associated with immune suppression.
- **Vitamin B6:** more than 2g per day has been associated with nerve damage, but doses as low as 50mg per day have been associated with peripheral neuropathy.
- **Calcium:** doses greater than 1.5mg are associated with hypercalcaemia (high levels of calcium in the blood).

## Alcohol

There is no evidence that moderate alcohol consumption by people with HIV is harmful. Many people find that moderate drinking (one or two units a day) helps relieve stress and anxiety and acts as an appetite stimulant. A unit of alcohol is equal to a half pint of normal strength beer or lager, a glass of wine, a single measure of spirits or a small glass of sherry or port. There is also some evidence to show that a unit or two of alcohol drunk daily can help protect against heart disease and diabetes. It is recommended

that men drink no more than three or four units of alcohol a day and women a maximum of two or three units a day.

However, heavy drinking can affect your immune system and may slow down your ability to recover from infections. Heavy drinking is also linked to hepatitis and liver damage. It is particularly important that people with HIV take care of their liver, not least because the liver plays an important part in metabolising anti-HIV medicines. Heavy drinking may also lead to vomiting. If you vomit within an hour of taking your medicine, you should retake

the dose. Heavy drinking means ten or more units of alcohol a day. Binge drinking can also be harmful to general health, so don't drink all your weekly allowance in one day.

People who are co-infected with either hepatitis B or C should be aware that even minimal alcohol intake is not advisable.

## Water

It is important to stay properly hydrated to ensure that the body has enough fluid to function properly. Everybody is recommended to drink about two litres of water a day. It is especially important to drink plenty of fluids if you are taking some

anti-HIV drugs to help the body process them properly and avoid side-effects.

It is important to drink extra fluids if you have fever or diarrhoea. Similarly, if you are exercising it is important to stay properly hydrated and increase your water or sports drink intake.

You can replace some of your daily fluid intake with fruit juices or squashes diluted with still or fizzy water, however you should be aware that alcohol dehydrates the body as does coffee, cola and to a lesser extent, tea.

## Food and water safety

If you are HIV-positive, particularly if your CD4 count is below 200, you may be more vulnerable to food poisoning. The risks can be reduced by taking care during the preparation, cooking and storage of food.

The following tips might be useful:

- Avoid raw meat, raw fish, sushi, raw eggs, undercooked chicken, poultry or pork.
- Avoid unpasteurised or blue cheese (such as Brie or Stilton), milk and yogurt.
- Avoid live yogurt and probiotic drinks and supplements, although many HIV-positive people use these with no ill-effects.
- Make sure that food is thoroughly reheated if it has already been cooked.
- Avoid food that is mouldy or has passed its sell-by date.
- Wash fruit and vegetables thoroughly.
- Make sure that uncooked food is kept separate from cooked food.
- Cooked stews should be kept in the fridge and eaten within two days. Portions should be frozen if you wish to keep them for longer than two days.

## Drinking water safety

If your CD4 count is below 200, then you may wish to boil your drinking water. This will reduce the chances of picking up waterborne infections such as cryptosporidiosis, which very rarely finds its way into the UK's drinking water. Once boiled and cooled the water can be left in a bottle or covered in a jug in the fridge for up to 24 hours. It can be used for drinking, preparing food and brushing teeth.

Unfortunately, it is not possible to guarantee that bought mineral and spa waters are free from waterborne infections. Much bottled water comes from exactly the same source as tap water and even water from mountain springs may be contaminated.

## Water filters

To protect against cryptosporidiosis and other waterborne infections, a water filter needs to be able to remove all particles above one micron in size.

Unfortunately jug filters are not suitable for this job and you will need to have a filter fixed to your water supply to avoid boiling tap water. The filter will need changing at regular intervals as it may start to harbour potentially harmful bacteria.

## Choosing your treatment

Choosing a drug combination that you can fit into your existing eating habits is usually easier than trying to adjust your eating habits to fit the drugs.

Drug combinations may demand one of the following adaptations:

- Eating at the same times as you take your drugs.
- Avoiding food for two hours before or an hour after you take your drugs.
- Eating or avoiding certain types of food in order to ensure that you absorb your medication.

## Interactions between drugs and food

The following is a brief overview of dietary requirements for currently available HIV drugs. When you are prescribed a new drug you should be given written information about how to take it, including information about dietary restrictions. Ask your doctor, pharmacist or dietitian if you require any further information about your diet and HIV drugs.

# 14 Table 1 - Drug and food interactions

Drug	Food requirements	Liquid requirements
Nucleoside/nucleotide analogues (NRTIs/NtRTI)		
3TC (lamivudine, <i>Epivir</i> )	May be taken with or without food.	No special requirements.
abacavir ( <i>Ziagen</i> )	May be taken with or without food.	No special requirements.
AZT (zidovudine, <i>Retrovir</i> )	May be taken with or without food, though taking with food may reduce nausea.	No special requirements.
d4T (stavudine, <i>Zerit</i> , <i>Zerit PRC</i> )	May be taken with or without food. The package information says that d4T should always be taken on an empty stomach for faster absorption; however, food does not make any difference to the amount of d4T absorbed and may help to reduce nausea.	No special requirements.

Drug	Food requirements	Liquid requirements
EC ddI (capsules) ( <i>Videx EC</i> , didanosine)	Essential to take on an empty stomach, either at least 30 minutes before or two hours after eating.	Must only be taken with cold non-carbonated water or clear apple juice (which may improve the taste). Take at least one hour apart from indinavir.
ddI (didanosine, <i>Videx</i> ) (100/200mg tablets)	Essential to take on an empty stomach, at least either two hours before or two hours after eating.	Cold water recommended.
ddC (zalcitabine, <i>Hivid</i> )*	May be taken with or without food.	No special requirements.
FTC (emtricitabine, <i>Emtriva</i> )	May be taken with or without food.	No special requirements.

\* Note: Production of ddC will cease in 2006.

Drug	Food requirements	Liquid requirements
AZT, 3TC combined ( <i>Combivir</i> )	May be taken with or without food.	No special requirements.
AZT, 3TC, abacavir combined ( <i>Trizivir</i> )	May be taken with or without food.	No special requirements.
3TC, abacavir combined ( <i>Kivexa</i> )	May be taken with or without food.	No special requirements.
tenofovir, FTC combined ( <i>Truvada</i> )	May be taken with or without food.	No special requirements.

### Combination pills

Drug	Food requirements	Liquid requirements
Non-nucleoside analogues		
efavirenz ( <i>Sustiva</i> )	May be taken with or without food. However, taking the drug with food may increase drug levels by up to 50% in some people. High fat meals may also increase absorption of efavirenz, which may lead to increased side-effects, particularly in the early weeks of treatments.	No special requirements.
nevirapine ( <i>Viramune</i> )	May be taken with or without food.	No special requirements.

Drug	Food requirements	Liquid requirements
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#### Nucleotide reverse transcriptase inhibitor

tenofovir	Preferably taken with food, but not essential. If taken with EC ddl (capsules) ( <i>Videx EC</i> , didanosine), the EC ddl may be taken with or without food.	No special requirements.
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#### Protease inhibitors

fosamprenavir ( <i>Telzir</i> )	May be taken with or without food.	Alcohol should be avoided by people on the liquid formulation.
atazanavir ( <i>Reyataz</i> )	Recommended to take with food, as food increases concentrations of the drug considerably.	Alcohol should be avoided by people on the liquid formulation.

Drug	Food requirements	Liquid requirements
<b>indinavir (<i>Crixivan</i>)</b> three times daily	Take two hours after or one hour before food high in fat or protein. A light snack, without fat can however be taken at the same time.	Increase fluid intake by up to 1.5 litres of water a day to reduce the chances of developing kidney stones. Grapefruit juice reduces absorption of indinavir and should not be drunk at the same time as the drug is taken.
<b>indinavir (<i>Crixivan</i>)</b> twice daily in combination with ritonavir	With or without food.	Increase fluid intake by up to 1.5 litres of water a day to reduce the chances of developing kidney stones. Grapefruit juice reduces absorption of indinavir and should not be drunk at the same time as the drug is taken.

Drug	Food requirements	Liquid requirements
lopinavir/ritonavir ( <i>Kaletra</i> )	Take with a substantial meal containing fat.	No special requirements.
nelfinavir ( <i>Viracept</i> )	Take with a substantial snack, such as cereal with milk, a sandwich, baked potato or large chocolate bar.	No special requirements.
ritonavir ( <i>Norvir</i> )	May be taken with or without food, but taking with a fatty meal minimises the risk of an upset stomach.	No special requirements.
saquinavir soft gel ( <i>Fortovase</i> )*	Take within two hours of a substantial meal containing fat.	No special requirements.

\*Note: Production of Fortovase will cease in 2006

Drug	Food requirements	Liquid requirements
saquinavir hard gel ( <i>Invirase</i> ) in combination with low-dose ritonavir	Take within two hours of a substantial meal.	No special requirements.
tipranavir ( <i>Aptivus</i> )	Eating a high fat meal at the same time as taking the drug doubles concentrations of the drug.	No special requirements.
<b>Fusion inhibitor</b>		
T-20 (enfuvirtide, <i>Fuzeon</i> )	Administered by injection.	No special requirements.

## Managing drug-related side-effects that interfere with eating

### Nausea and vomiting

Some anti-HIV drugs can cause you to feel or be sick. Your doctor should prescribe anti-nausea medication at the start of any course of treatment, which may cause these side-effects. However, you should note that anti-nausea medicines only stop you from vomiting, they do not remove feelings of nausea.

### Diarrhoea

Diarrhoea as a drug-related side-effect can normally be controlled by anti-diarrhoea medication, which your doctor can prescribe

to you or can be bought over the counter. It is worthwhile having a stool sample checked for infections. A change in diet may also help to alleviate diarrhoea (see the section on 'Diarrhoea' on page 36).

### Unpleasant taste

This may be a direct consequence of the disintegration of drug capsules in the mouth, in which case strong mints or sweets, or brushing your teeth may help take the taste away.

However some drugs have been reported to cause changes in taste after the body has metabolised them. In some cases these are temporary and disappear after a few weeks, but in other cases they may

persist, which may mean that you have to try food flavourings or cut out foods which have become unpleasant. Or you may choose to speak to your doctor about changing your drugs, especially if you are taking first-line treatment.

### Size and number of pills

If you have difficulty swallowing pills you may be able to obtain a liquid or powder formula of some of the drugs causing the problems. You should speak to your doctor or a pharmacist as soon as possible about this.

## Lipodystrophy

Changes in the way the body processes, uses and stores fat have been noticed in some people taking anti-HIV drugs. This can lead to changes in body shape or abnormally high blood fats. Another booklet in this series called *Lipodystrophy* deals with this subject in detail.

In particular, high levels of cholesterol and triglycerides have been found in the blood of people taking anti-HIV drugs. Having high levels of these substances in the blood for a long time has been linked to an increased risk of heart disease.

Stopping smoking and taking regular exercise cause blood fats to fall and reduce the risk of heart disease.

Changes in diet can help reduce cholesterol levels. In particular, try to reduce saturated fat intake (for cholesterol) and sugar and alcohol intake (for triglycerides).

Fish oils containing fatty acids of the omega-3 group can reduce triglycerides and LDL ('bad') cholesterol and increase HDL ('good') cholesterol, help maintain flexibility in the blood vessels and reduce blood thickness. You may also wish to eat more oily fish like mackerel, salmon,

tilapia and kippers. In addition, eating plenty of fruit and vegetables (at least five portions a day) is known to offer protection to the heart. If you do not like oily fish, then your doctor may prescribe *Maxepa*, *Omacor* or linseed oil.

Weight loss can be a very serious issue for people with HIV. Losing just 3% of your body weight unintentionally can significantly increase your chances of becoming ill because of HIV.

When you become ill you often lose your appetite. However your energy requirements are likely to be greater when you are sick. Losing weight can be dangerous as it reduces the body's ability to fight infection and recover. Changes in your appearance because of weight loss can also be difficult to cope with.

If you are ill, or are recovering from illness, what you eat is likely to be very important to how you fight illness and the speed at which you recover. If you are concerned

about your nutritional requirements at this time, then speak to a dietitian as soon as possible as it is very easy to start missing out on essential nutrients.

Above all, don't think that eating problems or weight loss are trivial. They are not and it is always better to see someone early to prevent problems later.

Weight loss is common in HIV infection and should always be taken seriously. If you cannot face eating or if you are finding it difficult to keep food down, a dietitian will not bully you into eating your food. Rather they will try and help you regain your appetite or recommend smaller, more nutritious meals.

## Causes of weight loss

There are many things that can cause weight loss, the most common being loss of appetite. Other causes can include:

- Eating problems due to a sore mouth or throat.
- Diarrhoea.
- Infections which make the body burn up more energy and nutrients.
- Difficulties buying or preparing food.
- Treatment side-effects.
- Psychological problems.
- Not having enough money to buy proper food.
- Taking too much exercise without increasing calorie intake to compensate.
- Missing meals because of being drunk or high on drugs.

An important first step is to identify any medical cause of the problem. Loss of weight can be an important warning sign of the presence of an infection which often manifests itself before other more specific symptoms become apparent. It is unusual for a person with HIV to lose weight without an underlying HIV-related medical problem, although lack of appetite, worry and depression can be a cause.

It is important to try and minimise weight loss during illness and to put weight back on as lean muscle mass if you lose it during an illness. If you are too ill to shop or cook for yourself during an illness, then ask your family, friends or carer to help. Your local council social services should also be able to offer advice and help about shopping and cooking or even by providing precooked meals.

### **Tips on eating when you are ill**

Always have food available in your home. Canned foods, long-life products and frozen, ready-made meals are ideal when you are feeling unwell. If you are unable to afford food then seek help and advice from your local council, HIV treatment centre or an HIV support agency.

Snacking through the day may be easier than eating three main meals; it will also be less tiring to prepare and eat food in this way.

Easy to swallow full-fat drinks and yogurt may provide a useful source of energy and calories.

Your clinic will be able to provide food supplements that contain a balance of the nutrients you need, which may help you boost your energy intake if you don't feel like eating large meals.

## Eating problems

If you have eating problems for any reason, there are things you can do to make eating easier.

### Lack of saliva

Chewing gum before eating may help. Liquid, or semi-liquid food is easier to swallow. Avoid dry foods or foods which are likely to stick to the mouth. Acidic

foods, like citrus fruits (oranges, tangerines, grapefruit, lemons and limes) and some spicy foods, may stimulate the production of saliva, but could cause irritation to mouth ulcers.

### Sore or inflammation in the mouth

Avoid spicy, acidic, salty, very hot, or hard food, such as crusty bread. Try and chew your food away from the sore or inflammation. Liquid or semi-liquid food may be easier to consume.

### Difficulty chewing

Liquidised food may be easier to eat. Mashed potatoes and well-cooked rice may also prove easy to eat and can be mixed with cheese, milk or vegetables to improve

flavour and increase nutritional intake.

If you are having difficulty swallowing because of throat problems, then liquid or semi-liquid foods are advisable.

### Altered taste

This can be caused by bleeding gums and some mouth infections or as a side-effect of drugs used to treat HIV and other infections. Try adding ingredients to alter the taste to meet your preference.

## Losing muscle mass

When people are ill and lose weight, it is usual for them to lose more muscle than fat. Not only does that make day-to-day living harder, but it also reduces strength and the ability to fight off further infections. If you have lost weight because of illness, then any programme designed to promote weight gain should include muscle building as well as fat gain. Exercise is crucial to maintaining weight and strength, particularly in these circumstances.

## Building muscle and improving appetite

The easiest way to build up muscle is aerobic exercise, sometimes called resistance, or weight training.

Resistance training using weights will help to:

- Increase muscle size and reverse wasting.
- Increase strength.
- Increase weight but not body fat.
- Lose fat from the buttocks, abdomen and stomach.
- Improve your mood.

To make sure that you are exercising safely and effectively, you should ask a fitness instructor to develop a training programme for you which includes warm-up exercises followed by exercises for all the major muscle groups, normally divided into three sets of eight to twelve repetitions.

You should try and overload the muscle (i.e. until you cannot lift any more). However, don't overdo it as this can lead to injury and illness, or at very least put you off continuing your programme.

You should also aim to include some cardiovascular exercise to keep your heart and lungs healthy. You should exercise three times a week at between 70-85% of

your maximum heart-rate. A gym instructor will show you how to work this out. Research has shown that a programme of weight and cardio-vascular exercise three times a week for a total of 45 minutes helped to reduce the blood abnormalities associated with lipodystrophy and to reduce fat accumulation in the trunk.

Some gyms, particularly in London, offer special exercise classes for people with HIV. Ask your HIV clinic or support group if they are aware of any you can join. Many hospitals have specialist HIV physiotherapists who may be able to offer advice on starting an exercise programme or some supervised sessions.

It is important to drink plenty of fluids if you are exercising to avoid dehydration, and if you are taking some anti-HIV drugs, particularly indinavir. You should try to drink 150-250ml every 15 minutes you are training and more in warm weather.

Try and eat a meal high in starchy food (complex carbohydrates) as soon as possible after each session. Carbohydrates are needed to fuel and build new muscle. If you do not want to, or cannot afford to go to a gym, then try to do any activity which raises your heart rate and breaks a sweat.

## Anabolic steroids

In a very small number of cases of severe muscle wasting, anabolic steroids may be prescribed by the doctor to help promote muscle gain. However, there is no evidence that this weight increase is maintained in the long term, and similar gains in muscle can be achieved by diet and exercise alone. Also, anabolic steroids can produce some unpleasant side-effects such as mood swings, irritability, shrinking of the testicles and changes in liver function. Speak to your doctor or dietitian for further advice.

Many people use anabolic steroids that they have bought illegally. You should be aware that there are many kinds of steroids available at differing strength and some can cause serious damage to the liver.

## Testosterone

If you are a man and feeling lethargic, find it difficult to put on weight, are not benefiting from resistance exercise (weights), or lack interest in sex, then it might be worth asking your doctor to do a blood test to test your testosterone level. Approximately 40% of HIV-positive men will have low testosterone at some time and your doctor can prescribe tablets, gels, patches or injections to boost it.

## Creatine

Creatine has been promoted to athletes and body builders as a supplement that can provide extra energy to muscles, therefore building greater endurance and strength. It also draws water into muscles fibres, increasing their size, and may help the growth of muscle tissue.

The supplement is widely available, but its use is controversial in sports circles; many regard its use as a means of bulking muscles with water, and see little convincing evidence that it improves performance except in activities that require a short burst of energy.

Studies suggest that creatine can increase lean body mass in HIV-positive men when used with resistance exercise (weight training), but the use of creatine does not increase strength.

People with HIV also need to be aware of the risk of long-term toxicity with creatine supplementation. Apart from causing muscle pain and cramping in the shorter term, creatine may also cause kidney damage with longer-term use, especially if the dose is too high or you are already suffering from kidney problems. There may be a particular risk of kidney problems if you are taking tenofovir (*Viread*) or other drugs associated with raised creatine levels.

## Human growth hormone

Human growth hormone assists the development of muscle tissue and trials have been undertaken to see if it is of benefit in the treatment of HIV-related wasting.

Trials have also been undertaken to see if human growth hormone has any impact on the body shape changes associated with lipodystrophy. See the booklet in this series, *Lipodystrophy* for more details.

## Appetite stimulants

If you have a low appetite and are not eating enough to maintain or gain weight, appetite stimulants may be effective. An alcoholic drink may improve appetite before meals and the illegal drug cannabis is used by some people to stimulate their desire for food.

## Artificial feeding

It is important to stress that most people with HIV meet their nutritional requirements through normal eating and drinking. However, if you are finding it difficult to gain weight despite increasing your food and supplement intake, then you may benefit, in some circumstances (for example if you have been very ill) from tube feeding. Two forms are commonly used.

### Nasogastric feeding

A very fine tube is passed into the stomach through the nose. It is usually used to boost nutritional intake in the short term, perhaps for a couple of weeks. This can be a useful way of reducing weight loss during or after an acute infection or period of illness.

### Gastrostomy (PEG) feeding

A fine tube is placed in the stomach (during an endoscopy) which comes out through the stomach wall. This is useful for people who have longer-term weight-loss problems.

Artificial feeding may seem worrying, but it can provide a useful short or longer-term solution in some circumstances and can take away the pressure of trying to eat or drink enough.

Diarrhoea is common amongst people with HIV. It can be caused by some anti-HIV drugs and some medicines used to treat some other infections. Diarrhoea may be directly caused by some opportunistic infections in people with a low CD4 count. Diarrhoea can take the form of a semi-loose to completely liquid stool, and may result in having to go to the toilet more frequently and urgently. It is common for diarrhoea to be accompanied by stomach pains, bloating, nausea, vomiting, fever and loss of appetite.

## Diarrhoea as a drug-related side-effect

Diarrhoea has been reported as a side-effect of all the protease inhibitors as well as ddI (*Videx*) and abacavir (*Ziagen*) in the NRTI class, and with some antibiotics.

With some drugs, diarrhoea goes away after the first few weeks or months of treatment, however for some people it becomes a permanent feature of living with the drug.

The severity of the diarrhoea also varies. Severe diarrhoea, involving many trips to

the toilet each day, large, uncontrollable liquid bowel movements, and feelings of weakness and dizziness as a result of the loss of fluids and salts are experienced by about a quarter of people starting treatment with nelfinavir (*Viracept*) and a fifth of people starting saquinavir (*Invirase*). Similar levels have been reported in people taking fosamprenavir (*Telzir*), lopinavir/ritonavir (*Kaletra*), ritonavir (*Norvir*) and indinavir (*Crixivan*). Less serious problems may be experienced by many other people taking protease inhibitors. However, many people find that after a few weeks or months on the drug the diarrhoea improves or becomes more manageable.

Changes in diet have little effect on protease inhibitor and other drug-related diarrhoea. However a variety of treatments are available from doctors to try and control diarrhoea caused by drugs.

These include:

- *Imodium* (loperamide). This is available on prescription from your doctor or can be bought over-the-counter from chemists. Stronger anti-diarrhoea drugs, such as lomotil or octreotide, can be prescribed by your doctor.

- In some people, calcium supplements of 500mg twice a day have been shown to reduce the diarrhoea associated with nelfinavir.
- Oat bran tablets have also been shown to be effective against nelfinavir-related diarrhoea. They work by absorbing fluid, making stools larger and slowing the movement of stools through the intestines.

## Medical causes

Diarrhoea is very common amongst people with HIV, particularly those with a low CD4 count. Often no specific cause can be found, and in cases of mild diarrhoea it can often be attributed to the direct effect of HIV. Another common cause is irritable bowel syndrome, when diarrhoea often alternates with constipation and is associated with bloating and wind. Rather than being caused by an infection it is likely that lifestyle issues, such as stress, are to blame.

In people with advanced HIV disease, infections such as cryptosporidium, clostridium difficile, microsporidium, CMV, MAI, giardia, salmonella and shigella can cause very serious diarrhoea.

## What to do

Usually diarrhoea will settle down after a few days. Try and avoid coffee, raw vegetables and spicy food as they can make diarrhoea worse. If it persists it is important to see your doctor.

As diarrhoea may result in excessive loss of salts and water from the body it is important to drink plenty of fluids or special rehydration drinks. Eating foods like bananas, potatoes, chicken and fish will help you replace potassium, levels of which are commonly depleted in people with severe diarrhoea. Soluble fibre from natural sources like pulses, oats, bananas, apples and pears have also been shown to be effective against diarrhoea.

In many cases avoiding foods that are high in fat, fibre or lactose may help alleviate the symptoms of diarrhoea.

If you are losing weight because of diarrhoea it is important to speak to a dietitian as soon as possible who will work with you to develop a diet which is more appetising, or easy to absorb.

Increasing or decreasing the fibre content of your diet may help if you have irritable bowel syndrome, as might anti-spasmodic therapies such as Colofac.

Diarrhoea can also cause soreness around the anus. Over-the-counter remedies for piles may prove soothing.

- Your normal diet may well be sufficient to meet your nutritional requirements – HIV alone rarely means that people have to make major changes to their diet.
- A side-effect of anti-HIV drugs called lipodystrophy may mean that you have to change your diet to avoid blood abnormalities which are associated with the condition and with an increased risk of heart disease – see the booklet in this series called *Lipodystrophy* for more details.
- People with HIV rarely need to take special nutritional supplements, some of which can be harmful or stop HIV drugs working properly.
- You should take care with food and water safety to avoid picking up infections, particularly if your CD4 count is low.
- Some anti-HIV drugs have special dietary requirements – these should be explained to you when you start or change treatment.
- It is important to continue to eat and drink properly even if you experience side-effects or are ill because of HIV – a dietitian may be able to help.
- Diarrhoea is common in people with HIV, either as a drug-related side-effect or due to HIV itself or infection. Changes in diet can help.

**absorption** The amount of drug that gets into the blood.

**anabolic steroid** A drug which stimulates the body's metabolism to build new muscle tissue.

**anaemia** A shortage or change in the size or function of red blood cells. These cells carry oxygen to the cells of the body.

**diarrhoea** Abnormal bowel movement, characterised by watery or frequent stools.

**CD4** A molecule on the surface of some cells onto which HIV can bind. The CD4 count usually reflects the state of the immune system.

**cholesterol** A waxy substance, mostly made by the body and used to produce steroid hormones.

**endoscopy** Viewing the inside of the body cavity with a flexible instrument using fibre optics.

**fusion inhibitor** Anti-HIV drug targeting the point where HIV locks onto an immune cell.

**human growth hormone** A drug which assists the development of muscle tissue.

**hypercalcaemia** A raised concentration of calcium in the blood.

**lipid** A general term for fats.

**lipodystrophy** A change in the way the body stores, handles and distributes fat. A side-effect of anti-HIV treatment.

**NNRTIs** Non nucleoside reverse transcriptase inhibitor; the family of antiretrovirals which includes efavirenz and nevirapine.

**nausea** Feeling sick.

**neutropenia** Shortage of immune cells which attack bacteria and other fungal infections.

**nucleoside analogues (NRTI)** Family of antiretrovirals which includes AZT, ddI, 3TC, d4T, ddC, abacavir and FTC.

**protease inhibitor** Family of antiretrovirals which includes indinavir, lopinavir, nelfinavir, ritonavir, amprenavir, fosamprenavir, atazanavir and saquinavir.

**triglycerides** The basic 'building blocks' from which fats are formed.



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Seventh Edition 2006  
© NAM  
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**photography** Creatas  
**print** Lithosphere

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