CHAPTER-3

SCIENTIFIC METHODS OF DRUG TESTING

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SCIENTIFIC METHODS OF DRUG TESTING

No human being can go more than a few days at most without insulin. Insulin controls blood sugar levels by taking the excess from the blood and ordering it "into storage" as ready-releasable compounds like glycogen. Glycogen is stored in the liver, but also around muscle tissue, in preparation for required sudden release, for example in a "flight from predators" response, or more likely, in a bout of vigorous exercise. The requirement for insulin of athletes such as Geoff Capes and Stephen Redgrave is the same as any of us, but unfortunately, as they have Type I Diabetes, they cannot produce their own, and therefore need to inject insulin every day normally at every mealtime.

Insulin, as with other peptide hormones, is increasingly abused by elite athletes willing to compromise their integrity. A large black market in illegal sales and use of insulin now exists, particularly on the body-building circuit. A recent scandal highlighted in the news is the abuse of insulin by the Italian cyclist Marco Pantani, who certainly appears to be unstoppable in what lengths he will take to win at least Community pharmacists in Limerick, Cork, Dublin and more so in the UK frequently come across incidences of used insulin vials and syringes changing hands from 1.00 to 10 in the UK (1.5 to 15 Euro) per unit; penfills are averaging about 60 stg.

Without giving enough information to encourage misuse, the advantage of Insulin as well as some other human hormone analogues to the cheat is that it is almost impossible to tell apart from the naturally occurring form, plus it has a very short half-life, meaning it clears the body very rapidly. Insulin is only really anabolic in the presence of other
substances, and during or just before exercise, and so the ill-informed may be putting themselves at risk without gaining any advantage.

First, insulin rapidly lowers blood sugar, and this leads to lower oxygen levels not to mentions calcium, potassium and many other minerals. Low oxygen will irreversibly damage brain, liver and kidney cells. Often the first indication of this is collapse, coma, or a seizure (epileptic type fit) and ultimately the risk can be fatal. Second is the obvious risk is shared needles. If they are buying pre-filled insulin syringes, these normally have an attached needle, if the patient has an infection of a transmissible kind, this will be injected into the abuser. Third, an allergic reaction to the artificial insulin would not be detected due to the “athlete” not being a registered diabetic. Surely no victory can be worth risking life. Athletes who abuse insulin are playing a very deadly game.

To touch on more complicated biochemistry more insulin needs more sugar to burn. If it doesn’t get sugar, it will burn protein, and all of these produce by-products like ketones, lactic acid, and other toxic metabolites. If enough fluids are not consumed, or if the kidneys or liver are less than fully healthy, these compounds could do untold damage to the body. In short, as with any abuse, insulin cheating is high risk. Pantani’s name has now been reduced to the deplorable, and the recent revelations fulfill the often offered theory that if an apparently diminutive body is producing almost super-human output, that body must be either (a) physiologically or (b) pharmacologically adapted. In some sad cases the evidence is overwhelming.

In a more encouraging development, the athlete have learned at a recent doping educational seminar that a unique identifier test for growth
hormones is inevitable. Articles on this and other developments such as hair-tests to follow soon.

3.1 DIFFERENT KINDS OF DRUGS AND ITS EFFECTS

Figure No.38: Weight Loss Drugs

There are many reasons to diet. Health of course, being first and foremost, but we are also influenced by the media. We see celebrities we admire and we notice they are rich, they are influential and they are thin. Our doctors tell us that we must lose weight. Companies discriminate by not hiring the overweight and are now even firing overweight employees to cut down on their health insurance costs. We have become a society fixated on conquering the battle of the bulge.

Athletes also, unfortunately, as fit as they may be, or perhaps coming off a injury, where they have gained extra weight are under pressure to lose weight so they can perform at their maximum potential.
In a society that demands instant gratification so losing one or two pounds a week with a healthy diet and exercise is not fast enough for us. We want to lose a lot of weight and we want to do it quickly, and we turn to weight loss products to help us along.

There are many weight loss products on the market today and they work in different ways. Knowing how they each affect your body can help you make an informed decision as to which product would be most beneficial and least detrimental to your overall health.

Classifications of Weight Loss Drugs

1. Appetite Suppressants such as fasten, adipex or ionamin promote weight loss by tricking the body into believing that it is not hungry or that it is full. They decrease appetite by increasing serotonin or catecholamine two brain chemicals that affect mood and appetite. This is not without it’s drawbacks.

   These prescriptions are controlled substances which means the risk of addiction is there. Tolerance can also be developed, which means that after a relatively short time, more of the drug is needed to get the same effects. There are also many side effects including increased heart rate and blood pressure, insomnia, dry mouth, and anxiety. These drugs should only be used short term and your doctor should closely monitor treatment.

2. Cerebral stimulants such as Didrex, Bontril Melfiat, and Plegine are similar in structure to amphetamines. The actions of these drugs are similar to other appetite suppressants, but with strong side effects and addictive qualities. These will cause a very high increase in blood pressure and heart rate. There is also the possibility of depression and
psychotic episodes during withdrawal. Again, these drugs should be taken under strict medical supervision.

3. **Fat-absorption inhibitors** such as Meridian and Xenical work by preventing your body from breaking down and absorbing fat eaten with your meals. This unabsorbed fat is eliminated in bowel movements. As with all medications, there are side effects. Some side effects include gas with discharge, an urgent need to go to the bathroom, oily or fatty stools, an oily discharge and spotting, increased number of bowel movements and the inability bowel movements. These side effects are generally mild and temporary, but may be worsened by eating foods that are high in fat.

A person is determined to be overweight by the Body Mass Index (BMI). BMI is calculated by dividing a person’s weight in kilograms by his or her height in meters, squared. A person with a BMI of 24 or less is considered to be an ideal weight. A person with a BMI of 25-29.9 is considered to be overweight. Individuals who fall into the BMI range of 25 to 34.9, are considered to be at especially high risk for obesity-related health problems high blood pressure, heart disease and stroke, diabetes, gallbladder disease and gallstones, breathing problems, such as sleep apnea and asthma. BMI over 40 indicates that a person is morbidly obese.

Prescription weight loss should be considered as an option for people with a BMI of over 30 with no obesity-related conditions, or a BMI of over 27 if conditions are present. Since these drugs can have strong effects on the body, your doctor should be asking you about any drug allergies you may have, if you are pregnant or breastfeeding and if you are taking any other drugs. Since existing conditions can affect the way these work your doctor also needs to know if you have any of the
following conditions:

A. Diabetes
B. High blood pressure
C. Heart disease
D. Epilepsy (seizures)
E. Kidney disease
F. Glaucoma
G. Alcohol or drug abuse (or a history of)
H. Overactive thyroid (hyperthyroidism)
I. Depression or other mental illness
J. Migraine headaches requiring medication
K. Planning to have surgery requiring general anesthesia
L. Pregnancy or planning to become pregnant

The most sensible way to lose weight is with diet and exercise, but Sportsmen need some help along the way, and to follow the prescription directions carefully.

Nandrolone, Testosterone and Anabolic Steroids

Figure No.39: Nandrolone, Testosterone and Anabolic Steroids
Nandrolone (AKA 19-Nor-Testosterone or 19-Nor-Androstenolone) is an Anabolic Steroid. As the names suggests, it is related to Testosterone, a “male” hormone produced naturally in humans (male AND female) in varying quantities. All Anabolic Steroids have “Androgenic” effects, which are the actions we commonly associate with Testosterone; masculinisation, aggression, virilisation, growth, but only up to a point, and with reservations. Anabolic steroids also have “Anabolic” effects, those associated with growth of bone, muscle, red blood cells and mobilization of sugar. These are more the effects sought by athletes abusing this range off drugs. Although some Testosterone type anabolics are orally active, they undergo a very heavy Liver process, removing a lot of their action, and also stressing the liver. Serious abusers, or legitimate patients tend to have injections, or to take safer more orally compatible anabolics like Stanazolal the drug found twice in Ben Johnston’s blood

Anabolic steroids when used legitimately are used most often to stimulate some sort of growth, so are used in advanced osteoporosis, certain breast cancers, regeneration of red blood cells in kidney patients, puberty disorders, growth disorders, anemia, and to help gonad development in males. Illegitimate use is focused on increasing muscle mass and strength, but will also increase red blood cell production, therefore blood thickness and oxygen-carrying capacity.

Nandrolone is produced in both males and females as a metabolite by-product of Testosterone, and studies have shown it can be elevated to a very detectable level. The studies however did not prove the elevated levels would exceed the IOC threshold for a positive test. They barely reached a quarter of this value. The risks are something the takers ignore,
or the suppliers say nothing about. Added to this is the fact that the IOC was able to find Nandrolone in over 14% of muscle-building supplements it tested, all claiming to be “natural”, “safe” or “steroid free” athletes’ health may be at risk simply by taking untested muscle or strength supplements. The side effects are horrendous and are more likely to be serious the younger athletes take Anabolics. They include virilisation in males, early fusion of growing bones in teenagers, growth of breasts in males, androgenisation of females loss of feminine sexual characteristics, Liver cancers, hepatitis, heart disease, cholesterol elevation, blood sugar elevation, epileptic fits, fluid retention, and ultimately heart-attack and stroke.

Athletes should be very careful about what they take, and coaches more so. Remembering health advice sites are rarely overtly commercial, but sites selling Ephedra, weight-loss and performance products are exactly that- commercial You may receive a contaminated product in the post, but try chasing up the supplier It’s a case of – if the substance is found in your system then you are guilty regardless.

Nardil (phenelzine)

Figure No.40: Nardil (phenelzine)
Nardil has been found to be effective in depressed patients clinically characterized as "atypical," "nonendogenous," or "neurotic." These patients often have mixed anxiety and depression and phobic or hypo-chondriacal features. There is less conclusive evidence of its usefulness with severely depressed patients. Nardil should rarely be the first antidepressant drug used. Rather, it is more suitable for use with patients who have failed to respond to the drugs more commonly used for these conditions.

**Side Effects:**

Nardil is a potent inhibitor of monoamine oxidase. Because this enzyme is widely distributed throughout the body, diverse pharmacologic effects can be expected to occur. When they occur, such effects tend to be mild or moderate in severity often subside as treatment continues, and can be minimized by adjusting dosage; rarely is it necessary to institute counteracting measures or to discontinue Nardil.

Common side effects include are Nervous System: Dizziness, headache, drowsiness, sleep disturbances (including insomnia and hypersomnia), fatigue, weakness, tremors, twitching, myoclonic movements (muscle spasms), hyperreflesiz (Exaggeration of reflexes). Gastrointestinal: Constipation, dry mouth, gastrointestinal disturbances. Metabolic: Weight gain. Cardiovascular: Postural hypotension (low blood pressure upon standing), edema (swelling). Genitourinary: Sexual disturbances such as anorgasmia (inability to reach climax) and ejaculatory disturbances and impotence.

**Banned Substances**

None of the banned drugs lists can claim to have all the products
included at any time, due to the frequency of changes in medicines production. Many drugs and Nutritional products come under the umbrella of and related substances”.

Ireland is particularly prone to variation in product appearance, as well as drug ingredient, because the northern Irish product list is significantly different. Drugs that are considerable in the republic may look the same on the pack as products in N.I.-?, but they may contain banned ingredients. Again a good example is Lem-sip. The banned products that are Pharmacy- only may be available even in corner-shops and garages in Northern Ireland. Bearing in mind our GAA, Hockey, Bowling and IRFU organizations among others encompass both jurisdictions this is very significant.

Banned drugs and substances can be allowed and substances that do not test positive can cause a ban Examples of this would be medicines absolutely essential for the health of an athlete. Insulin is widely abused in sport, but is absolutely necessary in Diabetics, many of whom are high profile athletes; Geoff Capes, Steve Red grave as long as these are registered by an athlete through his or her GP and the Group’s Medical Officer/Doctors using the appropriate form

An example of non-banned substances causing a ban or worse would be Sodium Bicarbonate (Bread Soda) or one of the many so-called “food supplements” which may contain banned ingredients. Soda-doping is a dangerous and banned practice where endurance athletes Like cycling, long-distance runners take massive overdoses of Bread Soda, trying to counter the Lactic Acid build-up in muscles.
Food supplements include all those products like Herbs, Vitamins, Minerals and “muscle improving” nutritional products which have no means of proving safety or credibility for athletes. The adage that-is something which people often say and which express a general truth about some aspect of life. Many Nutritional products that are claimed to be “clean” are manufactured under very questionable conditions, but as these are not Pharmaceutical products, no laws exist to protect the Consumer. As a result, many of these cause bans because of contamination by banned ingredients during Production. Slimming products and Ginseng may contain banned stimulants, Creatine can contain steroids, herbs can contain toxic heavy metals, so unless quality can be absolutely verified, they should be avoided. Many professional Soccer Teams get an analytical laboratory to regularly test one brand of supplement, and will then only recommend this brand.

Because of the relatively low level of information supply until very recently, Prescribers and Advisers are very worried about getting the message wrong, or even inadvertently giving the wrong product. An example would be if a player needs stitching on the field, doctors often use a local Anesthetic, often containing Adrenaline. This is not essentially banned, but it is in Rugby, so mistakes can happen. Medical Officers must keep up-to-date and watch for changes to the lists, as well as recording everything they give, if this means having to carry a small notepad onto the pitch in the pouring rain. Likewise, confusion, panic and misinformation are causing players who need medicine not to take it. Asthmatics, Arthritis sufferers, Hay fever, for example So a list of allowed substances is also crucial. Patient’s ability to drive, use machines or perform tasks that require alertness. Thus, patients should be cautioned about engaging in hazardous activities until they are reasonably certain
that Remeron therapy does not adversely affect their ability to engage in such activities.

In depressed patients, the possibility of suicide should always be considered and adequate precautions taken. It is recommended that careful observations of patients undergoing Remeron treatment be maintained until control of depression is achieved. If necessary, additional measures ECT, hospitalization, etc should be instituted.

Zoloft (sertraline)

Figure No.41: Zoloft (sertraline)

Zoloft is in a class of drugs called selective serotonin reuptake inhibitors. Zoloft affects chemicals in the brain that may become unbalanced and cause depression, panic or anxiety, or obsessive or compulsive symptoms.

Zoloft is indicated for the treatment of major depressive disorder, Obsessive-Compulsive Disorder, Panic Disorder, Posttraumatic Stress Disorder, Premenstrual Dysphoric Disorder, Social Anxiety Disorder

Side Effects

Zoloft has numerous side effects on all the body systems. *Body as a Whole: Malaise (A vague feeling of bodily discomfort), fatigue, pain,
Dematologic: Rash, Cardiovascular: Palpitation, Vasodilation (increase in the internal diameter of a blood vessel causing increased blood flow), Gastrointestinal: Nausea, Dry Mouth, Decreased Appetite, Flatulence, vomiting, diarrhea, dyspepsia (impairment of digestive function), Abdominal Pain, Constipation, Nervous System: Ejaculation Failure, Dry Mouth, Increased Sweating, Somnolence (sleepiness), tremor, dizziness, Psychiatric Disorders: Agitation, Insomnia, decreased libido, Nervousness, Special Senses: Abnormal vision

Other precautions

Significant weight loss may be an undesirable result of treatment with sertraline for some patients. Abnormal Bleeding: Published case reports have documented the occurrence of bleeding episodes in patients treated with psychotropic drugs that interfere with serotonin reuptake. Patients should be cautioned regarding the risk of bleeding associated with the concomitant use of ZOLOFT with non-selective NSAIDs such as aspirin, or other drugs that affect coagulation. Liver Impairment: The use of sertraline in patients with liver disease must be approached with caution. If sertraline is administered to patients with liver impairment, a lower or less frequent dose should be used.

Warning

Cases of serious, sometimes fatal reactions have been reported in patients receiving ZOLOFT in combination with a monoamine oxidase inhibitor (MAOI). Symptoms of a drug interaction between an SSRI and an MAOI include: hyperthermia, rigidity, myoclonus, autonomic instability with possible rapid fluctuations of vital signs, mental status changes that include confusion, irritability, and extreme agitation.
progressing to delirium and coma. These reactions have also been reported in patients who have recently discontinued an SSRI and have been started on an MAOI. Clinical Worsening and Suicide Risk: Patients with major depressive disorder, both adult and pediatric, may experience worsening of their depression and the emergence of suicidal ideation and behavior (suicidality). Patients being treated with antidepressants should be observed closely for clinical worsening and suicidality, especially at the beginning of a course of drug therapy, or at the time of dose changes, either increases or decreases.

Discontinuing Treatment: If the decision has been made to discontinue treatment, medication should be tapered, as rapidly as is feasible, but with recognition that abrupt discontinuation can be associated with certain symptoms including the following: dysphoric mood, irritability, agitation, dizziness, sensory disturbances e.g. paresthesias numbness and tingling in the limbs such as electric shock sensations, anxiety, confusion, headache, lethargy, emotional liability, insomnia, and hypomania. While these events are generally self-limiting, there have been reports of serious discontinuation symptoms.

Remeron (Mirtazapine)

Figure No.42: Remeron (Mirtazapine)
Remeron is indicated for the treatment of major depressive disorder. A major depressive episode implies a prominent and relatively persistent nearly every day for at least 2 weeks, depressed or dysphoric mood that usually interferes with daily functioning, and includes at least five of the following nine symptoms: depressed mood, loss of interest in usual activities, significant change in weight and/or appetite, insomnia, psychomotor agitation or retardation, increased fatigue, feelings of guilt or worthlessness, slowed thinking or impaired concentration, a suicide attempt or suicidal ideation.

**Side Effects:**

Common side effects include Body as a Whole: Asthenia (weakness), Flu Syndrome, Back Pain; Digestive System: Dry Mouth, Increased Appetite, Constipation; Metabolic and Nutritional Disorders: Weight Gain, Peripheral Edema (swelling of the arms and/or legs), Edema (body swelling); Musculoskeletal System: Myalgia (muscle pain); Nervous System: Somnolence (sleepiness), Dizziness, Abnormal Dreams, Abnormal Thinking, Tremor, Confusion; Respiratory System: Dyspnea (shortness of breath, difficult breathing); Urogenital System: Urinary Frequency

**Drug Abuse and Dependence**

Remeron has not been systematically studied in animals or humans for its potential for abuse, tolerance or physical dependence. While the clinical trials did not reveal any tendency for any drug-seeking behavior, patients should be evaluated carefully for history of drug abuse, and such patients should be observed closely for signs of Remeron misuse or abuse.
Other precautions

Remeron has been known to increase cholesterol and triglyceride levels, increase appetite and weight gain. Remeron may impair judgment, thinking, and particularly, motor skills, because of its prominent sedative effect. The drowsiness associated with Remeron use may impair a Suicide; The possibility of a suicide attempt is inherent in depression and may persist until significant remission occurs. Close supervision of high risk patients should accompany initial drug therapy. Prescriptions for Prozac should be written for the smallest quantity of capsules consistent with good patient management, in order to reduce the risk of overdose. Because of well-established co-morbidity between both OCD and depression and bulimia and depression, the same precautions observed when treating patients with depression should be observed when treating patients with OCD or bulimia.

Recommended Dosage

Recommended dosage differs depending upon the condition being treated.

Depression: A dose of 20 mg/day, administered in the morning, is recommended as the initial dose. A dose increase may be considered after several weeks if no clinical improvement is observed. Doses above 20 mg/day may be administered on a once a day (morning) or twice a day (i.e., morning and noon) and should not exceed a maximum dose of 80 mg/day.

Obsessive Compulsive Disorder: a dose of 20mg/day, administered in the morning, is recommended as the initial dose. Doses above 20mg/day may be administered on a once a day (i.e., morning) or twice a
day (i.e., morning and noon). A dose range of 20 to 60 mg/day is recommended, however, doses of up to 80 mg/day have been well tolerated in

**Prozac (Fluoxetine)**

**Figure No.43: Prozac (Fluoxetine)**

Prozac is in a class of drugs called selective serotonin reuptake inhibitors. Prozac affects chemicals in the brain that may become unbalanced and cause depression, panic or anxiety, or obsessive or compulsive symptoms. Prozac is indicated for the treatment of depression, obsessive compulsive disorder and bulimia nervosa.

**Side Effects**

Prozac has numerous side effects on all the body systems which are as follows:

Body as a Whole: Headache, Asthenia (lack or loss of strength and energy), flue syndrome, fever. Cardiovascular: Palpitation, Vasodilation (increase in the internal diameter of a blood vessel causing increased blood flow). Dermatologic: Weating, Rash, pruritis (itching). Gastrointestinal: Nausea, Dry Mouth, Decreased Appetite, Flatulence,

Other precautions

Rash and Possibly Allergic Events: In U.S. Prozac clinical trials, 7% of 10,782 patients developed various types of rashes and/or urticaria (hives). Anxiety and Insomnia: In U.S. placebo-controlled clinical trials for depression, 12% to 16% of patients treated with Prozac reported anxiety, nervousness, or insomnia. Altered Appetite and Weight: Significant weight loss, especially in underweight depressed or bulimic patients may be an undesirable result of treatment with Prozac. Increments and at intervals of at least 1 week. Social Anxiety Disorder: Paxil should be administered as a single daily dose with or without food, usually in the morning. The recommended and initial dosage is 20 mg/day. Generalized Anxiety Disorder: Paxil should be administered as a single daily dose with or without food, usually in the morning. In clinical trials the effectiveness of Paxil was demonstrated in patients dosed in a range of 20 to 50 mg/day. The recommended starting dosage and the established effective dosage is 20 mg/day. Posttraumatic Stress Disorder: Paxil should be administered as a single daily dose with or without food, usually in the morning. The recommended starting dosage and the established effective dosage is 20 mg/day.

Drug Abuse and Dependence

Paxil is not a controlled substance. Paxil has not been
systematically studied in animals or humans for its potential for abuse, tolerance or physical dependence. While the clinical trials did not reveal any tendency for any drug-seeking behavior, these observations were not systematic and it is not possible to predict on the basis of this limited experience the extent to which a CNS-active drug will be misused, diverted, and or absurd once marketed. Consequently, patients should be evaluated carefully for history of drug abuse, and such patients should be observed closely for signs of misuse or abuse of PAXIL (e.g., development of tolerance, incrementations of dose, drug-seeking behavior).

**Paroxetine (Paxil, Paxil CR, Asimia,)**

**Figure No.44 : Paroxetine (Paxil, Paxil CR, Asimia,)**

Paroxetine is in a class of drugs called selective serotonin reuptake inhibitors. Paroxetine affects chemicals in the brain that may become unbalanced and cause depression, panic or anxiety, or obsessive or compulsive symptoms.

Paroxetine is used to treat major depression disorder, obsessive-compulsive disorder, panic disorder, generalized anxiety disorder, social anxiety disorder (social phobia), posttraumatic stress disorder (PTSD) and premenstrual dysphoric disorder (PMDD).
Side Effects

Paxil has numerous side effects on all the body systems. Body as Whole: headache, Asthenia (lack or loss of strength and energy). Cardiovascular: Palpitation, Vasodilation (increase in the internal diameter of a blood vessel causing increased blood flow). Dermatologic: Sweating, Rash. Gastrointestinal: Nausea, Dry Mouth, Constipation, Diarrhea, Decreased Appetite, Flatulence, Oropharynx Disorder (disorder of the throat at the back of the mouth, trouble swallowing). Musculoskeletal: Dyspepsia, Musculoskeletal Myopathy (disease of the muscles and bones), Myalgia (muscle pain), Myasthenia (muscle weakness). Nervous System: Somnolence (sleepiness), Dizziness, Insomnia, Tremor, Nervousness, Anxiety, Paresthesia (numbness and tingling in the limbs), Libido Decreased, Drugged Feeling, Confusion. Respiration: Yawn, Rhinitis (inflammation of the nasal passages), Pharyngitis (sore throat). Special Senses: Blurred Vision, Taste Perversion. Urogenital System: Ejaculatory Disturbance, Other Male Genital Disorders, Urinary Frequency, Urination Disorder, Female Genital Disorders

Mitriptyline (Elavil, Endep):

Amitriptyline is indicated for the relief of symptoms of depression.

Side Effects

Amitriptyline has numerous side effects on several of the body systems. Cardiovascular: Myocardial infarction (heart attack); stroke; arrhythmias (irregular heartbeat); hypotension (low blood pressure), particularly orthostatic hypotension (low blood pressure upon standing); syncope (fainting); hypertension (high blood pressure); tachycardia (rapid
heartbeat); palpitation. CNS and Neuromuscular: coma; seizures; hallucinations; delusions; confusional states; disorientation; incoordination; ataxia (failure of muscle coordination): tremors; numbness, tingling, and paresthesias of the extremities; dysarthria (imperfect articulation of speech due to disturbances of muscular control); disturbed concentration; excitement; anxiety; insomnia; restlessness; nightmares; drowsiness; dizziness; weakness; fatigue; headache; tinnitus (ringing in the ear);

Allergic: Skin rash; urticaria; photosensitization; edema (swelling) of face and tongue. Gastrointestinal: Rarely hepatitis (including altered liver function and jaundice); nausea; epigastric distress; vomiting; anorexia; stomatitis; peculiar taste; diarrhea. Endocrine: testicular swelling and gynecomastia in the male (development of breasts); breast enlargement in the female; increased or decreased libido; impotence; elevation and lowering of blood sugar levels. Other: alopecia (hair loss); edema; weight gain or loss; urinary frequency; increased perspiration.

Other Precautions:

The possibility of suicide in depressed patients remains until significant remission occurs. Potentially suicidal patients should not have access to large quantities of this drug. Prescriptions should be written for the smallest amount feasible. When possible, the drug should be discontinued several days before elective surgery. Both elevation and lowering of blood sugar levels have been reported. Amitriptyline HCI should be used with caution in patients with impaired liver function.

Discontinuation of Treatment with Amitriptyline:

Lexapro treatment be maintained until control of depression is
achieved. If necessary, additional measures should be instituted. Discontinuation of Treatment with Lexapro: During marketing of Lexapro there have been spontaneous reports of adverse events occurring upon discontinuation of these drugs, particularly when abrupt, including the following: dysphoric mood, irritability, agitation, dizziness, sensory disturbances for example paresthesias such as electric shock sensations, anxiety, confusion, headache, lethargy, emotional liability, insomnia, and hypomania, while these events are generally self-limiting, there have been reports of serious discontinuation symptoms.

Patients should be monitored for these symptoms when discontinuing treatment with Lexapro. A gradual reduction in the dose rather than abrupt cessation is recommended whenever possible. If intolerable symptoms occur following a decrease in the dose or upon discontinuation of treatment, then resuming the previously prescribed dose may be considered.

**Lexapro Cescita Eopram**

Lexapro is indicated for the treatment of major depressive disorder. A major depressive episode implies a prominent and relatively persistent (nearly every day for at least 2 weeks) depressed or dysphoric mood that usually interferes with daily functioning, and includes at least five of the following nine symptoms: depressed mood, loss of Interest in usual activities, significant change in weight and/or appetite, insomnia or hypersomnia, psychomotor agitation or retardation, increased fatigue, feelings of guilt or worthiessness, slowed thinking or impaired concentration, a suicide attempt or suicidal ideation.
Side Effects

Common side effects include: Body as a Whole: Flu-like Symptoms, Fatigue, Digestive System: Nausea, Diarrhea, Constipation, Indigestion, Abdominal Pain * Psychiatric Disorders: Insomnia, Somnolence, Appetite Decreased, Libido Decreased; Nervous System: Dizziness, Dry Mouth, Increased Sweating; Respiratory System Disorders: Rhinitis (inflammation of the nasal lining), Sinusitis (inflammation of the sinuses); Urogenital: Ejaculation Disorder, Impotence, Anorgasmia (inability to achieve climax)

Drug Abuse and Dependence

Lexapro is not a controlled substance. While Lexapro has not been systematically studied in clinical trials for its potential for abuse, there was no indication of drug-seeking behavior in the clinical trials. However, physicians should carefully evaluate patients for history of drug abuse and follow such patients closely, observing them for signs of misuse or abuse.

Other Precautions

In depressed patients, the possibility of suicide should always be considered and adequate precautions-taken. It is recommended that careful observations of patients undergoing

Celexa (citalopram): Celexa is indicated for the relief of symptoms of depression

Side Effects

Celexa has numerous side effects on several of the body systems:Nervous System: Dry Mouth, Increased Sweating, Tremor; Gastrointestinal: Nausea, Diarrhea, Dyspepsia (impairment of the power
of function of digestion), Vomiting, Abdominal Pain; Body as a whole: Fatigue, Fever; Musculoskeletal: Arthralgia (pain in a joint), Myalgia (muscle pain); Psychiatric Disorders: Somnolence (sleepiness), Insomnia, Anxiety, Anorexia, Agitation, Dysmenorrhea (painful menstruation periods), Decreased Libido, Yawning; Respiratory System: Upper Respiratory Tract Infection, Rhinitis (inflammation of the mucous membrane of the nose), Sinusitis (inflammation of the sinuses); Urogenital: Ejaculation Disorder, Impotence

**Precautions and drug interactions:**

Celexa should not be taken with the medications: MAOI'S, Other Antidepressants, Alcohol, Cimetidine, Warfarin, NSAXD's, aspirin, or other drugs work as blood thinners.

**Discontinuation of Treatment with Celexa:**

During marketing of Celexa there have been spontaneous reports of adverse events occurring upon discontinuation of these drugs, particularly when abrupt, including the following: dysphoric (depressed) mood, irritability, agitation, dizziness, sensory disturbances (e.g., paresthesias such as electric shock sensations), anxiety, confusion, headache, lethargy, emotional liability, insomnia, and hypomania. While these events are generally self-limiting, there have been reports of serious discontinuation symptoms. Patients should be monitored for these symptoms when discontinuing treatment with Celexa. A gradual reduction in the dose rather than abrupt cessation is recommended whenever possible.

**Combined reuptake Inhibitors and receptor blockers**

These combine reuptake inhibitors with receptor blockers.
Receptors are areas of the brain that chemicals affect. Each receptor is specific to a certain type of chemical. They work with a lock and key action. That is, once a chemical has entered the receptor it locks out any other chemicals. Therefore, when a blocker drug enters the receptor, it blocks out any other chemicals from entering.

The combination drugs are: trazodone (brand name: Desyrel), nefazodone (brand name: Serzone), maprotiline, mirtazpine (brand name: Remeron).

Common side effects of these medicines are drowsiness, dry mouth, nausea and dizziness.

**Monamine oxidase inhibitors (MAOIs)**

Once the brain's three neurotransmitters, known as monoamines (serotonin, norepinephrine, and dopamine), have played their part in sending messages in the brain, they get burned up by a protein in the brain called monoamine oxidase, a liver and brain enzyme. If too many monoamines are absorbed, it leads to a chemical imbalance in the brain.

Monoamine oxidase inhibitors, or MAOIs' work by blocking this cleanup activity. When the excess neurotransmitters don't get destroyed, they start piling up in the brain. And since depression is associated with low levels of these monoamines, increasing the monoamines ease depressive symptoms.

The MAOIs are Isocarboxazid (brand name: Marpian), Phenelzine (brand name: Nardil), Tranlcypromine (brand name: Parnate).
**Bupropion (Wellbutrin, Zyban)**

**Figure No.45: Bupropion (Wellbutrin, Zyban)**

Bupropion HCl is indicated for the treatment of depression and as a smoking cessation treatment side effects. Bupropion has numerous side effects on all the body systems: Body as a Whole: Headache, Infection, Abdominal pain, Flu-like symptoms; Dermatologic: Rash, Sweating, Pruritis. Cardiovascular: Palpitation, Flushing, Edema; Gastrointestinal: Nausea, Dry Mouth, Decreased Appetite, Vomiting, diarrhea, Abdominal Pain, Constipation; Nervous System: Insomnia, Agitation, Anxiety, Nervousness, Irritability, Ataxia (lack of muscle coordination), Seizure, Myoclonus (muscle spasm), Dyskinesia (impairment of voluntary movement), Dystonia (disorder of muscle tone) Somnolence (sleepiness), Tremor, Dizziness; Psychiatric: Mania/hypomania, Increased libido, Hallucinations, decrease in sexual function and depression; Respiratory: Pharyngitis; Urogenital: Urinary frequency, Nocturia; Special Senses: Tinnitus, Taste perversion

**Other precautions**

Suicide: The possibility of a suicide attempt is inherent in depression and may persist until significant remission occurs. Allergic Reactions: Allergic reactions characterized by symptoms such as pruritis,
urticaria, angioedema, and dyspnea, requiring medical treatment have been reported for bupropion HCl for smoking cessation. Be aware that Zyban, used as an aid to smoking cessation, contains the same active ingredient found in Wellbutrin and Wellbutrin SR used to treat depression and that Zyban should not be used in conjunction with Wellbutrin, Wellbutrin SR, or any other medications that contain bupropion HCl. Do not smoke at any time: It is possible to get too much nicotine and have serious side effects.

Important Warning:

At a dose of 300 mg each day, there is a chance that approximately 1 out of every 1000 people taking bupropion HCl, the active ingredient in bupropion sustained release tablets, will have a seizure. The chance of this happening increases if you: Have a seizure disorder (for example, epilepsy); Have or have had an eating disorder (for example, bulimia or anorexia nervosa); Take more than the recommended amount of bupropion sustained release tablets. Take other medications with the same active ingredient that is in bupropion HCl (such as taking Wenbutrirr (bupropion HCl for depression) and taking Zyban (bupropion HCl for smoking cessation).

You can reduce the chance of experiencing a seizure by following your doctor's directions on how to take bupropion HCl. You should also discuss with your doctor whether bupropion HCl is right for you.

Anti Anxiety Medication

Everyone experiences anxiety at one time or another. Most of the time it is a simple case of nervousness, such as sweaty palms or "butterflies in the stomach" before a job interview or giving a speech. These are normal body responses and are usually mild and manageable,
There are times, however, when anxiety can present serious problems. Anxiety disorders, in addition to generalized anxiety, include such disorders as phobias, panic disorder, obsessive-compulsive disorder, and post-traumatic stress disorder. Studies indicate that eight percent of all adults have suffered from a phobia, panic disorder or other anxiety disorder during the preceding six months. For millions of Americans, anxiety disorders are disruptive, debilitating and often the reason for loss of job and serious problems in family relationships.

Many anxiety disorders can be helped with therapy, support groups and other non-medication treatments, but when the problem is severe or with certain diagnoses, a person may require medicine to control the unrelenting and uncontrollable tension and fear that rule their lives.

Doctors can prescribe highly effective medications that relieve the fear, help end the physical symptoms such as pounding heart and shortness of breath, and give people a greater sense of control. Psychiatrists often prescribe one of the benzodiazepines, a group of tranquilizers that can reduce debilitating symptoms and enable a person to concentrate on coping with his or her illness. With a greater sense of control, this person can learn how to reduce the stress that can trigger anxiety, developing new behaviors that will lessen the effects of the anxiety disorder.

There are two types of anxiety symptoms, the first is physical and they includerapid or irregular heartbeat (palpitations), stomach problems (gnawing feeling, "butterflies," diarrhea, irritated bowel syndrome), breaking out in a sweat, or feeling cold and clammy, headaches, lightheadedness or dizziness, bodily tension or aches, fatigue
Other symptoms of anxiety are more emotional, such as a general sense of apprehension and dread difficulty failing asleep or staying asleep, jumpiness, irritation.

If any sportsmen experiencing these symptoms and they seem unmanageable, there are some logical steps to determining the cause and treatment.

Some medications or diseases may create symptoms of anxiety such as rapid heartbeat, headache, nervousness or other reactions. Make a list of your symptoms and medications you are currently taking before seeing your doctor,

Secondly, if anxiety symptoms are not caused by a medical condition, then review the stressors in your life. You may be reacting to being over-tired, worried or afraid of something happening in your job or family. If this is the case, the symptoms may very well end when the stress factors do. If you feel you may need some help in coping while going through it then see your doctor. Some kinds of anxiety are readily controlled by medications often called anti-anxiety medications or mood stabilizers, which can be prescribed and monitored by a psychiatrist. The use of medications is somewhat controversial, and you should gather information to decide if this is the best option for you. In any case, whether or not you are taking medications, you should also see a therapist to help you handle the feelings you have about events and stressors in your life.

Anti anxiety medications help to calm and relax the anxious person and remove the troubling symptoms. There are a number of anti anxiety medications currently available. The preferred medications for most
anxiety disorders are the benzodiazepines. In addition to the benzodiazepines, a non-benzodiazepine, buspirone, is used for generalized anxiety disorders.

The most commonly used benzodiazepines are alprazolam (Xanax) and diazepam (Valium), followed by chlordiazepoxide (Librium, Librax, Libritabs). Benzodiazepines are relatively fast-acting medications; in contrast, buspirone must be taken daily for 2 or 3 weeks prior to exerting its anti-anxiety effect. Most benzodiazepines will begin to take effect within hours, some in even less time. Benzodiazepines differ in duration of action in different individuals; they may be taken two or three times a day, or sometimes only once a day. Dosage is generally started at a low level and gradually raised until symptoms are diminished or removed. The dosage will vary a great deal depending on the symptoms and the individual's body chemistry.

Benzodiazepines have few side effects. Drowsiness and loss of coordination are most common; fatigue and mental slowing or confusion can also occur. These effects make it dangerous to drive or operate some machinery when taking benzodiazepines especially when the patient is just beginning treatment. Other side effects are rare. Benzodiazepines combined with other medications can present a problem, notably when taken together with commonly used substances such as alcohol. It is wise to abstain from alcohol when taking benzodiazepines, as the interaction between benzodiazepines and alcohol can lead to serious and possibly life-threatening complications.

Following the doctor's instructions is important. The doctor should be informed of all other medications the patient is taking, including over-the-counter preparations. Benzodiazepines increase central nervous
system depression when combined with alcohol, anesthetics, antihistamines, sedatives, muscle relaxants and some prescription pain medications. Particular benzodiazepines may influence the action of some anticonvulsant and cardiac medications. Benzodiazepines have also been associated with abnormalities in babies born to mothers who were taking these medications during pregnancy.

Each anti anxiety drug is different and it's important that you work with your doctor in finding the one that's best.

**Antidepressants**

Anti-depressants are a very commonly prescribed drug these days, perhaps too commonly prescribed. With the stress of everyday life, more and more people are going to their doctors for pharmaceutical help in coping. Not to say that there are times when medication is needed, for when there is a chemical imbalance in the brain medication is helpful and necessary to restore balance. The problem is that many doctors prescribe antidepressants for any patient who says they are feeling a little down or stressed out.

Most antidepressants are believed to work by slowing the removal of certain chemicals from the brain. These chemicals are called neurotransmitters. Neurotransmitters are needed for normal brain function. Antidepressants help people with depression by making these natural chemicals more available to the brain. There are six groups of antidepressants and each work on different neurotransmitters. Most are reuptake inhibitors.

Reuptake, or uptake, is a chemical process that occurs in the brain. It is defined as the re-absorption of a neurotransmitter after it has
performed its function of transmitting a neural impulse. In effect, what happens is that the neurotransmitter, once reabsorbed, is no longer available in the active synapses of the brain. Reuptake inhibitors, by slowing down the re-absorption of these chemicals allow the brain to function more normally.

1. Selective serotonin reuptake Inhibitors (SSRIs)

It is believed that many important brain functions are dependent on the serotonin function. Serotonin regulates the development of serotonergic neurons and the development of specific tissues. A disruption in serotonergic development can permanently change the brain's function and behavior.

Deficiencies in serotonin availability have been linked to depression, anxiety, irregular appetite, aggression and pain sensation.

The SSRI's are: citalopram (brand name: Celexa); escitalopram (brand name: Lexapro); fluoxetine (brand name: Prozac); paroxetine (brand names: Paxil, Pexeva); sertraline (brand name: Zoloft)

These medicines tend to have fewer side effects than other antidepressants. Some of the side effects that can be caused by SSRIs include dry mouth, nausea, nervousness, insomnia, sexual problems and headache.

2. Tricyclics

From the 1960s through the 1980s, tricyclic antidepressants (named for their chemical structure) were the first line of treatment for major depression. Most of these medications affected two chemical neurotransmitters, norepinephrine and serotonin, Though the tricyclics
are as effective in treating depression as the newer antidepressants, their side effects are usually more unpleasant; thus, today tricyclics are used as a second- or third-line treatment.

The tricyclics are:

a) Amitriptyline (brand name: Elavil)
b) Desipramine (brand name: Norpramin)
c) Imipramine (brand name: Tofranil)
d) Nortriptyline (brand name: Aventyi, Pamelor)

3. Serotonin and norepinephrine reuptake Inhibitors (SNRIs)

Norepinephrine is a neurotransmitter that is similar to adrenaline. High levels of norepinephrine can cause hostile behavior. Norepinephrine along with dopamine and phenylethalamne create feelings of infatuation. If children undergo excessive amounts of stress, they can acquire a permanent deficiency in serotonin and high levels of norepinephrine, which can lead to long-term, aggressive behavior. The nervous system responds to short-term stress with norepinephrine and epinephrine (adrenaline), which increase the heart rate and blood pressure. They also cause other actions within the body that prepare a person for a stressful situation. All of these chemical actions in the brain are responsible for launching a person into their natural defense mode. (Fight or Flight)

The SNRIs are:

a) Venlafaxine (brand name: Effexor)
b) Duloxetine (brand name: Cymbalta)

Some common side effects caused by these medicines include nausea and loss of appetite, anxiety and nervousness, headache, insomnia.
and tiredness. Dry mouth, constipation, weight loss, sexual problems, increased heart rate and increased cholesterol levels can also occur.

4. Norepinephrine and dopamine reuptake inhibitors (NDRIs)

Dopamine is a type of neurotransmitter. It is a chemical messenger that is similar to adrenaline and affects the brain processes that control movement, emotional response and the capacity to feel pleasure and pain. Dopamine is vital for performing balanced and controlled movements. A shortage of dopamine can cause a lack of controlled movements such as those experienced in Parkinson disease. Dopamine moves into the frontal lobe and regulates the flow of information coming in from other areas of the brain. A shortage or problem with the flow of dopamine can cause a person to lose the ability to think rationally, demonstrated in schizophrenia.

The NDRI's are: bupropion (brand name: Welbutrin)

Some of the common side effects in people taking NDRIs include agitation, nausea, headache, loss of appetite and insomnia. It can also cause increase blood pressure in some people.

Anabolic steroids

Steroids are hormones. Anabolic steroids or more precisely, anabolic/androgenic steroids are also referred to as ergogenic or performance-enhancing drugs. They are synthetic derivatives of testosterone, a natural male hormone,

- Anabolic = growing or building
- Androgenic = masculinization; developing male sexual characteristics.
Most healthy males produce between 2 to 10 milligrams of testosterone a day. The hormone's anabolic effect promotes retention of nitrogen, and this helps muscle growth. It helps the male reproductive system to grow during puberty, assists with the growth of body hair, and the deepening of the voice. Today, anabolic steroids are chemically manufactured. Steroids are administered by injection, or can be taken orally. Injectable steroids are longer lasting in the body and can be detected in the body for a longer period of time.

**Anabolic steroids work system**

The body produces testosterone predominantly in the testes in the male, and adrenal glands in the female. During puberty the testes (20 or 40 fold increase compared to early childhood levels) release testosterone. This hormone is largely responsible for the changes in muscle, bone structure and density.

**Uses of anabolic steroids**

When athletes use steroids they might believe that steroids will give them a "winning edge," in developing their power and strength, and increase recovery from heavy workouts. Fulier and LaFountain (1987) found that athletes rationalized their use by trying to justify that using steroids caused no harm either to themselves or to others. Also, individuals perceived their competitors were taking anabolic drugs, so they needed to use to compete at the same level.

Some individuals use steroids because they perceive that increased muscle mass improves their appearance (Yesalis, 1998). Mottram (1996) has suggested that social norms about "bigger being better" feelings of inadequacy, and low self-esteem may influence the younger generation's use of steroids.
Prevalent of the use of steroids

Surveys and anecdotal evidence indicate that the rate non-medical steroid use may be increasing. Reports of steroid use indicate that between 250,000 and 1 million individuals use. According to Yesalis (1998) more than 300,000 used steroids during one year. The National Institute of Health (1999) reported that 2.9% 12th graders used steroids.

Anabolic steroids banned by the NCAA are;

a) Boldenone   Androstenedione
b) Testosterone Mesterolone
c) Dromostanolone Methyltestosterone
d) Dihydrotestosterone Oxandrolone
e) Methenolone Dehydrochloromethyl-Testosterone
f) Norethandrolone Epitestosterone
g) Oxymetholone Methandienone
h) Clostebol Nandrolone
i) DHEA Oxymesterone
j) Fluoxymesterone Stanozolol

Different types of anabolic steroids

From the 1930's to the 1960's scientists modified the structure of the testosterone molecule to produce anabolic steroids to increase muscle and body protein metabolism at dose levels which tend not to increase other secondary sexual characteristics. They should not be confused with steroidal anti-inflammatory drugs such as cortisone, corticosteroids.

Differences between oral and injectable steroids

Oral Steroids

Oral, fat-soluble steroids can be detected in the body for several weeks or months after a person stops taking them.
Injectable Steroids

Injectable anabolics are injected into muscle tissue. They are slowly released from the muscles into the rest of the body, and may be detectable for months after last use. The body tolerates the injectable steroids more effectively than the oral steroids. Long-term steroid abusers use them, for this reason.

Anabolic steroids are classified as Schedule III drugs in accordance with the Controlled Substances Act (U.S. Department of Justice-DEA, 1997) These agents are available legally as prescribed medications for treating anemia, osteoporosis, growth stimulation, general dysfunction, and gynecological disorders.

Anabolic steroids affect

Anabolic steroid use by males and females may lead to health conditions ranging from mild, to life-threatening seriousness. Not every individual who takes anabolic steroids experiences serious side effects; however, reports of different effects include; cancer of the liver, prostate, kidney, reduction in HDL the "good" cholesterol, high blood pressure, enlarged prostate, liver damage, aggressive behavior, post-use depression, aching joints, injury to tendons, ligaments, and muscles, blood coagulation disorders, HIV disease from sharing needles, acne, swelling of feet or ankles, nosebleeds, reduced libido, increased sex drive, increased fatty deposits, heart arrhythmia's, stunted growth in immature individuals, breast growth in males, reduced sperm count, shrinking of the testicles, baldness, body hair growth in female, and masculinization, clitoral enlargement and breast reduction in females.

According to Yesalis (1998), "although there has been an alleged small decline in the ranks of Division I male college athletes who use
steroids, the number of women athletes who use steroids has grown, a worrisome fact because they are highly vulnerable to permanent damage."

The new list coming into effect on Jan 1st 2004 shows the World Anti-doping Agency (WADA) has taken account of the many previous comments and tests in making significant changes to the banned list of drugs, methods, and of procedures. Most notable are: The removal of common stimulant decongestants, which will make inadvertent positive tests due to cough and cold remedies much rarer. The removal of Caffeine from the banned list, thereby reducing the potential for positive dope tests due to coffee, tea, drinks and common cough, cold, and pain-killers. The introduction of a "monitoring list" whereby permitted

In 1967 The International Olympic Committee was established in order to deal with the increasing problem of doping in the sports world. The initial goal of putting in place an anti-doping structure was rapidly widened to encompass the following three fundamental principles:

1. Protection of the health of athletes
2. Respect for both medical and sport ethics.
3. Equality for all competing athletes.

For more than 40 years, the IOC Medical Commission has worked in the anti-doping field, studying alternative methods to help athletes. These alternatives consist of sport medicine, biomechanics, physiology applied to sports, nutrition and all the other sciences linked to sports.

The OIC uses a list created by the World Anti Doping Agency. This list of prohibited substances and methods is the international standard. The Prohibited list consists of the following:
Anabolic Agents: Anabolic agents have been misused in sports to increase muscle strength and bulk and to promote aggressiveness. There are two categories of anabolic agents.

1. Androgenic steroids, which increase testosterone and epi-testosterone. They improve competiveness and endurance; increase strength, power and bulk. The banned drugs in this category are: Andro, DHEA, stanozolol, testosterone and nandroione. Side effects of these drugs include liver damage, psychological changes, they can stunt growth in teens. In women they can cause loss of breast tissue, male pattern hair growth and loss of menstrual cycle.

2. Beta - antagonists, commonly used as asthma medication, when taken into the bloodstream may increase muscle and reduce body fat. The banned drugs in this category are: bambuterol, cienbuterol and salbutamol. The side effects of these drugs include palpitations, headaches, nausea, muscle cramps and dizziness.

Blood Doping

Figure No.46: Blood doping

Blood doping is injection of red blood cells or related blood products that contain red blood cells. Athletes will typically remove and store a few liters of blood before the games. The body replaces the lost
blood. The athletes then return the stored blood to their body before the competition. This increases the number of oxygen containing red blood cells and the athlete's endurance. The banned substances in this category are stored blood before the games and artificial oxygen containers. Side effects resulting from blood doping include: heart attack, stroke, transmission of blood borne disease such as HIV and hepatitis and metabolic shock.

**Peptide Hormones**

These hormones increase the number of oxygen carrying red blood cells in the bloodstream and thus increase endurance. They also build up weight and muscle bulk. The banned substances in this category are: chorionic gonadatrophin (banned in men only), somatotropin (growth hormone), synthetic erythropoietin (EPO) and corticotrophin, which mimics corticosteroid use. Side effects from these drugs can include: thickened blood, heart attack, stroke, soft tissue swelling, hypertension, enlarged heart, liver or spleen and use may lead to diabetes.

**Stimulants**

These work directly on the central nervous system. They increase heart rate and blood flow. They improve alertness and reduce fatigue, They also may increase competiveness and hostility. The banned drugs in this category include; amphetamines, beta2 agonists, ephedrine, pseudoephedrine, fenphenamine, cocaine, methamphetamine, mesocarb and other substances with a similar chemical structure and similar biological effect. Side effects of these drugs include: high blood pressure, increased and irregular heartbeat anxiety, loss of appetite, loss of judgment and tremor. These drugs are potentially lethal.
Diuretics

Diuretics, (or water pills) induce a rapid loss of fluid from the body. They are used to reduce weight quickly (important in sports involving weight categories) and to lower the concentration of drugs in the urine, thereby possibly enabling doping to escape detection. The banned drugs in this category are: acetazolamide, furosemide, hydrochlorothiazide and spironolactone.

Side effects of these drugs include: dehydration, which could lead to heart attacks or kidney failure, faintness, dizziness, muscle cramps, headaches and nausea.

Amphetamines

Narcotics

Narcotics are Analgesics represented by Morphine, derived from Opium. Effects of using Narcotics are Act on Central Nervous System, Reduce feeling of Pain and false sense of security The Side Effects are Aggravate Injuries and Risk to further Damage, Addiction, Loss of Balance & coordination, Depression

Anabolic steroids increases muscle strength and bulk and Promotes aggressiveness.

Androgenic anabolic steroids are used for Anabolic – Tissue Building Androgenic – Masculine are used by Athletes in sports involving Strength (WL, Throwing Events etc.) Males use Cortisol and Testosterone and Females use- Estrogen & Progesterone. These can be can be injected or Pills. Side Effects for male are Baldness, Infertility, Breast Development and for female are Hair Growth, Menstrual
Disturbances, Infertility, Hoarsen Voice, Fetus Problems. Liver & Kidney Damage, HBP, Aggressiveness are common because of using these steroids

**Diuretics**

These drugs increases rate of Urine Formation. Used in weight Category Sports. Used to mask Other Drugs. Dilute the concentration of Drugs. Side Effects are Dehydration, Dizziness, Cramps, Heart Damage and Kidney Failure.

**Peptide Hormones**

Hormones are natural substances that act as “messenger” within the body and cause the production of other endogenous hormones like testosterone and corticosteroids. Effects are Increase Growth, Strength, Reduce pain. Examples: HCG, HGH, ACTH, EPO. Side Effects are Masculinity, Abnormal Growth, HBP, DM, High Viscosity of Blood, Myocardial Infarction, Cerebral Infarction, Pulmonary embolism, Convulsions.

**Beta-2-Agonists**

Used for Inhalation in Asthma. Used as Injection to give the Anabolic Effect. Example: Clenbuterol, salbutamol. Side Effects are Heart Failure Narrow the blood vessels, Muscle Cramps Constrict Blood Vessels of Brain

**Glucocorticoids**

These are naturally occurring or synthetic drugs which are related to the corticosteroid hormones released from the adrenal cortex. Can be used only on medical grounds with TUE certificate. Corticoids are used by athletes: To Depress inflammation & Pain
Masking agents are Narcotics, ACTH, Cortisone, Local Anesthetics. Masking drugs are Epitestosterone, Plasma Expanders, Secretion Inhibitors and Diuretics.

Prohibited methods are Enhancement of O2 Transfer, Blood Doping (Autologus, Homologus), Red Blood Cell Products, EPO Manipulations, Urine Substitution, Tampering, Inhibition of Renal excretion, Alteration of T/E Ratio, Gene Doping. Side effects in nutshell are Heart, Central Nervous System, Kidneys, Liver, Lungs, Reproductive System

**Narcotic Analgesics**

Analgesics treat moderate to severe pain. They mask the effect of painful injuries allowing the athletes to continue training or competing. Codeine and a few other painkillers are permitted. The banned drugs in this category are: heroin, methadone, morphine, oxycodone, oxymorphone, fentanyl and its derivatives and pethidine. The potential side effects from these drugs are: respiratory depression and they have a high risk of physical and psychological dependence.

**1. Sports Supplements**

The many Sports Councils, in presenting their reports make one message very clear. The days of taking supplements, alleged to boost performance, are well and truly over. This is the end of the association between so-called "health" supplements and sporting performance. Gone are the bucket-chemistry produced plant extracts, boiled up herbal soups and ridiculous Latin phrases designed to confuse as well as to give the impression that there is something legal or acceptable about the products.
So too are the more familiar supplements like Creatine, Muscle maximisers, "natural" anabolics, stimulants or haematinics on the list of substances advised against, because to put it simply in the Terms of Dr Conor O'Brien "taking supplements will lead to 1 in 5 athletes testing positive for a banned substance"

A powerful, evocative comment was delivered by John Treacy, who stated that it is up to all of us, not just Ireland, not just the ISC, but every athlete, coach, adviser, and most of all every participating Country to sign up to the new World anti-doping convention, and to apply it and its sanctions with vigour, Athletes and their organizations are going to need education and advice to confront any fears or reservations they may have about medicines they may have to take, but there is little to fear, as the information is out there, and the key word is "Medicine". If a product does not have a legal Product License (called a PA in Ireland, PL in the UK/NI) it cannot easily be verified as "permitted" in sport.

Nevertheless, there are pitfalls, and athletes need not be afraid, but very aware, Now a days a high profile Premiership footballer who stood accused of associating with a known drug-dealer and general "cowboy" explained his actions by stating he had consumed "quite a lot of alcohol, including vodka and Red Bull" on the night In question, did no one spending the millions on this and other players think of informing him that drinking even a seemingly small amount, of high-caffeine drinks like Red Bull could lead to a positive dope test the next day.

Stupidity, ignorance, or lack of education could well lead to a lot of very unfortunate positive tests, but with the new rules, quite correctly, ignorance will not be accepted as an excuse.
Recently, Irish Times Johnny Watterson states that the new "drugs in sport" labeled MIMs contains references to "every known drug in Ireland". This is well off the mark; as we live in particularly difficult region to advise, The reason is that many drugs are not listed in this publication due to their being too new, too old, or Generic versions of a drug entity that have not been listed. In addition the list and even the ingredients of the same products varies from Northern Ireland to the Republic. Only today we talked to the IRFU who stated that the computer list they use check drugs up on deals almost exclusively with OTC products, and even then, only in Ireland.

The days are truly numbered for supplements, but this will not stop athletes getting conned into their use, and most worryingly, it is the youth who are most at risk, mainly because of their ability to find supplements, sales and supply on-line.

It is one thing for an adult to be exposed to Nandrolone but in a child its long-term effects can be devastating. The side effects include early bone fusion (stunted growth) jaw elongation, sterility, and permanent loss of sexual function or characteristics, meaning males can become more feminine, and females more masculine...for good! We owe it to under-age athletes if not to all competitors to keep them away from this rubbish, because it is all pervasive.

Look up Soma or Creatine, or weight-loss, or Tribulus terrestris or any other alleged supplement and one can find 100's of sites selling and competing to sell the product, but is out there especially with more and more organisations advising against the use of such products and supplements.
2. Athlete’s Injuries and Rehabilitation

The most common injuries for athletes, whether professional or amateur include Chronic Back Pain Elbow and Shoulder Injuries, Knee Injuries Foot and Ankle Injuries, Headaches, Stress Related Disorders, Degenerative Disorders. Any Rehabilitation clinic should providing rehabilitation that's personal and effective. Patients are treated the same way professional athletes are, with a focus on getting back to activities as quickly as possible without compromising safety. Emphasis on flexibility, endurance, strength as well as pain management are essential to getting the patient back to complete wellness. Part of the treatment protocol is to keep these components of fitness viable while the patient is nursing their injury, By keeping the patient as close as possible to their normal fitness level, comeback time from many injuries is reduced. Using many techniques including back stabilization programs for lower back pain, rotator cuff strengthening exercising programs for shoulder pain, and forearm flexibility and strengthening programs for tennis elbow, patients are given the tools to avoid injuries and chronic pain in the future. Some of the Modalities Used Are: Steam Packs/Whirlpool Paraffin Bath Ultrasound Ionophoresis Electrical Stimulation.

A number of studies have now proven that conservative care such as chiropractic manipulations and therapeutic exercises have the fastest and most effective results in treating acute low back pain. A Western journal of Medicine report showed that patients treated with chiropractic care recovered four times faster than non-chiropractic patients with similar cases. "Vertebrae" is the Latin term for the bones in your spine. Adults normally have 24 vertebrae along with the sacrum and the coccyx or tailbone. The last two make up the base of the spinal column. When doctors use the term "vertebral subluxation" it simply means that one or
more of the vertebrae of the spine do not move normally or are partially dislocated (misaligned). This could result in symptoms such as: Pinched Nerves: Misaligned vertebral joints can irritate or pinch nerve roots that can cause back pain or even radiating pain down your arms or legs. Distorted Spinal Discs: When vertebrae are misaligned the interconnecting spinal disc is often affected. Stress on the disc can cause it to bulge or rupture. This can trigger nerve root irritation causing pain. Vertebral subluxations can be the cause of muscle spasms and soreness. Along with physical therapy modalities such as ultrasound, electrical stimulation, and massage therapy, chiropractic manipulation can help to relieve these symptoms quickly.

The drugs removed from banned list

The list of banned substances has been revised, with the removal of the decongestant Phenylephrine from the list. This is a very welcome development, as the very effective decongestant is used in all manner of Cold and Flu remedies to alleviate sinus congestion. Therefore many common brand name products which previously were banned are now safe to take.

All decongestants were thought to mimic Ephedrine, with marked stimulant effects on the heart and blood-pressure as well as on the nasal blood-vessels. In fact only 12 months ago many products containing the decongestant Phenyl propanolamine were removed from sale, for fear of over-use of this drug causing strokes in women in particular.

Athletes should be aware therefore, that many products containing this ingredient may be marked as "banned" when in fact they are no longer. Our advice is to update your lists.
3.2. TESTING METHODS

Every year over 100,000 drug tests are conducted worldwide at a cost of $30 million. The drug tests are designed to detect and deter abuse of performance-enhancing drugs by competitors. The testing procedures for drug abuse in sports are strict and at times deemed unfair by athletes. They are deemed unfair because athletes are responsible for knowing what is banned despite the fact that additions are made almost daily to the list of banned substances. The best possible solution is to avoid all drugs unless listed on the allowed substance list.

There are some athletes who will try and beat the testing. When athletes know when a drug test will occur, they can prepare for it and thereby neutralize the effects of drug testing on the use of performance enhancing drugs and or masking agents. Year round short notice and no-notice testing are the most effective means to curtail the use of training drugs because they make athletes always at risk to be tested.

Drug Testing Procedure

The drug testing procedure begins with taking a urine sample. While this sounds simple, it initiates a formal and highly regulated procedure to ensure that the urine sample that arrives at the laboratory actually comes from the athlete in question, with no opportunity to tamper with the sample. Once selected for drug testing, the athlete is notified by an official and asked to sign a form acknowledging this notification. The athlete may or may not be accompanied by an official and must attend the testing station within the designated period. The testing station is supposed to be a private, comfortable place where plenty of drinks are available. Many times it is set up inside a specially designed mobile testing unit. Independent sampling officers, whom are trained and
appointed by the respective governing body, carry out the collection of urine samples. Each officer carries a time-limited identity card and a letter of authority for the event to which they are allocated.

Before giving a urine sample, the athlete is told to select two numbered bottles. After providing the sample (about 100 ml), the athlete must voluntarily complete a form. The athlete declares any drug treatment taken in the previous seven days and must check and sign that the sample has been taken and placed in the bottles correctly. The urine sample is then sent for analysis to a laboratory currently accredited by the IOC. In the event of a positive test result, the laboratory will notify the governing body of the sport, who will then notify the athlete.

The rules of the governing body of the particular sport determine what happens next. The rules vary across governing bodies, sports and countries. An athlete is usually suspended while a positive result is investigated, but has the right to have a second athlete’s representative. There is then a hearing, at which time the athlete’s case is presented.

An appeal can be made, and there have been successful appeals both in the United States and other countries.

**Collecting a Urine Sample**

**Figure No.47: Urine sample**
The testing procedure must be strictly adhered to so that all athletes receive the same treatment. Collection of the urine sample has to be observed because drug abusers may attempt to falsify the results by tampering with the samples. Volume, pH, and in some cases specific gravity and temperature of the sample are tested immediately. These simple tests check for some of the known methods of cheating the drug tests at this early stage. The urine pH is tested to detect attempts at changing the nature of the sample, which can affect the analysis of certain drugs, as well as their metabolism and clearance. Sodium bicarbonate, for example, can be taken by mouth in order to change urine pH. The pH is also tested to verify that the level of degradation, which a sample may have experienced by the time it is tested, is within acceptable limits. The specific gravity is checked for attempts to dilute the concentration of drugs, as is the case by deliberate diuretic use.

To ensure that the sample actually comes from the athlete, the testing officer must be able to see the urine flow from the athlete into the bottle. Male athletes are asked to strip to their waist and lower their shorts to their knees. Female athletes must also be observed very closely while they void a sample. At the time of interview one of the drug abused sports person explaining his experiences while taking a urine sample as this procedure can be very awkward, embarrassing, and humiliating. For a young athlete, giving a urine sample under these circumstances can be very traumatizing. Many people, regardless of age, are uncomfortable with the idea of being observed while giving a urine sample. The situation is further complicated if an athlete has been competing in an endurance sport and is dehydrated or competing at a weight category where they are reluctant to drink excess fluid.
At least 75 ml must be given under close scrutiny and the urine is split into 2 portions as “A” and “B” bottles. The athlete chooses the two coded bottles and the samples are sealed by the athlete. In most cases, only the athlete handles the urine and collection containers, wrapped in tamper-evident seals and coded. The independent official observing the sample procedure records all of the information on a document. This initiates a chain-of-custody record to be continued by anyone who handles the specimen until the urine is used up or discarded in the laboratory. The laboratory staff never knows the athlete's name, only the bottle identification number. Everyone who handles the sample must understand the importance of the chain of custody and the essential role of maintaining it. The chain of custody guarantees that the sample content is protected and that the sample tested is from the correct athlete.

The possibility of sabotage of a urine sample has been raised many times by athletes. It is for this reason that the athletes should ensure that the testing procedure is observed rigorously for their own protection. Samples should be dispatched in the appropriate containers and all paperwork completed without any errors. After this the athlete is no longer part of the process and must rely on the integrity and accuracy of the system. The sample is then taken and sent by courier, along with a chain of custody document, to an accredited laboratory.

While the test protocol may seem excessive and violate certain rights of privacy and decency, there are important reasons for this protocol. There are many reports of athletes using elaborate arrangements of catheters to provide and alternative sample, bringing condoms filled with drug free urine to the testing station, and even catheterizing themselves and installing drug free urine. If athletes go to these lengths to avoid detection, the testing protocol must be strict.
The proper storage of samples is important to the reliability of the tests. Once collected, the sample must be protected so that the fluid, when tested in the laboratory, reflects the composition of the sample as it left the body of the person being tested. As part of the sports doping policy, urine is not refrigerated or frozen until it reaches the laboratory. In a clinical setting, great care is taken to ensure that the sample tested is as near as possible to the condition in which it left the body. This is accomplished by adding a preservative or more often by refrigerating or freezing the sample. With worldwide testing in sports, samples are sent all over the world and there can be delays in delivering them to labs.

While refrigeration or freezing of the sample is the usual practice in the clinical setting, note that this is definitely not the case in sports. The addition of chemicals to prevent bacterial growth in the urine could preserve the specimen and may be more practical alternative. Athletes, however, regard this method with some suspicion and think that this may introduce the possibility of tampering with the sample. Current scientific evidence indicates that their fears are misplaced. Urine contains thousands of bacteria from many different species.

This is even more the case for a sexually active female. Urine collected from a female athlete will contain skin cells and microorganisms from the intestine flushed to the vaginal area by sweat. Many bacteria are ubiquitous and survive even in tap-water plumbing; if the water were used to wash any of the sample containers, other microorganisms could be added to the sample. Bacteria, in a container to which urine is added, will flourish in such a medium that is infinitely richer in nutrients than the water in which they have survived. Many constituents of urine support the growth of such bacteria, and metabolism
presents a serious problem in drug testing because of the risk of falsifying doping test results. In this regard, urine contains several steroids that are utilized by bacterial enzymes that can interconvert endogenous steroids to the extent of producing testosterone (T) in the urine. Because of the steroid concentrations in the urine, even a low conversion rate of steroids to T will produce a level of T sufficient to distort the test result. So athletes should be more concerned if officials don’t add something to the urine sample and not the other way around.

**Drugs of Abuse Testing**

Also known as Drug screen; Drug test; Substance abuse testing; Toxicology screen; Tox screen Formal name is Drugs of Abuse Screen. Related tests are Emergency and Overdose Drug Testing; Ethanol; Testosterone; Growth Hormone; Erythropoietin; IGF-1

**Table No.4**

**Details of Drug Class Screened and Examples of Specific Drugs Identified during Confirmation**

<table>
<thead>
<tr>
<th>Drug class screened</th>
<th>Examples of specific drugs identified during confirmation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amphetamines</td>
<td>Methamphetamine, amphetamine</td>
</tr>
<tr>
<td>Barbiturates</td>
<td>Phenobarbital, secobarbital pentobarbital</td>
</tr>
<tr>
<td>Benzodiazepines</td>
<td>Diazepam, lorazepam</td>
</tr>
<tr>
<td>Cannabinoids</td>
<td>Marijuana</td>
</tr>
<tr>
<td>Cocaine</td>
<td>Cocaine and/or its metabolite (benzoylecognine)</td>
</tr>
<tr>
<td>Opiates</td>
<td>Codeine, morphine, metabolite of heroin</td>
</tr>
<tr>
<td>Phencyclidine (POP)</td>
<td>PC</td>
</tr>
</tbody>
</table>
Medical Screening

Medical screening for drugs of abuse is primarily focused on determining what drugs or combinations of drugs a person may have taken so that he can receive the proper treatment. The overall effect on a particular person depends on the response of his body to the drugs, on the quantity and combination he has taken, and when each was taken. For instance, MDMA is initially a stimulant with associated psychedelic effects, but it also causes central nervous system (CNS) depression as it is metabolized and cleared from the body. In many cases, drugs have been combined or taken with ethanol (alcohol). If someone drinks ethanol during this time period, they will have two CNS depressants in their system, a potentially dangerous combination.

Those who may be tested for drugs for medical reasons include:

1. Someone in the emergency room who is having acute health problems that the doctor thinks may be drug-related: unconsciousness, nausea, delirium, panic, paranoia, increased temperature, chest pain, respiratory failure, seizures, and/or headaches.

2. Someone in the emergency room who has been in an accident, when the doctor suspects that drugs and/or alcohol may have been involved.

3. A youth or adult who the doctor suspects may be using drugs.

4. Those who are being monitored for known drug use. This may include both legal and illegal drug use. It may be general testing or specific for the substance that has been abused.
5. Pregnant women thought to be at risk for drug abuse or neonates exhibiting certain characteristic behaviours.

Legal or Forensic Testing

Figure No.48: Forensic Testing

Drug testing for legal purposes is primarily concerned with the detection of illegal or banned drug use in a variety of situations. Sample collection procedures for this type of testing are strictly controlled and documented to maintain a legal “Chain of custody.” The donor provides a sample that is sealed and secured with a tamperproof seal in his or her presence. Specific chain-of-custody paperwork then accompanies the sample throughout the testing process; each person who handles and/or tests the sample provides their signature and the reason for the sample transfer. This creates a permanent record of each step of the process. Examples of legal drug abuse screening include:

1. Court-mandated drug testing usually involves the random monitoring of someone who has been convicted of illegal drug use. Testing may also be ordered in custody cases to rule out drug use by one or both parents.

2. Government child protective services may sometimes require extended monitoring of a parent with a known drug problem to ensure that they have not returned to drug use.
3. Law enforcement drug testing may be done when someone has an accident that is suspected to be alcohol- or drug-related.

4. Forensic testing utilizes a variety of body fluids and tissues that may be tested for numerous drugs during a crime investigation. The goal may be to determine whether drugs were a contributing factor to an accident or crime, such as a DUI or rape. Testing may also be done to determine whether someone died of a drug overdose or drug-related condition.

5. Insurance companies may perform drug screening on their applicants. This may include a test for cocaine and a test for nicotine, even though tobacco is a legal substance.

6. Schools may have programs that incorporate random drug testing. This may include illegal drugs of abuse and, with competitive sports, may include testing for performance-enhancing substances.

**Sports/Athletic Screening**

**Figure No.49: Sports/Athletic Screening**

While conventional drug testing is performed on competitive athletes, the primary focus is on doping - drugs or supplements that are taken to promote muscle growth and to improve strength and endurance. On a local level, sports testing may be limited, but on a national and international level, it has become highly organized.
The World Anti-Doping Agency (WADA), U.S. Anti-Doping Agency (USADA), and the International Association of Athletics Federations (IAAF) and National Anti-Doping Agency (NADA) work together to monitor athlete drug use on a national, international, and Olympic level. WADA has a written code, which establishes uniform drug testing rules and sanctions for all sports and countries, and a substantial list of prohibited substances. Athletes are responsible for any banned substances that are found in their body during testing. Most of the compounds tested are considered positive if they are detected in any quantity while others, such as caffeine, are only prohibited when they are present in large amounts. Some of the substances, such as anabolic steroids (testosterone) and peptide hormones such as erythropoietin, growth hormone, and Insulin like Growth Factor-I are banned but are difficult to measure as they are produced by the body. Testing methods must be able to distinguish between endogenous that produced by the athlete’s body and supplemented compounds.

Screening programs randomly perform out-of-competition drug tests on athletes during the training season to look for anabolic steroids, such as testosterone, that promote increased muscle growth. During competitions, testing is frequently done both randomly and on all winners and includes categories such as: stimulants, narcotics, anabolic agents, and peptide hormones. Sports such as archery, gymnastics, and shooting add additional testing for substances like beta blockers, which are prohibited in these sports because they decrease blood pressure and heart rate.

While professional sports organizations, such as the NFL (National Football League), NHL (National Hockey League), and NBA (National Basketball Association), are not covered by the WADA code, they have
programs in place to test their athletes for panels of drugs that combine aspects of sports and employment testing. Those professional athletes who also take part in the Olympics, however, are subject to the same out-of-competition (pre-game) and in-competition testing as other competing athletes.

Drug testing is performed whenever a doctor, employer, legal entity, or athletic organization needs to determine whether a person has illegal or banned substances in his body. It may be ordered prior to the start of some new jobs and insurance policies, at random to satisfy workplace and athletic drug testing programs, as mandated when court ordered, as indicated when ordered by a doctor to monitor a known or suspected substance abuse patient, and whenever a person has symptoms that suggest drug use.

If a result is positive during initial drug screening, then it means that the person has a substance in his body that falls into one of the drug classes and is above the established cutoff level. If the sample is confirmed as positive after secondary testing, such as positive for marijuana, then the person has taken this drug. In some cases, this result can be tied to a window of time that the person took the substance and roughly to the quantity but, in most circumstances, that information is not necessary.

If the drug or drugs is not present or is below the established cutoff, then the result is usually reported as “not detected” or “none detected.” A negative result does not necessarily mean that the person did not take a drug at some point. The drug may be present below the established cutoff, the drug may have been already metabolized and eliminated from the body, or the test method does not detect the particular drug present in the sample.
Urine testing shows drug use over the last 2 or 3 days for amphetamines, cocaine, and opiates. Marijuana and its metabolites, cannabinoids, may be detectable for several weeks. Hair samples, which test the root end of the hair, reflect drug use within the last 2 to 3 months but not the most recent 2-3 weeks - the amount of time it takes for the hair to grow. Saliva detects which drugs have been used in the last 24 hours. Samples of sweat may be collected on an absorbent patch worn for several days to weeks and therefore can indicate drug use at any point during that extended period of time. These other types of samples are often used for specific purposes. For instance, hair samples may be used as an alternative to urine testing for employment or accident drug testing. Sweat testing may be used as a court-ordered monitoring tool in those who have been convicted of drug use, while saliva is often used by the insurance industry to test insurance applicants for drug use. Blood is most frequently used for alcohol testing.

Interpretation of sports testing results for hormones and steroids should be done by someone who is familiar with the test methods. A negative result indicates that there is a "normal" amount of the substance present in the body. Positive results reflect the presence of the substance above and beyond what is normally produced by the athlete's body. This can be complicated by the fact that each person will have their own normal baseline concentration and will produce varying amounts of hormones and steroids, depending upon the circumstances.
Symptoms associated with drug abuse and drug overdose will vary from person to person, from time to time, and do not necessarily reflect drug concentrations in the body.

Ethanol may be measured in both the blood and the breath. This is the basis for the breathalyzer test used by law enforcement.

For some types of testing, such as workplace testing of federal employees, there are many regulations that cover the test from collection through interpretation and reporting of results. It is important for the ordering physician, law enforcement representative, forensic professional, government entity, insurance agent, employer, and sports organization as well as for the person being tested to understand what exactly is included in the testing, how it is done, and how the results may or may not be interpreted. This process is not nearly as simple or straightforward as collecting a sample and requesting “drug testing.”

Certain prescription and over-the-counter drugs may give a positive screening result. One should declare any medications that they have taken and for which they have prescriptions when they have a drug test so that results can be interpreted correctly. Also, poppy seeds that have not been washed can cause a positive opiate screening result if eaten, for example, with a bagel or muffin.

The Test Sample

Drugs of abuse testing is the detection of one or more illegal and legal substances in the urine or, more rarely, in the blood, saliva, hair, or sweat. It usually involves an initial screening test followed by a second test that identifies and confirms the presence of a drug or drugs. Most laboratories use commercially available tests that have been developed and optimized to screen urine for the “major drugs of abuse.”
For most drugs of abuse testing, results of initial screening testing are compared with a predetermined cut-off. Anything below that cut-off is considered negative; anything above is considered a positive screening result.

Within each class of drug that is tested, there may be a variety of chemically similar drugs. Legal substances that are chemically similar to illegal ones can produce a positive screening result. Therefore, screening tests that are positive for one or more classes of drugs are frequently confirmed with a secondary test that identifies the exact substance present using a very sensitive and specific method, such as gas chromatography and mass spectrometry (GC/MS).

Substances that are not similar to the defined classes can produce false negative results. Some drugs may be difficult to detect with the standardized assays, either because the test is not set up to detect the drug, such as methylenedioxy-methamphetamine (MDMA, Ecstasy), oxycodone (Oxycontin), or buprenorphine, or because the drug does not remain in the body long enough to be detected, such as gamma-hydroxybutyrate (GHB).

For sports testing of hormones and steroids, each test performed is usually specific for a single substance and may be quantitative. Athletes, especially those at the national and international level, are tested for illegal drugs and are additionally governed by a long list of prohibited substances called performance enhancers.

Groups of drug tests are typically ordered for medical or legal reasons, as part of a “drug-free workplace” or as part of a sports testing program. People who use these substances ingest, inhale, smoke, or inject them into their bodies. The amounts that are absorbed and the effects that
they have depend on the which drugs are taken, how they interact, their purity and strength, the quantity, timing, method of intake, and the individual person's ability to metabolize and excrete them. Some drugs can interfere with the action or metabolism of other medications, have additive effects such as taking two drugs that both depress the central nervous system (CNS), or have competing effects such as taking one drug that depresses the CNS and another that stimulates it. The drugs tested for are not normally found in the body, with the exception of some hormones and steroids measured as part of sports testing.

Urine is the most frequently tested sample, but other body samples such as hair, saliva, sweat, and blood also may be used for drug abuse screening but not interchangeably with urine.

Urine and saliva are collected in clean containers. A blood sample is obtained by inserting a needle into a vein in the arm. Hair is cut close to the scalp to collect a sample. A sweat sample is typically collected by applying a patch to the skin for a specified period of time.

The Center for Education and Drug Abuse Research (CEDAR), funded by the National Institute on Drug Abuse since 1989, has the overarching mission of delineating the origins and developmental pathways to substance use disorder (SUD). Bio-behavioral processes and environmental factors are comprehensively assessed prior to first exposure to alcohol and drugs, and subsequently during the period of substance use behavior leading ultimately to a diagnosis of substance use disorder (SUD). Employing a prospective paradigm enables clarifying the factors influencing the transition from no use to substance use to SUD. From the practical perspective, upon completion of this longitudinal investigation, the individual risk for succumbing to SUD can be
quantitatively specified across different stages of development. Youth who are at high risk for SUD can thus be accurately and objectively identified for prevention intervention.

About CEDAR

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CEDAR recruits proband fathers with and without SUD and studies their offspring from pre-drug use until at least age 30 at which time SUD will most likely be manifest if such is to occur. A total of 800 families are recruited where there is at least one child, deemed the index subject, who is between 10-12 years of age. Where available, the next younger sibling is also assessed when s/he reaches age 10. In this manner, the quality of sibling relationship as a contributor to SUD outcome can be assessed in addition to the quality of parent-child relationship.
The children are studied on fifteen occasions using protocols that enable documenting change during development between childhood and adulthood. Using this schedule of evaluations, it is possible to chart the trajectory to good and poor outcomes and to identify the variables which may predict which individuals will transition across states (i.e. no drug use to drug use to SUD). The assessment schedule is age 10-12, 12-14, 16, 19, and annually from ages 20 to 30.

CEDAR is divided into five cores such as Administrative, Clinical, Computing and Information Systems, Methodology and Statistics, and Scientific and four research modules as Genetics, Neurocognition, Developmental Psychopathology, and Family and Social Ecology.

Drug Free Sport is now providing drug-testing services to interested athletics conferences. Drug Free Sport launched its conference testing program last fall with the Big 12 Conference. "Conference testing really makes sense for larger conferences that may be concerned about the level-playing-field issue," said Drug Free Sport's Frank Uryasz. "It provides a little more consistency within a conference since some institutions choose to test and some do not. It also bridges the gap between institutional testing and NCAA testing." The Big 12 conference program, though administered by Drug Free Sport, is completely "The Big 12 was already conducting conference-wide testing," said Dan Beebe, Big 12 senior associate commissioner and chief operating officer. "But we decided to go with Drug Free Sport because of the company's stature in college sports. We also like the fact that Drug Free Sport uses the UCLA Analytical Laboratory a WADA-certified lab for the sample analysis."
About Drug Free Sport

In today’s sports world, you need a seasoned veteran who eats, sleeps and breathes the rules of fair play. Experts who build their reputation by protecting yours. And a company that combines its tools and talents to deliver an MVP performance across your entire organization.

Team up with Drug Free Sport, the drug-testing authority dedicated to upholding the integrity of the game. For more than two decades, we have remained committed to policy development, drug testing, program management and customized education.

More About Drug Free Sport

1. Drug Free Sport Overview - The National Center for Drug Free Sport (Drug Free Sport) is a company devoted to preventing drug abuse in athletics. As the premier provider of drug-use prevention services for athletic organizations, Drug Free Sport provides strategic alternatives to traditional drug-use prevention programs.

2. Our Beliefs - Testing is a necessary and effective drug-use prevention tool to develop athletes who are committed to success on and off the field.”.

3. Our Staff - Drug Free Sport executive staff is comprised of a diverse team of professionals with a combined knowledge base embodying nearly 80 years of experience in sports drug testing...

Our Clients - Our winning track record is why both amateur and professional sports organizations — including the NCAA, Major League Baseball’s Minor League program and the PGA TOUR — choose us as their go-to player
4. Client Testimonials - Don’t just take our word for it. Find out why others choose Drug Free Sport for sport drug testing, education, and consulting.

5. Career Opportunities - At Drug Free Sport, we’ve assembled a diverse team of professionals dedicated to administering the best substance abuse testing and education programs in the world.

At Drug Free Sport, we have assembled a diverse team of professionals dedicated to administering the best sports drug-testing and education programs in the world. We work in a serious business as we tackle some of the biggest challenges in sport today. (Good news is, we’re big on fun, too) Working here, your day-to-day efforts will not only impact your future, but sport’s as well.

The National Center for Drug Free Sport (Drug Free Sport) is a company devoted to preventing drug abuse in athletics. As the premier provider of drug-use prevention services for athletic organizations, Drug Free Sport provides strategic alternatives to traditional drug-use prevention programs. More importantly, Drug Free Sport is a drug-use prevention company. Unlike traditional third-party drug-testing administration companies that conduct primarily workplace and insurance testing, Drug Free Sport works exclusively with sports organizations and their athletes.

**Drugs of Abuse Resources**

In the 1960s a large number of people embraced drugs like marijuana, amphetamines and psychedelics. In 1973, the U.S. Drug Enforcement Administration was created to enforce federal drug laws. Cocaine made a huge re-entrance onto American soil during the 1970s
and held many Americans with in its grasp. Crack cocaine would follow some years later and show how detrimental drug abuse could be to our country.

Drug Free Sports Resource Exchange Center (REC) is a subscription-based service that exists to provide up-to-date, confidential information, interactive tools and educational materials to empower athletes to make healthy and responsible decisions.

REC membership grants access to a comprehensive database of information on drugs of abuse and how they relate to you. The REC also provides information on the Anabolic Steroids; Ergonomic Aids: EPO, Diuretics, Central Nervous System stimulants; Prescription Drugs; Alcohol; Over-the-Counter Drugs.

The Resource Exchange Center (REC) is dedicated to helping protect the integrity of sportsmanship in all sports. The REC exists to provide up-to-date, confidential and accurate information on dietary supplements, dangerous and/or banned (prohibited) substances, and provide educational materials to empower athletes to make healthy and responsible decisions.

“Products labeled as dietary supplements sold over the counter in print advertisements and through the Internet are under-regulated by the U.S. FDA. Whether a product is classified as a dietary supplement, conventional food or drug is based on its intended use by the manufacturer. Dietary supplements are at risk of contamination or may include ingredients that are banned under drug testing policy. Studies have found 12-25% of dietary supplements contain unlisted steroids, stimulants, or trace metals.”— are dietary supplements at a risk for
contamination. Considering these points, (1) Manufacturers do not have to prove the safety and effectiveness of a dietary supplement before it is marketed. (2) Manufacturing facilities are virtually unregulated, they are required to adhere to Current Good manufacturing Practices (CGMPs), but unfortunately only an average of 5 inspections take place a month. (3) A number of company’s contract manufacture their products and leave the sourcing of ingredients to the contracted company. So the true identity of the ingredients can be cut or changed without the parent company ever knowing. This was solidified by the FDA’s Brad Williams participating in an education program at Supply side West, and he said the number one issue with companies inspected under the supplement GMP program has been failure to adequately test ingredients for identity.

The safety or purity of any dietary supplement product. Also, the claims made by manufacturers may not be backed up with reliable, scientific research. Student-athletes take any dietary supplement at their own risk. Without proper testing of the finished product, there is no way to know if the ingredients, and their amounts, listed on labels are correct. Often, the “research” a company cites is not reliable, has been done by a party that has interest in the success of the product, or is not scientific in nature. Below are a few tactics used by Supplement company’s: Misrepresented clinical studies (results out of context, “University tested”, inappropriately referencing research results); False, exaggerated, or purchased endorsements (How much money is the athlete making for saying he takes a product?); Media distortion and false advertising (planted stories online, Company reps posing as local gym guy online in forums, “As seen on Oprah”); Omitting relevant Facts (Product marketed to men but all research done on women)
Again, we realize that there may be benefits to some dietary supplements and that not all manufacturers engage in dubious practices. However, our first commitment is protecting the health and safety of student-athletes. Lastly, we are dedicated to helping protect the integrity of sportsmanship in all sports, and at this time that includes not suggesting dietary supplements.

Dietary Supplement - As defined by the FDA, a dietary supplement is a product taken by mouth that contains a “dietary ingredient” intended to supplement the diet. The “dietary ingredients” in these products may include: vitamins, minerals, herbs or other botanicals, amino acids, and substances such as enzymes, organ tissues, glandulars, and metabolites. Dietary supplements can also be extracts or concentrates, and may be found in many forms such as tablets, capsules, softgels, gelcaps, liquids, or powders. They can also be in other forms, such as a bar, but if they are, information on their label must not represent the product as a conventional food or a sole item of a meal or diet.

3.3 BANNING MEASURES TAKEN BY FEDERATIONS/ORGANIZATIONS

The purposes of the National Anti-Doping Code and the National Anti-Doping Program which supports it are: To protect the Athletes' fundamental right to participate in doping-free sport and thus promote health, fairness and equality for Athletes worldwide, and to ensure harmonized, coordinated and effective anti-doping programs at the international and national level with regard to detection, deterrence and prevention of doping.

The Code is the fundamental and universal document upon which the World Anti-Doping Program in sport is based. The purpose of the
Code is to advance the anti-doping effort through universal harmonization of core anti-doping elements. It is intended to be specific enough to achieve complete harmonization on issues where uniformity is required, yet general enough in other areas to permit flexibility on how agreed-upon anti-doping principles are implemented.

The National Anti-Doping Program

The National Anti-Doping Program encompasses all of the elements needed in order to ensure optimal harmonization and best practice in international and national anti-doping programs. The main elements are:

a) National/International Standards

b) Models of Best Practice and Guidelines

a) National and International Standards

National and International Standards for different technical and operational areas within the anti-doping program will be developed in consultation with the Signatories and governments and approved by WADA. The purpose of the International Standards is harmonization among Anti-Doping Organizations responsible for specific technical and operational parts of the anti-doping programs. Adherence to the International Standards is mandatory for compliance with the Code. The International Standards may be revised from time to time by the WADA Executive Committee after reasonable consultation with the Signatories and governments. Unless provided otherwise in the Code, International Standards and all revisions shall become effective on the date specified in the International Standard or revision.
The International Standards contain much of the technical detail necessary for implementing the Code. International Standards, while expressly incorporated into the Code by reference, will, in consultation with the Signatories and governments, be developed by experts and set forth in separate technical documents. It is important that the WADA Executive Committee be able to make timely changes to the International Standards without requiring any amendment of the Code or individual stakeholder rules and regulations.

b) Models of Best Practice and Guidelines

Models of best practice and guidelines based on the Code have been and will be developed to provide solutions in different areas of anti-doping. The models will be recommended by WADA and made available to Signatories upon request but will not be mandatory. In addition to providing models of anti-doping documentation, WADA will also make some training assistance available to the Signatories.

The National Anti-Doping Code

Anti-doping programs seek to preserve what is intrinsically valuable about sport. This intrinsic value is often referred to as "the spirit of sport", it is the essence of Olympism; it is how we play true. The spirit of sport is the celebration of the human spirit, body and mind, and is characterized by the following values:

Ethics, fair play and honesty, Health, Excellence in performance, Character and education, Fun and joy, Teamwork, Dedication and commitment, Respect for rules and laws, Respect for self and other Participants, Courage, Community and solidarity, Doping is fundamentally contrary to the spirit of sport.
To fight doping by promoting the spirit of sport, the Code requires each Anti-Doping Organization to develop and implement educational programs for Athletes, including youth, and Athlete Support Personnel.

**Doping Control**

Part One of the Code sets forth specific anti-doping rules and principles that are to be followed by organizations responsible for adopting, implementing or enforcing anti-doping rules within their authority, e.g., the International Olympic Committee, International Paralympics Committee, International Federations, Major Event Organizations, and National Anti-Doping Organizations. All such organizations are collectively referred to as Anti-Doping Organizations.

All provisions of the Code are mandatory in substance and must be followed as applicable by each Anti-Doping Organization and Athlete or other Person. The Code does not, however, replace or eliminate the need for comprehensive anti-doping rules adopted by each Anti-Doping Organization. While some provisions of the Code must be incorporated without substantive change by each Anti-Doping Organization in its own anti-doping rules, other provisions of the Code establish mandatory guiding principles that allow flexibility in the formulation of rules by each Anti-Doping Organization or establish requirements that must be followed by each Anti-Doping Organization but need not be repeated in its own anti-doping rules.

Anti-doping rules, like Competition rules, are sport rules governing the conditions under which sport is played. Athletes or other Persons accept these rules as a condition of participation and shall be bound by these rules. Each Signatory shall establish rules and procedures to ensure that all Athletes or other Persons under the authority of the Signatory and
its member organizations are informed of and agree to be bound by anti-doping rules in force of the relevant Anti-Doping Organizations.

Each Signatory shall establish rules and procedures to ensure that all Athletes or other Persons under the authority of the Signatory and its member organizations consent to the dissemination of their private data as required or authorized by the Code and are bound by and compliant with Code anti-doping rules, and that the appropriate Consequences are imposed on those Athletes or other Persons who are not in conformity with those rules. These sport-specific rules and procedures aimed at enforcing anti-doping rules in a global and harmonized way are distinct in nature from and are, therefore, not intended to be subject to or limited by any national requirements and legal standards applicable to criminal proceedings or employment matters. When reviewing the facts and the law of a given case, all courts, arbitral hearing panels and other adjudicating bodies should be aware and respect the distinct nature of the anti-doping rules in the Code and the fact that those rules represent the consensus of a broad spectrum of stakeholders around the world with an interest in fair sport.

The prohibited list is International Standard and Applicable to the Sport in Whole World. It indicates Substances & Methods Banned in In-Competition, Out-of-Competition and in Particular Sports. WADA Issues the List every Year on 1ST SEPTEMBER effective From New year day first of January.

**Prohibited in Particular Sports**

P1-Alcohol-Karate, Aeronautics, Bowls, Automobiles, Shooting, fencing, Archery, Moto Bikes P2-Beta Blockers: Archery, Shooting,
Billiards, Wrestling, Gymnastics, 9-pin Bowling, Sailing, Moto biking, Aeronautics, Skiing, Bob Sled, Diuretics: Wt Category sports.

Stimulants are Substances, which have direct stimulating effect on the Central Nervous System. It increases Excitation of Brain and Spinal Cord, Cardiac Output and Rate of Metabolism.

Reasons to use are Alertness, Wakefulness, Increased Concentration, and Decrease Sensitivity to Pain. Side Effects are Body Heats Up, Loss of Appetite, Insomnia, Restlessness, HBP, Palpitation, Addiction.

Types of testing

In-Competition, Out-of-Competition (Athlete’s Whereabouts) (Registered Testing Pool) of NADO, IF, WADA.

The doping control process

Selection, Notification, Reporting to Dope Control Station, Dope Sample Collection, Sample Storage & Transportation, Analysis, Result Management, Sanctions, Appeals.

Therapeutic use exemption

DOPING-Articles

Article 1 of ADC

**Earlier Definition** is Use of any Prohibited Substance and Method prohibited by IOC/IOC Medical Commission. **New Definition** is Doping is defined as occurrence of one or more of the Anti Doping rule violations Set forth in Article 2.1 – 2.8 of the Anti Doping Code

**Article 2**

The presence of a Prohibited Substance or its Metabolites or Markers (compound/group of compound/biological parameters) in an Athlete’s bodily Specimen. Athlete’s personal duty to ensure that no Prohibited Substance enters his or her body. Athletes are responsible for any Prohibited Substance or its Metabolites or Markers found to be present in their bodily specimens. Not Necessary: Intent, Fault, Negligence or Knowing Use.

**Exemption to Article 2.1**

Excepting those substances for which a quantitative reporting threshold is specifically identified in the Prohibited List. The Prohibited List may establish special criteria for the evaluation of Prohibited Substances that can also be produced endogenously.

**Article 2.2**

Use or Attempted Use of a Prohibited Substance or a Prohibited Method. The success or failure of the Use of a Prohibited Substance or Prohibited Method is Not Material. It is sufficient that the Prohibited Substance or Prohibited Method was Used or Attempted to be Used for an Anti Doping rule Violation to be committed.
Article 2.3

Refusing or failing without compelling justification to submit to Sample Collection after Notification as authorized in applicable Anti-Doping Rules or otherwise Evading Sample Collection

Article 2.4

Violation of applicable requirements regarding Athlete availability for Out-of-Competition Testing including failure to provide required whereabouts information and missed tests which are declared based on reasonable rules.

Article 2.5

Tampering or attempting to tamper with any part of Doping Control Altering Identification Numbers on a Doping Control Form during Testing. Breaking the B Bottle at the time of B Sample Analysis

Article 2.6

Possession of Prohibited Substance and Methods. Possession by an Athlete at any time or place of a substance that is prohibited in Out-of-Competition Testing or Prohibited Method. Possession of a substance that is prohibited in Out-of-Competition Testing or a Prohibited Method by Athlete's Support Personnel in connection with an Athlete Competition or Training.

Exemption to Article 2.6

The Athlete establishes that the Possession is pursuant to a therapeutic use exemption granted in accordance with the rules and regulations of the Code or other acceptable justification. The Athlete's
Supporting Personnel establishes that the Possession is pursuant to a therapeutic use exemption granted to an Athlete in accordance with the rules and regulations of the Code or other acceptable justification.

**Article 2.7**

Trafficking in any Prohibited Substance or Prohibited Method, Sell, Give, Administer, Transport, Send, Deliver and Distribute a prohibited substance or Prohibited Method to an Athlete either directly or through one or more third parties.

**Exemption to Article 2.7**

Excluding the sale or distribution (by medical personnel or by Persons other than Athlete’s Support Personnel) of a Prohibited Substance for genuine and legal therapeutic purposes.

**Article 2.8**

Administration or attempted administration of a Prohibited Substance or Prohibited Method to any Athlete or assisting, encouraging, aiding, abetting, covering up or any other type of complicity involving an Anti Doping Rule Violation or any attempted violation

**Article 3**

Proof of doping Anti Doping Organization shall have the burden of establishing that an Anti Doping Violation has occurred

**Athletes/Supporting Personnel Rights**

Athlete or other person alleged to have committed an Anti Doping Rule Violation the burden to rebut a presumption or establish specified
facts or circumstances. Rebut that the Sample Analysis and Custodial Procedures were not in accordance with the International Standards. Even if there is any departure from International Standard but it did not cause an Adverse Analytical Finding or other Anti Doping Rule Violation shall not invalidate such results

**Article 8: Right to a Fair Hearing**

Each ADO shall provide a hearing process for any Person who is asserted to have committed an Anti Doping Rule Violation by addressing the consequences. Timely Hearing, Fair & Impartial Hearing Body. Right to be represented by Counsel at the Person’s own expense. Right to be fairly and timely informed of the asserted Anti Doping Rule Violation

**Right to a Waiver of Hearing**

Right to respond to the asserted Anti Doping Rule Violation and resulting consequences. Right of each party to present evidence, including the right to call and question the witness. Person’s right to an interpreter at the hearing. Timely written reasoned decision.

**Article 9**

Automatic disqualification of individual results. An anti-doping rule violation in connection with an In-Competition test automatically leads to Disqualification of the individual result obtained in that Competition with all resulting consequences including forfeiture of any medal, points and prizes

**Article 10: Sanctions**

Disqualification of Results in Event During which an Anti Doping Rule Violation occurs. If the Athlete establishes that he or she bears No fault or Negligence for the violation, the Athlete’s individual results in
other Competitions shall not be Disqualified unless the Athlete’s results in Competitions other than the Competitions in which the Anti Doping Rule Violation occurred were likely to have been affected by the Athlete’s Anti Doping Rule Violation. Prohibited Substances & Methods. Use or Attempted Use of Prohibited Substances & Methods. Possession of Prohibited Substances & Methods

**First Violation – 2 Years Ineligibility; Second Violation – Lifetime Ineligibility**

On establishing, specified Substances which are particularly susceptible to unintentional anti doping rules violations because of their general availability in medicinal products, that the use of such specified substances was not intended to enhance sport performance. First violation – Warning. Second Violation – 2 Years Ineligibility. Third Violation – Lifetime Ineligibility. Prohibited Substances & Methods. Use or Attempted Use of Prohibited Substances & Methods. Possession of Prohibited Substances & Methods.

**First Violation – 2 Years Ineligibility, Second Violation – Lifetime Ineligibility**

Refusing or Failing to Submit to Sample Collection. Tampering with Doping Control. **First Violation – 2 Years Ineligibility. Second Violation – Lifetime Ineligibility.** Trafficking. Administration of Prohibited Substance or Method **4 Years – Lifetime Ineligibility, If the Athlete is Minor – Supporting Personnel – Lifetime Ineligibility**

**Whereabouts Violation or Missed Test**

Minimum – Three Months, Maximum – 2 Years
Article 13 right to appeals:

Roles of Coaches

Coaches have profound influence upon the attitudes, behaviors and belief of athlete. As leaders coaches have a specific responsibility to contribute to physical, moral, spiritual and emotional development of their athletes. The collaborative network of communication between coaches and athletes provides an important network for preventing the drug abuse in sports. Coaches should educate their athletes about substance use and the latest happening in the field of anti doping. Create Healthy Environment. Involve students in discussions on drug abuse in sports. Periodical check-ups of the athletes, their hostels. Check the behavior of athletes

Roles of Physicians

Team physicians can observe physical, behavioral and mood changes in athletes during physical examinations, injury and illness examinations, training or the actual competition. Team physicians can take advantage of these opportunities by communicating their concern and act in the best interest of the health and well being of a student athlete

Rights of Athletes

To know the Anti Doping Program, To know the consequence of failure to comply, To accomplish your assignments viz. cooling down, medal ceremony, further participation, media obligations, To have your accomplice during testing, To have the copy of your dope testing, To be informed of the result of the test, To be heard and given fair hearing, To appeal.
Roles and Responsibilities of National Olympic

Committees and National Paralympics Committees to ensure that their anti-doping policies and rules conform with the Code. To require as a condition of membership or recognition that National Federations' anti-doping policies and rules are in compliance with the applicable provisions of the Code. To require Athletes who are not regular members of a National Federation to be available for Sample collection and to provide accurate and up-to-date whereabouts information as part of the National Registered Testing Pool during the year before the Olympic Games and Paralympics Games. To cooperate with their National Anti-Doping Organization. To require each of its National Federations to establish rules requiring each Athlete Support Personnel who participates as coach, trainer, manager, team staff, official, medical or paramedical personnel in a Competition or activity authorized or organized by a National Federation or one of its member organizations to agree to be bound by anti-doping rules in conformity with the Code as a condition of such participation. To withhold some or all funding, during any period of his or her Ineligibility, to any Athlete or Athlete Support Personnel who has violated anti-doping rules. To withhold some or all funding to its member or recognized National Federations that are not in compliance with the Code. To vigorously pursue all potential anti-doping rule violations within its jurisdiction including investigation into whether Athlete Support Personnel or other Persons may have been involved in each case of doping. To promote anti-doping education. To cooperate with relevant national organizations and agencies and other Anti-Doping Organizations.
Roles and Responsibilities of National Anti-Doping Organizations

To adopt and implement anti-doping rules and policies which conform with the Code. To cooperate with other relevant national organizations and agencies and other Anti-Doping Organizations. To encourage reciprocal Testing between National Anti-Doping Organizations. To promote anti-doping research. Where funding is provided, to withhold some or all funding, during any period of his or her Ineligibility, to any Athlete or Athlete Support Personnel who has violated anti-doping rules. To vigorously pursue all potential anti-doping rule violations within its jurisdiction including investigation into whether Athlete Support Personnel or other Persons may have been involved in each case of doping. To promote anti-doping education. The use of performance-enhancing drugs in sports is commonly referred to by the term "doping", particularly by those organizations that regulate competitions. The use of performance enhancing drugs is mostly done to improve athletic performance. This is why many sports ban the use of performance enhancing drugs. Currently, an investigations into the doping scandal, which has rocked Indian sports sacked Indian athletics coach, Yuri Ogorodnik, left India. The coach fired by Sports Minister Ajay Maken, as he held responsible for the dope flunk of six athletes. Ashwini Akkunji, winner of the 400 meters hurdles at the 2010 Asiad Games and Priyanka Pawar failed their respective dope tests. Akkunji was also a part of the 4x400 meters relay team which won the gold medal in last year's Commonwealth Games. Doping in athletics had taken scandalous proportions with five Indian athletes, including Commonwealth and Asian Games gold medalist Sini Jose, flunked the tests conducted by the National Anti-Doping Agency. Jose, along with another 400m runner Tiana Mary Thomas, long jumper Hari Krishnan,
and shot putter Sonia returned positive for anabolic steroids in their 'A'. Two more Indian athletes - Mandeep Kaur and Juana Murmu - were suspended and faced the prospect of a two-year ban after failing an out-of-competition dope test.

From 1991 to September 2008, the Dope Control Centre, India (DCC) collected 14767 samples, out of which 670 returned positive. Since its inception on January 1, 2009 till June 30 2011, the National Anti-Doping Agency (NADA) has collected 6607 samples and caught 248 sportspersons for doping in the last two-and-half years out of which 138 have been handed bans.