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Workplace Substance Misuse Testing

Mistakes to avoid (red flags)

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Overview - workplace substance* misuse testing

Part 1: General Principles

1. Foundation for having a workplace substance misuse programme
2. Key steps to implementing workplace substance programme
3. “Under the influence of” a substance of misuse

Part 2: Alcohol testing - core knowledge & errors to avoid

1. Equipment / tests
2. Process

Part 3: Drug testing - core knowledge & errors to avoid

1. Equipment / tests
2. Process
3. Specific challenges with cannabis

* Note: “substance” = “alcohol” (ethanol) and “drugs” (legal & illegal)

PART 1

GENERAL PRINCIPLES ABOUT WORKPLACE SUBSTANCE MISUSE TESTING

Grounds for having a workplace substance misuse programme

Safe-guarding workplace **safety** (aims at **legal** compliance & risk management)

Striving to maintain employee productivity / work **performance** (aims at business sustainability)

Reducing the burden of drugs & alcohol on employees / communities (aims at troubled employee assistance)

Safety Imperative

Sustainability Imperative

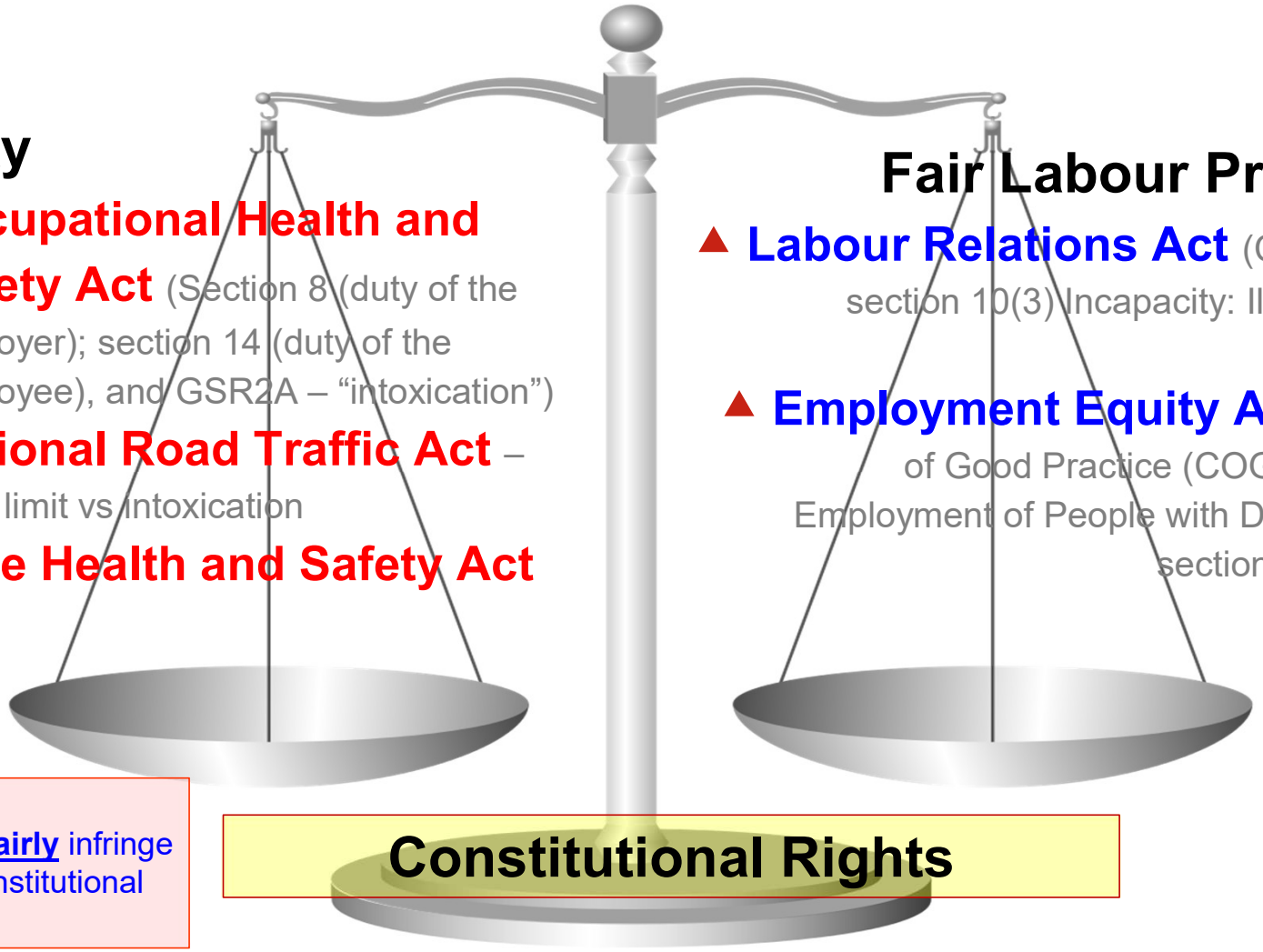
Moral Imperative

When establishing the policy's rules and prohibitions, weigh up the contributions of these focus areas.

Once the rules are in place, breaking them constitutes misconduct.

Red Flag:
Is the rule/sanction "**rational**"? (is it appropriate to the **workplace setting**? - eg a sanction for breaking a **safety** rule in a setting where safety is not an issue (an office))

Safety & compliance (legal) Imperative



Safety

- **Occupational Health and Safety Act** (Section 8 (duty of the employer); section 14 (duty of the employee), and GSR2A – "intoxication")
- **National Road Traffic Act** – legal limit vs intoxication
- **Mine Health and Safety Act**

Fair Labour Practice

- **Labour Relations Act** (Chapter 8, section 10(3) Incapacity: Ill health or injury)
- **Employment Equity Act** (Code of Good Practice (COGP) on the Employment of People with Disabilities, section 5.1.3(iv))

Constitutional Rights

Red Flag
Does your policy **unfairly** infringe on an employee's constitutional rights?

General Safety Regulations (GN R928/2003)

Red Flag
If you are going to discipline an employee, are you able to prove “intoxication” or “under the influence”?

2A. Intoxication

(1) … an employer or a user, as the case may be, **shall not permit** any person who is or who appears to be under the influence of intoxicating liquor or drugs, **to enter or remain at a workplace**.

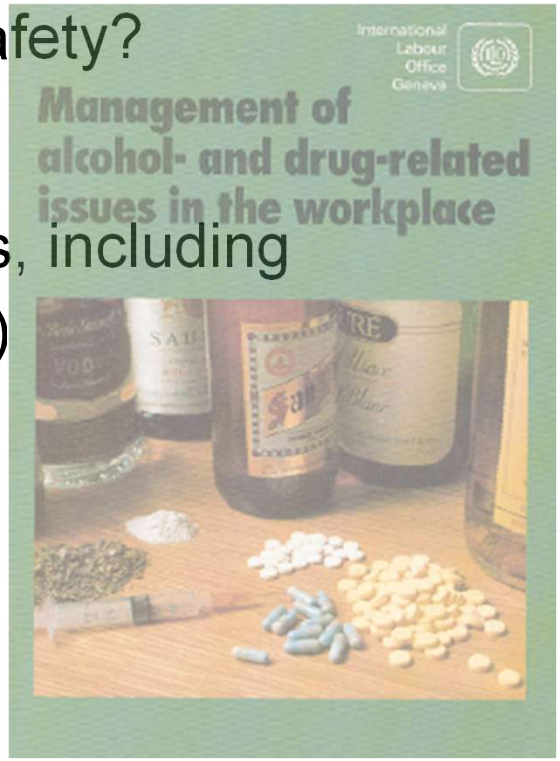
(2) … no person at a workplace shall be under the influence of or have in his or her possession or partake of or offer any other person intoxicating liquor or drugs.

(3) An employer or a user, as the case may be, shall, in the case where a person is taking medicines, only allow such person to perform duties at the workplace if the side effects of such medicine do not constitute a threat to the health or safety of the person concerned or other persons at such workplace.

5 steps to implementing a Workplace Substance misuse Programme

(ILO Recommendations)

- ✓ **Step 1**: Determine the need for a programme (Safety? Sustainability? Moral?)
- ✓ **Step 2**: Formulate a policy & procedure (the rules, including whether or not there will be alcohol / drug testing)
- ✓ **Step 3**: Participation & Communication
- ✓ **Step 4**: Establish a support structure
- ✓ **Step 5**: Implementation



Red Flag
Are all these steps in place?

5 elements of a fair sanction for misconduct

On what grounds can an employer discipline an employee for breaking a rule?
(e.g. a rule about substance use / misuse)

1. There is a **rule** (ie a policy)
2. The rule is **fair** (ie supported by correct facts)
3. The employee was **aware** of the rule (ie it was communicated)
4. The employee knowingly **broke** the rule
5. The employee **failed to take corrective action** despite being the opportunity to do so (ie a fair process was followed)

Is your cannabis testing strategy scientifically correct?

Is the sanction "SUBSTANTIVELY Fair"?

Is the sanction PROCEDURALLY fair?

PART 2

TESTING FOR ALCOHOL

Testing for alcohol (ethanol) - questions

Issues relating to the tests

- How reliable are your breath alcohol screening tests? (calibration, accuracy)
- What testing devices should we use?
- **Is the testing device displaying what you think it is?**
- **What cut-off levels should these tests be set to?**

Issues relating to process

- Is the tester trained and competent?
- What about confidentiality?
- **Can other substances (food) cause a positive breath alcohol result?**
- **What if the employee contests the result because they had a blood test which was negative?**
- **What if an employee argues use of alcohol-containing medication? (legitimate use)**
- **Can one fool the test into a false negative test?**

Red Flag:
Are these matters addressed in your Procedures?

How reliable are your breath screening tests?

- How often do you send the screening devices in for calibration?
- Do you check them for “drift”?
- What results are they producing on their display screen?

Is the testing device displaying what you think it is?

Breath alcohol concentration or blood alcohol concentration?

Is there a difference?

What outcome is your breath alcohol device displaying?

Breath alcohol concentration or blood alcohol concentration?

Breath alcohol concentration (BrAC)

- The amount of alcohol present in a person's breath.
- An indirect estimate of alcohol in the blood.
- Measured in:
  - mg/L (mg of alcohol per litre of breath)
  - µg/100 mL (micrograms per 100 mL of breath)
- BrAC is proportional to BAC because alcohol in the blood equilibrates with alcohol in the lungs' alveolar air.
- 2100mL* breath ≈ 1 mL blood in alcohol content (blood-to-breath partition ratio)

* Jurisdictions vary 2000–2400

Blood alcohol concentration (BAC)

- The amount of alcohol present in a person's blood.
- It is the indirect estimate of impairment.
- Measured in:
  - g/100 mL (grams of alcohol per 100 millilitres of blood) or "%BAC".
- BAC is the value of interest in legal and medical contexts; BrAC is used as a non-invasive proxy.
- Conversion: BAC (mg/100mL) = BrAC (mg/L) × 2100 ÷ 10000

Bottom line: Breath alcohol concentration is NOT the same as blood alcohol concentration!

Comparing BrAC with BAC and their levels of impairment

Note differences:
BrAC is ±5x BAC!

Note health effects as BAC increases, especially at >**0.1**, >**0.2**, >**0.4**

Note legal limits.

BrAC (mg/L breath)	Equivalent BAC (% by volume)	**Typical Effects** (note: people do not all respond the same)	Intoxication Level
0.01	**0.00%**	Impairment very difficult to detect (? detectable)	None / very minimal
0.05	**0.01%**	Possible early subclinical impairment	Minimal
0.10	**0.02%**	Very mild effects; slight relaxation, **no obvious (visible) impairment**.	Within legal limit for general drivers; **professional driver limit in SA.**
0.15	**0.03%**	Mild euphoria, lowered inhibition, **minimal motor impact**.	Below general driver limit.
0.20	**0.04%**	Mild impairment of judgment and coordination.	Approaching general driver limit.
0.24	**0.05%**	Clearer impairment of reaction time and reasoning.	**General driver legal limit in SA**.
0.30	**0.06%**	**Noticeable loss of coordination**, mild slurring, impact on vision.	Above legal limit for all drivers in SA.
0.40	**0.08%**	**Significant impairment** in balance, judgment, and reflexes; possible arrest for DUI.	Legally intoxicated in most countries.
0.50	**0.11%**	**Major loss of motor control**, blurred vision, impaired speech.	Significant intoxication.
0.60	**0.12%**	Severe impairment; increased risk of accidents and injury.	Very high intoxication risk.
0.80	**0.17%**	Severe motor and cognitive impairment, confusion, possible vomiting.	Severe intoxication.
1.00	**0.21%**	**Staggering gait, confusion, disorientation**; medical risk.	Very severe intoxication.
1.40	**0.29%**	Possible stupor, greatly reduced sensation and reflexes.	Stupor.
≥2.00	**≥0.42%**	Likely **unconsciousness**, risk of respiratory arrest and death.	Potentially fatal.

Be very suspicious of values at >**0.2! The device is probably set to BrAC.**

Case Study (some details altered for illustrative purposes)

- John was found to blow positive on the breathalyser.
- Result on confirmatory mode = **0.02**.
- Behaviour was normal. No visible evidence of physical or cognitive impairment.
- He became upset when he was told that his alcohol levels were above the company limits and when he was questioned about his drinking habits.
- As per company policy -> denied access to work and faced a disciplinary hearing.
- At the hearing:
  - He strongly denied recent alcohol consumption that would be commensurate with a BAC at a level of 0.02%
  - He asked to see the device that was used to test him. He checked the settings and found the display was set to Breath Alcohol Concentration.
  - When the result was converted to Blood Alcohol Concentration, the result was **0.00%**
  - The case against him was dismissed and the company was ordered to conduct an audit of it's breath alcohol screening devices

Case Study (some details altered for illustrative purposes)

Some of the results of audit of positive alcohol test cases tested with breathalysers displaying BrAC

Positive Alcohol Cases			(Company policy limit is 0.00%)	
Date	**Employee Name**	**Original Reading (mg/L) (BrAC)**	**BrAC to BAC (g/100ml) (using 2200)**	**BrAC to BAC (g/100ml) (using 2100)**
xxxx/xx/xx	Name 1	0.02	**0.00**	**0.00**
xxxx/xx/xx	Name 2	0.28	0.06	0.05
xxxx/xx/xx	Name 3	0.09	0.01	0.01
xxxx/xx/xx	Name 4	0.03	**0.00**	**0.00**
xxxx/xx/xx	Name 5	0.19	0.04	0.03
xxxx/xx/xx	Name 6	0.41	0.09	0.08

Incorrectly sanctioned for being over the limit

These are very high for BAC, so they should have been red flags to the parties responsible that something may be wrong.

%BAC	
0.11%	**Major loss of motor control**, blurred vision, impaired speech.
0.21%	Staggering gait, confusion, disorientation; medical risk.
0.29%	Possible stupor, greatly reduced sensation and reflexes.
≥0.42%	Likely unconsciousness, risk of respiratory arrest and death.

Some other findings of the audit:

- 50% of the devices were set to Breath Alcohol Concentration
- The people doing the testing, and those responsible for testing, (security, risk) did not know the difference between BrAC and BAC, or that their device could be set to display either.
- When the suppliers were contacted for an explanation, the suppliers insisted that the setup was “correct” (had no idea of the difference between BrAC and BAC in the setup)

Breathalyser setup – display how many decimal points?

Two decimal points = 0.00% or three decimal points = 0.000%?

(probable reasoning for three decimal points: you want to detect people at 0.00**1**-0.00**9**%)

(the "zero tolerance" argument)

- How low do you go and still be "reasonable" ("rational")? (how impaired is a person with a BAC of <0.01%?)
- If you set to display two decimal points, do you set the device to:
  - Round up values >0.005? (0.006 = 0.01)
  - Round down values >0.005? (0.006 = 0.00)
  - Simply drop the digit at the third decimal? (**0.00**8 **= 0.00**)

Red Flag:
Be absolutely sure you know your breath alcohol tester.

Alcoholic hot cross buns (1)

So, what is going on here?

https://www.youtube.com/watch?v=xvoYbdB_2RI

Alcoholic hot cross buns (2)

- After 10 min, the police officer was re-tested and the result was 0.00

Explanation:

- The hot cross buns contain yeast, which converts refined sugars in the buns to tiny quantities of alcohol (ethanol).
- This lines the mouth and upper airways whilst chewing & swallowing
- For a few minutes, this alcohol lining the upper airways will produce a positive breath alcohol test

Solution:

- Perform a confirmatory test 20 min after the screening test

Red Flag:
Always do a confirmatory test after ±20min.

Case Study: The breathalyser result is wrong (1)

- Patrick was found to blow positive on the breathalyser.
- Result on confirmatory mode = **0.003**. (confirmed BAC).
- Behaviour was normal. No visible evidence of physical or cognitive impairment.
- As per company policy -> denied access to work and faced a disciplinary hearing.
- At the hearing:
  - He reported that after being sent home, he went to see his doctor and had a blood test.
  - The test result came back “negative”. (“no alcohol in the blood”).
  - According to the doctor and the lab specialist the lab result was more accurate than the breathalyser.
- What now?

Case Study: The breathalyser result is wrong (2)

- How much time passed between the breathalyser test and the blood test?

  (Note: Result on confirmatory mode = **0.003**%)

  - The arguments and discussions at security following the positive breathalyser: 10min
  - The walk to the car from the security point: 5min
  - The drive from the company to the doctor's rooms: 15min
  - The admin at the doctor's rooms: 10min
  - The explanation to the doctor: 10min
  - Total time between the breathalyser and the blood test = **60min**.

- What is the impact of the time delay?

  - Humans metabolise ethanol at a rate of **0.015 to 0.018** g/100ml (=%) per hour (**±0.02%BAC**)
  - That is **±0,004% every 15min**!
  - After 60min, the value obtained by the breathalyser (0.003%) will be <<0.000%

Bottom line: the blood test is only comparable if taken at the same time as the breathalyser.

Case Study: “I used alcohol-containing medication” (1)

- Mary was found to blow positive on the breathalyser.
- Result on confirmatory mode = **0.013**. (confirmed BAC).
- Behaviour was normal. No visible evidence of physical or cognitive impairment.
- She reported to the testing officer (security) and line manager that she had taken some cough mixture (Solphyllex) just before coming to work.
- As per company policy -> denied access to work and faced a disciplinary hearing.
- Prior to the hearing, a professional opinion was requested on the veracity of the claim

Case Study: “I used alcohol-containing medication” (2)

- Widely used equation to solve this question: “Widmark formula”
- BAC = (A/p × r)x100); where
  - **A** is the amount of the absorbed ethanol (g),
  - **p** is the body weight (g)
  - **R** is the so-called Widmark factor
- The Widmark factor is (1) different for men vs women, and (2) there is a range for variations in metabolic rate.
- **Conclusion:** The Solphyllex could not have increased the BAC to the 0.013% measured by the breathalyser.

	Name:	Mary	
	Date:	2025/03/01	
			Solphyllex
Beverage / mixture consumed (ml)			15
Ethanol % (v/v)			0.50%
Ethanol consumed (mL)			0.075
Ethanol consumed (g)			0.059
Body Weight (kg)			60
Sex of User			Female
Ethanol Distribution Ratio (r) (AVG)			0.550
Peak BAC (g/100ml blood) (Average)			0.0002
Peak BAC (g/100ml blood) (Upper)			0.0002
Peak BAC (g/100ml blood) (Lower)			0.0002
BAC after:	20	min	0.0000
BAC after:	60	min	0.0000

Three decimal places just for illustrative purposes

Rate of ethanol metabolism in humans: 0.015 to 0.018 g/100ml (%BAC) per hour

Out of interest – what about other cough mixtures?

	Vicks Honey & Ginger	Vicks Medinite	Benylin Wet Cough Menthol	BronCleer	Day Nurse	Solphyllex / Alcophyllex
Beverage / mixture consumed (ml)	15	30	20	15	30	15
Ethanol % (v/v)	**5.00%**	**10.00%**	**9.50%**	0.50%	**5.00%**	0.50%
Ethanol consumed (mL)	0.75	3	1.9	0.075	1.5	0.075
Ethanol consumed (g)*	0.592	2.367	1.499	0.059	1.184	0.059
Body Weight (kg)	75	75	75	75	75	75
Sex of user	Male	Male	Male	Male	Male	Male
Ethanol Distribution Ratio (r) (AVG)	0.680	0.680	0.680	0.680	0.680	0.680
Ethanol Distribution Ratio (r) (lower)	0.595	0.595	0.595	0.595	0.595	0.595
Ethanol Distribution Ratio (r) (upper)	0.765	0.765	0.765	0.765	0.765	0.765
Peak BAC (g/100ml blood) (Average)	0.0012	0.0046	0.0029	0.0001	0.0023	0.0001
Peak BAC (g/100ml blood) (Upper)	0.0013	0.0053	0.0034	0.0001	0.0027	0.0001
Peak BAC (g/100ml blood) (Lower)	0.0010	0.0041	0.0026	0.0001	0.0021	0.0001
BAC after: 20 min	0.000	0.000	0.000	0.000	0.000	0.000
BAC after: 60 min	0.000	0.000	0.000	0.000	0.000	0.000
How much to drink (in mL) to be over: 0.02	259	129	136	2586	259	2586

* A "**standard drink**" is defined as 14 grams of pure alcohol, regardless of the type of alcoholic beverage.

Note 1: Differences in alcohol content!

Note 2: The peak BACs are all below the **0.00** threshold, but some are above the **0,000** threshold!

Note 3: **20 min** after peak, BACs are all below even the **0.000** threshold.

Note 4: How much must you drink to be over the legal limit for professional driving (peak BAC).

Out of interest – what about alcoholic beverages?

	Beer	Wine	Spirits (Fortified wines, Vermouth)	Spirits (vodka, whiskey, rum, tequila, brandy, gin)
Beverage / mixture consumed (ml)	330	175	75	44
Ethanol % (v/v)	5.00%	12.00%	20.00%	40.00%
Ethanol consumed (mL)	16.5	21	15	17.6
Ethanol consumed (g)*	13.019	16.569	11.835	13.886
Body Weight (kg)	75	75	75	75
Sex of user	Male	Male	Male	Male
Ethanol Distribution Ratio (r) (AVG)	0.680	0.680	0.680	0.680
Ethanol Distribution Ratio (r) (lower)	0.595	0.595	0.595	0.595
Ethanol Distribution Ratio (r) (upper)	0.765	0.765	0.765	0.765
Peak BAC (g/100ml blood) (Average)	0.026	0.032	0.023	0.027
Peak BAC (g/100ml blood) (Upper)	0.029	0.037	0.027	0.031
Peak BAC (g/100ml blood) (Lower)	0.023	0.029	0.021	0.024
BAC after: 20 min	0.020	0.027	0.018	0.022
BAC after: 60 min	0.009	0.015	0.006	0.010

How much to drink (in mL) to be over: 0.02

NRTA Legal limits: General driver: **0.05**; Professional driver: **0.02**

Beer	Wine	Spirits (Fortified wines, Vermouth)	Spirits (vodka, whiskey, rum, tequila, brandy, gin)
259	108	65	32

* A "**standard drink**" is defined as 14 grams of pure alcohol, regardless of the type of alcoholic beverage.

Note 1: Comparisons are aimed at close to 1 standard drink" (14g alcohol)

Note 2: Much higher alcohol content than cough mixtures.

Note 3: The peak BACs are all above the **0.00** threshold, and just on the legal limit for professional drivers.

Note 4: **20 min** after peak, BACs are all above even the **0.00** threshold, 3 are still above the legal threshold. **60 min** after peak, 2 are still above 0.01%

Note 5: How much must you drink to be over the legal limit for professional driving (peak BAC).

Some try to interfere with the test to make it falsely negative

Foods and Drinks

✘ Strongly flavoured foods like garlic, onions, or coffee. Temporarily mask mouth alcohol smell. Do not actually lower BrAC.

✓ Very cold drinks (ice water, iced tea) just before the test. Cools the breath sample, reducing the alcohol vapour detected.

Medications

✘ Mouth rinses with no alcohol (e.g., chlorhexidine-based) — if used after drinking, they can wash away residual mouth alcohol. Do not lower BrAC.

± Bronchodilators or inhalers with propellants (e.g. albuterol) — may change breath sample composition and affect some older sensor types.

Physiological Factors

✓ Hyperventilation for 20–30 seconds before the test can lower BrAC readings by up to 10–20% due to rapid removal of alveolar alcohol vapour.

Take home messages

Know your alcohol screening device!

- It is correctly displaying BAC not BrAC
- You are ok with the decimal points displayed (0.00 vs 0.000)
- It is calibrated and maintained according to its specifications

Know your procedures to deal with:

- How to tackle a positive breath alcohol result caused by food
- An employee contests the result because of a negative blood test.
- An employee argues use of alcohol-containing medication.

PART 3

TESTING FOR SUBSTANCES OF MISUSE (DRUGS)

Testing for Substances of Misuse (alcohol & drugs) – Q&A

Testing is the most complicated aspect of a Substance misuse Programme.

Issues relating to the tests

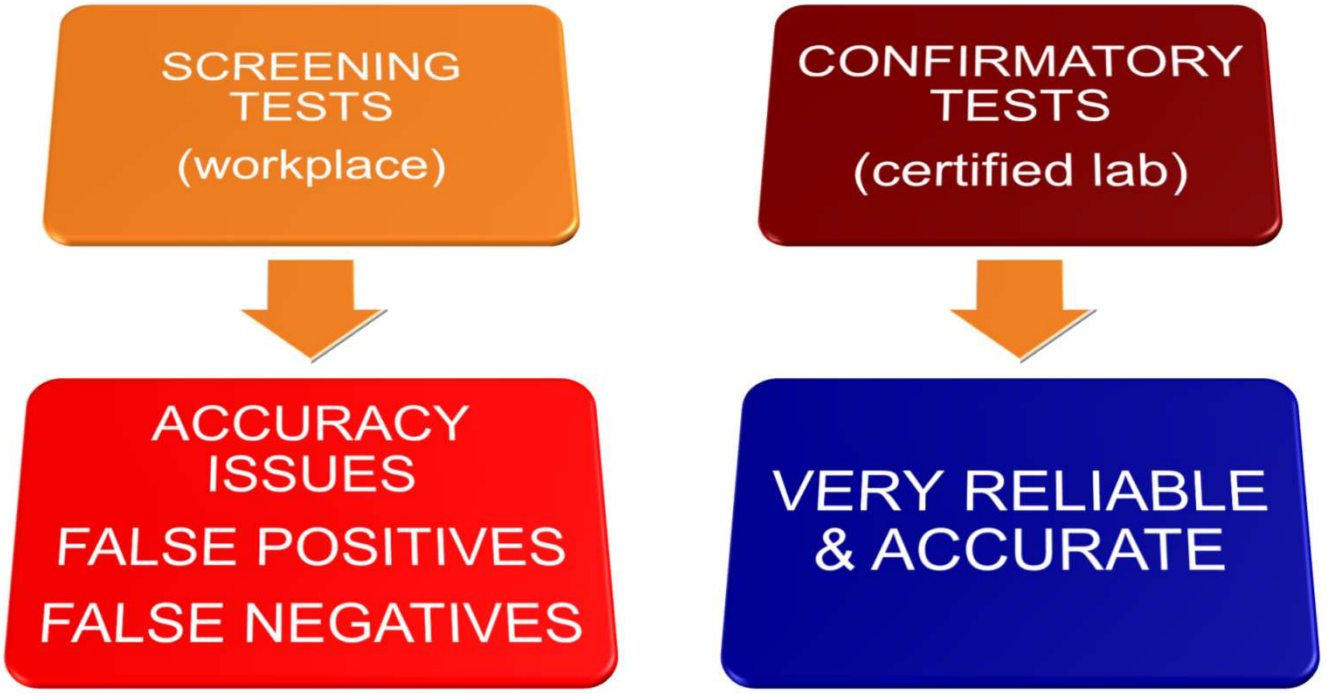
- **How reliable are the screening tests**? (is a “non-negative” urine screening test reliable enough to sanction an employee?)
- What cut-off levels should these tests have?
- **What testing kits should we use?**

Issues relating to process

- Who to test? (random / for cause / part of medical screening / post-incident) (visitors?)
  - Pre-employment testing – do you do a confirmatory test? Who pays?
  - At what frequency should the random testing be done?
- What if an employee refuses to be tested?
- Who should do the testing?
- What about confidentiality?
- **What about cannabis?**

Red Flags:
Are these matters addressed in your Policy & Procedures?
Beware of acting on a non-negative urine screening test.

How reliable are the tests?

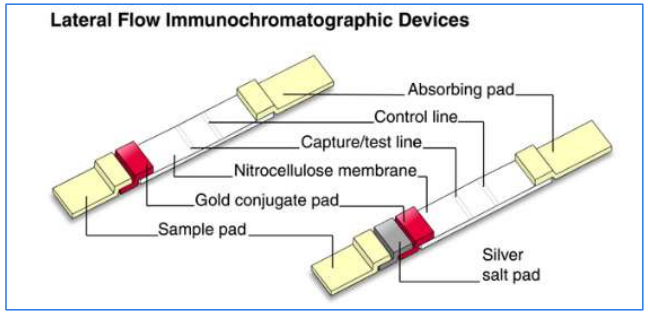


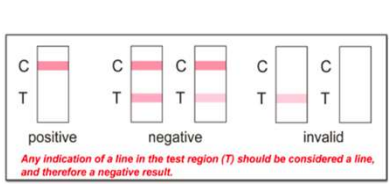
Red Flag
Understand the limitations of the screening test you are using.
Understand the implications of sanctioning an employee on the results of just a screening test.

Drugs: Screening Tests versus Confirmatory Tests

Screening Tests

- At Point of Contact (workplace)
- Designed for ease of use and low cost
- Lateral flow, immunochromatography
- **E**nzyme-**L**inked **I**mmuno**s**orbent **A**ssay technology
- Can have false positives and false negatives (cross-reactivity, accuracy)
- Cannot tell what the actual drugs are (detect the general drug groups only)

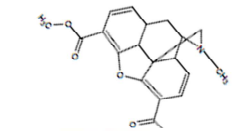


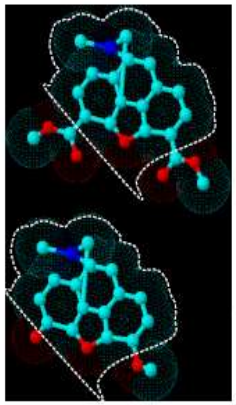


Confirmatory Tests

- Accredited toxicology laboratory
- High levels of accuracy (no false positives / negatives)
- Gas chromatography or liquid chromatography and Mass Spectrometry ("GC-MS" or "LC-MS")
- Are able to determine the exact compound (no cross-reactivity, and not just the drug group identified)

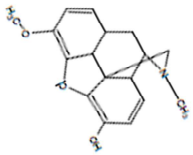
Drug Screening Tests: The problem of "non-specific category testing"





Heroine

Codeine



Immune body immobilised on test strip

↓

3D shape of foreign compound fits

↓

Response "+"

?

Heroin ← Illegal

Morphine ← Illegal

Codeine ← Legal

Positive for **opiates**

Positive for **amphetamines**

?

Cough / flu meds ← Legal

Designer drugs ← Illegal

Methamphetamine (Tik) ← Illegal

Heroine & codeine molecules are very similar.
Screening tests cannot tell them apart.

Drug Screening Tests: “False positives” (cross-reactivity)

Positive for **amphetamines** → ? Anti-ulcer meds

Positive for **opiates** → ? Anti-cholesterol meds

Positive for **cannabis** → ? Anti-retrovirals

This cross-reactivity happens with legitimately prescribed medications for many of the tested substances.

Drug Screening Tests: “Analytical sensitivity”

A drug-free urine pool was spiked with drugs at the listed concentrations. The results are summarized below.

The 5 substances of misuse added to the urine, to be detected by the test panel, and their concentrations in the test solutions (which are the **published cut-offs**)

Drug concentration Cut-off Range	n	AMP/ 1000		BAR/ 300		BZD/ 300		COC/ 300		THC/ 50		THC Sensitivity
		-	+	-	+	-	+	-	+	-	+	
0 % Cut-off	30	30	0	30	0	30	0	30	0	30	0	0%
-50 % Cut-off	30	30	0	30	0	30	0	30	0	30	0	0%
-25 % Cut-off	30	26	4	27	3	27	3	26	4	26	4	13%
Cut-off	30	15	15	16	14	15	15	13	17	14	16	53%
+25 % Cut-off	30	3	27	4	26	3	27	3	27	3	27	90%
+50 % Cut-off	30	0	30	0	30	0	30	0	30	0	30	100%
3X Cut-off	30	0	30	0	30	0	30	0	30	0	30	100%

The ability of the test to detect the drug (THC)

Performance at the published cut-off value.

(**Cut-off** = the value above which the result is deemed “positive”)

13% of tests false positives.

47% of tests failed to detect the substance at the published cut-off value.

10% of tests false negatives.

False positives!

False negatives!

Red Flag
Understand the limitations of the screening test you are using.
Use confirmatory tests before sanctioning an employee.

Drug Confirmatory Testing: Clinical Lab versus Toxicology Lab

Clinical ("Path") Laboratory

Enzyme-**L**inked **I**mmuno**s**orbent **A**ssay technology

[redacted]

PracNum: 5200539 FINAL REPORT Page: 1

Doctor
DR GREG KEW
LIFE HEALTHCARE, GROUND FLOOR
MERANO PLACE
7530 BELLVILLE CAPE TOWN

Copies To
[redacted]

Patient
[redacted]

Age : Sex : DOB : 26:M:1992-10-30
ID Number NOT AVAILABLE Tel No (H) NOT AVAILABLE
Other Number NONE Tel No (C) NONE
Specimen : 0212:BA05596R Lab Ref
Collection Date : 2019-02-12 UNK 723650272
Received Date : 2019-02-12 16:10
Report Date : 2019-02-15 10:15

Clinical Data : * * * NO NAME ON TUBE
Patients name and surname not available on specimen;
the Laboratory cannot accept responsibility for
identification of this specimen .
Please note that the collection date or time was not
provided and could not be verified by [redacted].
Tests Requested :
[redacted] U-AMPHETAMINES/METAM, TOXS COM URINE QUANT,
CREAT - U (mmol/l)

----- BIOCHEMISTRY -----

Test	Result	Flag	Reference
URINE TOXICOLOGY			
> AMPHETAMINES URINE	POSITIVE		

This is a screening method to detect amphetamine and methamphetamine. False positive results are seen with pseudoephedrine, phenylpropanolamine and ephedrine. This test may be positive for up to 48 hours after ingestion.
Positive results may be obtained in patients taking prescription stimulants, such as methylphenidate (Ritalin) for attention deficit and hyperactivity disorder.

> TOXICOLOGY COMMENT

1) These results are for diagnostic information only, and cannot be used for medico-legal purposes.
2) GC/MS techniques give more specific and sensitive information, although costly and time consuming. If require

d

on a specimen (excluding cannabinoids), please phone the

Toxicology Laboratory

GC-MS or LC-MS technology

Drug of Abuse Test Report 22033103

iMed Laboratories
Unit 2, 69 Sovereign Drive
Route 21, Corporate Park
Irene, Pretoria
0046

Test Information: Drugs of Abuse MS/ DOA_1

Completion Date	Sample ID	Processing Notes	Test Deviations
2022-04-01	URN_6953		

Analytes and Results: Drugs of Abuse MS/ DOA_1

Analyte Name	Observed Value	Test Status	Test Method	Cut-off value
Cocaine	< 4 ng/mL	Not detected	HPLC-MS/MS	121 ng/mL (Guard Band)
Cannabinoids-THC	23 ng/mL	Detected below SAMHSA cutoff value	Emit II Plus: HPLC-MS/MS confirmation	57 ng/mL (Guard Band)
Amphetamine	30 ng/mL	Detected below SAMHSA cutoff value	HPLC-MS/MS	300 ng/mL (Guard Band)
Methamphetamine	408 ng/mL	Detected above SAMHSA cutoff value	HPLC-MS/MS	302 ng/mL (Guard Band)

Other Information

Comment 1

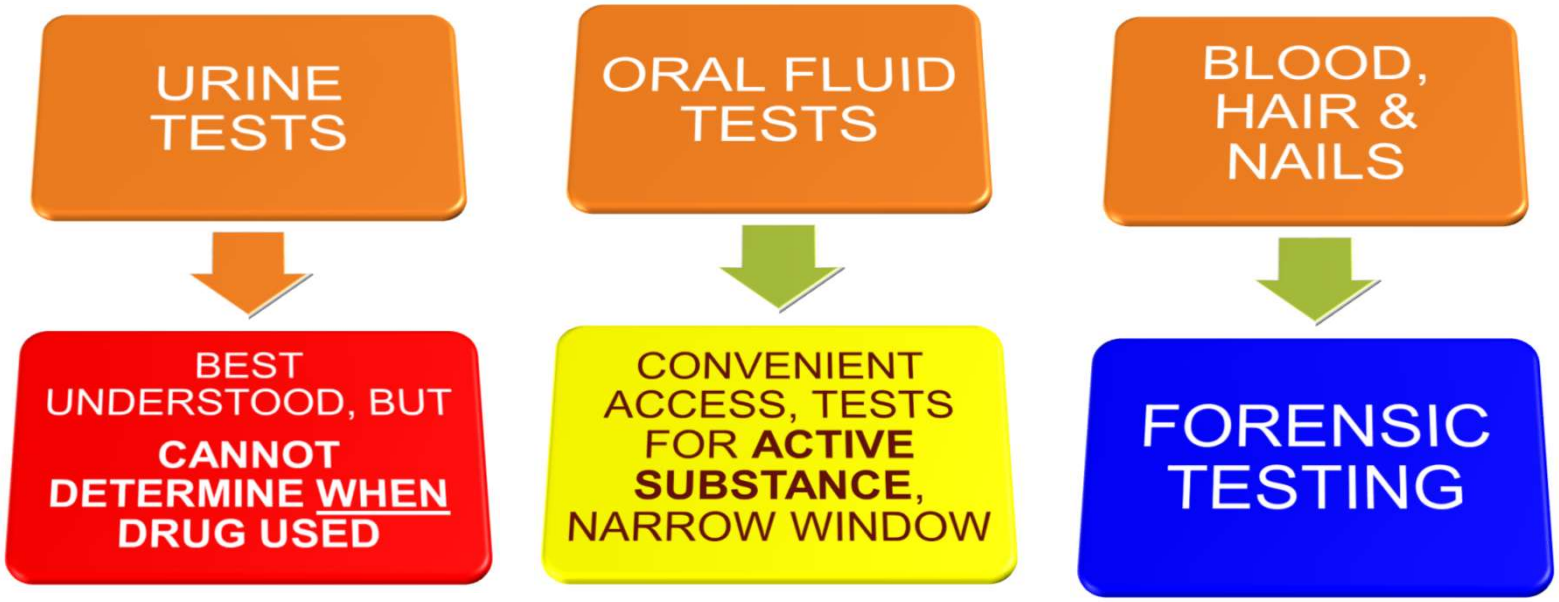
For Methamphetamine to be positive, Amphetamine needs to be present at >100 ng/mL. Possible sources of Methamphetamine include (but are not limited to) prescription medication prescribed by a doctor, OTC products for example Vicks inhaler, and then illicit methamphetamine or drug use (Crystal Meth).

Comment 2

None of the other drug metabolites within the Chroms LC-MS/MS test scope were detected above the lower limit of detection.

Red Flag
Understand the limitations of the laboratory you are using.
Preferably use a toxicology lab.

What body fluids should we test? (screening or confirmatory tests)

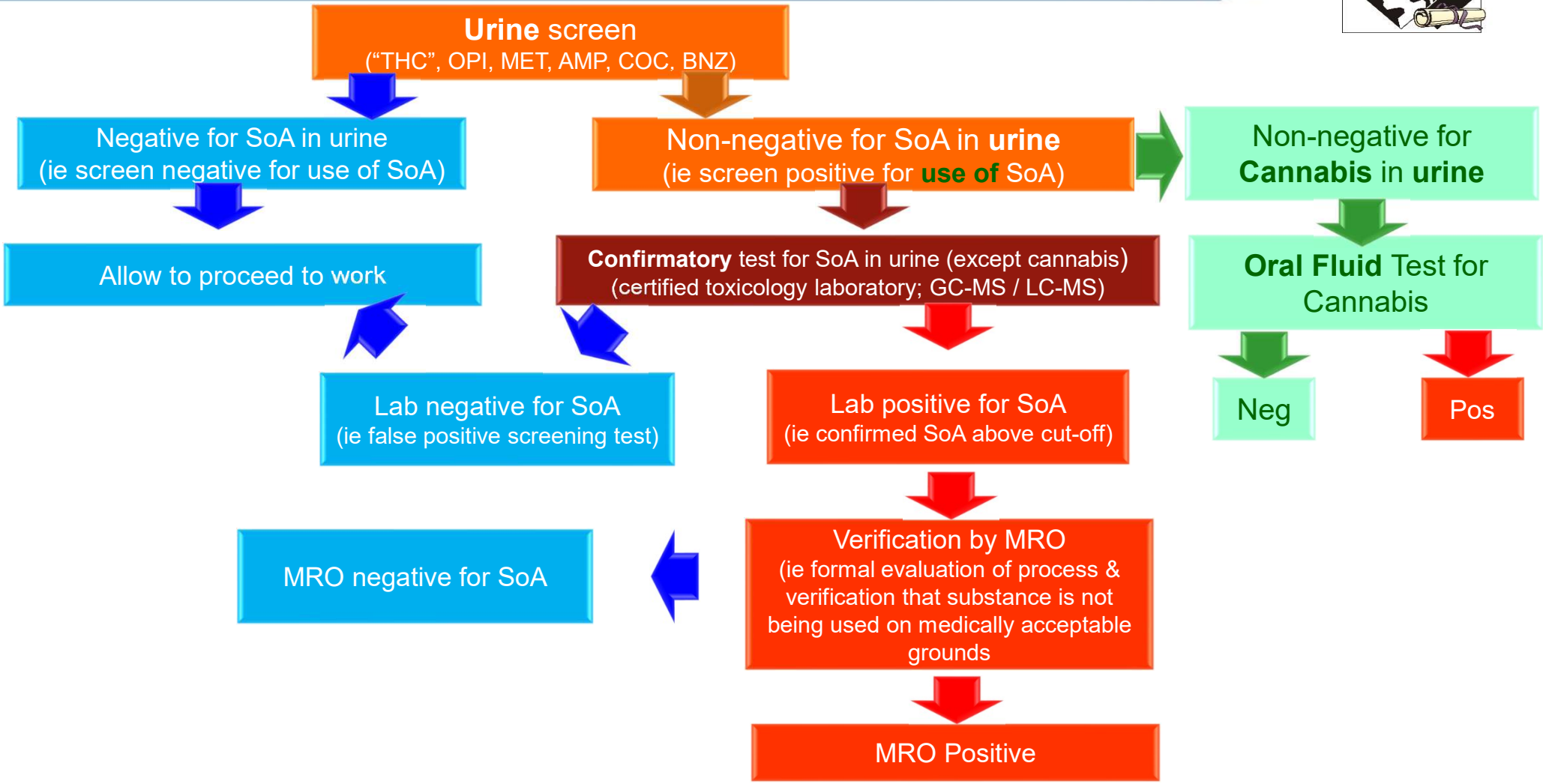


Urine = **U**se of a substance

Saliva = **Ps**ychoactive **s**ubstance is in your **s**ystem

Red Flag
Understand the limitations of urine tests for cannabis.
Beware of a disciplinary sanction on the grounds of a positive test for cannabis in urine!

General process flow



“Under the influence” of a Substance of Misuse?

Question: Does a positive **urine** test for a substance of misuse (drug) mean “**under the influence**”?

No, because

the levels of the metabolites measured in the **urine** DO NOT correlate with level of intoxication (notably cannabis, where the measured substance is in the urine for days to weeks)

So, we test **urine** for **USE** of the Substance of misuse, **not** to determine “**under the influence**”

“Under the influence” of a SoA?

How does one test for “under the influence”?

(Test for the presence of the **psycho-active substance** – e.g. alcohol on the breath, THC in oral fluid)

Beware – the courts have ruled that this does not automatically infer “under the influence”

“Field Sobriety Tests”

- Appearance (red eyes, dishevelled look,
- Behaviour (slurred speech, unsteady gait)
- Other (smell of an alcoholic beverage)

Beware – sobriety tests can be wrong if done by an inexperienced person!

SOLUTION: In the Policy, make it clear that **the rule is “*do not test positive”. (****breathalyser for alcohol, confirmatory urine test for drugs, or oral fluid test for cannabis).* The rule makes no reference to testing to prove “under the influence”. Sanction is therefore “**breach of policy**”.

Cannabis and its challenges for workplace substance abuse policies

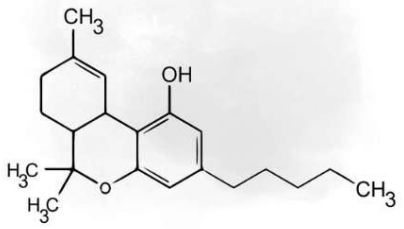
Cannabinoids

- The cannabis plant (“cannabis sativa”) produces over 113 substances called “cannabinoids” which have various roles in the plant’s life;
- The two cannabinoids most important for us are
  - Δ9-tetrahydrocannabinol (**THC, or Δ9 THC**)
  - Cannabidiol (**CBD**)

Δ9-tetrahydrocannabinol (THC)

- The psychoactive cannabinoid
- Known as marijuana, weed, ganga, insangu
- occurs most abundantly in the flowering parts (floral calyxes and bracts) of the female plants

It is initially in the plant as inactive **tetrahydrocannabinolic acid** which is naturally converted to psychoactive **THC** over time.
This conversion is *accelerated* when the plant is heated (cookie) or combusted (cigarette)



THC binds to naturally occurring **cannabinoid receptors**

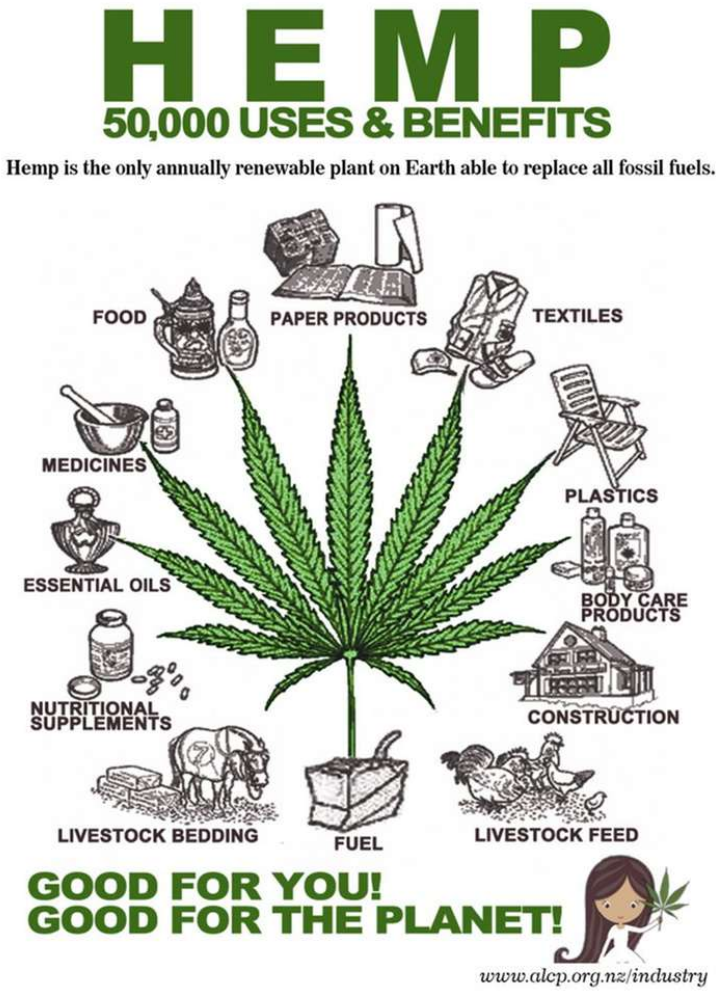
- in the brain (**CB1**) (psychotropic effects, boosts dopamine) and
- various tissues (immune system) (**CB2**) (regulates cytokine release).

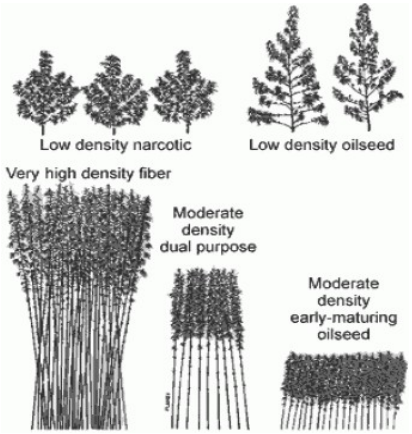
Cannabidiol (CBD)

- Not psycho-active
- CBD also **binds with CB1 & CB2 receptors**, but binds only *weakly to CB1* receptors in the brain, and interferes with THC binding thereby **dampening the THC effects**
- Supplied as an oil, capsules or liquid solution; BUT note that unless rigorous manufacturing techniques are used, these all contain some THC.
- A purified version of CBD was approved by the FDA (Epidiolex) in 2019 for intractable epilepsy
- CBD is now being manufactured & sold by large pharma companies in South Africa as a sched 0 medication

Hemp fibre

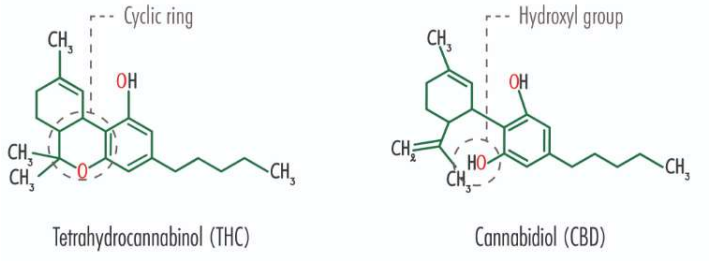
- The hemp plant is a sub-species of cannabis, developed for its fibre & seed oil
- Hemp **fibre** is durable and soft, it is derived from the cannabis plant stem (stalk).
- It has been used for centuries in the manufacture of cloth and ropes
- Genetic manipulation produces “industrial” varieties of cannabis plants, with high fibre content, which are called “hemp”
- Hemp (including its oil), has very low levels of THC and CBD.





Cannabis oils and Hemp oils

- "**Cannabis (CBD) oil**" and "**Hemp Oil**" are **both** extracted from flowers & seeds of the cannabis plant (sativa, indica, or hybrid)
- Certain varieties of cannabis plant have been developed to carry an increased CBD component relative to the THC component
- Hemp seed oil has very little THC or CBD. It is marketed for its wellness effects.
- Unfortunately, the CBD oil contains some THC as well, although in varying quantities



Metabolism & excretion of cannabis

Plant tetrahydrocannabinolic acid (inactive)

Plant cannabidiolic acid (inactive)

Time

Time

Recreational, (medicinal)

Δ9 THC

Cannabidiol (CBD)

Medicinal

Note: This is what is measured in oral fluid tests! (is psychoactive) Window of detection: hours

Combustion/heat

Heat

Psychoactive

Not psychoactive

Absorbed through lungs (& GIT, skin)

Metabolised in liver hydroxylation (& conjugation)

Eliminated through kidneys (urine)

Slightly psychoactive

11-OH-THC (hydroxyTHC, THCA)

7-OH-CBD 6-OH-CBD

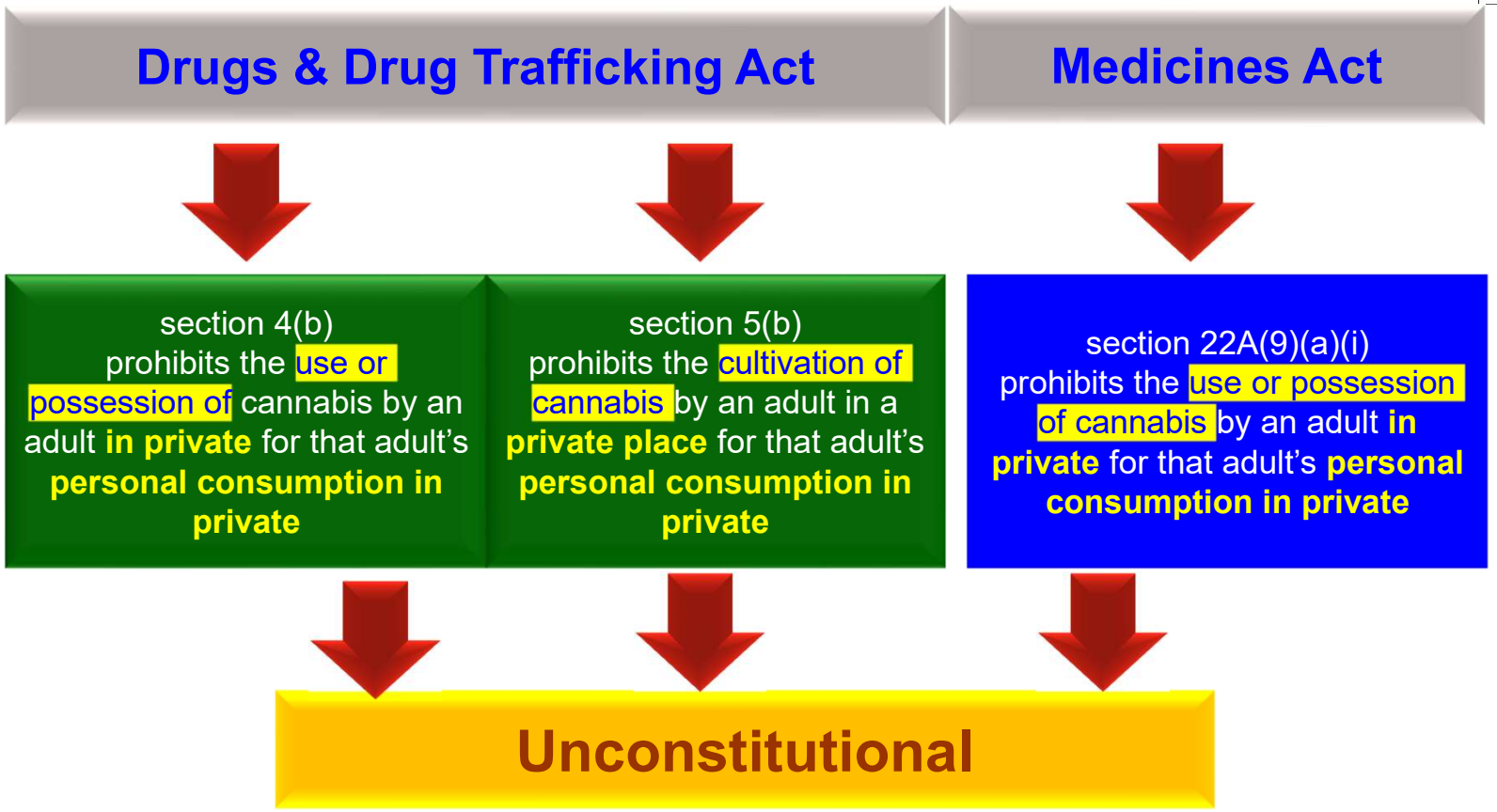
Urine

Note: This is what is measured in urine tests! (not psychoactive) Window of detection: days to weeks

11-COOH-THC (carboxyTHC)

Not psychoactive

Cannabis in the Constitutional Court (18/09/2018)



Cannabis regulation following the Constitutional Court ruling

Drugs & Drug Trafficking Act

Medicines Act

section 4(b) prohibits the use or possession of cannabis by an adult **in private** for that adult's **personal consumption in private**

section 5(b) prohibits the cultivation of **cannabis** by an adult in a **private place** for that adult's **personal consumption in private**

section 22A(9)(a)(i) prohibits the use or possession **of cannabis** by an adult **in private** for that adult's **personal consumption in private**

Removal of the following from Schedule 2 of the Act: cannabis (the whole plant or any portion or product thereof), tetrahydrocannabinol, Dronabinol, trans delta 9 THC.

Regulation of cultivation, manufacture, distribution and sale of cannabis (THC & CBD)

Cannabis for Private Purposes Act (07 of 2024)

South African Health Products Regulatory Authority (SAHPRA)

The Cannabis for Private Purposes Act 7 of 2024 (7 of 2024)(2)

Deletion of the following from Schedule 2 of the Drugs & Drug Trafficking Act:

- **Cannabis** (the whole plant or any portion or product thereof)
- **Dronabinol**, **trans delta 9 THC** (meds)

Schedule

(Section 7)

LAWS AMENDED

Item No.	Number and year of law	Short title	Extent of repeal or amendment
1.	Act No. 140 of 1992	Drugs and Drug Trafficking Act, 1992	*(a)* Part II of Schedule 2 is amended by the deletion of the item: "Dronabinol [(-)-transdelta-9-tetrahydrocannabinol]." *(b)* Part III of Schedule 2 is amended by the deletion of the items: (i) "Cannabis (dagga), the whole plant or any portion or product thereof, except dronabinol [(-)-transdelta-9-tetrahydrocannabinol]"; and (ii) "Tetrahydrocannabinol".

The Cannabis for Private Purposes Act 7 of 2024 (7 of 2024)(3)

Amendment of the threshold limits for substances with narcotic effects in the **National Road Traffic Act**:

- **Alcohol**
- **Δ9 THC** (the psychologically active substance)
- **Combinations** of these

(10) (a) Where a person is a **professional driver** referred to in section 32—
(i) a concentration of less than a concentration of a drug having a narcotic effect, as may be prescribed, per 100ml of blood;
(ii) a concentration of less than—
(aa) 0,02 gram **alcohol** per 100 millilitres of blood;
(bb) 200 nanograms **THC** per 100 millilitres of blood [2ng/ml]; or
(cc) 0,01 gram alcohol **and** 100 nanograms THC per 100 millilitres of blood [1ng/ml],
... (more details)

(b) Where a person is **not a professional driver**—
(i) a concentration of less than a concentration of a drug having a narcotic effect, as may be prescribed, per 100 ml of blood;
(ii) a concentration of less than—
(aa) 0,05 gram **alcohol** per 100 millilitres of blood;
(bb) 500 nanograms **THC** per 100 millilitres of blood [5ng/ml]; or
(cc) 0,025 gram alcohol **and** 250 nanograms THC per 100 millilitres of blood [2,5ng/ml]; ,
... (more details)

Regulation of cultivation, manufacture, distribution and sale of cannabis

Personal use, private place

Cultivation, possession of & use within the limits of the Con Court ruling (**personal use, private place**)

- Recreational
- Home Remedy
- Medicinal

Beyond personal use; for others, public

Subject to regulation under sections **22A** (Permit) & **22C** (Licence) of the Medicines Act

SAHPRA South African Health Products Regulatory Authority

South African Health Products Regulatory Authority
Building A
Loftus Park
Arcadia
Pretoria

10 November 2022

GUIDELINE FOR CULTIVATION OF CANNABIS AND MANUFACTURE OF CANNABIS-RELATED PHARMACEUTICAL PRODUCTS FOR MEDICINAL AND RESEARCH PURPOSES

Cultivation	✓
Manufacture	±
Distribution	✗
Sale	✗

Cultivation	✓
Manufacture	✓
Distribution	✓
Sale	✓

*"**Cultivation** for any other purpose than allowed for through the **licence** and **permit** system under the Medicines Act is a criminal offence."*

*The **sale, supply and use** of a medicine or scheduled substance is subject to Section 22A of the Medicines Act.*
All medicines are subject to a scheduling process based on their active pharmaceutical ingredients (APIs).

Schedule 7 substances are deemed to have no legitimate medicinal use and can only be accessed by means of a permit issued by the Director-General of the National Department of Health

Cannabis in the Medicines Act schedules:

- **Sched 7**: cannabis plant*; synthetic cannabinoids (cannabicyclohexanol).
- **Sched 6**: Δ9THC for therapeutic use
- **Sched 4**: CBD for therapeutic use
- **Sched 0**: THC & CBD within prescribed limits

* **Cannabis plant** = the whole plant or any part or product of it, with certain **exceptions**, eg:

- otherwise scheduled (S6)
- processed hemp fibre & products manufactured from such fibre, contain no more than 0.1% THC

Red Flag:

Increase in cannabis use = increase in accident risk.

and

Use is increasingly “legitimate” (prescribed medication) = changes in drug testing policy required.

Red Flag: Cannabis as a medication & company policy

It follows that the employer should **regulate cannabis** in the **same manner as alcohol (recreational use or as a home remedy)** or a **scheduled medication (medicinal use)**, including:

- There should be clear rules in place (in a **policy**) that prohibit employees from using or being in possession of intoxicating liquor or drugs (including cannabis) **in the workplace**.
- Employees found to be in in breach of the policy should be formally dealt with in terms of the employer's disciplinary code.

Concluding suggestions - cannabis use

For the **THC-containing** substances / meds, consider the following approach:

- **"recreational use":** must not test positive for Δ9THC whilst on duty (**similar to alcohol**), or
- **"home remedy"** (grown at home for personal use or sched 0 med) must not test positive for Δ9THC whilst on duty (**similar to alcohol**) (THC @ sched 0 has *very low* THC levels (0.001%));
- **"medicinal use" (sched 6):** must not test positive for Δ9THC whilst on duty and must be prescribed by a medical practitioner and all the formulations should be regarded as having the potential to **cause drowsiness** (thereby **affecting safety sensitive work**). (**note 1**: sched 6 requires prescription; **note 3**: no sched 6 THC registered with SAHPRA yet)

Illustrative Case Law: Zero Tolerance to cannabis use

- The OHSA and GSR 2A places a duty on the employer to prevent employees under the influence of intoxicating liquor or drugs to enter into the workplace
- The company takes safety of employees seriously ("zero tolerance"), so:
  - Any employee who tests positive for alcohol or drugs (including cannabis) is in breach of company policy.
  - This applies equally for all employees in the company

Red Flag:
Be careful how you apply "zero tolerance" to cannabis use

Case Law: Zero Tolerance to cannabis use

- An employee in Admin tested positive for cannabis. She refused to stop, citing recreational & medical reasons.
- She was dismissed.
- The Labour Court found against the employee, saying as cannabis is an intoxicating substance and employers may implement their own rules or policies to ensure occupational health and safety.
- The Labour Appeal Court (LAC) set aside the order of the Labour Court and found in the employee's favour, saying she had been unfairly dismissed.

What happened?

Case Law: Zero Tolerance to cannabis use

Judge's Ruling: dismissal was automatically unfair, because

- The employer's Alcohol and Substance Abuse Policy is irrational and violates the right to privacy in Section 14 of the Constitution, to the extent that it prohibits office-based employees that **do not work** with or within an environment that has heavy, dangerous and similar equipment, from consuming cannabis in the privacy of their home.
- Whilst the employer did operate in an environment with heavy machinery, the Policy was unjustifiably overbroad, and the same standards could not be applied to an employee who works in an office outside of the dangerous environment. That the employer had a zero-tolerance approach was irrelevant in this regard and there was no justifiable reason to limit the Appellant's rights.
- This is because cannabis stays in the body much longer than alcohol, the only way the Appellant could comply with the Policy is by not smoking cannabis at all. This meant that she had to choose between her job and her right to smoke cannabis in private. Employees who use alcohol do not face this dilemma.
- The employee was awarded compensation equivalent to 24 months' salary.

Taking the zero tolerance approach beyond just safety

Occupational Health and Safety Act

GSR 2A. Intoxication

(1) …. an employer …, shall not permit **any person** who is or who appears to be under the influence of intoxicating liquor or drugs, to enter or remain at a workplace
... etc.

Safety is an inherent part of the job

The main aim of the OHSA is health and safety; it is not concerned with protecting an organisation's interests, such as property, liabilities, finances, reputation, or public image.

Common Law of Contract

Employment Contract

- Employees are required to perform their duties diligently and effectively, and failure to do so constitutes a breach
- If an employee is found to be impaired or intoxicated, they breach the contract, which justifies disciplinary action for failing to meet performance expectations, such as arriving fit for duty
- In addition, employers have a common law duty to ensure workplace safety
- The employment contract must refer to rules indicating that there are cut-off concentrations for substances with impairment potential in an employee's body.

Recognition: Dr Tim Laurens, PhD (Med law & Ethics), PhD (Chem). Expert Laboratory Services

Key take-home messages

- Know the limitations of the urine screening tests. Confirm the results.
- Substance Misuse Policies must set out **rules that are fair**:
  - Do not over-reach into the private lives of employees (be cautious of “zero tolerance”)
  - Do not unfairly discriminate between users of alcohol & cannabis
- When invoking the OHSA, remember the inherent requirements of the job relate to employee safety (therefore blanket testing may not be acceptable).
- If a wider reach than just safety is being considered (“blanket testing”), ensure the above rules are enshrined in employment contracts (common law of contract).

Thank you for your attention!