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## WHAT IS MARIJUANA DRUG TESTING? WHAT DOES A MARIJUANA DRUG TEST REVEAL?

Drug testing is a means of identifying the metabolites of drugs in a biological specimen, such as urine, saliva, or blood. A single test panel will typically screen for marijuana as well as crack/cocaine, (meth)amphetamines, PCP, and opioids. Panels may also include other drugs, such as alcohol, nicotine, and benzodiazepines.

Different tests analyze different specimens and reveal different information. Some tests are qualitative, indicating either the presence or absence of certain drugs or drug metabolites. Other tests are quantitative, specifying exact concentrations of drugs or drug metabolites within a given sample, usually expressed in nanograms per milliliter (ng/mL). Marijuana drug tests can suggest a window of time in which a person may have consumed marijuana, but they cannot measure a person's active intoxication or level of impairment. They also cannot establish how often or how much marijuana a person uses or whether they have an addiction.

Many variables impact whether any given test can detect drugs or drug metabolites. For marijuana tests, individual factors include weight, metabolism, level of hydration, and even hair color and texture! Other factors that can influence a marijuana test's efficacy are the unique pharmacological properties of cannabinoids, the potency of the consumed marijuana, and the route of administration. Research has also pointed to the role of human error in confounding results by miscalibrating testing machines<sup>2</sup> and mishandling samples as they were prepared for testing, particularly for hair.<sup>3</sup>

A marijuana test can detect cannabinoids for anywhere from six hours to 90 days after consumption. Frequency of use has one of the greatest impacts on drug test results: cannabinoids dissipate quickly from the bodies of occasional users but can linger after weeks or months of abstinence in those who once consumed marijuana daily.<sup>4</sup>

## HOW IS MARIJUANA DRUG TESTING USED?

Marijuana drug testing is used in a wide variety of contexts, such as public and private workplaces, hospitals and addiction treatment centers, highway safety enforcement, and K-12 schools. A person may be tested as a condition of employment, parole or probation, receiving public assistance, or maintaining custody of their children. Therefore, the results of a marijuana test can bear massive consequences on the course of a person's life.

Marijuana drug testing is permitted in both private and public workplaces, but only federal workplaces, including contractors and grantees, are required by law to conduct drug testing. Employees in federally-regulated "safety or security-sensitive" industries, such as aviation and hazardous waste disposal, are also required to be tested.<sup>5</sup> Mandated workplaces must test for the five most common classes of illicit drugs, but they can also test for more. Currently, the only specimens that federal workplaces can collect for drug testing are urine and oral fluids,<sup>6</sup> but the Substance Abuse and Mental Health Services Administration (SAMHSA) has been advocating to include hair testing as an option.<sup>7</sup>

## WHAT KINDS OF MARIJUANA DRUG TESTS EXIST? WHAT ARE THEIR BENEFITS AND LIMITATIONS?

### URINE TESTING

There are two main types of urine testing: rapid urinalysis (immunoassay) and laboratory urinalysis (gas chromatography-mass spectrometry, or GC-MS). Both types measure the concentration of drug metabolites in the urine after a substance has been processed by the body. A rapid urine test generally gives qualitative results (negative or positive) based on a concentration cutoff level decided by the test manufacturer. Rapid tests are quick, easily administered on-site, and relatively inexpensive, making them most commonly used in workplace environments. The American Society of Addiction Medicine suggests that all positive results should undergo confirmatory laboratory testing before any employment decisions are made to ensure they are not false positives.<sup>8</sup> Since laboratory analysis provides quantitative results that identify exact concentrations of drug metabolites, it is generally more expensive, as it requires specialized training and equipment. Results may be available within 24 to 72 hours.

**NEITHER RAPID NOR LABORATORY URINE TESTS CAN TELL THE DIFFERENCE BETWEEN AN OCCASIONAL USER WHO CONSUMED MARIJUANA WITHIN THE PAST THREE DAYS AND A ONCE-REGULAR USER WHO STOPPED CONSUMING MARIJUANA A MONTH BEFORE.**

The detection window for marijuana in urine is highly dependent on a person's consumption habits. People who use marijuana infrequently may test positive for 4 to 8 hours (and up to 72 hours) after initial consumption.<sup>9</sup> On the other hand, frequent users may test positive, even after 1 to 2 months of sustained abstinence.<sup>10</sup> This discrepancy is due to a number of factors, including the fact that cannabinoids are "extremely lipid soluble," meaning that they are quickly absorbed into body fat and slowly released back into the body over time.<sup>11</sup>

Neither rapid nor laboratory urine tests can tell the difference between an occasional user who consumed marijuana within the past three days and a once-regular user who stopped consuming marijuana a month before.

### BLOOD AND PLASMA TESTING

Blood testing is widely viewed as a more reliable measure of gauging active intoxication. However, blood tests have a narrower detection window compared to other forms of testing, meaning they have to be given during or shortly after someone has used a drug in order to detect it. Unlike urine tests, blood tests can detect a drug as well as its precursors and metabolites, giving a fuller picture of someone's drug use over time.<sup>12</sup>

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### FREQUENT MARIJUANA USERS MAY TEST POSITIVE, EVEN AFTER

# 1-2 MONTHS

### OF SUSTAINED ABSTINENCE.

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A person's frequency of marijuana use distinctly impacts blood test results. A person who occasionally uses marijuana will test positive for 6 to 8 hours after consumption, while a daily user may test positive after at least 7 days (and up to 30 days) of abstinence.<sup>13,14</sup> The route of marijuana administration also matters, as THC edibles create "a delayed and longer-lasting peak blood level" that is lower than that of smoked marijuana. Therefore, edibles are less likely to be detected.<sup>15</sup>

Blood testing is rarely done in employment contexts due to its high cost, need for specialized staff and equipment for drawing blood and managing samples, and delayed timeline for receiving results. Outside of clinical contexts, blood testing is often used in criminal charges for driving under the influence to prove intoxication. Importantly, THC blood levels are not reliably correlated with level of impairment or one's subjective feeling of being "high" in the way that blood alcohol concentration correlates with intoxication.<sup>16</sup>

## ORAL FLUID TESTING

Oral fluid (saliva) testing is a minimally invasive alternative to urine and blood testing. Like blood tests, oral fluid tests look for active drug compounds as well as their precursors and metabolites. On-site rapid testing kits deliver qualitative results (negative or positive) in a matter of minutes, while laboratory tests yield quantitative results after approximately 24 hours. Rapid oral fluid tests are generally less sensitive to THC than laboratory-based tests<sup>17</sup>, and their results are often misinterpreted and confounded by miscalibration.<sup>18</sup>

**THE HIGH RATE OF FALSE POSITIVES AND FALSE NEGATIVES IN THE FIELD INDICATES THAT POSITIVE RAPID RESULTS SHOULD BE SUBJECTED TO CONFIRMATORY TESTING.<sup>19</sup>**

The detection window for marijuana in oral fluids depends on a person's consumption habits. Generally, THC is detectable in saliva for 12 to 24 hours after consumption in both casual and frequent marijuana users.<sup>20</sup> However, its metabolite, THC-COOH, can be detected in saliva for approximately 13 days (and up to 29 days) after last intake in frequent marijuana users. In occasional users who smoke marijuana, it may not be detectable in oral fluid concurrently with THC at all.<sup>21</sup> This makes it very difficult to determine active use or rule out passive exposure through secondhand smoke.

## HAIR TESTING

Hair testing provides the longest detection window by far in comparison to other forms of drug testing, estimating use for 90 days to three months prior to testing.<sup>22</sup> Hair acts as a "timeline" of drug use as it grows, accumulating metabolites over time as they are deposited into the bloodstream. A hair test generally requires a sample of at least 1.5 inches of hair taken from the scalp, or from the surface of the skin if a person's head hair will not suffice. Negative results are usually delivered from a laboratory within 24–72 hours, while positive results that require confirmatory testing will take an additional 72 hours.

Hair testing presents a number of logistical and ethical problems, especially for marijuana. Hair tests frequently deliver false positives as well as false negatives for marijuana, necessitating confirmatory testing of an alternative specimen (such as saliva, urine, or blood) in almost all circumstances.<sup>23</sup> Like with other drug tests, once-frequent marijuana users may continue to test positive after months of abstinence.<sup>24</sup> Marijuana precursors, active compounds, and metabolites have all been found in hair follicles of people who have only been passively exposed to marijuana, either through handling it or being in close contact with someone who recently handled or consumed marijuana.<sup>25</sup> A person's hair care routine can also significantly compromise test results, especially if their hair was recently bleached or dyed.<sup>26</sup> Most significantly, hair tests have been legally ruled to be discriminatory against Black individuals due to the disproportionate rate of false positives associated with darker, denser hair follicles<sup>27</sup> and hair treatments that are designed to preserve moisture.<sup>28</sup> Mandatory hair testing has also been ruled to violate religious freedom, for Sikhism, Rastafarianism, and Orthodox Judaism, among other religions, which bar hair cutting and shaving under some or all circumstances.<sup>29</sup>

Despite the many problems present in hair testing, SAMHSA has pushed to include hair testing as a drug testing method (in addition to urine or saliva) for mandatory pre-employment and random testing for federal employees, contractors, and safety- and security-sensitive workers.<sup>30</sup> Particularly worrisome is the proposed guideline to exempt positive results from confirmatory, alternate specimen testing if they contain THCA-A, a non-psychoactive precursor to THC.

THCA-A is thought to be a compound that is only present in hair following marijuana metabolization, but it is actually present in live and raw marijuana as well as marijuana smoke.<sup>31</sup> Hair can become contaminated with THCA-A through second-hand smoke, handling marijuana plants or materials, or coming into close contact with someone who has handled or consumed marijuana.<sup>32</sup> One study concluded that

## **"ALMOST ALL OF THCAA FOUND IN ROUTINE HAIR ANALYSIS DERIVE[S] FROM EXTERNAL CONTAMINATION CAUSED BY DIRECT TRANSFER," OF PLANT MATERIAL, RATHER THAN MARIJUANA CONSUMPTION.**

This challenges the efficacy of categorically excluding THCA-A-positive results from confirmatory testing.<sup>33</sup>

## **WHAT ARE THE IMPACTS OF MARIJUANA DRUG TESTING IN THE WORKPLACE?**

It is often assumed that drug testing promotes safety and productivity in the workplace, but this is not backed by evidence. The claim that increasing workplace drug testing decreases rates of on-the-job injuries is weak and unproven, especially since urine tests "have poor validity and low sensitivity to detect employees who represent a safety risk."<sup>34</sup> Random and selective testing may actually reduce workplace morale, and expensive laboratory drug tests can increase costs to businesses.<sup>35</sup>

Certain industries are also facing labor shortages as qualified candidates avoid applying to workplaces that have drug tests, especially hair tests that reveal marijuana use from long before a person decided to apply for a job.<sup>36</sup> While all drug testing methods are imperfect, hair testing is particularly invasive and redundant, with little benefit to employers or their workers. Marijuana consumption shortly before or during work may lead to impairment, but it is unclear whether off-the-clock use affects performance in any meaningful way.<sup>37</sup> When most drug tests cannot evaluate active or very recent use, the totality of a person's behavior is scrutinized when only their on-the-clock performance is relevant. Moreover, more workplace accidents can be attributed to exhaustion, stress, and illness rather than illicit drug use: these factors go unnoticed when employers insist on suspicionless, mandatory drug testing.<sup>38</sup> In lieu of invasive drug tests that do not evaluate job performance, employers should opt for alternative methods of gauging a person's impairment and risk to safety.

## **ALTERNATIVES TO WORKPLACE MARIJUANA DRUG TESTING**

Since marijuana drug testing is an inadequate measure of impairment or workplace performance, employers should consider alternative methods of ensuring safety. Some standard field sobriety tests (SFSTs), such as the walk-and-turn test, can be used to detect marijuana intoxication.<sup>39</sup> SFSTs only evaluate a person's current level of impairment, rather than past marijuana use.<sup>40</sup> One study suggested several observable traits of recent marijuana use that should be considered in addition to SFST performance, including bloodshot eyes, droopy eyelids, affected speech, coating on the tongue, and the odor of marijuana.<sup>41</sup> Some people, but not all, who recently consumed marijuana also had dilated pupils or an elevated pulse. Importantly, poor SFST performance and signs of marijuana use should not be taken in isolation: they may also be the result of illness, disability, or passive exposure to marijuana.

## **THE IMPACT ON MEDICAL MARIJUANA PATIENTS**

The use of drug testing in the workplace has also had massive negative repercussions on medical marijuana patients. While 36 states, as well as Washington D.C., Guam, Puerto Rico, and the U.S. Virgin Islands, have authorized medical marijuana programs, only 12 states (and D.C.) have passed medical marijuana anti-discrimination employee protections.<sup>42</sup> Of those, only Nevada requires employers to provide reasonable accommodations for medical marijuana patients.<sup>43</sup> These protections do not apply to those working in federal or security- or safety-sensitive positions or those suspected of using marijuana — medical or otherwise — on the job.

The lack of workplace protections — combined with federal criminalization — leaves an estimated 4.4 million medical marijuana patients vulnerable to unemployment and underemployment.<sup>44</sup> Despite the fact that medical marijuana patients may have "grave and debilitating disabilities," several federal courts have refused to grant them protections

under the Americans with Disabilities Act due to the federal prohibition of marijuana.<sup>45</sup> Employers may still use a positive drug test as an indication of on-the-job use, even though the presence of THC metabolites proves neither active intoxication or impairment.<sup>46</sup> Hence, medical marijuana patients must often decide between gainful employment and treatment for painful and debilitating conditions.

## CONCLUSION

Marijuana prohibition has severely limited empirical research on drug testing and methods of evaluating drug-induced impairment. We simply do not yet have good testing technologies to evaluate impairment. And yet, zero-tolerance drug-free workplace policies continue to impose harsh consequences for people who test positive for marijuana, without also determining whether or not an employee's job performance was negatively impacted.

Federal marijuana decriminalization presents the opportunity to improve research on marijuana and marijuana drug testing. Eliminating testing for positions where impairment does not pose a threat to safety and ending zero-tolerance policies will promote a better workplace for all employees. Workplaces must accommodate medical marijuana patients, and safety-sensitive workplaces should develop minimally invasive and evidence-based drug testing policies that approach drug use with honesty and compassion.

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