Most anabolic androgenic steroids are synthetic products based on the structure of testosterone. Testosterone is the male sex hormone responsible for the development of masculine characteristics such as body hair, muscular development and deepening of the voice.

Anabolic - means tissue building, and muscular development.

Androgenic - means male producing, and is responsible for the development of secondary male sex characteristics such as aggression, deepening of the voice and increased body hair.

Steroid use is not confined to bodybuilders and other sports.

Safer injecting messages are important for all clients including those who are injecting steroids.

Some basic information for steroid users which can prevent hepatitis C, hepatitis B, HIV and other infections includes:

- Swab the injection site before injecting, and stop bleeding with a cotton bud or tissue (not a swab).
- Swab the top of bottles/vials/bladders.
- Needles that pierce bladders and vials must be sterile just as needles used to administer the steroid must be sterile.
- Shake water-based steroids well to mix particles in the solution.
- Draw up the liquid using the larger needle
- Inject into the muscle using the smaller bore needle
- Rotate injection sites between the buttocks, thigh and arm to reduce marking and scarring.

All needles and syringes should be disposed of appropriately.

Non prescribed use of steroids is illegal.
Legal Status of Steroids

Unauthorised possession and supply of steroids, as well as the administration of steroids to another person is an offence and carries severe penalties. Penalties vary state by state.

This is important for people to be aware of if they are helping someone inject.

It is illegal for medical practitioners to prescribe steroids for performance enhancement, but they are allowed to monitor a steroid user’s health as a form of harm minimisation.

Anabolic androgenic steroids are proscribed substances, and are not permitted in sporting competition. If anabolic androgenic steroids are used in competitive sport the user may face penalties if caught.

This book is for people working in needle and syringe programs. Neither the book nor any part is to be given to any member of the public for any reason.

This book is not to be used as a point of advice to clients except in relation to safer injecting techniques.

It should be noted that content is drawn from a wide variety of sources. All care is taken to ensure accuracy; due to the complexity of the area you must be aware of the limitations of this book. As such it is intended to give background information only to NSP workers.
Introduction
The Steroid Book contains current information about anabolic androgenic steroids (AAS). It is intended to help needle and syringe program workers understand basic information about steroids and steroid use. It is not to be used to give advice about steroid use. Non prescribed steroid use is illegal in Australia.

If you are unfamiliar with blood borne virus harm minimisation you should ensure you are sufficiently trained in BBV harm minimisation principles before continuing.

Steroids are not generally associated with overdose or similar problems that may cause immediate health jeopardy. Harms from using steroids arise from unwanted side-effects such as increased blood pressure or from poor injecting technique.

Significant harms associated with steroid use include
- blood clotting
- hypertension
- atherosclerosis
- heart attack

In addition to the above, steroid use significantly alters the body’s natural hormonal balance and may cause significant illness and disease.

Rationale behind The Steroid Book
The use of anabolic steroids and other substances incorporates a range of health, legal, social and other risks. The Steroid Book has been written to assist staff to minimise these associated harms when providing information to steroid using clients. It must be noted NSP are best placed to reduce harms associated with injecting rather than harms associated with steroids.

People using steroids should consult with a medical practitioner, preferably one who has some knowledge and a particular interest in the subject, and who will monitor a client’s health with the aim of reducing the risks.

Unauthorized possession and supply of steroids, including those intended for human or veterinarian use, as well as the administration of steroids to another person, is an offence which carries penalties in every state and territory of Australia. In addition to the legal penalties, steroids are banned by every professional sporting body.

This book does not seek to dismiss the potential effectiveness of anabolic steroids in assisting people to achieve anabolic gains. However, it does seek to highlight and question information which is currently available to people in the community about the gains which might be achieved and the possible risks associated with the use of steroids and other substances.

Knowledge about steroids has increased significantly in the past decade. The Internet has played a large role in this with people discussing different steroids and usage in various online forums. Access to online journals and other scientific research has also allowed people interested in steroids to compile and assess scientific research. The information available through these forums is not always reliable, and tap into many myths and misconceptions concerning steroid use. This has been compounded with selective reading or misinterpretation of the research, with users often choosing to ignore any negative aspects.

Similarly, much of the information that is available through print or visual media (videos, for example) is partially inaccurate. Whilst based on scientifically factual information, it is often taken out of context, incorrectly interpreted, or distorted. In other cases, information may be based on myth and have no scientific basis at all.
SECTION 1: ANABOLIC ANDROGENIC STEROIDS: HOW THEY WORK
1.2 How Do Anabolic Androgenic Steroids Work?

While the weight of anecdotal evidence in support of the effectiveness of steroids in facilitating gains in muscle size and strength is substantial, there have been few rigorous scientific evaluations investigating whether and/or how high dose anabolic steroids might work to promote this “supra-physiological” muscle development. The following information describes what is typically used and the rationale, noting however that scientists state that there is as yet only limited replicated and conclusive evidence to support many of the theories or drug regimens which are used by body builders. Ethical concerns about the potential harms associated with such investigations will continue to limit the upper dose range employed in the research. As a result, proper evaluation of the high dose steroid regimens which are commonly followed by bodybuilders will also be limited.

When an anabolic androgenic steroid (hereafter referred to as “AAS” or “steroid”) is taken it travels through the blood stream and binds to receptor sites in muscle cells and other receptive cells in the body. When the steroid attaches to the muscle cell receptor (like a key going into its lock) it chemically stimulates protein synthesis, which leads to muscle repair and growth.

Steroids produce muscular development together with an increase in strength. They work best when used in conjunction with good nutrition, and intense weight training prior to and during the period of steroid use. If steroids are taken alone without adequate attention to good nutrition and training, there may be some increase in body weight and cross-sectional area of muscle. Such gains may not be quality (lean muscle or strength) gains. Alternatively, if steroids are taken frequently and at high doses unwanted side effects may be the only effect experienced.

AAS and Women

Women may experience a more significant anabolic and androgenic response to (the same doses of) steroids since they have low levels of naturally occurring testosterone. In addition, the number of unsaturated anabolic-androgen receptors in the skeletal muscle of adult females may be higher than in normal adult males.

Recent improvements in athletic performances among the female (but not the male) athletes of some countries may be attributed to this physiological difference. Needless to say, even if this proves to be true, the masculinising effects of steroids (many of which are permanent) should be taken into account by women who are considering the use of steroids.
**AAS and adolescents**
Adolescents considering the non-medical use of AAS and who are still growing (usually by age 18 to 20 years but sometimes a little later) should be aware that AAS may accelerate skeletal and muscular growth. This may also stimulate premature closure of the growing ends of the long bones, which can lead to the prevention of a young steroid user attaining their genetically determined maximum height.

**Issues with excess testosterone**
The body is only able to process a certain amount of testosterone (or AAS) at any one time. The limiting factor for testosterone is the number of anabolic steroid receptor complexes in each muscle cell.

A substantial portion of any excess testosterone may be converted or ‘aromatised’ to the female hormone, oestrogen. This oestrogen may then attach to different receptor sites and cause certain side effects. A common example in males is gynaecomastia (otherwise known as “bitch tits” or “bitchies”). Some AAS are more prone to causing gynaecomastia than others.

Similarly, surplus exogenously administered testosterone suppresses normal follicle-stimulating hormone and luteinising hormone production, leading to a shutdown of natural testosterone production. The result is atrophy (shrinkage) of the testicles. In females a permanent deepening of the voice and clitoral enlargement may occur.

High levels of testosterone often (though not always) increases libido; sexual performance, however, may not match the increase in libido. Over time this heightened libido may be reversed and for some steroid users, the libido is reduced from the outset.

1.4 Real, Fake, Real Illicit

Steroids are available as professionally made substances prepared by pharmaceutical companies for human and animal use, or professionally made substances prepared by underground pharmaceutical laboratories for human use. The latter are often prepared in countries where laws relating to the manufacture of steroids are less rigorous than Australia, Western Europe, or the USA.

Water based injectables
These are steroids which come prepared in a water based solution. The water and steroid is rapidly absorbed by the body. Water based substances usually find their way into the bloodstream quickly and are used and excreted from the body faster than oil based substances.

Some water based steroids are now sold in paper form. Perforated blotting paper is soaked in a steroid solution which then evaporates. Each square contains a measured dose of steroid.

Oil based injectables
These steroids are prepared in an oil based solution which increases the length of time taken for the substance to be absorbed into the body and to take effect. Once use has ceased, oil based substances tend to linger in the body and maintain an extended effect.

Tablets
The effect of steroid tablets is short acting and they must be administered regularly, usually twice a day. Tablets are associated with more problems and side effects because of their toxicity.

Whereas injectable steroids are absorbed directly from the injection site (which bypasses the digestive system and reduces liver toxicity and delivering greater potency), tablets are subject to the first pass through the digestive system, where the oral steroid may lose much of its potency and may cause some liver damage.

Some oral steroids have a special coating which is designed to prevent the steroid from being destroyed by the acidity of the stomach. These steroids are categorised as C-17 Alpha Alkylated. Debate about the coating’s potential toxicity to the liver is continuing.

1.3 Types Of Anabolic Androgenic Steroids.

It should be noted that there are several types of steroids.

Anabolic androgenic steroids come in three basic forms:
- water based injectable
- oil based injectable
- tablets

Injectable steroids may not be as toxic as tablets and they have a longer duration of action so daily administration is unnecessary. Injections are usually the preferred way of using steroids.

2. introduced from outside the organism
water based steroids will tend to separate out into two layers if left overnight undisturbed, the steroid particles at the bottom of the vial and the water at the top (like a snow globe), fake versions of water based steroids are usually some sort of solution, not a suspension, so do not separate into layers.

Some anabolic androgenic steroids available in Australia are veterinary preparations, which are NOT designed for human consumption. Quality controls with veterinary products during their manufacture may not be as stringent as the control on human products but are sufficient to avoid unintended toxic effects or infection. It should be stressed that products prepared for animal use are not safe for human use.

Like all things profitable there are often fakes with little or no steroid in them. Fakes are made of all types of steroids.
All drugs including steroids affect people in different ways. Anabolic androgenic steroids have the potential to cause significant harm. Side effects may depend on:

- the amount used
- the type of drug
- the length of time the drug is used, and
- the size and weight of the person

Side effects can arise after taking relatively small doses of steroids.

Other harmful effects, including BBV, may also be experienced if unsterile injection equipment and poor, aseptic injecting technique is used. Below is a list of the more common harmful effects which are known to occur. Some are temporary and less serious while others may be more serious and permanent. Consultation with a health professional or medical practitioner is the best way of minimising the risks of serious or even irreversible damage.

1.5 Side Effects Of Anabolic Androgenic Steroids

The following effects or side effects (not listed in any particular order) may be experienced by people who use AAS:

- Salt and water retention (may cause bloating in the face and elsewhere)
- Acne (may leave permanent scarring)
- Testicular atrophy (shrinkage - usually reversible)
- Increased irritability (may be more common in people predisposed to such behaviour)
- Increased confidence and/or depression and lowered mood (not applicable to all steroid users)
- Increased self-image and self-esteem
- Permanently stunted growth in young people (particularly if use began before the growth cycle was complete)
- Increased body hair (referred to as hirsutism)
- Increased LDL cholesterol (“bad fats”) +/- lowered HDL cholesterol (“good fats”) which can lead to heart disease
- Gynaecomastia (breast enlargement in men, colloquially known as “bitch tits”)
- More frequent colds
- Irregularities in menstruation and infertility in women (usually reversible)
- Clitoral enlargement (a permanent change)
- Smaller breasts in women
- Deepening of the voice in women (a permanent change)
- Changes in libido
- Impotence (usually reversible)
- Priapism (involuntary and long lasting erection)
- Liver damage
- Sleeping difficulties

It is not known how commonly these side effects occur and who might be more prone.

There are also a range of possible social impacts such as:-

- Legal issues due to illicit activities
- Damage to relationships due to aggression, moodiness, sexual dysfunction or by a partner’s obsession with body building

2.1 Common Side Effects Of Steroids - details

The more common side effects are listed in alphabetical order with suggestions for potential reduction of their harm/s.

**Acne**

Acne is common for men and women using steroids and all steroids can cause acne. Acne occurs when androgens bind to sebaceous glands which lead to excess oil production. Oil collects dirt and bacteria and clogs the pores. Acne fades as steroid use stops but pockmarks and scarring will stay.

The effects of acne may be reduced by:

- keeping the skin clean
- using facial cleansing agents such as benzoyl peroxide and
- seeking treatment from a medical practitioner if the condition persists.

Long-term antibiotics or isotretinoin may be prescribed by a dermatologist. In severe cases of acne, stopping steroid use will be the most effective and sensible way to treat the problem.

**Aggression (“roid rage”)**

It is often reported that aggression is a major problem resulting from AAS use. There have been reports of some users experiencing “wild explosions of rage” over seemingly trivial matters. There is no evidence directly linking steroid use and aggression, all reports of ‘roid rage’ are anecdotal only.
Personality may be a factor with some people finding that steroids enhance already aggressive natures. Alcohol or other drugs may also contribute to or cause such behaviour.

It has also been suggested that some of the gains made by body builders while using steroids are due to increased aggression towards training.

Some people state that their enhanced strength and size makes them more aggressive simply because they feel more powerful or “invincible”. Some say they feel less tolerant while using. Increased irritability and agitation may be a more common response. It is usually the steroid user who will feel the impact of this reaction as social contact becomes more difficult.

**Blood Clotting Changes**

Steroid use can increase the amount of time it takes for blood to clot. This is a serious issue if there is significant blood loss such as in an accident or during surgery. If undertaking surgical procedures, it is advisable to inform the medical practitioner overseeing the surgery.

**Bone Growth - Premature Arrest**

Steroids that convert to estrogens cause early bone growth closure and young users risk not reaching their potential full height. The only way of avoiding this side effect is to avoid the use of steroids during the growth cycle.

**Cancer**

The prolonged use of oral steroids has, in particular, been linked with cancer of the liver, kidney or prostate. This link however is still being debated.

As mentioned previously, the “C-17 Alpha Alkylated” steroids have a particular coating that is designed to prevent the steroid from being destroyed by the acidity of the stomach. The liver has difficulty in breaking down these substances into forms that can be processed by the body. Anabolic androgenic steroids that are “C-17 Alpha Alkylated” are thought to be more likely to cause cancer.

It is possible that steroid induced cancers may not be observed for a number of years, as it is common for some cancers to appear 20 years after exposure to a causative agent.

**Cardiac**

Cholesterol is produced naturally in the body, as well as consumed in the diet. There are two types of cholesterol:

- **HDL (high density lipoprotein):** delivers cholesterol to the liver from the cells and removes it from the blood
- **LDL (low density lipoprotein):** delivers cholesterol to the cells from the liver. If there is more LDL than the cells can utilise, the LDL will remain in the blood in a higher concentration.

Cholesterol is an essential element for many metabolic processes and cellular structures. All steroidal hormones are based on the cholesterol molecule.

Blood cholesterol levels increase in some, but not all, people using steroids. This usually involves a decrease in HDL cholesterol and an increase in LDL cholesterol. Some people find that their blood cholesterol level declines while they are using steroids.

**Clitoral Enlargement**

Enlargement of the clitoris is caused by the virilising effects of androgenic steroids. Clitoral size will reduce slightly after stopping steroids; however the clitoris will not return its previous size.

**Deepening of the Voice**

Steroid use may produce permanent and irreversible deepening of the voice. This may or may not be dose related and is the result of the enlargement and thickening of the vocal chords. It is permanent.

In women, the masculinising effect of steroid use may lead to psychological and social problems.

**Depression**

Depression is defined as persistent lowered moods and can manifest as:

- sleeping too much or too little
- restless sleeping
- nightmares
- feelings of helplessness and hopelessness
- loss of interest and motivation
- fatigue
- self critical thoughts
- irritability
- anxiety

It has also been suggested that some of the gains made by body builders while using steroids are due to increased aggression towards training.

Some people state that their enhanced strength and size makes them more aggressive simply because they feel more powerful or “invincible”. Some say they feel less tolerant while using. Increased irritability and agitation may be a more common response. It is usually the steroid user who will feel the impact of this reaction as social contact becomes more difficult.
Hypertension (high blood pressure)
Some anabolic androgenic steroids can increase blood pressure. There are usually no noticeable signs associated with high blood pressure until such time as the pressure is extremely high. Indicators include persistent severe headaches, shortness of breath and dizziness.

It is important for steroid users to monitor their blood pressure.

Liver Damage
The liver is susceptible to damage from steroid use. Liver damage is not regarded as a side effect of steroid use per se, rather, it is associated with the chemical C17 Alpha Alkylate (which assists with the uptake of oral dose steroids into the bloodstream, bypassing the usual processing by the liver).

The liver has a wide range of important functions including:
- the manufacture and/or storage of essential body chemicals such as cholesterol, thiamine (vitamin B1) and glycogen
- detoxification or cleansing of the blood.

When seriously damaged, the liver becomes inflamed causing the build up of a chemical called “bilirubin” in the blood. This causes a yellowish colouring of the skin and whites of the eyes known as “jaundice”.

Steroid use should cease immediately and a physician consulted if jaundice occurs.

Steroid use will aggravate any pre-existing liver conditions, for example hepatitis C or B.

Menstrual Irregularities
Steroids cause an imbalance in hormone production and this can cause menstruation to become irregular or cease. Menstruation should return to normal once steroid use is stopped, however this may take six months or more. If menstruation does not return within six months, medical advice should be sought.

Tendon/ Ligament Damage
It has been suggested that tendon and ligament damage often occurs because anabolic androgenic steroids cause rapid muscular strength gains, but connective tissue (like tendons and ligaments) take much longer to strengthen. Alternative explanations are that damage occurs as a result of the effects of steroids on tendon and ligament collagen (which is a protein) and, when trying to increase weight too fast, overloading the tissues. This presents as elbow pain when training triceps or biceps, or knee pain when training thighs or calves.
**Testosterone and Sperm Production**
All steroids affect testosterone production. When using steroids the brain receives a signal that there is enough testosterone in the body. This can cause testosterone production to diminish or stop. The higher the androgenic properties of the steroid, the greater the disruption.

Most steroids shut down testicular function - which includes testosterone and sperm production ("spermatogenesis") and after extended periods of use, libido may decline. The testicles shrink because they are no longer producing sperm. This condition is known as "sultana nuts". In addition there may also be abnormal sperm formation. These side effects are mainly reversible.

**Virilisation Effects in Women**
Some steroids are thought to be more suitable for women. Highly androgenic steroids are not recommended for women, because of their reported masculinising effects. However, some side effects are inevitable even with low androgenic steroids.

**Water Retention**
Anabolic androgenic steroids cause the body to retain sodium. Since the body maintains sodium in balance with water, as one increases so does the other. Certain forms of testosterone appear to cause more water retention than others, and high doses will also increase the amount of water retained.

Some people mistake this water retention for an actual increase in lean body mass. However, this deceptive weight gain is a side effect and does not represent a true increase in muscle mass. Bloating of the face and body, and poor muscle definition are the characteristics of this side effect. Bloating may appear rapidly with the use of steroids and disappear quickly when steroid use has stopped.
There is no guaranteed safe way of using steroids at high doses, but the supervision or advice of a health professional may assist in reducing risk. Regular check-ups while using steroids will enable both a medical practitioner and client to monitor the steroid user’s health, in an effort to avoid or minimise some of the problems they might otherwise experience. Some harmful effects may not manifest until they are well advanced, hence compromising risk reduction through medical monitoring.

3.1 Cycles

Common practice among bodybuilders is to use a course of steroids in cycle lengths of 6-12 weeks, with an equivalent break between cycles. For example, if a person’s cycle runs for eight weeks they should, according to this recommendation, have eight weeks steroid free.

Among the steroid using community this advice stems from a suggestion that using steroids for lengthy periods without a break will result in muscle receptor shutdown (“down regulation”), and this could, in theory, result in more side effects and less growth. It should be noted that this recommendation appears to be based on “common sense” and “the wisdom of experience”, since there is little scientific evidence for such advice. In the absence of scientific guidance, this rule of thumb has some merit as it provides some respite to the body.

3.2 Steroid Doses

Muscle receptor physiology is a complex and evolving science. The following comments represent a simplified, and in some cases conjectural description of events relating to the physiological actions of AAS on muscle receptors.

Receptor sites within any given muscle appear to only respond to a certain amount of anabolic androgenic steroid at any one time, meaning that high doses of steroids will provide no added benefit.

Conversely, there is a possibility that rapid drug-receptor association/dissociation may result in increased stimulation or enhanced post-receptor responses in muscle cells, when high doses of steroids are used. There is also a possibility that other receptor systems are involved in mediating the effects of high dose AAS.

Steroid receptors may be most sensitive at the start of a course of steroids and that they become progressively less sensitive as the course continues and the larger the doses. This reduced sensitivity is called “down regulation”. It should be noted that down regulation occurs even with relatively small doses of testosterone.

An average person produces the following levels of testosterone:

- The healthy adult male produces about 2.5-11 mg each day and 17.5-77 mg per week.
- An adult female produces about 0.25 mg each day and 1.75 mg per week.

Body builders often use doses which are up to 10 times of these amounts. World Health Organisation (W.H.O.) male contraception clinical trials are utilising 150 and 200 mg/ week testosterone enanthate intramuscularly and have reported no serious side effects. Many body builders report good responses to doses of 250 mg/ week of testosterone providing it is accompanied by adequate attention to nutrition and training. Whether there is an “optimum dose” or whether increasingly larger doses produce increasingly better results remains the subject of debate.

3.3 Stacking

Steroids are often used in combinations during a cycle in an effort to obtain synergistic effects. This is called “stacking”, and may involve the use of two or more steroids at once. Some stacking regimes can use eight different steroids although two or three are more common. Different combinations of steroids will produce different effects; some will increase muscle mass, others lean mass, and help with “cutting”.

It is argued that the “stacking” of a number of different AAS allows for better muscle growth with a lower risk of side effects, using lower individual doses. Stacking is highly personal and is more alchemy than science with each person often developing their own combinations. There is, in fact, no scientific evidence in support of this hypothesis and endocrinologists doubt that it is true.

Scientists dispute the potential effectiveness of stacking. They argue that there is only one type of steroid receptor in the body and using more than one type of steroid doesn’t make any difference in terms of maximal stimulation of this one receptor complex. However, this does not exclude the possibility that other physiological mechanisms mentioned above,
Detoxification considerations
Detoxification can affect the individual in three ways:

Physical detoxification
- craving
- loss of libido
- fatigue
- insomnia
- loss of appetite
Less common affects include restlessness, headaches, nausea and suicidal thoughts

Psychological detoxification
- depression
- anhedonia
- apathy
- body image dissatisfaction (body dysmorphia)
Less common is experiencing anxiety

Rebound detoxification
- Oestrogen rebound: the antithesis to ‘roid rage’, where oestrogen levels bounce back following cessation of steroid use, producing a euphoric feeling.

3.4 Detoxing From Anabolic Androgenic Steroids

Dependence on steroids, as defined by standard international classification systems (e.g. DSM IV and ICD-10), is possible. This is denoted by:
- maintaining the use of steroids may become more important than family, friends, health or work
- fear of losing strength and size may lead to continuous use despite harmful consequences
- experiencing withdrawal symptoms (including depression and lethargy)

On the basis of these international definitions of drug dependence, dependence on anabolic steroids may be more common than has been previously recognised.

‘Managing’ dependence
After completion of a steroid cycle, users may experience the effects of abnormally low testosterone levels, including
- lethargy
- decreased appetite weight loss
- strength decrease
- depression

Some steroid users who are aware of steroid dependence say that they hope to avoid this risk by using lower doses and having regular breaks from use.

Steroid users sometimes report that length of time and the dosage used affect how they feel when they stop using. There is evidence that after using steroids for a long time at high doses, it takes time (four months or more) for the body’s natural testosterone production to return to normal. However, the precise relationship between dose and duration of use and withdrawal severity remains unclear.

However, by maintaining a healthy diet and consistent training, loss in body size may be minimised.

Detoxification can affect the individual in three ways:

Physical detoxification
- craving
- loss of libido
- fatigue
- insomnia
- loss of appetite
Less common affects include restlessness, headaches, nausea and suicidal thoughts

Psychological detoxification
- depression
- anhedonia
- apathy
- body image dissatisfaction (body dysmorphia)
Less common is experiencing anxiety

Rebound detoxification
- Oestrogen rebound: the antithesis to ‘roid rage’, where oestrogen levels bounce back following cessation of steroid use, producing a euphoric feeling.

3.5 Injecting Steroids

Oral vs. Injectable
There is debate surrounding the question of whether injectable steroids are more or less effective and safe than oral steroids. As discussed previously (see Sections 1.3 and 2.1) oral steroids may be more toxic to the liver and are subject to “first pass metabolism”; the liver is exposed to the drug at its highest concentration immediately after it is absorbed from the gastro-intestinal system.

Injecting is potentially more dangerous because penetration bypasses skin, the body’s natural defence against infection. The user exposes themselves to a host of harmful infections, such as HIV, hepatitis B and hepatitis C. Steroid users should be given information about blood borne viral infections.
Injecting and training
There is no benefit in injecting into the muscle group that is due to be trained on that particular day. The AAS that is injected will work its way through the body via the bloodstream, reaching all muscle groups. Injecting into a particular muscle, such as calves, pectorals, or biceps can be potentially dangerous, and will not lead to any special growth in size of the muscle that was injected.

3.6 Injecting Steroids – Technique

Steroids are always injected intramuscularly, never intravenously. Steroid using clients should be given the same information about BBV that non steroid clients receive. For people that assist others gloves are recommended when injecting.

The following method is adapted from standard nursing practice.

I. Equipment
1. a 2.5 ml or a 5 ml syringe (the size depends on the dosage and type of drug to be taken);
2. when using oil based steroids a larger gauge needle may be required to draw up the drug, i.e. a 19 or 21 gauge needle;
3. a 21 or 23 gauge needle to inject the steroid;

II. Preparation
When preparing to inject steroid users need to be aware of the following:
1. Seals or rubber caps must be cleaned with a swab first.
2. Water based steroids should be shaken sufficiently well to mix the steroid particles in the solution.
3. Drawing up should be done with a large bore needle, 19 or 21 gauge.
4. A 21 or 23 gauge needle should be used to inject.

III. Injecting technique
1. The syringe should be held as if it were a dart, between the thumb and the forefinger of the hand most used. The other hand is then used to spread the skin tightly at the injection site.
2. The needle is inserted at a ninety degree or right angle with enough force for it to enter into the skin and muscle smoothly.
3. The plunger should then be drawn back a small distance.
4. If blood appears in the syringe, the needle has gone into a vein (or artery). The syringe must be removed and pressure applied to the area for a few minutes and the process restarted.
5. Once the needle is safely in place the plunger should be pushed down into the syringe with a smooth motion;
6. The injection site can then be massaged with a cotton ball to disperse the drug and reduce pain.
7. Pressure should be applied to the injection site with the cotton ball until any bleeding has stopped.
8. If any steroid appears at the injections site this indicates the injection was too shallow.
9. Relax and apply heat to the injection spot.

IV. Where to inject
The best injection sites are in the larger muscles such as the buttocks, mid thigh and upper arm. Rotating injecting sites will reduce any marking or scarring.

Injected steroids are distributed equally throughout the body. Injecting into specific muscle groups will NOT give any added benefit to that muscle group.

Some steroids will hurt more than others when injected.
3.8 Using Vials and Bladders

Steroids can come in a range of different sized vials and bladders. Continued injecting into these can introduce bacteria into the steroid.

It is essential that before and after each use the rubber cap should be swabbed to lessen any chance of contamination.

There is also the risk of contaminating the vial or bladder contents with blood borne viruses if a used needle is used to draw from the vial or bladder.

Piercing the rubber cap with the needle blunts and contaminates the needle. A 19 or 21 gauge needle should always be used for drawing up and a smaller gauge used for injecting.

Vials are difficult to sterilise. Refilling vials has a significant risk of bacterial infections.

Some steroids come in bladders of about 200 ml. These could be cheaper, but they are easy to contaminate. They are used for a longer period of time and unless a new needle and syringe is used every time to draw out the steroid, they are easily contaminated with tiny particles of dirt, bacteria and possibly HIV or hepatitis (B and C) viruses.

Needles that go into bladders and vials must be sterile. Needles used to administer the steroid must also be sterile.

3.7 Safe Injecting Hints for Clients

- Rotate injection sites - if one injection site is repeatedly used, scar tissue will develop. This tissue can become bruised, sore, inflamed or hard. Injecting into scar tissue will interfere with drug absorption.
- Injecting with blunt needles causes a “trampoline effect”. A blunt needle bounces and has difficulty breaking the skin.
- Don’t touch, breathe, or cough over the needle or injection site;
- Keep the needle capped until ready for use.
- All standard BBV prevention precautions. For example:
  _ Always use sterile injecting equipment
  _ Wash hands before and after injecting

Buttocks (“Backside”)
It can be very difficult to inject oneself safely into the buttocks (backside). It is preferable to have the assistance of another person who knows how to inject correctly.

It must be stressed however that assisting another person to inject is an offence.
To inject into the buttocks, draw an imaginary line vertically down the middle of one of the buttocks. Draw another line horizontally across the same buttock half way down. Injections should be into the upper, outer quarter of the buttock where there are no large nerves.

The sciatic nerve runs down the middle of the buttocks and can be permanently damaged by a needle. If a nerve is hit or severe pain is experienced on injecting, the needle should be removed immediately and pressure applied on the area for a few minutes. An ice pack will also help reduce any bleeding or pain.

Thigh
The thigh has more exposed nerves and veins than the buttocks.

To inject into the thigh, divide the thigh from the knee to the hip in thirds by drawing three imaginary horizontal lines across it. Injections should be into the outer part of the middle section.

Arm
To inject into the arm, divide the area from the elbow to the shoulder into thirds (horizontally) and inject into the upper outer third. This is the deltoid muscle.
SECTION 4:
PROTECTING HEALTH WHILE USING STEROIDS.
Bodybuilders often find that certain test results are abnormal because of the metabolic changes and muscle damage caused by heavy weight training (e.g. changes in the levels of the liver enzymes alanine aminotransferase [A.L.T.] or aspartate aminotransferase [A.S.T.]). These abnormalities usually disappear on ceasing steroids. However, this is not an indicator of reduced or absent risk.

The only way to avoid all the side effects associated with steroid use is to not use them; but if a person is determined to use steroids they should take some precautions.

1. Find a medical practitioner who is willing to monitor their health
2. Have regular liver and kidney function tests
3. Avoid using high doses
4. Take regular breaks from use
5. Practice sterile injecting techniques

### 4.1 Monitoring Of Training

Monitoring is used to work out how a certain steroid affects a person’s body. This is sometimes called “receptor mapping”.

Each person reacts differently to each steroid and combination of steroids. What can work for one person may have very negative effects for another. Monitoring both steroid use and other variables will make it easier to identify which steroids work best while minimising the harms. A steroid user will find keeping a journal will help them monitor effects of the steroids they are taking.

While the basic idea is sound, steroid users should be cautious not to fall into the trap of believing they can reliably self-monitor and avoid any serious damage to their health. It is preferable to find a medical practitioner who will assess their health before they start using steroids and monitor their health during and following steroid cycles.

### 4.2 Blood and Other Pathology Tests

Having blood and pathology testing may assist a medical practitioner to gauge how steroids are affecting a steroid user’s body and may help to make decisions which will minimise the possible harm to health as a result of steroid use.

Pathology tests may be useful when done before, during and after a cycle. Tests should be done before starting to discover physiological abnormalities that require treatment and pre-empt use.

Some medical practitioners believe that testing done during a course is less helpful but should be performed where symptoms are experienced, either as a direct result of steroid use or co-incidentally. Other medical practitioners are more conservative and routinely perform tests during a course.
SECTION 5: ANABOLIC ANDROGENIC STEROIDS AND OTHER DRUGS
The Steroid Book does not promote or recommend the use of any drugs. Using anabolic androgenic steroids with other drugs, legal or illegal, can be dangerous.

Steroids alter the sodium/potassium balance of the body. The increase in sodium causes water retention. Taking diuretics also alters the sodium/potassium balance. Excess potassium can cause heart failure. The combined use of diuretics and steroids can lead to exhaustion, kidney damage, muscle weakness, heart attack and death.

Various types of diuretics (hyperosmolar agents, carbonic anhydrase inhibitors, benzthiazides, loop diuretics and aldosterone antagonists) have specific adverse effects relating to their use.

The main side effects that are detrimental to athletic performance include hypovolaemia (decreased blood volume) and muscle cramps due to fluid and salt losses. Such dehydration may present specific dangers to the individual.

Biochemical changes, especially hypokalaemia (low blood potassium concentration) may cause cardiac arrhythmias and can be life threatening. Potassium supplements are required when non potassium sparing diuretics are used, in order to avoid hypokalaemia. Conversely, electrolyte imbalance, notably hyperkalemia (high blood potassium), is likely to occur if athletes use “potassium sparing” diuretics in conjunction with potassium supplements, in the belief that such potassium supplements are necessary to protect them from hypokalaemia.

Death has occurred from inappropriate use of diuretics.

Anti Oestrogens (e.g. clomiphene, letrozole, tamoxifen)

As stated previously, the body is only able to use a certain amount of testosterone (or other AAS) at any time. The limiting factor to the action of testosterone is the number of anabolic steroid receptor complexes in each muscle cell. A substantial portion of any excess testosterone may be converted or ‘aromatised’ to the female hormone, oestrogen. To counteract the side effects, steroid users take anti oestrogens such as clomiphenes and tamoxifen.

There are several different anti oestrogen compounds that vary in their effectiveness and associated harms.
Clonidine ("Catapres")

Catapres is a treatment for high blood pressure and used in smaller doses to prevent migraine headaches. Bodybuilders use Catapres (clonidine) to reduce high blood pressure. It is anecdotally reported that Catapres increases the natural level of growth hormone; however there is no scientific evidence to support of this claim.

Insulin

A belief has emerged among body builders that insulin can assist in achieving substantial gains in muscle mass and muscle definition. This would appear to be speculation at this point.

Incorrect use of insulin is dangerous.
If insulin is used short acting insulin only be used in the first half of the day, not before working out. It is also preferable to work with a peer who can watch for the following:
• confusion
• disorientation
• sweating
• drowsiness

If the insulin user experiences any of these symptoms they should be given glucose or a drink containing sugar, or food.

If the person loses consciousness, they should be placed in the recovery position (also referred to as the “lateral” or “coma” position), tilting the head fully back and jaw forward, in order to ensure an open airway and protect them from possible aspiration.

An ambulance should be called immediately.
6.1 Distinction Between Illegal Drugs and Substances Banned By the International Olympic Committee (IOC)

It is important to note the distinction between illegality with respect to Statutory Law or the Criminal Code and the unsanctioned use of performance enhancing drugs contrary to the rules of sporting bodies.

Examples of illegality with respect to statutory law and the criminal code include use of an illicit drug such as cocaine, or having in one’s possession, supplying, procuring or offering to supply or procure a Schedule 4 (Restricted) or schedule 8 (Dangerous) drug without its being appropriately prescribed or authorised in accordance with the Poisons Regulations. Steroids are a Schedule 4 drug.

“Illegality” according to sporting bodies relates to the use of any of a list of banned drugs by athletes competing in sporting events or competitions for which these prohibitions apply.

6.2 Drug Testing in Sport

The first drug testing in sport took place during the 1968 Olympic Games in Mexico, and the first anabolic steroid testing was at the 1976 Montreal Olympic Games. Since then, increasingly sophisticated technologies are being applied such that precise identification of thousands of different compounds is now possible and quantities as low as one thousand millionth of a gram per ml to one trillionth of a gram per ml can be detected by these techniques.

Test methods include liquid and gas chromatography and, for precise identification, Gas Chromatography Mass Spectrometry (G.C.M.S.), which can identify with great reliability and precision the chemical fingerprint of any substance or chemical providing the chemical has been previously identified (known as being “finger printed”) and stored for cross referencing.

It should be noted that certain synthetic AAS such as nandrolone which is lipophilic6 and remains in fatty (adipose) tissue for long periods of time, can be detected by G.C.M.S. for up to nine months or more after its use by injection. The synthetic AAS are all easily detected by this analytical method.

6. Has a chemical affinity with lipids (biological compounds that are not water soluble)
SECTION 8: GLOSSARY

alpha alkylated 17 (sometimes written as _alkylated 17): A form of synthetic testosterone that has an addition of an alkyl substitute at the 17 carbon position increasing the steroid’s oral bioavailability.

anabolic: Tissue building.

androgenic: Refers to the male producing aspect of steroids.

aromatise: Excess testosterone can convert or ‘aromatise’ to oestrogen in the body. Oestrogen attaches to different receptor sites in the body than testosterone, causing unwanted side-effects.

cycle: Refers to the period in which steroids are being used.

different: Created within the body.

endogenous: Created within the body.

exogenous: Made outside the body.

gynecomastia: Literally translated, means “women’s breasts” – an unwanted side effect in men.

muscle receptor sites: The point in the body’s cells that the steroid targets to deliver its chemical stimulant for protein synthesis.

muscle receptor shutdown: Muscle receptor sites become ‘full’ and shut down because only a certain amount of testosterone can be used by the body at one time.

plateau: When the steroid no longer has an effect.

receptors: Very small special sites in muscle cells to which drugs attach, like a key fitting into a lock. This causes one or more chemical reactions in the cell, such as the production of a chemical known as an “enzyme”, which triggers another chemical reaction or set of reactions. This might lead to the production of amino acids required for muscle protein synthesis.

receptor mapping: A monitoring technique to measure the effectiveness of steroids and any side effects.

stacking: Involves using two or more steroids in combination.

side effects: Effects of steroid use that range from changes in organs, skin and bones to changes in temperature and mood.

virilise: Masculine characteristics – used when describing unwanted side effects in women.