

# HIV and quality of life: guide to fewer side effects, better health and longer life

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Watch out for out-of-date information

Talking to your doctor  
Side effects and symptoms  
HIV and ageing  
Further information

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Disclaimer: Information in this booklet is not intended to replace information from your doctor. Treatment decisions should always be taken in consultation with your doctor.

Welcome the i-Base guide to HIV  
and your quality of life...

This booklet will help you:

- Get the most out of your relationship with your doctor and other health professionals.
- Have accurate, up-to-date information about side effects and what to do about them.
- Have information about age-related health issues: diet, exercise, heart disease, bone health and cancer.
- Feel more in control of your treatment.
- Get better medical care and improved health, and
- Achieve a better **quality-of-life**.

## **ART:** antiretroviral treatment

“Antiretroviral treatment (ART) is now so effective that it is recommended for everyone living with HIV.

So although everyone worries about side effects before they starting treatment, modern ART actually involves few or no side effects.

When side effects do occur, they are generally mild and short-term.

Getting the right ART is important – it is not just about your CD4 and viral load results.

Looking after your long-term health means making sure you get you the best quality of life.”

# Section 1:

## General information

Introduction

General questions

How to report side effects

Side effects diary

How side effects are graded

Side effects, drug levels and genetics

Changing treatment

Side effects and adherence

You and your doctor

## Introduction

HIV treatment is now more effective and simpler to take than ever before. It involves far fewer side effects and usually fewer pills.

This is the seventh edition of this guide and each edition needs fewer pages about side effects.

With over 30 drugs and formulations approved this choice means you can now aim for the best quality of life.

It is not just about your CD4 count and viral load.

### Negotiating healthcare

This guide has been written by people who are HIV positive. We have taken many of these treatments and experienced many of the side effects

We also understand some of the practical difficulties of being a patient.

Although you might have trouble with one treatment, there is nearly always something you can do about it. This includes using another drug to treat the side effect, changing to another HIV drug, or, sometimes, altering the dose.

However, many people do not receive as much help in managing side effects as they need.

This might be because communication with your doctor is not as good as it could be.

- Perhaps there was not enough time.
- Perhaps your doctor didn't understand exactly how you are affected.
- Perhaps you just forget to mention a problem.
- Perhaps you did not think or feel it was important enough to mention.

Sometimes, if side effects continue for several months, you might think it is easier not to mention them at all or to just put up with them.

This is not a good approach.

- Something you think is a side effect might be a symptom of a more serious illness.
- Newer treatments might have become available that you could use.
- You deserve the best quality of life.

Many other people can also help including nurses and pharmacists.

## Outline of this guide

The first section of this booklet includes general information, including how to talk with your doctor and your rights as a patient.

The second and third sections include information on each main side effect, symptoms or health topic.

The fourth section focuses on issues that might or might not be directly related to HIV and side effects, but which are related to ageing. This section also includes links and references.

The online version of this guide has additional text from earlier print editions.

Many of the i-Base guides are available online in other languages.

[www.i-Base.info](http://www.i-Base.info)

## Changes to this edition

This edition includes the following changes:

- It has been updated to include side effects of recently approved drugs.
- Information on side effects of drugs that are now rarely used has been reduced in the print edition. This information is still available online.

- Most information about treating side effects that are less common - for example on diarrhoea, nausea and fatigue - is now only online.
- The references available online have been updated. This includes more than 400 research studies or clinical guidelines. These are listed by subject with hyperlinks to the online publications.

These include:

- The product information for each drug.
- Treatment guidelines (from the UK, Europe and the US).
- Studies that focus on safety of HIV drugs.

Whenever possible we selected references that provide free full text access online.

If you have a question about anything you read here, you can call the i-Base phoneline or email a question to the online Q&A service.

## Feedback and comments

We welcome feedback and comments. Please see page 97 or use the online survey:

[www.surveymonkey.com/s/7CCWBW2](http://www.surveymonkey.com/s/7CCWBW2)

## General questions

### What are side effects?

Even when drugs are very effective at treating a health problem, they sometimes affect other parts of your body.

This other activity is called a side effect or “adverse event” or referred to as drug toxicity.

Side effects can vary on a scale from being minor, annoying, difficult and in rare cases, extremely serious.

In this booklet we mainly focus on side effects of antiretroviral treatment (ART).

### Do all drugs have side effects?

Every drug is likely to have some side effects for some people, even if this is very rare. In most cases side effects are mild and easy to manage.

Sometimes they are so mild that they are not noticed. Side effects to ART usually only affects a small proportion of people.

Serious side effects to current ART, although possible, are not common.

### How common are side effects with ART?

Most people starting ART report one or more side effects. Sometimes this is because when we start a treatment we are more sensitive to anything that happens, even though it might not be a side effect.

People in studies taking a placebo often report high rates of side effects.

Not everyone taking drugs will have the same effects. What is important is how they affect you and what you can do about them.

Most HIV drugs have a low risk of serious side effects.

However, the information about potential side effects can sound worrying. Even common, over-the-counter, medicines like aspirin or paracetamol have many potential side effects (see Table 1).

---

#### Table 1: Side effects listed for aspirin

*Dyspepsia (digestive problems), nausea, vomiting. Less commonly, irritation of the gastrointestinal mucosa may lead to erosion, ulceration, gastrointestinal bleeding. Hepatotoxicity (liver toxicity), which occurs rarely.*

*Hypersensitivity reactions including urticaria (rash), rhinitis (nasal problems), angioedema and severe bronchospasm (blocked airways).*

*May cause salt and water retention as well as a deterioration in kidney function.*

*Source: [www.medicines.org.uk](http://www.medicines.org.uk)*



## Symptoms vs side effects

The word symptom is usually used for any change in how you feel that you could report to your doctor. For example, feeling tired, or having diarrhoea are both symptoms that could be side effects.

Other side effects can only be seen after a lab test, for example, high cholesterol or raised liver enzymes.

The symptoms of many common side effects are similar to symptoms of illnesses. Your doctor needs to know about every symptom in order to be able to decide whether it is caused by treatment (a side effect) or a different illness.

Different treatments are needed when a symptom relates to an illness.

## Why do side effects occur?

It is difficult to make a drug that targets one part of the body but that doesn't affect other parts.

Developing drugs is also complicated because no two people are exactly the same. So even drugs that have virtually no side effects, might be difficult for some people.

Current HIV drugs might not be perfect, but they are better than they have ever been. And drugs in development now will hopefully be better still.

New drugs are developed to be better than earlier treatment.

## Where can I get more information?

Every medicine that you are prescribed, including ART, should come with a leaflet about each of the drugs. If your hospital doesn't provide this then ask for it.

This leaflet is important. Even when the information is simplified, it should include:

- How and when to take the drug.
- Whether you need to take it with food.
- Common and/or serious side effects.
- Interactions with other drugs.

Sometimes the leaflet is much more detailed, usually in small print and is similar to the Summary of Product Characteristics (SPC).

The SPC is a detailed document for every new drug. It is available free on the European Medicines Agency (EMA) website in most EU languages.

[www.ema.europa.eu](http://www.ema.europa.eu)

The information in the SPC includes more detail about:

- All reported side effects and their frequency in studies.
- The studies that led to approval, and
- Food and drug interactions, and doses, including dose changes.

Information on each HIV drug on the i-Base website includes a direct link to the EMA web page for that drug.

[www.i-base.info/guides/category/arvs](http://www.i-base.info/guides/category/arvs)

## How are side effects reported?

The risk of side effects should always be given in real (numerical) terms. This is so you have factual information when choosing ART.

A 10% risk means you have a 1 in 10 chance that it will occur. This is the same as saying if 10 people use the drug, one person is likely to get the side effect.

Sometimes the risk is described with more general words, like rare, or common.

Language is very important but it is not always used correctly.

A side effect that occurs in more than one in 10 people is 'very common'. A rare side effect has to occur in less than one in 1,000 people, see Table 2.

When a drug is first studied, every side effect is recorded, even if it cannot be directly linked to the drug being studied.

This is one reason why the leaflet that comes with any drug usually has such a long list of potential side effects.

The risk of getting most of these listed side effects is usually very low - often less than 1 in 100 or 1 in 1000.

**Table 2. Definitions for frequency**

Very common	Affects 1 to 10 people in 10. ie 10% chance or higher.
Common	Affects 1 to 10 people in 100. ie 1% to 10% chance.
Uncommon	Affects 1 to 10 people in 1,000. ie 0.1% to 1% chance.
Rare	Affects 1 to 10 people in 10,000. ie 0.01% to 0.1% chance.
Very rare	Affects less than 1 in 10,000. ie less than a 0.001% chance.
Not known	Frequency cannot be estimated from the available data.

If side effects only become apparent after the drug has been approved, the drug leaflet might not have this information.

**Some side effects are only discovered after a drug has been approved. However, most drugs become safer over time, as more people use them, and more information is collected.**

If you are feeling more anxious or nervous, are not sleeping properly, have a lower sex drive or have lost your appetite, it is important that your doctor understands this.

### Starting treatment for the first time?

Everyone worries about the risk of side effects before they start treatment.

Before choosing your combination, ask for information about each of the drugs you might take. Ask about the likelihood of side effects. Ask what percentage of people had side effects related to each drug and how serious they were.

Before starting ART, ask for the out-of-hours phone and email contact details for your clinic.

You might be asked to join a study looking at side effects. These studies are important to define the extent of side effects when different drugs are used together.

People in studies are monitored more carefully and more frequently, so you might get better care.

Research is essential if we want new and better drugs in the future.

### Can I change drugs easily?

Everyone should be offered at least two options whenever you start or change treatment. Ask about the advantages and disadvantages for each one.

Some people are not told that they have a choice. This is not right. Even if your doctor prefers one combination, you need to be involved in this choice.

If you do have problems with the first combination, you can easily modify the drugs.

There are lots of HIV drugs to choose from. While you can't quite mix and match them all, if one or more of the drugs in your combination is difficult to tolerate, you can change it for another.

If you change a drug because of tolerability, you can usually use it again later if you need to (*except for abacavir - see page 44*).

**Just because you used a drug once, does not mean you have 'used up your option' of using it again in the future.**

Usually side effects improve after the first few days, weeks or months, but sometimes they don't. See the sections on each side effect in this booklet for an idea of how long you should put up with them before changing.

**You do not have to continue with a drug to prove anything to yourself or your doctor. If something is wrong, ask your doctor to change to something else. Some drugs are just not for everyone.**

## Can I know if I will get side effects?

You cannot know whether you will get side effects from a drug until you take it.

The only way to know is to try, and you will be carefully monitored.

## Are side effects different by gender?

Generally, side effects are similar for all people. Sometimes, other factors, such as weight, might explain any differences as smaller people might absorb relatively higher drug levels.

Most HIV studies have a higher proportion of men compared to women and they include very few transgender people.

When data is available, it generally shows few differences by gender.

## What about side effects and adherence?

Adherence is the term for taking the meds in your combination exactly as they are prescribed. It includes taking them on time and following any dietary advice.

If side effects affect your adherence your doctor needs to know.

There is a special section about adherence and side effects on page 22.

## Getting your doctor to help...

Many of us **underestimate** side effects when we talk to our doctor.

- We don't like to make a fuss.
- We say they are more manageable than they really are.
- Sometimes we even forget to mention them.

Unfortunately, some doctors think that we **overestimate** side effects.

- They think people exaggerate side effects, and that they are not really as bad as we say.

This means there can be a big difference between what is actually going on and what your doctor thinks is going on.

This is one reason that side effects are often under-treated.

Talk to your doctor about any problems. This should *not be about how you feel on the day you see you doctor*, but about how you feel *on days you get side effects*.

If you don't say something, nothing will change.



i-Base can answer  
your questions  
by phone, email or online:  
0808 800 6013  
[questions@i-Base.org.uk](mailto:questions@i-Base.org.uk)  
[www.i-base.info/questions](http://www.i-base.info/questions)

### What happens if side effects continue?

If the first treatment you are given to help with a side effect does not work, there are usually other drugs that you can use.

In this guide we list a range of options, including alternative treatments. If one doesn't work then try others.

Changing one HIV drug for another is also an important option.

Stopping treatment is not generally recommended, but for some people in some circumstances, this might still be considered.

### Can I report side effects officially?

In the UK, both patients and healthcare professionals can report side effects directly to the Medicines and Healthcare products Regulatory Agency (MHRA).

This is through the Yellow Card scheme.

This contributes to an important safety database, especially for new and unexpected side effects.

Side effects from new drugs often emerge after approval, and it is worth reporting something even if you aren't sure.

Side effects can be reported online with this scheme and through the Yellow Card app.

[www.yellowcard.mhra.gov.uk](http://www.yellowcard.mhra.gov.uk)

## How to talk about side effects to your doctor

If you want your doctor to help, you need to describe your symptoms clearly and in detail – including how they affect your life.

Your doctor can then check for other possible causes. For example, that diarrhoea is not related to food poisoning, or that sexual problems are not related to low testosterone.

The best way to do this is to keep a side effect diary. Record everything and take this when you see your doctor.

An example is included on page 16. Use a new sheet of paper if you need more space and take this to your appointment.

For each symptom, include information about how often, for how long, how badly - and the impact on your life.

### How often?

How often do you get symptoms?

- Once or twice a week? Once every day? 5–10 times a day? etc
- Do they occur at night as well as during the day?

### How long?

How long do the symptoms last?

- If you feel sick or get headaches, does this last for 20 minutes, 3 to 4 hours, or different lengths of time?
- Is there a pattern? Is it two hours after each dose? or every morning etc?

### How badly?

How bad are the symptoms?

- Rate them on a scale (from 1 for mild to 5 for severe).
- A scale is a useful way to describing anything that involves pain.
- Recording severity when side effects occur is better than trying to remember later.
- Does anything help? If yes, write this down too.

### How does it affect your quality of life?

How do the symptoms affect your daily life? This can really help your doctor understand how difficult the side effects are for you.

- Some people put up with diarrhoea without explaining to their doctor that it stops them going to the pub or cinema. Explaining the impact on your life makes it easier for your doctor to understand.
- If you are feeling more anxious or nervous, are not sleeping properly, or have a lower sex drive, it is important that your doctor understands this.
- If you have taste changes, or feel too sick to eat properly, tell your doctor.
- Symptoms of lipodystrophy, the term for body fat changes, are difficult to measure. If this worries you it can change your whole outlook on life. Are you less social or less confident? Is this contributing to depression?
- Do you miss taking your meds because of side effects?

## Side effects diary

Use this page to record any changes in your health that could be related to side effects. You might not get any side effects but if you do, then this diary will be useful. The most common side effects are listed below but include others even if they are not listed here.

- |                      |                         |                            |
|----------------------|-------------------------|----------------------------|
| 1. Feeling anxious   | 9. Rash                 | 17. Body shape changes     |
| 2. Mood swings       | 10. Nausea/vomiting     | 18. Sexual changes         |
| 3. Feeling depressed | 11. Yellow eyes or skin | 19. Hair loss              |
| 4. Sleep disturbance | 12. Diarrhoea           | 20. Tingling in hands/feet |
| 5. Vivid dreams      | 13. Stomach pains       | 21. Pain in hands/feet     |
| 6. Nightmares        | 14. Taste or appetite   | 22. Dry skin               |
| 7. Feeling tired     | 15. Weight gain         | 23. Eyesight changes       |
| 8. Headache          | 16. Weight loss         | 24. Other(s) specify       |

Side effect	Date	Time(s)	Scale: 1 = mild to 5 = severe				
			1	2	3	4	5
_____	_____	_____	1	2	3	4	5
_____	_____	_____	1	2	3	4	5
_____	_____	_____	1	2	3	4	5
_____	_____	_____	1	2	3	4	5
_____	_____	_____	1	2	3	4	5
_____	_____	_____	1	2	3	4	5
_____	_____	_____	1	2	3	4	5
_____	_____	_____	1	2	3	4	5
_____	_____	_____	1	2	3	4	5
_____	_____	_____	1	2	3	4	5

Other comments and questions to ask your doctor:

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## How side effects are graded in research studies

Most information about the risk of side effects comes from research studies.

This is why it is important to report all side effects if you take part in a study.

Drug studies collect information about:

- All potential side effects.
- How often side effects occur.
- How serious they are.

But studies use small numbers of people for relatively short periods. So sometimes rare side effects are only discovered after a drug is approved and has been widely used for many years.

In studies, each side effect is graded from 1 to 4. Grade 1 is mild and grade 4 is serious, life threatening or requiring hospitalisation.

Knowing about these grades can help understand information about each drug.

### **GRADE 1 (Mild)**

Transient (goes away after a short time) or mild discomfort; no limitation in your daily activity; no medical intervention/therapy required.

### **GRADE 2 (Moderate)**

Your daily activity is affected in a mild to moderate way – some assistance might be needed; no or minimal medical intervention/therapy required.

### **GRADE 3 (Severe)**

Your daily activity is markedly reduced – some assistance usually required; medical intervention/therapy required, hospitalisation or hospice care possible.

### **GRADE 4 (Potentially life threatening)**

Extreme limitation to daily activity, significant assistance required; significant medical intervention/therapy, hospitalisation or hospice care very likely.

Grading for some common side effects (from the United States Division of AIDS) is shown in Table 3.

**Table 3: Examples of how common side effects are graded by level of symptoms**

Side effect	Grade 1	Grade 2	Grade 3	Grade 4
Diarrhoea	3–4 loose stools a day OR mild diarrhoea lasting less than one week.	5–7 loose stool a day OR diarrhoea lasting more than one week.	Bloody diarrhoea OR over 7 loose stools a day OR needing IV treatment OR feeling dizzy when standing.	Hospitalisation required (possible also for Grade 3).
Fatigue	Normal activity reduced by less than 25%.	Normal activity reduced by 25–50%.	Normal activity reduced by over 50%; cannot work.	Unable to care for yourself.
Liver toxicity: AST or ALT levels	1.25–2.5 Upper Limit Normal	2.5–5.0 x ULN	5.0–7.5 x ULN	more than 7.5 x ULN
Mood disturbance	Mild anxiety, able to continue daily tasks.	Moderate anxiety / disturbance, interfering with ability to work, etc.	Severe mood changes requiring medical treatment Unable to work.	Acute psychosis, suicidal thoughts.
Nausea	Mild OR transient, but reasonable food intake.	Moderate discomfort OR intake decreased for less than 3 days.	Severe discomfort OR minimal food intake for more than 3 days.	Hospitalisation required.
Rash	Redness or itchy skin on part or whole body.	Rash that breaks skin, hard or soft pimples OR light peeling/scaling.	Blistering, open ulcers, wet peeling, serious rash over large areas.	Severe rash, Stevens Johnson syndrome. Severe broken skin.
Vomiting	2–3 episodes a day OR mild vomiting for less than one week.	4–5 episodes a day OR mild vomiting for more than one week.	Severe vomiting of all food and fluids over 24 hours OR needing IV treatment OR feeling dizzy when standing.	Hospitalisation for IV treatment (possibly also for Grade 3).

## Side effects, drug levels and genetics

Most drugs are approved at one standard dose even though different people absorb drugs differently. This can be related to differences in our genes and is a new area of research called pharmacogenetics.

For example, tiny differences in your DNA can explain the differences in levels of drugs including efavirenz, nevirapine and atazanavir.

Just as the blood levels of a drug affect how effective it is, they also affect the chance of side effects.

Drug levels for some HIV drugs can be checked using a test called therapeutic drug monitoring (TDM). The dose can then be changed if they are too high or too low.

- Protease inhibitors, NNRTIs and integrase inhibitors **can** be measured.
- Nukes (3TC, FTC, abacavir, tenofovir DF and TAF) **can not** be measured. This is because the important levels of these drugs are inside cells and the tests measure drug levels in blood.

TDM is not routinely used but it is important in some situations.

### When should Therapeutic Drug Monitoring (TDM) be used?

TDM is important when routine recommended dosing is not always appropriate, for example:

- In children.
- In people with pre-existing liver or kidney damage.

TDM is important for children and people with pre-existing liver or kidney damage ... and... whenever drug levels or drug interactions might be linked to side effects.

- When drug levels might be linked to side effects. If you get yellow eyes with atazanavir TDM can help find an effective lower dose.
- When drug interactions are a concern. For example, when antacid drugs like omeprazole reduce levels of atazanavir and cause treatment to fail.

TDM involves taking a blood sample, usually after you have been on a treatment for at least two weeks.

**The hospital needs to know the exact time that you took your previous dose in order to interpret the results.**

Sometimes a sample is taken just before you are due to take your next dose, and sometimes it is also taken 2–3 hours afterwards.

TDM is part of an individualised approach for specific groups of people on ART.

Information on TDM:

[www.lab21.com/hiv-tdm](http://www.lab21.com/hiv-tdm)

Information on drug interactions:

[www.HIV-druginteractions.org](http://www.HIV-druginteractions.org)

## Changing your HIV drugs

Some symptoms in the first few weeks of treatment might be caused by immune stimulation or your body getting better. So what you think might be side effects might not be related to the drugs at all.

If your initial symptoms are only mild or moderate, seeing whether they settle down before changing treatment, can be good advice. Some side effects become much easier after the first few days and weeks of treatment.

If side effects are more serious or difficult it is easy to switch drugs.

Changing to another treatment will not affect your future options.

- Switching drugs can improve your quality of life and still keep your viral load undetectable.

The decision to change treatment in order to manage side effects will depend on:

- The other drugs available.
- Whether the side effects are likely to get worse if you don't change.

- Whether the side effects are related to drugs. Even though there might not be a known link, this might be a new report, and you might be the first person to experience this.
- If your current combination is not your first treatment, you might have fewer options.

Close monitoring after changing a drug will help you know whether that treatment was causing the symptoms.

**Never just stop or interrupt treatment without contacting your doctor first.**

### Switching nukes

Most combinations involve two nukes. the most commonly used nukes are lamivudine (3TC), emtricitabine (FTC), abacavir and tenofovir DF (TDF).

So long as you haven't developed resistance to other nukes, you can switch one for another.

A new version of TDF called TAF is likely to become more widely used in the next few years.

### Switching the third drug

The third component of most combinations is usually an NNRTI, a boosted PI or an integrase inhibitor.

Sometimes it is good to switch to a different drug in the same class. Sometimes it is better to change to a different drug class.

There are usually lots of options and your doctor should talk about the advantages and disadvantages of each one.

More information about drug choice is included in the online guide.

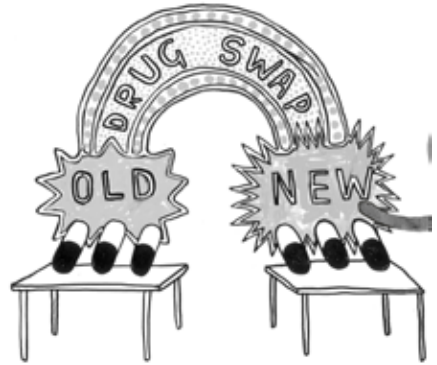
### Other classes of drugs

Maraviroc is a CCR5 inhibitor that can sometimes be used when switching treatment

New drugs in development will also hopefully have fewer side effects.

Each choice will be based on your individual treatment history.

**It might also depend on how the drug is licensed, on drug cost, and on which clinic you attend. If it is important to get access to a new drug, it might be worth changing your clinic.**



“I have changed HIV meds four times. Sometimes because of side effects and sometimes because of new and better drugs.

It always takes me time to decide to change, even when I know that this will be better for me.

Every time, my quality of life improved more than I expected – even switching from twice-daily to once-daily.”

## Side effects and adherence

Whether you are starting your first treatment or have been using HIV drugs for a long time, your doctor should have talked to you about the importance of adherence.

This is the term that describes taking the medications exactly as they are prescribed.

This includes:

- Taking them on time.
- Following any dietary advice (ie with or without food).
- Taking them everyday: weekdays, at weekends and on holiday.

Not getting adherence right leads to treatment failure and resistance.

There is a link between adherence and side effects.

**...If you are getting side effects, take them seriously and tell your clinic...**

If you get side effects, take them seriously and tell your clinic.

Many treatments help with nausea and diarrhoea. You can be given a small supply of these to take to prevent side effects when you first start treatment. You should also be able to collect these easily from your clinic if you get symptoms later on.

Adherence can be more difficult when medications make you feel less well.



## You and your doctor

A good relationship with your doctor and health workers can help your health in the long term.

Nurses and pharmacists can give you support and advice on all aspects of your treatment. This includes adherence and side effects.

They can make referrals to other professionals, including dieticians, psychologists and social workers.

Both you and those involved in your care have certain rights and responsibilities. The following lists include some of your rights and responsibilities as a patient.

### Some of your rights as a patient...

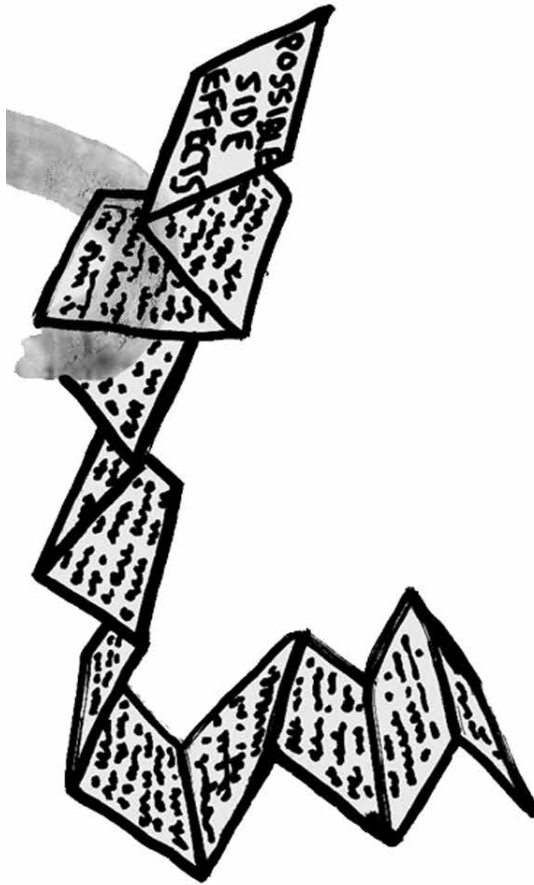
- To be fully involved in all decisions about your treatment and care.
- To be seen within 30 minutes of your appointment. If they are running late, you should expect an explanation.
- To be treated with respect and confidentiality.
- To have different options for treatment explained to you. This should include the risks and benefits of each option.
- To have your doctor or nurse explain any test results.
- For your records to be kept securely. They should be made available for you to see if you ask.
- To choose whether to take part in research trials. This should not affect your current and future care.
- To be able to make a complaint about your treatment. Any complaint must be fully investigated. Again, this must not affect your future care.
- To have a second opinion from a suitably qualified doctor.
- If you write to your hospital or clinic, you should have a written response within 14-28 days.
- To change your doctor or treatment centre without it affecting your future care. You do not have to give a reason for changing doctors or clinics. However, if there has been a problem, then giving a reason can sometimes help resolve the problem.
- To have test results and a summary of your treatment history forwarded to your new doctor or clinic.



### Things you can do to help

- Find a clinic that is convenient to you and that you feel comfortable with.
  - Find a doctor who you like. If you are a woman and want to see a female doctor then ask for this.
  - If you are a gay man and want to see a gay doctor, this might be available and might affect your choice of clinic.
  - Turn up for your appointments on time. Tell the clinic if you can't make it. Then they can give your slot to another patient.
  - Make a list of things you want to discuss with your doctor. Remember to take it to your appointment!
  - Ask to see the same doctor at each visit at least until you are settled with your care. This is important. It's difficult to develop a good relationship if you always see a different doctor. Once you are more settled, the advantages of sometimes seeing a different doctor include getting a second opinion and perspective.
  - Have your routine bloods taken 2-3 weeks before your regular clinic visits so the results are ready for your appointment.
- Treat all people involved in your care with the same respect you would wish to receive yourself.
  - Listen carefully to the health advice that you are given, and act upon it.
  - If you don't understand something, ask your doctor to explain it again or in a different way.
  - Be honest with those caring for you. Tell them about any other drugs that you are taking. This includes alcohol, legal and illegal drugs and complementary treatment.
  - Be honest about your level of adherence. If the people managing your care don't know you are having problems, they can't help.





# Section 2:

## General symptoms

Diarrhoea

Feeling sick (nausea and vomiting)

Feeling tired (fatigue)

Insomnia (not sleeping well)

Mental health

Sexual health

## Diarrhoea

Most HIV meds list diarrhoea as a potential side effect. Protease inhibitors – and the boosters ritonavir and cobicistat – are most associated with diarrhoea.

Diarrhoea is no longer a common side effect with most HIV drugs.

As a symptom though it is often not treated properly because people find it difficult to discuss.

Diarrhoea can also be caused by untreated HIV and HIV-related illnesses.

Diarrhoea includes looser and more watery stool and increased frequency.

It is important that diarrhoea is managed properly by your doctor. Moderate or severe diarrhoea can lead to dehydration, poor absorption of nutrients and drugs, weight loss and fatigue.

Long term use of early HIV drugs (some nukes) or heavy alcohol use can damage the pancreas. This can upset the production of enzymes from the pancreas that help you digest food, and cause diarrhoea.

Diarrhoea can be related to something you have eaten, other infections and travel to other countries.

Most of us get diarrhoea at some point and having a lower CD4 count increases this risk. Most diarrhoea is self-limiting lasting just for a few days. However, sometimes it can last for a few days, weeks, months or, in some cases, years.

Anything lasting more than a few days is serious enough to talk to your doctor about.

### How to describe diarrhoea to your doctor

- How often each day do you need to use the toilet?
- How loose is your stool? Is just less firm or is it completely watery?
- Is this linked to certain times of the day or after eating certain foods?
- How urgently do you need to use the toilet?
- Has this affected your social life in terms of going out?
- Do you feel more tired or weak as a result?

### More information

The online version of this guide has more information on:

- Finding the cause.
- Non-drug causes.
- Management and treatment.
- Diet advice.
- Medications and supplement.
- Other treatments.

[www.i-base.info/guides/side/diarrhoea](http://www.i-base.info/guides/side/diarrhoea)

## Feeling sick (nausea and vomiting)

Most HIV meds list nausea as a side effect

Nausea is now a much less common side effect and it is generally mild and short term.

Nausea (feeling sick), and vomiting (being sick), is much less common than it used to be, because modern drugs are easier to take.

For most people, nausea also improves after a few days or a week as your body gets used to the drugs.

Using an anti-sickness medicine regularly can often help. If one anti-emetic does not work, it is worth trying others. Some work by emptying your stomach more quickly and others by stopping the signals that tell your brain that you feel sick.

If the nausea does not improve, there might also be an underlying cause which should be investigated.

If continued nausea is related to an HIV drug, then you might need to switch to another HIV medication.

If you are taking abacavir and you feel like you might be sick or are vomiting, contact your clinic straight away because of the risk of hypersensitivity reaction. (See page 44).

### How to describe nausea to your doctor

- How often each day do you feel sick, or are you sick?
- How many days a week does this happen?
- How long does the nausea last?
- Has this affected how much you can eat or drink?
- Do you feel more tired or weak as a result?

### More information

The online version of this guide has more information on:

- Medications for nausea.
- Other suggestions: diet and lifestyle changes.

[www.i-base.info/guides/side/nausea](http://www.i-base.info/guides/side/nausea)

**“If diarrhoea, nausea or fatigue do not improve quickly – or respond to simple treatment – then given the choice of drugs available, it is probably better and easier to just try a different combination.”**

## Feeling tired (fatigue)

Most HIV drugs list fatigue as a side effect but this is not very common and usually mild.

Many people instead find they have far more energy, even in the first weeks of treatment, because their viral load is reduced.

Fatigue in HIV positive people is often more likely to be related to other factors than as a side effect of HIV drugs.

These factors include depression, anxiety, sleep problems, other health complications, and social factors like not having work or enough money.

If your HIV meds stop you sleeping well, you will be tired the next day, so the tiredness can be due to poor sleep rather than a direct side effect of the drug.

### What is fatigue?

Fatigue is defined as a general feeling of tiredness that does not really go away, even after you have been able to rest.

Fatigue can be physical or mental.

With physical fatigue you are not able to be as active as usual, even with simple tasks like going up stairs or carrying shopping.

With psychological fatigue, you are not able to concentrate as well as normal or you lose the motivation to do things.

Fatigue can be caused by many things including:

- Untreated HIV.
- HIV drugs.
- Lack of sleep.
- Poor diet.
- Stress.
- Depression.
- Antihistamines (used to treat hay fever) and flu and cold remedies.
- Alcohol and recreational drug use.
- HIV-related illnesses.
- Being more active than you are able to manage.
- Hormone imbalances such as low levels of testosterone or DHEA (dehydroepiandrosterone) in both men and women.
- Other health problems.

### How to describe fatigue to your doctor

Fatigue can start slowly and build up without you realising it. To describe this to your doctor it helps to give examples of when you feel more tired.

Compare how you feel now with how you felt six months or a year ago.

Describe how often you are tired or out of breath. As fatigue can be related to poor sleep, include information about your sleep patterns.

Describe how fatigue affects your daily life.

### More information

The online version of this guide has more information on:

- Medications for fatigue
- Information about lactic acidosis (rare side effect linked to older HIV drugs).

[www.i-base.info/guides/side/fatigue](http://www.i-base.info/guides/side/fatigue)



## Insomnia (not sleeping well)

Insomnia is a side effect of efavirenz (see page 40-43), rilpivirine and perhaps abacavir.

Sleep is an essential part of a healthy life. It is a time when your body is able to rest and repair.

If you are not able to get regular, good quality sleep, either in the long or short term, your ability to think, speak and concentrate will be reduced. You can be irritable and have slower reactions, and your memory and judgement will be affected.

Sleep problems are generally under-reported, under-diagnosed and under-treated. Keeping a sleep diary for the week before you see your doctor can help diagnose some of the problems.

Apart from with efavirenz, insomnia is far more commonly related to depression than a side effect of HIV treatment.

One recent study reported that 1 in 3 HIV positive people had symptoms of depression and in 40% of cases this was not being treated.

Your psychological health relates closely to your physical health. Getting a referral for support for depression, including treatment if appropriate, might help with sleep problems.

Factors affecting sleep include:

- Problems falling asleep at night.
- Waking up too early in the morning.
- Waking throughout the night and only getting intermittent sleep.

Your sleep diary should include when you fall asleep and when you wake up on week days and weekends. Include any naps you have during the day.

- Record how you feel about the general quality of your sleep, including vivid dreaming or nightmares.
- Record drug and alcohol use — or changes in use such as withdrawal or cutting back on either.
- Caffeine in tea, coffee and cola can affect your ability to sleep, even many hours before you go to bed. Keep a record of how much caffeine you drink during the day and see if changing to a non-caffeine alternative helps.
- Include details about your sleep environment. How comfortable is your bed? Is the room warm and quiet?
- Include when you normally eat. Leaving a couple of hours between your last meal and going to sleep will improve the chance of better sleep.

Stress and worry can easily disrupt your sleep pattern, as can ongoing health concerns, especially if they are painful or uncomfortable.

Your doctor should also give you a physical check up and blood tests to check for cardiovascular, respiratory or hormonal reasons, especially thyroid function, that might be causing sleep disturbance.





## Medication

Sleeping pills are only usually prescribed when other self-help remedies have been tried. They are used to help re-establish a pattern of sleeping. **They are not recommended or generally prescribed for long-term use.**

Sleeping tablets should only be used for a short period and at the lowest dose.

All sleeping pills work in a similar way by reducing brain activity, but the type of sleep they produce varies between different types of drug.

They can help you sleep, but the depressed brain activity means that the quality of sleep is often not as good as natural sleep, and you might still not feel rested the next day.

Sleeping pills reduce the amount of 'dream sleep' that you get which is an important component of good sleep. Sometimes this can leave you feeling drowsy the next day. They can become less effective after even a few days' use, and you can develop a physical or psychological dependency if they are used for more than 1–2 weeks.

Although benzodiazepines (ie temazepam) have relatively few side effects they can interact with protease inhibitors. Non-benzodiazepines such as zopiclone and zolpidem work in a similar way, are shorter acting, and are preferred when anxiety is not a contributing factor.

Melatonin is a hormone produced at night linked to your 'biological clock'. As a supplement it is used to help deal with jet lag and might help return sleep patterns to normal, although side effects include vivid dreams.

## Suggestions to help

It is important that the causes of insomnia are diagnosed before any treatment is given.

The wide range of causes mean that non-pharmaceutical approaches, such as having a warm bath or hot milky drink before bedtime, can often make a big difference and are sometimes sufficient.

### Do...

- Sleep only enough to be refreshed.
- Get into a routine where you can go to sleep and wake up at the same time each day. Waking up earlier might help.
- Try to exercise every day.
- Avoid extremes of noise or temperature.
- Drink chamomile or other herbal teas.
- Make your bedroom as comfortable and relaxing as possible.
- Eat an evening meal so that you are not hungry when you go to bed.
- Try burning oils.

### Don't...

- If you use sleeping pills, don't use them every night
- Drink caffeine drinks or alcohol before bedtime as this will reduce the chance of sleeping well
- Smoke close to bedtime – it makes sleeping difficult
- Don't nap during the day, so that you are more tired at night when you need to sleep

## Mental health

Your mental health describes how you think about yourself and your life on a day-to-day basis. It is about how you interact with your surroundings and the people around you.

From a medical perspective, mental health covers a wide range of symptoms. These include depression and anxiety that can range from mild (which are easy to manage) to moderate and severe (when they dominate your life).

Most people have times when their mental health is fragile. Life involves stress, and stress can change your mood and ability to cope with difficult situations.

If difficulties continue over time, this can increase the risk of other medical problems, including adherence to meds. Getting appropriate help and support is important, and the earlier the better.

Your doctor can only help if he or she knows about these difficulties. It is important to say if you are worried.

It is very common for HIV positive people have to have symptoms of depression or mental health problems and these are often untreated.

This can be for several overlapping and complicated reasons.

- An HIV diagnosis affects how you feel about yourself and how you fit in to society. Prejudice is still around—as is ignorance about HIV. This leaves many people feeling more isolated and needing support to restore their confidence about themselves.
- HIV rates are higher in people who are already marginalised or disempowered. This can be related to sexuality, gender, drug use, poverty,

sex work, previous abuses and other causes of vulnerability including mental health itself. An HIV diagnosis can further add to this.

- HIV positive people are more likely to use alcohol and recreational drugs which are associated with mental health issues.
- Some HIV drugs have side effects that change your mood and include depression, paranoia, anxiety etc. It is essential that someone with these side effects uses alternative drugs (see pages 40–42).
- HIV can increase the risk of infections in the brain. This is usually related to very low CD4 counts (under 100). Neurological symptoms (how you think, feel and behave due to a direct impact on the brain) have also been reported in very early HIV infection during seroconversion.

### HIV and depression

Depression can include a wide range of symptoms and if these continue (for example occurring every day for two weeks) this should prompt referral for a specialist assessment. These include:

- Feeling sad, empty, anxious, restless or irritable in a way that affects your daily life
- Feeling hopeless or pessimistic or that you are not in control of your life
- Lacking energy, or interest in activities that you would normally enjoy
- Feeling guilty, hopeless or worthless
- Having difficulty concentrating, remembering things or making decisions

“After 12 years of treatment I’ve had my share of difficult side effects but none of them have put me off continuing treatment.

Diarrhoea and insomnia added to my depression, anxiety and agoraphobia. Fatigue from lack of sleep and anxiety have at times made me reclusive. I found psychological side effects are extremely hard to describe or quantify to a doctor.

It is definitely better to ask for help early. Asking for help at a time of crisis might mean a waiting list to see a counsellor.

Anti depressants can help but sometimes have their own side effects.”

- Not sleeping or eating properly, weight loss, overeating, lack of interest in personal care
- Thinking about death or suicide or attempting suicide

If you have any of these symptoms, you might be depressed, and your doctor or other health care workers need to understand how you feel and the impact this is having on your daily life.

Depression can easily be overlooked in general consultations so is often undiagnosed. The earlier you talk about how you feel the easier it will be to get the support you need.

Recovery from depression, even with medications, can take time, but treatment and support can work.

### Treatment and management

HIV does not mean you will have mental health problems, but if you are having problems, many things can help.

- Having a friend who you can talk to.
- Support groups reduce isolation and help you meet other people with similar experiences.
- Counselling and/or behavioural therapy can help you cope with issues related to HIV or earlier traumatic experiences.
- Keeping active can keep you occupied. Regular exercise reduces stress and mental health symptoms.
- Anti-depressants can often help.

## Sexual health

Good sexual health is important to overall quality of life.

Sexual dysfunction, whether due to HIV, side effects of HIV treatments, or other factors, can dramatically reduce quality of life.

Sexual dysfunction includes reduced sex drive (a loss of interest in sex) and physical difficulties (such as loss of erection or difficulty reaching orgasm).

Although several reports linked this to protease inhibitors, sexual dysfunction is not generally reported as a side effect of HIV drugs.

It is likely that sexual problems affect a lot of HIV positive people, not least because of the complex social factors. It takes many people a long time after they are diagnosed before they develop or regain sexual confidence.

Although most research into sexual dysfunction associated with HIV has been carried out in men, when women have been included in these studies, a similar level of concern has been reported.

For example, a study by anonymous questionnaire in over 900 HIV positive people using combination therapy (80% men, 20% women) found that around one-third reported less interest in sex.

With new partners, the decision to discuss HIV, perhaps before you know very much about a person, can be difficult. Not disclosing your HIV status, even when your partner is not at risk because you use condoms, can be a difficult barrier to overcome later in any relationship.

In long-term relationships, fear and concerns about risk might never be discussed or resolved in detail. With an HIV negative partner, either or both partners might become preoccupied with a risk of transmission during sex, however small the risk and however safe the sex.

This is a pity given that having an undetectable viral load on ART makes it difficult to transmit HIV. The risk becomes so low that post exposure prophylaxis (PEP) is no longer recommended when viral load is undetectable.

If both people are HIV positive, they might worry about resistance or reinfection even though this risk is close to zero if both partners have undetectable viral load on ART.

Many people find it difficult to talk to their doctor about their sexual health and it is something that doctors rarely ask patients about directly.

Together with many of the medical issues listed below, it might be complicated to identify one single cause.

Now that treatment has given us the possibility of living a natural life-span, it is important to try and resolve sexual problems. This is something that your clinic can help with, but it is something you might need to directly ask about.

## Causes

Sexual dysfunction can be caused by a wide range of medical and psychological issues.

- HIV positive men and women have reduced testosterone levels compared to HIV negative people.
- Depression can affect sexual health.
- Many treatments for depression including fluoxetine (Prozac), citalopram (Cipramil), paroxetine (Seroxat) and sertraline (Lustral) can decrease libido and lead to erection difficulties in men. Mirtazapine (Zispin) might be considered as it has little or no effect on sex drive and fewer interactions with HIV drugs.
- Sedatives, tranquillisers and other medications can cause sexual dysfunction, as can smoking, alcohol and recreational/illegal drug use.
- Long-term use of steroids or male hormones.
- Stress, related to relationship- or work.
- Some side effects are associated with higher rates of sexual dysfunction. This can include neuropathy (for physical reasons) and lipodystrophy (for psychosocial reasons).
- Sexual dysfunction is more common in HIV positive people who are not using HIV drugs compared to HIV negative people.
- Age (older than 40 years), diabetes, pelvic surgery, fear of failure, hypertension can all cause changes in sexual function.

## Testosterone levels

If you have a reduced sex drive then ask to have your testosterone levels checked with a simple blood test.

For men, the range for normal levels is 10-30 nmol/L but this does not allow for changes in age. If your levels are lower than this, testosterone replacement treatment can be given by patch, gel, implant or injection.

If you have other symptoms (low sex drive, fatigue, etc) then testosterone treatment is one option you can try, even if you are within 'normal' levels.

If your testosterone levels are low, have your bone density monitored as HIV positive people are at higher risk of osteoporosis.

If effective, increased testosterone levels should reduce depression and fatigue and increase sex drive.

Testosterone (at much lower doses) is being studied as a treatment for sexual dysfunction in women. Hair growth, deeper voice and clitoral enlargement are side effects that require caution in women.

## Psychological issues

How you feel about yourself and your body and how you feel about HIV can affect your sexual health. HIV negative people and society in general can react in irrational ways to HIV, which can contribute to how you feel as an HIV positive person.

Dealing with an HIV diagnosis, whether or not you are on treatment, takes a lot of courage and perseverance. If treatments work well, you can be faced with new choices in life. But it can be difficult to make choices if meds are not working well and you are dealing with illness or side effects. You would expect these things to impact on your sex life.

Talk to your doctor. Referral to a sexual health clinic or counselling support is often appropriate. Many clinics have psychologists who are trained and experienced in sexual dysfunction.

## Treatments for sexual dysfunction

Different approaches are used depending on the most likely cause.

Approaches to treating erectile dysfunction in men include counselling, vacuum devices, cockrings and treatments like Muse (an implant) and alprostadil injections (Caverject).

Oral medications include sildenafil (Viagra), vardenafil (Levitra) and tadalafil (Cialis).



Oral medications can sometimes help reduce psychologically difficult situations. For HIV positive people they should be available on the NHS (after a consultation) or by asking your doctor for a private prescription.

Some HIV medications interact with Viagra. Lower doses – usually one 25 mg in any 48-hour period – are used for people using a PI or NNRTI based combination.

Viagra should never be used with poppers (amyl nitrate).

Viagra is not currently licensed for women although small studies reported benefits.

In 2015, flibanserin (Addyi) was approved in the US as a treatment to increase sexual desire for premenopausal women.

It has not been widely used because it requires daily treatment and drinking no alcohol for only marginal benefit.

# Section 3:

## Drug-specific side effects

**CNS side effects:** mood alteration, anxiety, dizziness & sleep disturbance

**Hypersensitivity reactions** (abacavir and others)

**Increased bilirubin** (yellow skin or eyes)

**Kidney health and renal side effects**

**Skin problems:** rash

**Skin, hair and nails:** injecting T-20

**Peripheral neuropathy**

**Liver-related side effects**

**Lactic acidosis and pancreatitis**

**Lipodystrophy and metabolic changes:** fat loss, fat accumulation, glucose and diabetes

## CNS side effects: mood changes, anxiety, dizziness & sleep disturbance

Associated drugs: efavirenz, Atripla (contains efavirenz), rilpivirine, Eviplera and Odefsey (both contain rilpivirine). Raltegravir and dolutegravir (also in Triumeq) have been linked to insomnia or mood changes, though more rarely.

Efavirenz is the main drug linked with mood changes.

Since 2016 UK guidelines stopped recommending efavirenz as the preferred choice for starting treatment. However, even in the UK it is still likely to be widely prescribed. This is because generic efavirenz is now very inexpensive.

Case reports of similar side effects have been reported with atazanavir/r, nevirapine, abacavir, raltegravir, dolutegravir and other ARVs, but these are much less common.

There are several difficult things about the side effects linked to efavirenz.

Firstly, nearly everyone will get some of these symptoms but for most people they will be mild and easy to manage.

This means that you might have some strange dreams, or find yourself daydreaming or getting more worried, or you might get more upset than usual.

Secondly, if you have not been told about this before you start treatment, you might not realise the mood changes are a side effect at all. Information about what to expect before you start taking efavirenz is therefore essential.

CNS side effects can occur after a few hours or after several days and are more common over the first few weeks of treatment. They generally become easier to tolerate.

About a quarter of people in the first efavirenz studies recorded serious CNS side effects. This definition included 'difficulty carrying out daily work'. So there is a 1 in 4 chance that efavirenz side effects could affect your work until you get used to them.

Starting efavirenz or rilpivirine when you have a few easy days or time off work might reduce any anxiety. It might help if you are more relaxed and less stressed.

Efavirenz is not recommended for people who are on shift work that alternates between days and nights.

Many of the symptoms described here can also be symptoms of HIV-related diseases that are now seen less frequently such as dementia, TB or cryptococcal meningitis. These can develop slowly over time, so describing symptoms to your doctor, in order that they can rule out these factors is very important.



## Severe side effects

Some people will experience severe side effects from efavirenz.

If this is the case, it is essential that you get support as soon as you need it. Perhaps 2-3% of people switch to a different drug within a few days or weeks.

However, other people only switch after several months. This is because although side effects usually get easier to tolerate, they might continue at a low level for longer than the first few months.

Up to 20% of people might switch over the first year.

CNS side effects can lead to or worsen depression, including suicidal feelings and paranoia. Anyone taking efavirenz needs to be aware that such mood swings can be related to efavirenz and that you are not 'going mad'.

- If you are feeling paranoid and worried about going outside, or have stopped seeing your friends as much, this might be related to efavirenz or rilpivirine side effects.
- Some studies have cautioned against using efavirenz if you are already depressed or have a history of psychiatric illness, but people without such a history have also found symptoms difficult.
- Several reports have been published of severe reactions in people with no previous psychiatric symptoms or illness.
- Some studies have linked higher efavirenz levels to low body weight – and race might be important too.

- About 10% of African people metabolise efavirenz slowly. This results in higher drug levels than are needed.
- Measuring drug levels with TDM can allow dose reductions – but it is probably easier to just use an alternative drug.

It is not known why these symptoms are associated with efavirenz. It is also not possible to predict who will experience more severe symptoms.

## Reducing CNS side effects

Although you can take efavirenz with or without food, a high fat meal increases drug levels by 60% and this increases the chance of side effects.

Taking efavirenz a couple of hours before you go to sleep, rather than at bedtime, makes it more likely that you will be asleep when the drug levels are at their highest – about four hours after taking efavirenz.

Haloperidol to reduce anxiety and sleeping pills to help with sleep disturbance might also help, although these have not been formally studied.

### **If you have difficult side effects with efavirenz it is easy to change to another HIV drug.**

You do not have to continue with efavirenz to prove anything to yourself or your doctor. If you know something is wrong, don't worry about asking to change to something else.

Even if you have only used efavirenz for a few days, if you know it is not for you, it is okay to change. Some drugs are not for everyone.

## How to report symptoms

Some of the symptoms associated with efavirenz are not easy to describe.

Writing down the effects you experience will let you see whether they are getting easier.

### Sleep disturbance

- Keep a diary of how often your sleep is disrupted.
- Try to describe this in a clear way. Is this every night or several nights a week?
- Can you estimate how much time you sleep each night, and how much you slept in a normal night before you started treatment?

### Concentration and memory

- Are you finding it more difficult to concentrate?
- Have you been aware of memory loss recently?

### Dreams and nightmares

- How often do you have dreams or nightmares?
- Do these disturb you sufficiently to leave you unsettled the next day?

### Mood changes

- If you get mood changes try to describe these clearly in a diary.
- Have your family or friends noticed a change in your behaviour, even if this is not clear to you?

### *CNS symptoms include:*

- Poor concentration, confusion and abnormal thinking.
- Mood swings including anxiety, agitation, depression, paranoia (feeling very anxious or nervous) and euphoria (feeling very happy).
- Disturbed sleep, including insomnia, drowsiness, vivid dreaming and nightmares.

- Examples of how your mood has changed can give a clearer idea of how you are affected.

### Depression and feelings of suicide

- A small percentage of people who experience severe side effects have reported feelings of unexplained depression that are out of character, including suicidal thoughts.
- Symptoms at this level mean that it is critical to discuss this with your doctor in order to change to another treatment.
- If you are currently taking efavirenz, you might find it easier to talk to a close friend about how you feel and ask them to come with you for support when you visit your doctor. There is never a problem with taking a friend or family member with you whenever you see your doctor.

“I tried efavirenz but it really was not for me. It was great at getting my viral load reduced, but the side effects were too difficult and I switched to etravirine.

Within days this was like lifting dark clouds and the sun coming out. I didn’t realise how much efavirenz was affecting me until I changed it.”



Information about what to expect before you start efavirenz is essential.

Some African people clear efavirenz from their bodies more slowly resulting in higher drug levels and greater risk of side effects.

Although many people use efavirenz without problems, this is a drug that is not for everyone.

## Hypersensitivity reactions (HSR)

Associated drugs: abacavir (also in Kivexa, Triumeq and Trizivir), cotrimoxazole (Septrin). HSR with other HIV drugs is rare.

The main side effect of abacavir is a hypersensitivity reaction (HSR) that used to occur in around 5% of people.

However, a screening test (called HLA-B\*5701), reduces this risk to less than 1%. This test is recommended in the UK *before* using abacavir.

HSR means that the body is oversensitive to a drug. Hypersensitivity reactions can also occur with raltegravir, dolutegravir, nevirapine, T-20, fosamprenavir and cotrimoxazole (Septrin). Genetic tests are only available for abacavir.

Hypersensitivity reaction to abacavir occurs during the first six weeks of therapy in over 90% of cases. Rarely, it can occur much later without any previous symptoms.

You need to know the symptoms of abacavir HSR before starting therapy, even if the B\*5701 genetic test is negative. If you get symptoms from two or more of the following groups, call your doctor straight away.

1. Fever.
2. Rash.
3. Nausea, vomiting, diarrhea, or stomach pain.
4. Generally ill feeling, extreme tiredness or achiness.
5. Shortness of breath, cough, or sore throat.

These general symptoms can be mistaken for other illnesses including cold, flu and chest infections, especially during the winter.

A few people who test negative for B\*5701 might still get HSR. If the symptoms get progressively worse each day it is an indication that this is HSR. A rash is not always present.

**Do not stop taking your medication until you have seen a doctor and a diagnosis of hypersensitivity has been made.**

If you stop using abacavir before you have seen a doctor with these symptoms then you will not be able to restart, as hypersensitivity cannot then be ruled out. This means you will be reducing your future treatment options.

If HSR is diagnosed by a doctor then abacavir will be stopped straight away. These symptoms should then disappear very quickly after abacavir is stopped.

**Abacavir must never be restarted at any time in the future if you have had the hypersensitivity reaction, as this can prove fatal.**

Abacavir is also included in these formulations:

- Kivexa (abacavir+3TC).
- Triumeq (abacavir+3TC+dolutegravir).
- Trizivir (abacavir+AZT+3TC).

“I was diagnosed in January 2003 and my viral load was very high and my CD4 count was 60.

When I started my treatment I used efavirenz, tenofovir, 3TC and Septrin. I developed a rash and called my consultant immediately. I was told to go to the clinic and then to stop taking Septrin. So this side effect was from the antibiotic and not the HIV drugs.

I continued taking my ARV’s and had restless nights and vivid dreams. After two years my consultant changed my drugs because I was putting on weight.

I used to have bad side effects. Now I can proudly say I’m not experiencing them anymore and I’m happy with my meds.”

## Increased bilirubin, jaundice (yellow skin/eyes)

(Bilirubin is an orange waste product; Hyper = increased; aemia = 'in blood')

Associated drugs: atazanavir and Evotaz (atazanavir + cobicistat).

An increase in bilirubin (called hyperbilirubinaemia) is a common side effect of atazanavir. More than 50% of people who use this protease inhibitor show increases in a laboratory test.

This is just a dye that is not causing any damage to your body. If levels get higher than five times normal, this is usually an indication to change or modify treatment.

Small increases are usually mild and less than 10% of people switch to an alternative drug.

When symptoms are noticeable, this includes your skin, or the white of the eyes being more yellow. Many people like it because it can look like a light sun tan.

### What is bilirubin?

Bilirubin is an orange-yellow part of bile. Bile is the bright green fluid secreted by the liver to help digestion.

Bilirubin is mainly formed by the normal breakdown of haemoglobin (the protein in red blood cells that transport oxygen).

Bilirubin normally passes through the liver. It is then excreted as bile through the intestines.

When this process is interrupted, excess bilirubin stains other body tissues yellow. Fatty tissues like skin, eye tissue and blood vessels are most affected.

### Two types of bilirubin

There are two types of bilirubin in the blood.

- Unconjugated (indirect) bilirubin is insoluble in water. This is the bilirubin before it reaches the liver
- Conjugated (direct) bilirubin has been converted to soluble bilirubin in the liver. It then goes into the bile to be stored in the gall bladder or sent to the intestines.

Routine blood tests for total bilirubin measure both unconjugated and conjugated bilirubin.

Increases in bilirubin with atazanavir are of **unconjugated** bilirubin. This is very common with atazanavir.

People who have lower levels of the enzymes responsible for converting bilirubin in the liver will be at a higher risk of increases in bilirubin from atazanavir. This has been linked to genetic factors.

Increases in **conjugated** bilirubin are linked with a range of illnesses and conditions. This includes jaundice associated with hepatitis and cirrhosis, anaemia, Gilbert's disease and sickle cell disease. Jaundice is common in babies. Very high levels in babies can cause permanent damage. Atazanavir is not linked to increases in conjugated bilirubin.

## Normal bilirubin levels

Normal values might vary between different labs but are within the following ranges.

Total bilirubin 3 to 17 mmol/L.

Direct bilirubin 0 to 3 mmol/L.

Jaundice only becomes visible at levels above 40 mmol/L. You need good natural light to see this.

Atazanavir and the booster are not usually changed (including the doses) unless bilirubin levels increase to five times the upper limit of normal (5xULN). This is at around 60-70 nmol/L.

This yellowish skin can look unusual. When related to atazanavir though it is not causing your body damage.

Less than 10% of people using atazanavir discontinue because of jaundice. If you stop atazanavir, the jaundice reverses within a couple of days.

## Using the booster

Just like other protease inhibitors, atazanavir usually needs to be boosted - by ritonavir or cobicistat.

- The booster increases atazanavir levels by around ten times and makes levels more consistent.
- Higher levels of atazanavir at the end of the dose reduces the risk of resistance and might make the drug more active.
- Higher levels also increase the chance of increasing bilirubin.

## Key points

- When related to atazanavir, higher bilirubin is not damaging your body
- If this is too disturbing then it often disappears by using higher dose atazanavir without a booster.
- Check atazanavir levels with TDM.

## Individualising dosing

Some people can use atazanavir without a booster.

High levels of bilirubin might be a marker of high levels of atazanavir. You can't guess this though—you need to use a test called TDM (see page 19).

In practice, people who get yellow skin or eyes when they use 300 mg/day atazanavir with a booster can often change to unboosted atazanavir (at 400 mg/day). Note that the daily unboosted dose of atazanavir (2 x 200 mg) is a higher dose than the boosted dose (1 x 300 mg capsule).

It is important that your doctor changes the formulation if you don't use a booster..

Atazanavir is available in four strengths: 100, 150, 200 and 300 mg. This means the dose can be easily adjusted to manage high bilirubin. It is also available as a powder.

## Other drugs that affect bilirubin

Other drugs can also increase bilirubin levels. These include anabolic steroids, some antibiotics, anti-malaria drugs, codeine, diuretics, morphine, oral contraceptives, rifampin and sulfonamides.

Drugs that can decrease bilirubin measurements include barbiturates, caffeine and penicillin.

## Kidney health and renal side effects

Associated drugs: Drugs cleared by the kidney with potential for renal toxicity include AZT, 3TC, FTC, tenofovir DF, atazanavir and maraviroc. Many combination pills contain tenofovir DF. Kidney stones can also occur with atazanavir and efavirenz.

The kidney is a major organ that:

- Filters salts and impurities from your blood to be cleared in urine.
- Regulates blood pressure.
- Regulates oxygen levels in blood.
- Helps bone health by processing vitamin D.

Kidney function (also called renal function) can be affected by HIV and other illnesses, including high blood pressure and diabetes.

In someone who has reduced kidney function related to HIV (including HIVAN), this can be improved by starting HIV treatment.

However, several HIV drugs can affect your kidneys and the use and monitoring of these drugs should be managed individually. Kidney function generally reduces as we get older.

### Symptoms

Mild kidney disease often has no symptoms, but more advanced kidney symptoms include:

- Nausea and/or vomiting.
- Feeling tired, being short of breath.
- Needing to urinate more often, especially at night, or less often.
- Itchy skin.
- Muscle cramps.
- Loss of appetite.
- Swollen hands or feet (from retaining water) or numbness.

### Monitoring kidney function

Routine tests monitor kidney function before and after treatment.

High levels of protein or a waste product called creatinine, indicate that the kidneys might not be working well.

Results from blood and urine tests calculate how well your kidneys are processing creatinine.

#### Dipstick urine tests

Urine tests can show abnormal levels of protein, blood, white blood cells, glucose and markers for diabetes.

#### Blood tests

Blood tests can measure protein and creatinine and are used to estimate glomerular filtration rate (eGFR).

#### eGFR

Estimated GFR is a common way to grade kidney function. It is measured in mL/min per 1.73 m<sup>2</sup>.

Higher than 90	Normal	Stage 0/1
60–89	Mild	Stage 2
30–59	Moderate	Stage 3
15–29	Severe	Stage 4
Less than 15	End-stage	Stage 5

An eGFR less than 60 is defined as Chronic Kidney Disease (CKD).

End Stage Renal Disease (ESRD) includes preparation for dialysis, transplant etc.



### **HIV drugs cleared by the kidneys**

Several HIV drugs are cleared by the kidney. These include tenofovir DF, 3TC, FTC, AZT and ddI. The dose for these meds (and maraviroc in some combinations) might need to be changed depending on your eGFR level.

The prescribing information for each drug includes detailed guidance.

### **Tenofovir DF and kidney toxicity**

Tenofovir DF (TDF) is a widely used HIV drug and it is mainly processed by the kidneys. Although serious kidney related side effects (including Fanconi's Syndrome) were reported in studies, these were rare. They also often reversed when TDF was stopped.

TDF also changes laboratory markers such as reducing creatinine clearance, low phosphate levels and increased protein levels in urine (called proteinuria). The importance of these changes in markers in the long-term is unknown, but it is likely to be more important if you already start with reduced kidney function.

Because TDF can also reduce eGFR compared to some other HIV drugs, it is not recommended in people who have eGFR below 75-80 if there are other HIV drugs to choose from.

Similarly, if you are using TDF and your eGFR drops to this level, then switching to a different drug is recommended.

If you are using TDF, there is also a caution against using other drugs that are cleared by the kidney.

It is not recommended to use creatinine supplements with TDF, as this will affect the interpretation of your monitoring tests.

A new version of TDF called tenofovir alafenamide (TAF) is available in several combination pills.

TAF is less likely to cause kidney (or bone) side effects.

### **Kidney stones: atazanavir and efavirenz**

Several reports of kidney stones that contained high levels of atazanavir or efavirenz, showed that this can be a rare side effect with these drugs.

The side effect of kidney stones can be reduced by drinking an additional 1-2 litres of water daily.

Detailed information on kidney stones is online.

[www.i-base.info/guides/side/kidney-toxicity](http://www.i-base.info/guides/side/kidney-toxicity)

## Skin problems: rash

Many drugs are associated with rash including: abacavir (also in Kivexa, Triumeq and Trizivir), emtricitabine (FTC), nevirapine, efavirenz, etravirine, atazanavir, darunavir, fosamprenavir, tipranavir, raltegravir and T-20 (enfuvirtide).

Although many drugs are linked to rash, the severity of rash and how long it lasts varies widely.

With some drugs, if you develop a rash during the first few weeks of therapy you must report this immediately to your doctor. This is because it can sometimes lead to very serious reactions.

Other rashes can be mild and disappear without treatment, or can be easily treated with antihistamine drugs such as cetirizine (Zirtek) or loratadine (Claritin).

**Atazanavir** can cause a mild rash during the first two months in 10% of people but this disappears without additional treatment within a few weeks.

**Emtricitabine** studies reported rash on the palms of the hands or feet in up to 10% of African Americans, but these have been reported less frequently since the drug was licensed.

Although antihistamines are available over the counter, it is important that you check with your doctor or pharmacist before taking them, as there can be interactions with HIV drugs.

A rash can also occur as a reaction from exposure to the sun, and will normally resolve. Any rash that makes you feel sick might not be a side effect but a symptom of an underlying disease (such as scabies).

### Nevirapine rash with liver toxicity

Nevirapine is linked to two different types of rash. One is the hypersensitivity-type reaction, probably linked to genetic risk factors.

The second is a rash that is related to liver toxicity, and this is more likely to be caused by an immune-related problem, and from starting nevirapine at a high CD4 count. See pages 56–57 on liver toxicity for more details.

### Things that can help

- Bath or shower in cool or warm water rather than hot water as this can irritate your rash.
- Avoid heavily scented or coloured soaps and shower gels. Try to use products that are marked hypoallergenic or wash with aqueous cream.
- Use liquids and not powder to wash your clothes as tiny amounts of powder can build up on your clothes. Try using non-biological products that are designed for sensitive skin.
- Wear cool fibres such as cotton rather than synthetic ones. When possible at home wear as few clothes as possible.
- Try not to use too many bedclothes. Keep as cool as possible in bed as being too warm can irritate your rash. Again, use natural, cool fibres such as cotton.
- Calamine lotion can be soothing when a rash is irritating.

### NNRTI rash (nevirapine, efavirenz and etravirine)

Up to 20% of people using nevirapine, efavirenz or etravirine, can experience a mild to moderate rash in the first weeks of treatment.

For most people this disappears over the next few weeks and they experience no further side effects. Less than 5% of people stop an NNRTI because of rash, and less than 1% people (0.1–0.5%) get a severe (grade 4) rash.

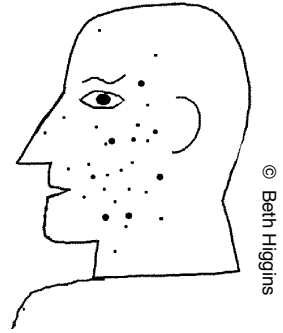
Nevirapine is no longer used for starting treatment in the UK but it might occasionally be used as a switch treatment.

If you get a rash with an NNRTI, you should make sure your doctor checks this carefully.

**Anything more than a mild rash might require stopping the NNRTI – but only on the advice of your doctor.**

**More serious rash (0.3% with nevirapine, 0.1% with efavirenz, less than 0.1% with etravirine) can be life-threatening.**

**Stevens-Johnson Syndrome (SJS) is a severe hypersensitivity rash and stopping treatment is essential. This is why a rash needs to be seen by a doctor.**



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### Abacavir and rash

A rash can sometimes be one of the symptoms of the hypersensitivity reaction associated with abacavir (also in Kivexa, Triumeq and Trizivir) that occurs in 4-5% of people using abacavir.

**It is essential that you see your doctor if a rash appears when using abacavir in a combination.**

**See page 44 for more details on this abacavir reaction.**

## Skin, hair and nails; injecting T-20

Associated drugs: lamivudine (3TC), AZT and emtricitabine (FTC).

Problems with hair, nails and dry skin are mainly related to older HIV drugs.

### Dry skin

Dry skin, chapped lips and nail problems are a problem for HIV positive people but this is often more related to HIV than HIV drugs.

All the measures listed about rashes are helpful where dry skin is a problem, along with the use of emollients (moisturisers) such as aqueous cream, diprobase, oilatum, and balneum. Try to drink plenty of fluids as well.

Vitamins and a healthy diet are also important for better skin health.

Where rashes and dry skin are unmanageable with medications or simple interventions then ask your doctor to change the medication that is responsible.

You can also ask to be referred to a specialist dermatologist.

### Hair loss

Changes in the thickness and quality of hair is rarely reported with HIV drugs.

Balding patches of head hair, called alopecia, have also been reported, though rarely, with lamivudine.

### Nail and skin pigment problems

AZT can darken nail and skin pigment in Africans and African-Americans, but this drug is now rarely used.

Emtricitabine (Emtriva) has been reported to cause pigment changes (mainly to the palms of the hands or soles of the feet) in African people.

Emtricitabine is included in many combination pills including Truvada, Descovy, Atripla, Eviplera, Genvoya and Stribild.

### T-20: injection site reactions (ISRs)

T-20 is an HIV drug that is now rarely used. It is given by sub-cutaneous injection.

**More detailed information on T-20 is included online.**

[www.i-base.info/guides/side/t-20](http://www.i-base.info/guides/side/t-20)

This includes a 6-page leaflet with information on how to minimise ISRs and tips for how to manage other aspects of an injectable treatment.



## Peripheral neuropathy

(peripheral = furthest away; neuro = nerve; pathy = damage)

Associated drugs: d4T, ddI, ddC, lamivudine (3TC), ribavirin, cancer drugs.

Peripheral neuropathy (PN) is rare with modern HIV drugs.

It only tends to be a problem in people who developed this side effect from using very early HIV d-drugs: ddC, ddI and d4T.

PN can be caused by HIV, especially at low CD4 counts (under 100 cells/mm<sup>3</sup>). It is also a complication of diabetes, and rates of diabetes are increasing as people living with HIV get older.

Symptoms include increased sensitivity or numbness, or tingling in your hands and/or feet. Often it is something you hardly notice, or that comes and goes.

If this is a side effect rather than a result of HIV, symptoms tend to be symmetrical in both hands or both feet.

If neuropathy gets worse it can become very painful. It is a side effect that you should take very seriously.

Non-HIV drugs that cause PN include dapsone, thalidomide, isoniazid, vincristine and some cancer treatments.

Alcohol, smoking, amphetamines, deficiency of vitamins B12 and E and other illnesses like diabetes and syphilis can also cause and make neuropathy worse. B12 and folate levels can be tested.

### Treatment and management

Painkillers are used to manage PN but they do not repair the nerve damage.

Amitriptyline, nortriptyline (tricyclic antidepressants) and gabapentin and pregabalin (antiepileptic drugs) are used to treat neuropathic pain.

Opiate-based painkillers such as codeine, dihydrocodeine, fentanyl, methadone, morphine and tramadol sometimes help when the pain is severe.

It is important that your doctor checks for drug-drug interactions before you start these drugs. Liverpool University's HIV drug interactions website gives free of charge, up-to-date evidence based information.

[www.hiv-druginteractions.org](http://www.hiv-druginteractions.org)

Cannabis (marijuana), or synthetic versions such as nabilone (Cesamet) or dronabinol (Marinol) reduce pain related to neuropathy.

Capsaicin patches that contain chilli pepper are available in the UK.

## *pain management clinics include a wide range of treatments and expertise*

### Tips that can help

- Avoid tight fitting shoes and socks which restrict blood circulation.
- Keep your feet uncovered at night - keeping them cooler and out of contact with sheets or bedding.
- Try deep tissue massage.
- Don't walk or stand for long periods.
- Soak your feet in cool water.

### More information

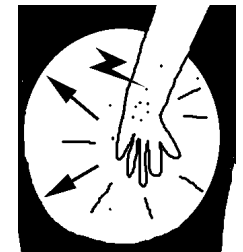
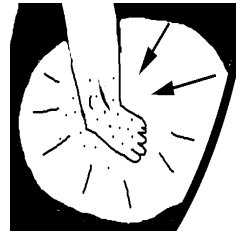
The online version of this guide has more information on:

- How to measure PN.
- Whether PN is reversible.
- Treatment for PN.
- Management and use of painkillers.
- Other suggestions including: Acetyl-L-carnitine, acupuncture, magnets, local anaesthetic creams or patches, diclofenac, cod liver oil, topical aspirin, Vitamin B6 (pyridoxine - with caution), Vitamin B12 (injections, lozenges, or nose-gel, magnesium and calcium.

Link:

[www.i-base.info/guides/side/peripheral-neuropathy](http://www.i-base.info/guides/side/peripheral-neuropathy)

neuropathy can be very painful and debilitating... ask for a referral to a pain management specialist



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## Liver-related side effects

Associated drugs: nevirapine, ritonavir, tipranavir, efavirenz.

Most anti-HIV drugs have potential for liver toxicity but this is generally rare.

Your liver is generally a strong organ. Its job is to filter chemicals from your blood. It usually does this very well.

A lot of people worry about the perceived damage that medications can have on the liver. Most drugs however, including HIV drugs, are actually easily processed by the liver without causing problems.

Routine blood tests will check your liver enzymes (ALT and AST). Liver toxicity becomes a more complicated problem when alcohol use or viral hepatitis have damaged the liver.

Only a few HIV drugs, including nevirapine, have been directly linked to liver problems. If this is the case, then the information leaflet that comes with your meds includes a 'black box' warning. Liver toxicity has also been reported with efavirenz, ritonavir and – due to the higher ritonavir dose – tipranavir.

The following factors can increase the risk of liver complications from HIV treatment.

- Viral hepatitis: hepatitis A, B or C (or other liver disease).
- High alcohol consumption.
- Use of other drugs, including recreational drugs, that are toxic to the liver.
- Gender: women are more prone to liver problems with HIV drugs.

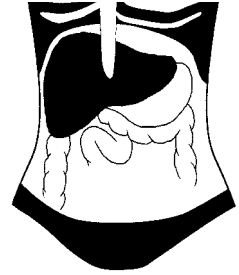
Your doctor will normally test your liver function at the same time as testing CD4 count and viral load.

If you have hepatitis or previous liver damage, therapeutic drug monitoring (TDM) should be used if you are using protease inhibitors or NNRTIs, you might need to use a lower dose.

When taking anti-HIV drugs you should report any side effects to your doctor. Especially if you have abdominal pain, nausea and vomiting, yellowing of the skin or the whites of the eyes.

Where liver toxicity is suspected, the drugs will normally be stopped to allow the liver to rest and return to normal. When the liver tests have returned to normal HIV drugs might be restarted. This is often with a different combination of drugs or reduced doses.





## More information

The online version of this guide has more information on:

- Nevirapine and liver toxicity

As nevirapine is no longer used in the UK for people starting treatment, this information is now only online.

## Hepatic steatosis/fatty liver

Hepatic steatosis is a medical term for ‘fatty liver’. This can develop from alcohol use, hepatitis, obesity and drug toxicity with the family of HIV drugs called NRTIs (nukes).

This build-up of fat in the liver can affect the way it processes fats. Hepatic steatosis can lead to lactic acidosis (see page 58). People who weigh over 70 kgs, especially women, might be more at risk of developing hepatic steatosis and lactic acidosis.

Ultrasonography is a sensitive, accurate, non-invasive screening tool to detect steatosis as this is not always shown in liver function tests.

Steatosis is also common in HIV positive children. It has no impact on disease, testing or management.

## Lactic acidosis and pancreatitis

All nukes (d4T, ddl, abacavir, tenofovir DF, FTC, 3TC, AZT) and ribavirin, have been linked to reports of lactic acidosis and/or pancreatitis. PIs and efavirenz have also been associated with pancreatitis.

### Lactic acidosis

*Lactic acidosis is a very serious side effect that is no longer seen in the UK because d4T, ddl and AZT are not used.*

### More information online

**More detailed information on lactic acidosis is included online.**

[www.i-base.info/guides/side/lactic-acidosis-pancreatitis](http://www.i-base.info/guides/side/lactic-acidosis-pancreatitis)

### Pancreatitis

Pancreatitis means inflammation of the pancreas.

The pancreas is the organ that produces enzymes to help the digestion of food in the stomach. It also helps regulate insulin which controls the levels of sugar in your body.

It is an uncommon or rare side effect of some HIV drugs including 3TC, d4T, ddl and is a very rare side effect of Septrin.

It can also be caused by gallstones, excess alcohol, other medications or infections.

Triglycerides higher than 10 mmol/L, increases the risk of pancreatitis and needs to be promptly managed. Pancreatitis can still occur when triglycerides are 5-10 mmol/L.

Pancreatitis can also be hereditary (genetic).

### Symptoms and diagnosis

Symptoms include upper abdominal pain with severe nausea and vomiting.

Blood tests measuring amylase lipase are usually checked to confirm a diagnosis of pancreatitis.

Measuring faecal amylase (FE1) shows whether pancreatic enzymes need to be supplemented.

Pancreatitis can be fatal if not treated early. If it is a side effect of HIV drugs, these medications need to be changed.

## Lipodystrophy and metabolic changes

(lipid = fat; dystrophy = disorder)

Lipodystrophy is a medical term referring to changes in body fat.

When this is part of a set of symptoms related to ART, it is usually linked to other metabolic changes.

The word ‘metabolic’ refers to how your body processes food into energy. This includes the production, regulation and storage of fats and sugars.

Although doctors are now aware of lipodystrophy as a side effect, you might still have to take an active role in getting the best monitoring and care.

The mechanism that causes fat loss is now understood. Hopefully, over the next few years, research will discover the cause(s) of metabolic fat gain.

### What are the symptoms?

The three broad sets of lipodystrophy symptoms are shown below.

Any information about lipodystrophy needs to specify which of these symptoms are being discussed: fat loss, fat gain or metabolic changes.

Each symptom is thought to have a different mechanism. You can have one symptom without the others.

Even when symptoms are generally linked to one class of drug, the effect of each drug can be very different.

**Lipodystrophy is likely to be the result of several different factors rather than any single cause.**

These factors include your HIV treatment history, individual drugs, lowest CD4 count, age, diet, exercise and family health.

These changes have been reported in men, women and children from a wide range of racial backgrounds.

### Main symptoms of lipodystrophy

Symptom	Details	Comment
Fat loss	From legs and arms leaving veins more prominent, also from buttocks and the face.	Now rare.
Fat gain	In the stomach, breasts in both women and men, shoulders, neck and sometimes small lumps of fat under the skin (called lipoma).	Much less common with modern ART.
Metabolic changes.	How your body produces and processes fats and sugars.	Changes are common: routine monitoring is important.

### How many people are affected?

Many people are unlikely to notice any changes in body shape. Lipodystrophy occurs more rarely with current drugs compared to the earliest HIV meds.

The benefits from treatment still outweigh the risks. For most people any changes are likely to be mild. However, for a minority, problems are more serious.

Preventing lipodystrophy is more important and more successful than trying to treat lipodystrophy after it has developed.

As no one can predict who will be affected before starting treatment, careful monitoring once you start ART is important. Try switching to other HIV meds if you get symptoms with your first combination.

### Monitoring changes in fat distribution

There are several ways that changes in body fat distribution can be measured and monitored.

- Most people are sensitive to physical changes in their body. This means that 'self-reporting', perhaps with careful measuring by a dietician, or photography can record any changes.
- Some HIV clinics have access to scanning equipment, but unfortunately lipodystrophy is rarely monitored in this way. MRI and DEXA scans look at the breakdown within your body of fat and muscle. A test called BIA (Bio Impedance Analysis) are sometimes used. (See side box on Monitoring).

- Getting a DEXA scan, or well-lit photo, even if you only have slight changes, will give you a reference to know how quickly symptoms are progressing or improving. Some specialist clinics, including the lipodystrophy clinic at St Thomas' Hospital in London, provide baseline DEXA scans to all patients. You can self refer to this clinic.
- As with your CD4 and viral load results, a single test result might only provide limited information. You are likely to need several tests over time to monitor changes.

If you are worried that you have lipodystrophy, make sure this is taken seriously. You should be offered monitoring and have any treatment choices explained.

### Changing treatment

Changing treatment can sometimes reverse fat loss, see pages 62 to 63.

Studies to reverse metabolic fat gain, had less success, see pages 64 to 65.

But just because studies haven't shown a benefit, it doesn't mean that another treatments will not be better for you.

Using combinations without NRTIs is one option. Another is to use an integrase inhibitor instead of a PI or NNRTI.

**Even if this does not reverse the symptoms, changing to a different drug or combination might stop the symptoms getting worse.**

### Monitoring tests

The following tests can monitor changes. Having a measurement before starting treatment will make it easier to interpret any change.

**Measurement:** careful measurement by a dietician using callipers can be useful if nothing else is available. This might be useful for fat increases but will be less sensitive for fat loss. Results might vary depending on the dietician. Measurement by callipers is not sensitive for small changes. Waist circumference (over 102 cm for men and 88 cm in women) and waist:hip ratio (higher than 0.95 in men and 0.90 in women) are also used.

**DEXA (or DXA) scan** (Dual X-ray Absorptiometry): these scans are available at most main hospitals as they are routinely used for checking bone changes as people get older. You lay on a flatbed scanner for 5–20 minutes (depending on the scanner) for a full body scan. Your head is not scanned. The results provide a breakdown of your body composition into fat, bone and muscle. Some doctors would like a DEXA scan before any HIV treatment is started, and repeated annually to monitor for changes.

DEXA scans can show the percentage of body fat in each main section of your body - in each arm, leg, your head and your trunk. An important limitation is that

DEXA scans cannot show whether trunk fat is visceral (around the organs inside your abdomen) or subcutaneous (love handles - under the skin but outside the abdomen). Visceral fat is most associated with HIV-related fat accumulation.

**MRI scan** (Magnetic Resonance Imaging): these scans are much less readily available and the equipment required is more sophisticated and expensive. An MRI scan provides a computer image of the tissues, muscle and bone in a cross-section of any part of your body. An MRI scan can show how fat is distributed – whether it is subcutaneous (under the skin) or visceral (around your central organs) – and is very accurate at measuring any changes.

### Bio-electrical Impedance Analysis (BIA):

BIA is a simple painless procedure that calculates the percentages of fat, muscle and water in the body according to height, weight, sex and age.

It has mainly been used for HIV-related wasting but might also be useful in monitoring lipodystrophy.

**Weight** in people with lipodystrophy is generally stable. Fat redistribution (rather than weight gain or loss) is usually the issue. However, weighing yourself is important in case you have lost or gained weight without realising it.

## Fat loss (lipoatrophy)

Associated drugs: d4T (stavudine), AZT (zidovudine), possibly efavirenz.

### Symptoms

Lipoatrophy is the medical term for fat loss.

This is a side effect that was associated with older HIV drugs d4T and AZT.

Lipoatrophy is not linked to current treatment.

Symptoms included loss of fat from under the skin on your arms and legs, which can make your veins look more prominent. It also includes loss from the face, especially sunken cheeks and temples.

Fat can be lost from the soles of the feet making walking more painful and tiring.

### Injectable treatments

Many substances have been used to treat HIV-related fat loss in the face but very few have been carefully researched. Many of these are used without approval for treating HIV-related fat loss.

Although non-permanent products need top-up treatment, these are currently the safest option. They work with your natural ageing process. Unlike permanent implants, there is no risk of it moving.

In the US, only New-Fill and Radiesse have been approved to treat HIV-related facial lipoatrophy.

In the UK, New-Fill is the most widely used, and it is approved by some NHS trusts. It is also supported by the strongest safety and efficacy results.

### New-Fill (Sculptra)

New-Fill (polylactic acid, PLA) has shown promising results in correcting the effect of facial fat loss and is approved in the US as a treatment for HIV-related lipoatrophy. Most people require 4-5 sets of injections but severe cases might require more sessions.

New-Fill does not replace fat but generates new collagen growth. This gives the effect that your skin grows thicker, sometimes by up to 1 cm. This process continues for several months after the injections have finished.

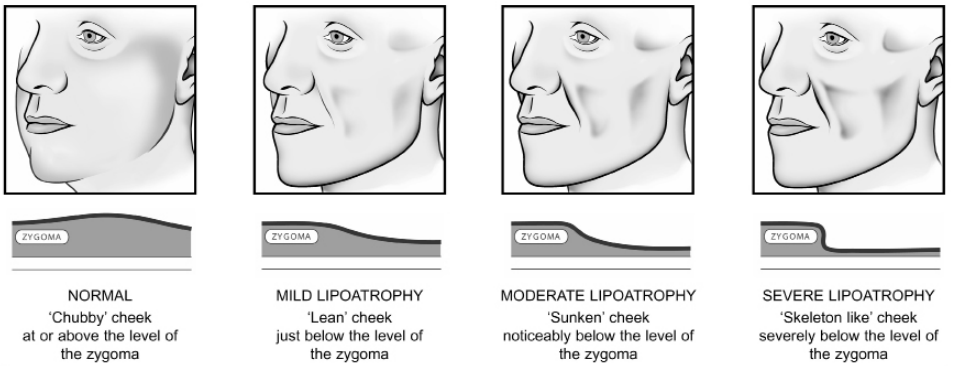
New-Fill has also been used to correct fat lost on the soles of the feet.

New-Fill is available free on the NHS in many of the larger HIV clinics in the UK. Since 2005, New-Fill has been available free on the NHS for any patient registered at a London clinic.

UK HIV treatment guidelines recommend that corrective treatment or surgery should be provided on the NHS.

However, New-Fill is not equally available throughout the UK. You might have to lobby your doctor and NHS trust. You might decide to register at a new HIV clinic to access this treatment.

Private treatment costs vary by clinic. Private treatment should ONLY be from a practitioner with experience treating HIV-related lipoatrophy.

**Figure 3: Visual scale to grade HIV-related facial lipoatrophy**

Note: Zygoma = cheekbone. Source: St Stephens AIDS Trust, Chelsea and Westminster Hospital

## Other injectable compounds

### Radiesse

A second non-permanent filler approved in the US to treat HIV-related facial fat loss is called Radiesse. This is the trade name for a formulation of calcium hydroxylapatite suspended in a gel.

Although this is used in some private clinics in the UK, it is not approved by the London commissioners as a free NHS treatment.

### Bio-Alcamid

Bio-Alcamid (polyalkylimide, Polymekon) is a 'gore-tex' filler that was used briefly. It is no longer used because of serious complications related to infections in the implant, often years after the procedure.

BioAlcamid is difficult to remove.

Anyone who has used BioAlcamid should inform their dentist about their implants and not have dental injections close to the implant site. Other complications have been reported from trauma. Do not take up boxing or contact sports.

### Silicone

Other approaches try to inject or implant material (fat or silicone) and hope it will stay in position. Very often, it disperses, moves or appears lumpy.

Silicone injections are dangerous and ineffective and were banned in the US many years ago.

### Fat transfer (Coleman technique)

Fat transfer involves extracting fat from one body site and reinjecting it surgically in another. This is usually subcutaneous fat from the stomach, which is then transplanted to the face.

Fat related to lipodystrophy (ie shoulder fat) should not be transplanted.

Although results are very good the process is now less frequently used. This is because it is invasive and more expensive.

## Fat accumulation

Associated drugs: nukes, NNRTIs, protease inhibitors, possibly integrase inhibitors

### Symptoms

Fat accumulation can occur in the abdomen, breasts, neck and shoulders. It can occur in both men and women. Small bumps or collections of fat, called lipomas, can occur under the skin in other parts of the body including the pubis. A hard fatty lump in a man's breast is called gynaecomastia.

Abdominal fat can be *visceral* or *subcutaneous*. Visceral adipose tissue (VAT) is fat that is around the organs inside the abdomen. Subcutaneous adipose tissue (SAT) is fat under your skin ('love handles').

With visceral fat your stomach wall is pushed out from inside. Your stomach muscles can sometimes be quite defined, but your stomach will still be extended.

In severe cases, this can compress your internal organs and interfere with normal functions like breathing and eating.

In these cases there is a greater medical urgency to reverse the fat accumulation. This might help you access treatments like growth hormone (rHGH).

### Treatments for fat accumulation

Diet, exercise and some treatments might help. Using more than one approach might be important. For example, using diet and exercise in addition to anything else that you try.

Diet means having a healthy balanced diet. It does not mean you should dramatically cut calorie intake, which makes fat loss more difficult.

HIV-related fat accumulation seems to be due to your body signalling itself to

produce more fat. **Dietary fat** is not the only mechanism, but high fat diets are unlikely to help. Whatever the cause, **diet and exercise** seem to be useful in helping reverse these changes.

**Anabolic steroids** are **not** recommended for fat accumulation as they could worsen fat loss in other parts of the body.

**Metformin** can reduce central fat accumulation in people who already have insulin resistance but should not be used if you have a low BMI.

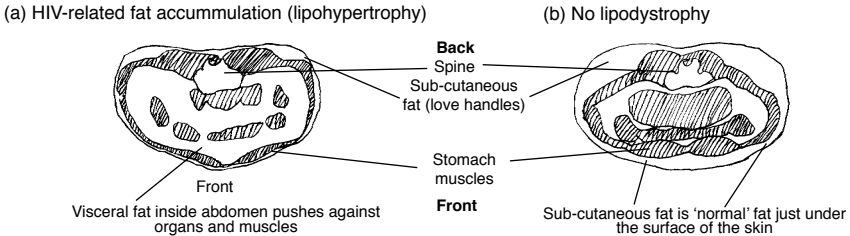
**Recombinant human growth hormone (rhGH)** can reduce visceral abdominal fat and fat pads from the back of the neck and shoulders. Side effects, including the risk of insulin resistance and diabetes, are reduced using lower doses in more recent studies. Fat accumulation appears to return if rhGH is stopped.

A growth hormone releasing factor called **tesamorelin** (Egriftra) that can reduce visceral fat by 20% was approved in the US in 2010. It had fewer side effects than rHGH but there is no long-term data (maximum one year).

Tesamorelin is a continual treatment and fat returns if the treatment is stopped. A lower maintenance dose of tesamorelin has not been established.

Neither tesamorelin nor rhGH are approved in Europe as treatments for lipodystrophy. However, rhGH can be prescribed off-label on an individual patient basis. Tesamorelin is unlikely to be approved in Europe in the near future.



**Figure 4: Illustration of MRI scans, fat shows as white areas**

### Neck, shoulders, breasts and lipomas

Removing fat from the neck or shoulders using liposuction has worked well for some people. The results were sustained in 50% of people but fat returned after several months in 25-50% of people.

There might be a higher likelihood of a permanent result if at the same time, HIV treatment is modified and diet and exercise changed.

Unless the underlying metabolic mechanism is altered, fat accumulation might return after several months.

Liposuction cannot be used for visceral fat accumulation in the abdomen.

Anecdotally, testosterone cream massaged onto the fat pads reduced fat pads on the shoulders. A lower dose should be used for women than for men.

Liposuction and surgery are also used to reduce breast size in both men and women.

Breast lumps (gynaecomastia) in men has been mainly linked to efavirenz, so switching treatment is a first option. Dihydrotestosterone gel (Andractim) might help.

Women with lipodystrophy might have higher levels of testosterone than either HIV positive women without lipodystrophy or HIV negative women. It is not clear whether this is due to high insulin levels associated with lipodystrophy, although a link between the length of time on PI-therapy (but not other drugs) and a greater chance of higher testosterone was found in one study.

### Switching HIV drugs

Switching individual drugs has not been effective in studies. But, if one particular drug is linked to these body changes then it is reasonable to at least try another, in case this works for you.

Fat accumulation does not seem closely related to high blood lipids.

## Cholesterol and triglycerides

Cholesterol and triglycerides are two types of fats that are carried in blood. These fats perform essential functions, including making effective cell structures and processing vitamins A, D, E and K.

Cholesterol and triglycerides are often referred to as 'lipids'.

In the general population, high lipid levels are linked to an increased risk of heart disease and stroke.

Even if high lipids are a side effect of treatment for just a few years, recommendations are similar to HIV negative people.

### HIV and lipids

HIV itself (before treatment) reduces both good and bad cholesterol and triglycerides are higher. Starting treatment with any combination will reverse these lipid effects as part of a return-to-health effect.

Because many HIV drugs and lifestyle factors affect lipids this is complex to interpret.

### Testing and monitoring

Cholesterol and triglycerides should be checked when you are first diagnosed. They should also be tested before starting or changing treatment and then three months after any change.

Routine monitoring for someone on stable treatment should then involve checking lipids every 6–12 months.

Most clinics will do this at the same time as your CD4 and viral load, but you might need to ask whether this is being done. These tests are best done fasted (on an

empty stomach) so don't eat or drink anything before you have your blood taken on those days.

Management of lipid levels should be part of an assessment of your risk for heart disease. This is also related to other risk factors, including lifestyle factors.

Lipids are first managed by diet and exercise, then by switching HIV treatment and then by using lipid lowering drugs.

### Cholesterol

Total cholesterol (TC) is measured first. If these results are high then a further test will break this down into two different types of cholesterol:

- i) High Density Lipoprotein (HDL) is 'good' cholesterol. It removes fats from your arteries.
- ii) Low Density Lipoprotein (LDL) is 'bad' cholesterol. It is a small molecule that carries fats from the liver to other parts of your body and can lead to heart disease.

Target levels for total and LDL cholesterol and desirable levels for HDL cholesterol and triglycerides are shown in Table 5. Target levels are lower for people who already have high cardiovascular risk due to other factors. Each 1.0 reduction in LDL reduces CVD mortality by 20%.

The TC:HDL ratio is used to determine the importance of using lipid lowering drugs, but is not used for monitoring afterwards.

If triglycerides are high, the test for HDL and LDL is more difficult to run.

**Table 5: Target/desirable levels for fasted lipids (EACS guidelines)**

Total cholesterol	Less than 5.0 mmol/L (under 4.0 if high risk)
LDL cholesterol	Less than 3.0 mmol/L (under 2.0 if high risk)
HDL cholesterol	Higher than 0.9 mmol/L
Triglycerides	Less than 1.7 mmol/L

**Table 6: Factors that can affect cholesterol and triglycerides (TG)**

HIV	TC is lower and TG is higher before HIV treatment
HIV treatment	Some drugs affect cholesterol (LDL and HDL) and TG
Ageing	Ageing can increase cholesterol and TG
Smoking	Increases LDL. Quitting increases HDL and reduces TG
Diet	Diet affects blood lipids
Exercise	Exercise has a good impact on lipids
Other infections	Other health conditions can affect lipids.

## Triglycerides

Some guidelines see triglycerides (TG) as an independent risk factor for heart disease. Others state that the evidence for treating moderate triglycerides is less strong.

In the D:A:D study, most of the impact of high triglycerides was explained by other risk factors, but this still remained at +10% per year.

Although there is a lot of individual variability, target fasted levels of under 2.2 mmol/L are considered normal and of 2.2–4.4 mmol/L are borderline. Above this, the risk of heart disease increases.

Levels above 10 mmol/L are very high and need urgent treatment due to the increased risk of pancreatitis.

Although less than 1.7 mmol/L is a target, treatment would not usually be used unless levels are over 2.3 mmol/L.

## Treatment and management

Options to improve lipids include lifestyle changes (diet etc), switching HIV meds and using lipid lowering drugs.

Cholesterol and triglyceride levels can often be improved by diet changes (especially reducing saturated fat, trans fat, cholesterol and alcohol and increasing fibre) and by starting or increasing exercise.

Weight loss, if you are overweight, will have a positive impact on lipids too.

Omega-3 can reduce triglyceride levels. Taking a supplement might be more effective than just changing diet.

For example, a 4 gram (g) daily dose Omacor, (90% omega-3 acid ethyl esters) is equivalent to 150 g mackerel or 700 g tuna or 1.1 kg cod or 280 g salmon or 1.7 kg eel or 850 g shrimps.

**Table 7: Lifestyle interventions to improve lipids**

Aim	Interventions
Reduce TC and LDL	Reduce dietary saturated fat, trans fat, cholesterol; Increase fibre. Minor impact from exercise/weight loss.
Reduce TG	Reduce overweight, alcohol, dietary fructose and high GI carbs. Eat high fibre and low GI carbs; increase physical activity. Omega-3 supplements.
Increase HDL	Replace dietary trans fat with unsaturated fat; increase activity; reduce excess weight. Only moderate alcohol.

See pages 81 to 88 for more information about diet and exercise.

Lipids generally improve after switching away from HIV drugs that cause this.

If diet, supplements, exercise and switching treatment (if appropriate) are not enough, then lipid-lowering drugs are generally more effective. They are widely used and have a low risk of side effects. Fibrates are used to reduce triglycerides and increase HDL cholesterol and statins reduce LDL cholesterol.

Lipid-lowering drugs need to be prescribed by an HIV specialist as they can interact with PIs and NNRTIs.

- Simvastatin should never be used.
- Atorvastatin and rosuvastatin need to start with a low dose.
- Pravastatin and fluvastatin might need a higher dose.

Studies are also looking at metformin (an insulin sensitising drug), rosiglitazone and growth hormone.

A study of HIV positive men looking at the effects of exercise and testosterone found that testosterone significantly reduced levels of 'good' cholesterol (HDL). This is a concern for people with lipodystrophy who already have elevated triglycerides and 'bad' cholesterol (LDL).

Although muscle gain and fat loss were greater in the testosterone group, levels of good cholesterol increased in people who used exercise without testosterone, and this might be more appropriate for people with lipodystrophy.

Although anabolic steroids can increase muscle mass they can also reduce fat, and have the potential to worsen lipodystrophy and lipid levels.

For further information see:

EACS metabolic guidelines (2015)

[www.eacsociety.org/guidelines/eacs-guidelines/eacs-guidelines.html](http://www.eacsociety.org/guidelines/eacs-guidelines/eacs-guidelines.html)

ESC/EAS Guidelines for the management of dyslipidaemias (Eur Heart Jour, 2011)

<http://eurheartj.oxfordjournals.org>

## Increased blood-sugar and risk of type-2 diabetes

Associated drugs: some protease inhibitors and some nukes.

### Glucose and insulin

Glucose is a type of sugar. Your body relies on glucose to provide energy. A hormone called insulin processes the sugar and allows it to enter cells.

Insulin also regulates production of new glucose by the liver, levels of glucose in the blood, and metabolic aspects of fat cells.

Insulin resistance is the term for when this system fails to work properly. Although your body produces more insulin to compensate, if insulin resistance continues, and sugar levels remain high, you can develop diabetes.

Insulin levels are difficult to measure, but glucose levels, usually checked by fasting or non-fasting blood tests, are routinely used for monitoring risk.

### Types of diabetes

There are two types of diabetes: Type-1 and Type-2.

Type-2 diabetes mellitus (T2DM) is more common as an adult illness. It usually develops slowly. It can take years for mild insulin resistance to progress to diabetes.

Some protease inhibitors can increase glucose levels and the risk of Type-2 diabetes.

Type-1 diabetes is caused by low insulin production. This is most often reported in childhood but adults get this too. Type-1 diabetes is managed by insulin injections.

### Risk of long-term health problems

High untreated blood-sugar is related to many long-term health problems.

This can include the kidneys, nerves, eyes and vision, risk of heart disease and stroke, erectile dysfunction in men and pregnancy complications in women.

Diabetes can increase the risk of having a heart attack as much as smoking.

Fat and sugar metabolism are also closely linked and insulin resistance is a complication of HIV therapy that is getting more focus. It is directly related to some protease inhibitors and possibly indirectly related to older nukes through their effect on fat distribution. Changes in blood glucose levels and insulin sensitivity are closely related to other symptoms of lipodystrophy.

### What can help

As with HIV negative people, mild insulin resistance can be managed by diet, exercise and stopping smoking. Switching HIV drugs associated with increases in blood-glucose is recommended when appropriate.

Dietary advice involves reducing processed sugars, refined and fast foods, white flour and potatoes as they all cause quick sugar 'highs'. Complex carbohydrates (wholemeal bread, wholemeal and pasta, porridge, most vegetables) provide energy more slowly with less impact on sugar levels.

Metformin might help people with insulin resistance and fat accumulation. Pioglitazone might help people with insulin resistance and fat loss. Drug interactions with HIV drugs (PIs and NNRTIs) means that drug-level monitoring (TDM) should be used to confirm dosing.

## Tests to diagnose and monitor glucose and insulin levels

**Fasting glucose test** - measures blood sugar after an eight-hour fast. This should be measured before starting and after switching treatment, and at least annually after this.

Fasting levels over 5.6 mmol/L in plasma indicate insulin resistance, and the need for an oral glucose tolerance test (OGTT).

**Random glucose test** - Unfasted glucose levels are less accurate but are taken shortly after someone has had something to eat or drink. If it is greater than 5.17 mmol/L other tests are run. Diabetes is over 11.1 mmol/L.

**Oral glucose tolerance test (OGTT)** - Monitors levels of glucose every 30-60 minutes for two hours after fasting for eight hours and then drinking a measured glucose drink. Healthy glucose on this test should be less than 3.62 mmol/L. If it is greater than 5.17 mmol/L other tests are run. Diabetes is over 11.1 mmol/L.

**Haemoglobin (HbA1c)** - tests how much glucose adheres to red blood cells. It is used to determine average glucose levels over several months. Without diabetes a normal range is 4-6% and managed treatment for someone with diabetes should aim to keep this under 7%.

**Fasting insulin test** - and results used to calculate HOMA-IR score (Homeostatic: Model Assessment-Insulin Resistance). Measuring glucose is generally preferred to measuring insulin directly.

**Insulin tolerance test** (also called glycemic clamp) - where insulin is infused by intravenous line, and glucose given until normal blood sugar levels are reached. This is expensive and again is rarely used.

## Symptoms of high blood-sugar, and diabetes

- Feeling thirsty or excessively hungry.
- Feeling tired.
- Low concentration.
- Blurred vision.
- Unexplained weight loss.
- Frequent need to urinate.
- Slow healing of cuts.
- Tingling in hands or feet (neuropathy).
- Nausea and vomiting.

## Risk factors for abnormal glucose

- Liver damage or coinfection with hepatitis C.
- Family history of diabetes.
- Overweight (BMI >30).
- Lipodystrophy or lipoatrophy.
- Low exercise.
- Over 40 years old.
- High blood pressure (over 130/85 but this depends on age and other risk factors for heart disease).
- High cholesterol and triglycerides (over 1.7 mmol/L) and low HDL (good cholesterol (less than 0.9 mmol/L).
- History of insulin resistance or high glucose.
- Other meds, including niacin, glucocorticoids, megestrol, growth hormone and some PIs.

Further information:

EACS guidelines (2015)

[www.eacsociety.org](http://www.eacsociety.org)

# Section 4:

## HIV, ageing and quality of life

HIV and ageing

Heart disease

Bone mineral changes

HIV and cancer

Lifestyle factors and your health

Diet: a balanced diet and your health

Exercise and staying active

Non-HIV drugs

References

Further information

## HIV and ageing

### The benefits of ageing

Ageing can bring new positive perspectives to life that are only possible because of previous experiences.

This can often bring greater personal confidence and assurance. It can include a greater appreciation for time and for making every day count. Sometimes this can bring a freedom from many of the insecurities and uncertainties that are common at a younger age.

Life can still be dynamic and exciting as we grow older. Of course there will be differences compared to when we were younger but these are not bad things.

By looking after your health, staying physically and mentally active and looking forward to the future optimistically, this should be an enjoyable and rewarding time of life.

Because ageing involves a higher risk of some health problems, researchers are now looking at how HIV affects ageing.

Many people living with HIV are now in their 50s and 60s and thinking about long-term issues. Treatment has been so successful at keeping most of us alive, that life-expectancy is now similar to that of someone who is HIV negative.

While it is true that we are living much longer, HIV positive people still have higher rates of many common health complications.

There are also increasing rates of new infections in older people: over 10% of new infections are in people over 50.

### Complications of ageing

Ageing also brings health issues that can be important to mention in this guide.

This is because many of the ageing processes involve body systems that are affected by HIV and sometimes by side effects.

These include:

- Physical health: agility, strength, balance and frailty.
- Mental health: neurological problems including memory, concentration, depression and dementia.
- Sensory functions: eyesight, hearing.
- Sexual health and hormone changes.
- Cardiovascular health.
- Lipid metabolism.
- Liver and kidney function.
- Bone health and lower bone density.
- Cancers.
- Social life, the risk of isolation, financial insecurity and care in old age.

### Access to healthcare

Medical care of many of these health problems might involve your GP and other healthcare professionals.

In the UK, some HIV services are routinely being moved to GP care. GPs might have more experience in these areas than your HIV doctor, including:

- Lipid management (although interactions with HIV meds often requires specialist advice).
- Services to help stop smoking.
- Diabetes management.
- Some cancer screening programmes.



Complications that are not managed by your HIV clinic might involve services that have less experience with HIV.

This is an aspect of life that will become increasingly important as routine HIV care gets easier to manage.

On the other hand, it will remain just as essential for your HIV doctor to be involved in any HIV-related complications.

### Lifestyle choices

Ageing is easier with some planning. You can take an active role in staying well for as long as possible.

- This includes staying physically active, eating a healthy diet, not smoking, moderate use of alcohol, and keeping mentally active.
- As we get older, our goals are likely to change. Exercise that is less physically stressful can be more fulfilling, as can socialising in bars that are less crowded and noisy. These are all important qualities of life.
- New interests can become more important and have a different quality compared to some of the things you did when you were younger.
- Find something to make each day important and have goals for the short, medium and long-term.

### Exercise

Daily life can easily become more sedentary and less active by spending more time on a computer or watching TV.

Unless we stay active, our strength, agility and endurance will reduce. Ageing is associated with poorer physical health. Find time to keep active.

- Walking is the easiest exercise. It gives you time to breathe deeply, think about life, see your surroundings and enjoy the seasons.
- Most gyms usually include free initial training and a wide range of classes: yoga, dance, swimming, boxing.
- Talk to your doctor before starting a new exercise programme.

See pages 87 to 88 for more information about exercise.

### Diet: food, drink, cigarettes

What you eat and drink can have a big impact on your health.

- A balanced diet includes vegetables, fruit, proteins, fats and carbohydrates. Eating more fresh fruit and vegetables and less saturated fats and fried food is good for your health.
- High dietary salt increases the risk of high blood pressure, kidney damage and diabetes.
- Alcohol in moderation might have health benefits. Weekly guidelines are up to 21 units for men and up to 14 for women. One unit is a small glass of wine, a half pint of beer or a single spirit measure.
- Cigarettes damage your lungs and blood vessels, raise cholesterol levels and are associated with an increased risk of numerous cancers.

See pages 81 to 88 for more information about diet and health.

## Heart disease

CVD = cardiovascular disease; CHD = coronary heart disease.

Just as in the general population, the many factors linked to the risk of heart disease can often be reduced by changes in life choices.

For HIV positive people, ART is a good thing and the risk of heart disease is likely to be lower by being on treatment.

Very few HIV meds have been linked to heart disease (abacavir, lopinavir/r and ddI in the D:A:D study for example) and your doctor will chose alternatives if this is important for you.

There is a lot of information and research about risk factors for heart disease in HIV negative people. This has often come from very large studies (Framingham, Caerphilly etc) that followed a large group of people for many decades. These studies led to the development of risk calculators that are easy to access online (see page 91 for links).

It is easy to check your risk of heart disease.

If you put in your age, gender, cholesterol and triglyceride levels and other risk factors such as smoking, you get your 5-year or 10-year risk of heart disease.

People with high risk factors for heart disease who need HIV treatment, should use HIV drugs that are least likely to increase the risk of cardiovascular disease any further. Support for lifestyle changes should also be provided.

### Risk factors for heart disease

The following factors increase the risk of heart disease; some of which are fixed and some are modifiable by lifestyle.

#### Fixed risk factors

- Older age (men over 45, women over 55).
- Gender (men are at higher risk at the same age).
- Family history of heart disease.

#### Modifiable risk factors

- Smoking.
- High lipids - ie high cholesterol and/or triglyceride levels.
- Lack of exercise.
- High blood pressure, especially diastolic blood pressure.
- High levels of sugar in blood, insulin resistance and diabetes.

### Symptoms of heart attack or stroke

**Symptoms of cardiovascular disease include:**

- Shortness of breath.
- Fatigue.
- Feeling dizzy or light-headed.
- Fainting.
- Chest pains (that can extend to the shoulders, back, arms, head and jaw).
- Chest pains after exercise or exertion.



**Additional symptoms for a stroke include:**

- Sudden numbness.
- Paralysis of the face or limbs, especially affecting just one side of the body.
- Difficulty speaking.
- Loss of balance or coordination.
- Severe headache.
- Brief loss of consciousness.

**If you experience these symptoms, you should seek urgent medical attention.**

Rapid treatment after a stroke (within 2-3 hours) can limit permanent brain damage.

**How to make lifestyle changes**

Changing the risk factors for heart disease can have a direct impact on future risk. By implication, this will also make HIV drugs safer to use.

The advice given to the general population is even more important if you are using HIV treatment.

- **Stopping smoking is the most important lifestyle change in terms of general health and risk of heart disease.**

Support groups and other interventions including replacement therapy like nicotine patches are now available on the NHS.

It is more effective to try a range of products over the first weeks to cope

with nicotine withdrawal – patches, gum, inhalers and sprays – so you find the ones that work best for you.

Your HIV doctor can refer you to specialist services to help you quit.

- Diet changes can significantly reduce your risk for heart disease.
- Reducing fatty foods can reduce lipids to some extent. Cutting down on salt reduces blood pressure. Eating less processed sugars reduces your risk of developing insulin resistance and diabetes.
- Eat more fruit and vegetables, fish and lean meat and reduce use of processed foods.
- Exercise is the other main factor that you can change. Regular exercise and being more active in your day-to-day life, by walking more and using the lift less, is more important than very vigorous exercise.

Any change in level of activity will probably have to start gradually. People who start an exercise programme report benefits in quality of life. This can include increased well-being and energy levels.

**More information online**

More detailed information on heart disease including the D:A:D study and a glossary is included online.

[www.i-base.info/guides/side/heart-disease](http://www.i-base.info/guides/side/heart-disease)

## Bone health

(osteo = bone; necrosis = death; porosis = thin)

HIV is one of several conditions that can reduce bone mineral density (BMD).

HIV in general reduces BMD a little more than natural ageing.

HIV treatment also reduces BMD a little but the benefits of ART generally outweigh this small risk in most people.

The SMART and START studies reported slightly lower bone density in people who were on any treatment, irrespective of which HIV meds were used.

Tenofovir DF can cause a small drop in bone mineral density. This is mainly in the first six months but this can continue.

### Types of bone problems

There are two main types of bone problems.

1. Changes in content and structure of bone. This is where your bone becomes thinner and more brittle. This is called osteopenia at mild levels (when there are no symptoms) and osteoporosis at more severe levels (that require treatment).
2. Interruption of blood supply to the bone. This causes death of bone tissue - called osteonecrosis and avascular necrosis (AVN).

### Osteopenia and osteoporosis

Osteopenia and osteoporosis are significantly more common in HIV positive people compared to the general population matched for age and sex.

Having osteopenia does not mean you will progress to osteoporosis.

Osteoporosis is more serious than osteopenia because it increases risk

of fractures and pain (commonly to the spine in men and the hip in women).

In the general population, bone density keeps growing until about age 30 and then gradually reduces with age.

Risk factors for low bone mineral density include:

- Age (BMD reduces in later life).
- Low body weight and low body mass index (BMI) as heavier people have stronger bones.
- Lipodystrophy and metabolic changes are linked to bone changes.
- Use of corticosteroids (prednisone).
- Alcohol use (more than 3 units/day).
- Caucasian/Asian race.
- Smoking cigarettes.
- Low calcium or vitamin D levels.
- Lack of physical activity.
- Family history of osteoporosis.
- Low testosterone levels in men and early menopause in women.

### Diagnosis: DEXA results

DEXA scans are used to diagnose low bone mineral density. Results are usually given as a T-score which compares your results to a reference group (age 30) matched for your sex and race.

	T-score
Normal	Higher than -1.0
Osteopenia	-1.0 to -2.5
Osteoporosis	Less than -2.5

A DEXA scan for all post-menopausal women and for men older than 50 is recommended in some HIV guidelines.

## If you have osteoporosis you will need advice on how to exercise safely.

### Osteonecrosis and AVN

Osteonecrosis and AVN are much less common. They usually affect the hip, shoulder or knee joints, and require replacement surgery. Corticosteroid use is a common factor in cases of AVN.

Early diagnosis of AVN makes a big difference to the success of treatment as well as your quality of life. If you have pain in these joints, ask to see a specialist. An MRI scan is used to make an appropriate diagnosis.

### Protecting bones: treatment and prevention

Your bones are a living structure, 10% of which naturally die each year to be replaced by new cells. Your bones become thinner and more brittle if the bone isn't replaced quickly enough or in sufficient quantities.

Leading an active life, and regular exercise, maintains healthy bone. This includes weight-bearing exercise (walking, jogging, running, steps and dancing) and muscle strengthening exercise. Improvements include better posture, balance and strength and a direct improvement in bone density.

**If you have osteoporosis some common exercises, including twisting and stretching might not be recommended. Take expert advice.**

Treatment and prevention measures are similar to HIV negative people - although closer monitoring of HIV positive people is important.

Stopping smoking, drinking less alcohol, taking exercise and eating a diet

adequate in calcium, protein and vitamin D (and spending some time in the sun) protect you against bone mineral loss.

Bone-building nutrients include calcium and vitamin D<sub>3</sub> (cholecalciferol) and any deficiency should be corrected by increasing dietary intake or use of supplements.

Guidelines recommend adult targets using 1200 mg daily for calcium and 800 -1000 IU/day for vitamin D<sub>3</sub> (for people at higher risk). If you have very low levels (<15 nmol/L) then use higher doses (50,000 IU weekly) for the first few months.

These nutrients can be prescribed by your doctor and sometimes require special monitoring and dosing.

The target for vitamin D is for blood levels of 25(OH)D to be higher than 75 nmol/L.

Although HIV meds might have a small negative impact on bone strength, the other benefits of treatment usually outweigh this small risk.

First-line medications to improve bone mineral density are a family of drugs called bisphosphonates. These include alendronate (Fosamax) and zoledronate (Zometa). These might only be needed for a few years until a treatment response is achieved.

### Links

National Osteoporosis Foundation (US)  
[www.nof.org](http://www.nof.org)

National Osteoporosis Society (UK)  
[www.nos.org.uk](http://www.nos.org.uk)

Bone Research Society  
[www.brsoc.org.uk](http://www.brsoc.org.uk)

## HIV and cancer

There are several reasons to include information about cancer in this guide.

- Some people are only diagnosed with HIV when their CD4 count is already very low or following a diagnosis of cancer. Very late diagnosis often includes an HIV-related cancer as part of the HIV diagnosis.
- The risk of most cancers increases with age. The longer we live, the greater the chance of having to cope with cancer-related illnesses.
- Although rates of the three AIDS defining cancers (KS, NHL & cervical cancer) have fallen with access to HIV treatment, some non-AIDS defining malignancies (NADM) still occur at a higher rate in HIV positive compared to negative people.
- HIV positive people with side effects from cancer treatment might find some of the information in this guide useful.

### HIV, treatment and cancer

Cancers that occur in HIV positive people were originally categorised as either AIDS defining or non-AIDS defining.

ART has reduced the risk of AIDS defining cancers and some non-AIDS defining cancers (NADMs) but not others. The risk of AIDS defining cancers increases at lower CD4 counts. This is one of the reasons why ART is now started earlier.

To make things complicated, some NADMs occur at higher rates in people living with HIV and this might be unrelated to CD4 cell count or ART use. Many of the NADMs that occur more frequently in people living with HIV are linked to a virus. These include anal cancer in men and women (linked to HPV), Hodgkin's lymphoma (linked to EBV) and liver cancer (linked to hepatitis B and C). A few cancers also occur more commonly in HIV positive people but are not linked to known viruses (lung and skin cancers).

Many cancers both NADM and ADM such as lymphomas have high chances of being cured and it is very important to seek treatment as soon as possible.

Other cancers don't seem to be linked to either HIV or use of ART and are not more common in people living with HIV than in the general population. These tend to be cancers that are not linked to another virus, including breast, colon and prostate cancers. These cancers are increasing in HIV positive people using ART, because they are living longer and so these age-related complications can occur.

For all cancers, early diagnosis and treatment is one of the most important factors for recovery.

This is a highly specialised aspect of medical care. If you are diagnosed with any cancer, whether formally HIV-related or not, you need to be treated by an expert in HIV and cancer.

**Table 8: Incidence of cancers affecting HIV positive people and impact of ART**

	Cancer (virus)	AIDS-defining	HIV risk vs HIV neg.	ART impact	Comments
AIDS-defining cancers reduced by ART	KS (HHV-8)	Yes	Yes.	KS, NHL and CNS lymphoma are significantly reduced by ART.	KS generally only seen in people diagnosed late. ART is first-line KS treatment.
	Non-Hodgkin's lymphoma/NHL (EBV)	Yes	Before ARVs rates were 70,000x (KS), 700x (NHL) and 3-8 times higher (cervical), respectively.	Rates of cervical cancer reduced in some studies.	Cervical cancer screening should start at a younger age and be more frequent in HIV positive women.
	CNS (brain) lymphoma (EBV-related)	Yes			
	Cervical cancer (HPV)	Yes			
AIDS-defining cancers not reduced by ART	Burkitt's lymphoma.	Yes	Higher.	ART improves outcome of cancer treatment but might not reduce the incidence.	
Non-AIDS defining but higher risk in HIV positive people.	Anal cancers (HPV).	No	Yes, but estimates vary by study.	Incidence is not reduced by ART but ART is essential to increase survival.	Screening for anal cancer in men and women is not currently routine, although recommended by some experts.
	Hodgkins Disease (EBV)	No	Approx 35x (anal),	Rates increasing due to living longer.	Stopping smoking reduces lung cancer.
	Lung cancer	No	10 x (HD),		All hepatitis coinfecting people should be screened for liver cancer (6 monthly US and AFP).
	Liver cancer (HBV, HCV)	No	2–5 times higher (lung, liver, head and neck, melanoma).		Avoid sunburn.
	Head and neck cancers (HPV)	No			
Not related to HIV or defined as AIDS related. Not affected by ART.	Melanoma	No			
	Breast cancer	No	No	Rates are not reduced by ART.	Screening recommended as part of general population screening.
	Colon cancer	No	No	Rates are increasing due to living longer.	
	Prostate cancer	No	No		

This table only refers to cancers in general terms. HIV-related cancers that occur at very low rates are not included. KEY: AFP: alfa-fetoprotein; CNS: Central Nervous System; EBV: Epstein Barr Virus; HD: Hodgkins Disease; HHV-8: Human Herpes Virus-8; HPV: Human Papilloma Virus; KS: Kaposi's Sarcoma; NHL: Non-Hodgkins Lymphoma.

## Lifestyle factors and your health

The following few pages focus on lifestyle changes that can affect your health.

The evidence for these benefits in the general population is summarised in Table 9.

As we get older, these risks and the potential to change them are just as important for HIV positive people.

The risk for all the health complications in Table 9 can be reduced by the linked lifestyle change.

Pages 83 to 90 include more detailed information about diet and exercise.

These are general principles for everyone – both HIV positive and HIV negative.

**Table 9: Lifestyle factors linked to serious health problems**

Risk factor	Health conditions
Cigarette smoking	Heart disease, stroke, diabetes, numerous cancers (lung, oesophagus, mouth, pharynx, stomach, liver, pancreas, cervix, bladder, kidney, colorectal), leukaemia, chronic obstructive pulmonary disease (COPD), other respiratory diseases, TB.
High blood glucose (sugar)	Heart disease, stroke, diabetes, renal failure, some cancers (colorectal, breast, pancreatic).
High LDL cholesterol	Cardiovascular disease (heart and stroke)
High blood pressure	Heart disease, stroke, hypertension, renal disease.
Obesity (high BMI)	Heart disease and stroke, diabetes, some cancers (colon, kidney, breast, gallbladder).
High trans fats in diet	Heart disease
High saturated fat diet	Heart disease
Low omega-3 in diet	Heart disease
High dietary salt	Heart disease, stroke, hypertension, stomach cancer, renal failure.
Low dietary fruit and vegetables	Heart disease and stroke, some cancers (colorectal, stomach, lung, oesophagus, mouth and throat).
Alcohol use (above recommended levels)	Heart disease and stroke, hypertension, diabetes, some cancers (liver, mouth, throat, breast, oesophagus, colorectal), cirrhosis, pancreatitis, road injuries, suicide, homicide and other injuries, alcohol use disorders.
Low physical activity	Heart disease and stroke, breast and colon cancers, diabetes.



## Diet: a balanced diet and your health

A healthy diet is good for your physical and mental health.

It can reduce the risk and severity of obesity, heart disease, diabetes, hypertension, depression and cancer.

### Why a balanced diet?

Sometimes we eat because we enjoy the taste and experience of different foods. Sharing food and meals are important social events.

But other than for pleasure, we need food to get nutrients, vitamins, minerals and energy.

Very few foods are either all good or all bad. By having an idea of the balance in your diet, it should be easier to enjoy food and be healthy.

There are seven essential factors for a balanced diet: carbs, protein, fat, fibre, vitamins, minerals and water.

The rough percentage of daily calories that should come from each factor is shown in Table 10.

A healthy diet should include a varied selection of foods. But some types of food are better for us (“5-a-day” for fruit and vegetables) than others (cakes, biscuits etc), see Table 11.

Eating a wide range of different foods will give your body the nutrients and micronutrients that it needs.

### Diet and weight

In general, if we eat fewer calories than our body needs for energy, we will lose weight. If we eat more than we need we put on weight.

But this is not the whole story. We all have an individual balance depending on how our body signals to itself to process food. Some people burn more energy and in different ways, and this explains some of the diversity in how we all look.

This can also change over time through life depending on whether we are still growing and when we get older.

Some foods are processed by our bodies in ways that are more healthy. This tends to be foods that release sugars more slowly and that contain fibre.

Other foods including saturated fats and foods that are high in salt or simple sugars can have a negative impact on health because of how the body processes them.

### Calories and lifestyle

The average number of calories you need each day can vary. It is influenced by many factors including sex, age, metabolism, physical activity, growth and pregnancy.

Body height, weight and size, genetics, hormone levels and any illness can affect how much energy we need.

Average daily guidelines recommend around 2500 calories for men and 2000 calories for women.

**Table 10: Essential factors for a healthy balanced diet**

Nutrient	% of daily calories	Function	Source
Carbs	45–55%	Energy	Grains (refined & unrefined): wheat, maize, corn, millet, oats, rice, flour, pasta, noodles; potatoes; sweet potatoes, yam. Fruit (sugar).
Protein	10–35%	Tissue growth and maintenance	Meat, fish, nuts, eggs, soya, beans and pulses.
Fat	20–35% from fat	Energy, energy storage, hormone production	Nuts, seeds, plant oils, dairy products (milk, cheese).
Fibre	Included in carbs.	Regulates blood sugar levels, bowel function and bowel health.	Peas, beans, vegetables, fruit, oats, whole grains, brown rice, nuts, seeds.
Vitamins & minerals	trace	Metabolism regulation, aiding cell growth, other biochemical functions	Specific to each vitamin/mineral. A range of vegetables, lean meat, nuts and seeds will cover most people's needs.
Water	0	Maintaining hydration	Drinking water, other beverages. About 20% of water intake comes from food.

**Table 11: Eat more, eat less...**

	Food types	Comments
Eat more	Raw and cooked vegetables & fruit ("5-a-day"), nuts, seeds, beans & pulses, whole grain cereals/bread, lean white meat (chicken without skin), fish (especially oily)	Linked to many aspects of better health including reducing LDL.
Eat in moderation	Lean cuts of beef, lamb, pork, shellfish, dairy products (low fat), unsaturated fats (olive oil, vegetable oil). Dried fruit, jams. Sucrose, honey, fructose, chocolate.	These foods can all be an important part of your diet.
Eat less and in limited amounts	Saturated fat (butter, margarine, lard, cheese, cream, high fat milk), trans fat, salt (less than 5 g daily). Processed meats/fatty cuts of meat (sausages, salami, bacon, ribs etc). Processed meals (high in fat, sugar and salt). Pastries, muffins, pies, cakes, sweets, etc. Alcohol is high in sugar and calories and is only recommended in moderation.	These foods are not good for your health. Some guidelines include specific recommendations.

## Differences within nutrients

There are healthy and less healthy dietary sources of nutrients, especially for carbohydrates (carbs) and fats. These are explained below and in Table 12.

### Carbs: simple vs complex

Guidelines recommend that carbohydrates (“carbs”) form the basis of most diets, making up half of total energy (calorie) intake. This food group can be separated into complex (good) and simple (bad) carbs.

Complex carbs (wholewheat flour and pasta, and brown rice) contain larger chains of sugar molecules. These take longer to digest than processed grains. This makes you feel full for longer, helping to control your appetite.

Complex carbs provide energy and are key sources of fibre, B vitamins and minerals.

Refined complex carbs (white flour, pasta and rice) are digested more quickly by the body. This makes them a faster source of energy. However, these types of carbs do not offer as many additional nutrients. This is why whole-wheat and brown carbs help improve the overall quality of your diet.

Simple carbs are the sugars. These can be natural (e.g. fructose found in fruit) or refined (e.g. sucrose or glucose in soft drinks, sweets and biscuits).

Another key carb-related term is the Glycaemic Index (GI). This relates to how quickly the sugar is released into the blood stream.

Low GI foods release sugar slowly. This gives a prolonged supply of energy to the body. Higher GI foods give shorter bursts of energy.

Many factors affect the GI of a carbohydrate including whether the carb is simple or complex, how the food is cooked and also what it is eaten with.

Fruit and vegetables are carbohydrate foods. They include a wide range of vitamins and minerals as well as soluble fibre. Aiming for five portions of fruit and vegetables a day is good for your health.

Fruit juice is counted as one of your 5-a-day, but if you are watching your weight it is better to eat whole fruit which takes longer to digest and keeps you feeling full for longer.

### Fat: saturated and unsaturated

Dietary fat is important for making healthy cells. It produces hormones and other signalling molecules and is a source of energy and energy storage.

Two categories of dietary fat are saturated and unsaturated. They have the same amount of calories but different effects on your health. We need to aim for a good balance between the different dietary fats to optimise our health and reduce health risks.

Saturated fats are generally solid at room temperature and these are the fats that will have a negative impact on our health. They are the naturally occurring ‘bad fats’ and are found in butter, hard cheeses, fatty meat and meat products, cream, lard, suet and some plant oils including coconut oil and palm oil.

Unsaturated fats include the polyunsaturated, monounsaturated and Omega 3 fats. These will have a positive impact on our health. Monounsaturated and polyunsaturated fats are found in oils such as olive, rapeseed and sunflower.

Omega-3 and omega-6 are known as essential fatty acids (EFA's) because the body can only get these from diet. They are found in oily fish such as sardines, salmon and mackerel.

Trans fats are a form of unsaturated fat that rarely exists in natural food but are associated with partially hydrogenated vegetable oils. They are often added to processed foods such as cakes and biscuits and so these should be eaten less often and in small amounts.

Trans fats as cooking oils have been banned in some regions because of their impact on cardiovascular health.

## Diet and cholesterol

Cholesterol is a compound that is similar to fat. It is needed by the body to form the outside barrier of cells (membrane). It can be made both by the body and consumed through sources in the diet. Absorption of dietary cholesterol is complicated. Other factors such as genetics can affect the overall level of cholesterol circulating in the blood.

High levels of cholesterol in the blood are associated with damaging arteries and heart disease.

Specifically, having high levels of low-density lipoprotein cholesterol (LDL) and low levels of high-density lipoprotein cholesterol (HDL) in the blood increase the risk of heart disease.

Changes in diet can make a difference though. Choosing foods with more unsaturated fats compared to saturated fats can increase levels of HDL (good cholesterol) and lower levels of LDL (bad cholesterol).

## Diet and triglycerides

Similar to cholesterol, triglycerides are fat molecules that help in metabolism and moving other fats around the body.

Like cholesterol, high levels of triglycerides in the blood have been linked to heart disease.

**Table 12: Types of fat and their impact on your health**

	Food types	Comments
Saturated	Generally solid at room temperature. Animal fat from meat and dairy (butter, cheese, cream). Some plant oils including coconut oil and palm oil.	Less healthy. Linked to high LDL and an increase in heart disease. Diets high in saturated fat are linked to raising levels of LDL; this can be a risk factor for heart disease. Saturated fat should not be excluded from the diet however, just consumed in smaller amounts (7-10% of fat intake). A range of fats is needed for healthy functioning of the body.
Unsaturated	Vegetable oils like olive, sunflower, and rapeseed/canola oil. Nuts, avocados.  Omega-3 (from oily fish or supplements) and omega-6.	Improve insulin sensitivity, LDL and TG compared to saturated fats.  Replacing saturated fats by unsaturated fats and carbs reduces the risk of heart disease.
Trans fats	Trans fats are included in processed foods.  As a processed cooking oil, it was widely used by fast food outlets for frying.	Trans fats increase bad cholesterol, reduce good cholesterol and are bad for your health, especially “partially hydrogenated trans fats”.  They are banned in some countries and US states for being used as cooking oils.

### **Dietary fibre: soluble and insoluble**

Dietary fibre is classed as either soluble or insoluble. A mixture of both soluble and insoluble fibre is needed for good health.

Soluble fibre changes how other nutrients are absorbed in the digestive system. Insoluble fibre is not metabolised and absorbs water itself.

Soluble fibre regulates blood sugar levels and balances intestinal pH levels.

Insoluble fibre helps with digestion and elimination by speeding up the passage of food in the digestive system.

Dietary fibre typically contains a proportion of the carbohydrate cellulose, which cannot be digested by humans as we lack the enzyme to break it down.

### **Vitamins and minerals**

Vitamins are chemical compounds and minerals are chemical elements that the body needs in small quantities. They are used by the body for a wide range of functions and very low levels (deficiency) are related to some health complications.

Unless you have a low level of a particular mineral or vitamin, there is unlikely to be a benefit from taking a supplement.

## Protein

Protein is a source of energy. It is essential in maintaining the function of all cells in the body.

Protein is made up by complex combinations of 22 amino acids. Ten of these amino acids can only be obtained by diet.

Although protein is an essential part of your diet, this is also only needed in moderation.

## Salt

High intake of salt and high salt-containing foods increase the risk of high blood pressure. This increases risk of heart disease.

Most salt in the UK diet comes from processed foods such as pastries, bread, convenience and savoury snacks. Tinned foods can also be high in salt so if in doubt check the label.

Recommended intake of salt varies depending on your age, health and other factors. UK guidelines recommend no more than 6 grams a day for adults, which is the equivalent to 2.4 g of sodium.

To convert sodium to salt multiply by 2.5. US guidelines are 5 g/day while recognising that actual average intake is often twice this high.

## Ways of cooking

The way that we cook and prepare food is important. Certain cooking methods are also better at retaining the nutrients within food.

Cooking techniques such as roasting and frying can be less healthy if a large amount of fat (oil or butter) is added during the cooking.

However, you can fry and roast using small amounts of healthier fats such as olive and rapeseed oil.

Grilling and steaming are widely considered to be healthier cooking techniques in most cases.

## Further information

The online references for this booklet includes links for further information.

## Exercise and staying active

Many sections of this booklet refer to exercise as a way to improve your health.

Table 13 describes different types of exercise and provides some examples and Table 14 highlights some of the related health benefits.

For more information talk to your doctor about the type of exercise that could benefit you most. Often this might just be a way to make your life more active.

WHO guidelines recommend at least 1–5 hours exercise each week depending on the type of exercise (see box).

If you have not exercised for a while you will need to build up your strength and stamina slowly.

Exercise is individual to your goals. Some people want to build up muscle, some want to lose weight and others just want to get fit. Each goal uses different types of exercise.

### WHO adult guidelines (age 18–64).

1. Aim for at least 150 minutes of moderate-intensity aerobic activity or at least 75 minutes of vigorous-intensity aerobic activity each week – or a combination.
2. Increasing this time (ie to 300 and 150 minutes respectively) will lead to better health benefits.
3. Aerobic activity should last for at least 10 minutes duration.
4. Muscle-strengthening activity should involve major muscle groups on at least two days a week.

The recommendations for children and those over 65 are slightly different but still promote the importance and many benefits of physical activity.

**Table 13: Main types of exercise and related benefits**

	Examples	Comments
Aerobic	Walking, jogging, running, cycling, rowing, step machines, dancing, skipping, swimming.	Any exercise that makes your heart beat faster and your breathing rate increase is aerobic exercise. Over time, with aerobic exercise, your heart muscles will grow stronger. This also increases blood circulation which helps clear your blood vessels. As you work harder and for longer periods this exercise starts to use the energy stored in body fat.
Resistance	Press-ups, pull-ups, using free weights or machines.	Any exercise where you use increased weights (and/or increased repetitions) to make muscles work harder is called resistance exercise. This type of exercise will build up and maintain muscle mass.
Weight bearing	Walking, running, jogging etc. Some weight lifting.	Exercise that puts weight on your bones, helps your bones grow and stay strong. This includes some aerobic exercise like running and some resistance exercise like weight lifting.
Flexibility	Stretching, yoga, pilates.	Exercises improves the range of motion of muscles and joints.

## Nutrition and exercise

A balanced diet will give the body all of the nutrients that it needs to repair itself after exercise. See page 85 to 90 on eating a healthy diet.

### Tips to stay active

Your own goals are personal to you. This is not competitive to anyone else.

Some people want to build muscle and others to lose weight. Get advice for the best exercise for your goal.

If you find an exercise that you enjoy you will be more likely to do it regularly.

Look out for classes that offer a range of activities and sports. Getting into a routine will help – after a few weeks or months this will feel normal.

Exercising with friends can be more fun, and can help keep you motivated. Or you can see this as time to focus on yourself.

Being more active throughout the day makes a difference. Take the stairs instead of a lift or walk to work for example.

It is important to stretch and warm up before and after most exercise. Start slow and gradually build up your level of activity, particularly if this is new.

**Table 14: impact of exercise on different health conditions**

	Link to exercise	Comments
Diabetes (type-2)	Physical activity reduces risk.	A more active lifestyle reduces risks of metabolic indicators for developing type-2 diabetes.
Heart disease	Physical activity improves aerobic fitness.	Improving aerobic fitness reduces risk of heart disease. Aim for 150 minutes or more of moderate-intensity activity per week.
Stroke	Physical activity reduces risk.	Highly-active individuals had a 27% reduced risk of stroke.
Cholesterol Triglycerides	Physical activity is associated with lowering levels in the blood.	Improved lipids are associated with reduced risk of cardiovascular disease. Few studies have looked at exercise and LDL/triglycerides directly.
Depression	Exercise can be used as a treatment or preventative.	Reduces risk of developing depression and can boost self-esteem.
Breast & colorectal cancer	Moderate-vigorous physical activity for 30-60 minutes daily.	Lowers risk of developing some cancers.
Ageing	Regular physical activity for over 65s.	Lowers rates of all-cause mortality, 30% reduced risk of falls, and better cognitive function.
Bone health	Resistance exercise increases bone density (and strength).	Moderate-vigorous physical activity performed for 3-5 days a week. 30-60 minutes per session increases bone mass density.



## Non-HIV drugs

As we age, similar to HIV negative people, we are more likely to have other health complications. These often need medications.

Many of the drugs used to treat HIV also have the potential to interact with other commonly used drugs, including lipid lowering drugs (like statins and fibrates) and antacid drugs (like omeprazole).

This is an area where the pharmacist who gives you your HIV drugs will have most expertise.

Both your GP and your HIV doctor should know about all medications and supplements you use.

If you do not want to tell the local pharmacy or your GP about your HIV medications, check for interactions with your HIV pharmacist, HIV doctor or nurse.

Your HIV pharmacist will be able to check whether drugs prescribed by your GP interact with your HIV meds.

Write a list of all your meds including the doses to make this easier.

The online drug interaction resource produced by Liverpool University lets you select the drugs in your HIV combination and then check for interactions with other medications. You can then print an individual summary chart.

This resource includes a wide range of potential interactions between HIV drugs and other medications including:

- Antibiotics
- Antifungals
- Antacids and gastrointestinal drugs
- Blood pressure drugs
- Cancer drugs
- Diabetes drugs
- Erectile dysfunction drugs
- Heart disease drugs
- Hepatitis C drugs
- Herbs, supplements and vitamins
- Hormone treatment and steroids
- Immune modulating drugs
- Lipid lowering drugs
- Oral contraceptives
- Painkillers
- Recreational drugs
- Smoking cessation drugs
- Weight reduction drugs (eg Orlistat)

### Further information

Liverpool University HIV drug interaction website.

[www.hiv-druginteractions.org](http://www.hiv-druginteractions.org)

## References

The information in this guide is based on treatment guidelines and over 380 published studies. The references for these studies are on the i-Base website.

Whenever possible, we used publications that are accessible free as open access online. Many publications provide free access to full text articles after 1–2 years of the publication date.

Where this was not possible, we include a web link to the study summary.

Each of these papers, especially treatment guidelines, include their own extensive references for more detailed research. These are a good pointer for further information.



## Credits

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Not-for-profit copying and translations are encouraged or contact i-Base for additional free copies.

## Further information

The BMA guide is a general reference book (not just HIV-related) including illustrated information on how drugs work and on many individual drugs:

‘BMA New Guide to Medicines and Drugs’. Produced by the British Medical Association, 9th edition, 2015.

Much of the most easily readable and up-to-date information on side effects and HIV is available on the internet.

The following links were correct when we went to press. If you have trouble finding an article or link call the i-Base phoneline on 0800 800 6013 and we'll try to help.

If you are not reading this in electronic format the i-Base website contains all these references as active links - to save you retyping addresses:

[www.i-base.info/guides/side](http://www.i-base.info/guides/side)

### Treatment guidelines

Treatment guidelines have good information on managing side effects:

[www.bhiva.org](http://www.bhiva.org) (UK)

[www.eacsociety.org](http://www.eacsociety.org) (Europe)

[www.AIDSinfo.nih.org](http://www.AIDSinfo.nih.org) (US)

### Community resources

The Canadian community organisation CATIE has a comprehensive guide to side effects that might cover other areas and options

[www.catie.ca/en/treatment](http://www.catie.ca/en/treatment)

Many conferences publish studies on the internet and some also let you hear lectures and see slides from some sessions.

Retrovirus conference (CROI)

[www.croiconference.org](http://www.croiconference.org)

International AIDS Society conferences

[www.ias.se](http://www.ias.se)

Reports from these and other meetings are usually available shortly after the meetings on the following sites:

[www.i-Base.info](http://www.i-Base.info)

[www.aidsmeds.com](http://www.aidsmeds.com)

[www.aidsmap.com](http://www.aidsmap.com)

[www.natap.org](http://www.natap.org)

[www.thebody.com](http://www.thebody.com)

A community site with a range of information on fat loss. As well as facial fat loss this is one of the few sites that includes an overview of fat loss from the buttocks.

[www.facialwasting.org](http://www.facialwasting.org)

### HIV and HCV drug interactions

[www.HIV-druginteractions.org](http://www.HIV-druginteractions.org)

[www.HCV-druginteractions.org](http://www.HCV-druginteractions.org)

### Online calculators

**For risk of heart disease and kidney function:**

Different calculators use different data sets to calculate cardiovascular and kidney function (estimated GFR). None claim to be 100% accurate or validated for HIV. See:

[www.qrisk.org](http://www.qrisk.org)

[www.qintervention.org](http://www.qintervention.org)

**For BMI, smoking etc:**

A range of NHS calculators include BMI (for weight) and financial savings (from stopping smoking):

[www.nhs.uk/Tools/Pages/Toolslibrary.aspx](http://www.nhs.uk/Tools/Pages/Toolslibrary.aspx)



## Feedback

Your feedback on this guide helps us develop new resources and improve this resource. All comments are really appreciated. Comments can be posted free to:

FREEPOST RSJY-BALK-HGYT, i-Base,

107 The Maltings, 169 Tower Bridge Rd. London SE1 3LB.

Or made directly online at: [www.surveymonkey.com/s/7CCWBW2](http://www.surveymonkey.com/s/7CCWBW2)

1. How easy was the information in this guide to understand?

Too easy       Easy       Difficult       Too difficult

2. How much of the information did you already know?

None       A little       Most       All

3. Did the information help you feel more confidence when speaking to your doctor?

Yes, a lot       Yes, a little       Maybe       No

4. Which information did you find most useful?

5. Do you still have questions after reading this guide? Please give examples.

Please include a contact email address if you would like us to contact you about this

6. Any other comments?

Contact details (If you would like a reply): Name \_\_\_\_\_

Email \_\_\_\_\_ @ \_\_\_\_\_



## i-Base publications

All i-Base publications are available free  
Treatment guides are written in everyday language  
HTB is written in more technical medical language

Please photocopy or cut out this form and post to

**HIV i-Base, 107 Maltings Place,  
169 Tower Bridge Road, London, SE1 3LJ**

or fax to **020 8616 1250**

or order online [www.i-Base.info](http://www.i-Base.info)

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### Please send me

- Introduction to ART .....
- Changing treatment: guide to second-line therapy .....
- Pregnancy and womens health .....
- Guide to hepatitis C for people living with HIV .....
- HIV testing and risks of sexual transmission .....
- UK guide to PrEP .....
- HIV Treatment Bulletin (HTB) .....

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