

Helping Clinicians
Make Better Decisions



Clinical Reference Guide

Period of Detection

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Patients exhibit varying periods of detection for any given drug. Periods of detection provide general estimates for the period of time in which a drug is expected to be detected in a given matrix. This time frame depends on many factors, including thresholds, analytes tested, dosing regimen, etc.

The windows of detection are different for each specimen type. Typically periods of detection are shortest for blood and oral fluid, longer for urine, and longest for hair. Various factors will influence the period of drug detection: drug half-life, specimen type, test threshold, whether parent drug and metabolites are included in testing, patient renal and hepatic function, drug plasma-protein binding, nutritional status, route of administration, drug absorption, genetic differences, drug interactions, food interactions, age, body composition, etc. Drugs taken infrequently on an as-needed (PRN) basis are likely to be detected for shorter periods than drugs taken chronically. All published periods of detection are gross estimates, as it is impossible to predict exactly how long a drug will remain detectable for any one patient.^{1,2}

A. Oral Fluid

Drugs present in oral fluid roughly mirror drug presence in blood, although concentrations will not generally show a direct correlation. Drugs may be detectable in oral fluid as early as 15 minutes following ingestion. On the other hand, medications may not be detectable in urine for 2-6 hours post ingestion.³⁻⁹ Medications which are chronically administered in pain management may be detectable in oral fluid for a period up to 48 hours. Studies have observed extended oral fluid detection of 6-monoacetylmorphine (heroin metabolite), methadone, amphetamine, and methamphetamine for up to 8 days in patients on an observed detoxification unit; however, these extended periods of detection are atypical in the context of other oral fluid studies.^{10,11} Use of medications on an infrequent basis (for example, taken at bedtime, but not every day) shortens the detection period.

B. Blood

As with oral fluid, the period of detection of a drug in blood is shorter than urine and will vary significantly from patient to patient. Detection of drugs in blood is almost always limited to current use. The detection period

will depend on medication dose, dosing frequency, drug half-life, and pharmacokinetic parameters of the patient.¹² About 97% of a drug dose will be eliminated from the body after five half-lives.¹³

C. Urine

The period of detection for drugs in urine typically exceeds that of oral fluid and blood. Lipophilic drugs which readily deposit into fat (such as marijuana, diazepam, methadone, and others) may exhibit notably longer periods of detection.^{2,7,13} In addition, many drug metabolites exhibit longer elimination half-lives than parent drug. Testing for metabolites in urine may therefore extend the detection window. This is true for illicit drugs such as marijuana and cocaine, as well as prescription medications like opioids and benzodiazepines.¹³⁻¹⁵ Testing for opioid normetabolites may extend the detection period for this drug class.^{14,15} Periods of detection may also be longer when using gas chromatography/mass spectrometry (GC/MS) or liquid chromatography/tandem mass spectrometry (LC/MS/MS) methods compared to immunoassay, due to increased sensitivity and lower testing thresholds. Period of detection estimates for urine with typical drug use are presented in Table 6.1.

D. Special Note on Marijuana

The detection time for marijuana in urine depends heavily on the body composition of the patient and the frequency of use. Daily use of marijuana is expected to be detectable in urine for a period up to 10 days; light use (such as one joint) may only be detectable for up to 3 days.¹⁶ One study demonstrated that 73% of 37 chronic marijuana users had THC concentrations below a cutoff of 15 ng/mL within 2 weeks of last ingestion.¹⁷

Patients with a large amount of adipose tissue may store marijuana and excrete metabolites for a longer period of time, especially after abnormally heavy use over a chronic period. In such rare cases, marijuana has been

reported with a period of detection up to 30 days, with the longest period published as 95 days. Such a long period of detection is the exception, not the rule.^{2,12,16}

Table 6.1: *Drug Periods of Detection in Urine**

DRUG CLASS	DRUG	REPORTING LIMIT	PERIOD OF DETECTION
Amphetamines	Amphetamine	250 ng/mL	Up to 5 days
	Methamphetamine	250 ng/mL	Up to 5 days
	MDMA (Ecstasy)	100 ng/mL	Up to 5 days
	MDEA (Eve)	100 ng/mL	Up to 5 days
	MDA (Adam)	100 ng/mL	Up to 5 days
	Phentermine	100 ng/mL	Up to 5 days
Anticonvulsants	Lamotrigine	500 ng/mL	Up to 10 days
	Levetiracetam	500 ng/mL	Up to 3 days
	Oxcarbazepine	500 ng/mL	Up to 3 days
	Topiramate	500 ng/mL	Up to 10 days
Antipsychotics	Aripiprazole	10 ng/mL	Up to 7 days
	Clozapine	50 ng/mL	Up to 5 days
	Haloperidol	1 ng/mL	Up to 10 days
	Lurasidone	10 ng/mL	Up to 5 days
	Olanzapine	10 ng/mL	Up to 7 days
	Paliperidone	10 ng/mL	Up to 7 days
	Quetiapine	10 ng/mL	Up to 7 days
	Risperidone	10 ng/mL	Up to 7 days
Ziprasidone	10 ng/mL	Up to 7 days	
Barbiturates	Amobarbital	200 ng/mL	Up to 10 days
	Butalbital	200 ng/mL	Up to 10 days
	Pentobarbital	200 ng/mL	Up to 10 days
	Phenobarbital	200 ng/mL	Up to 10 days
	Secobarbital	200 ng/mL	Up to 10 days
Benzodiazepines	Alprazolam	50 ng/mL	Up to 10 days
	Chlordiazepoxide	50 ng/mL	Up to 10 days
	Clonazepam	50 ng/mL	Up to 10 days
	Clorazepate	50 ng/mL	Up to 10 days
	Diazepam	50 ng/mL	Up to 10 days
	Flurazepam	50 ng/mL	Up to 10 days
	Lorazepam	50 ng/mL	Up to 10 days
	Oxazepam	50 ng/mL	Up to 10 days
	Temazepam	50 ng/mL	Up to 10 days
Illicit Drugs/ Drugs of Concern	Cocaine	50 ng/mL	Up to 5 days
	Heroin	10 ng/mL	Up to 24 hours
	Kratom	10 ng/mL	Up to 5 days
	Marijuana	5 ng/mL	Up to 10 days**
	Phencyclidine	25 ng/mL	Up to 5 days
	Synthetic Cannabinoids	2 ng/mL	Up to 10 days
	Synthetic Cathinones	25 ng/mL	Up to 5 days
Miscellaneous	Armodafinil/Modafinil	100 ng/mL	Up to 5 days
	Bupropion	50 ng/mL	Up to 7 days
	Buspirone	25 ng/mL	Up to 3 days
	Clonidine	50 ng/mL	Up to 3 days
	Dextromethorphan	50 ng/mL	Up to 5 days
	Ethanol	10 mg/dL	Up to 8 hours
	Ethyl Glucuronide	500 ng/mL	Up to 3 days
	Ethyl Sulfate	200 ng/mL	Up to 3 days
	Gabapentin	5 mcg/mL	Up to 5 days
	Guanfacine	50 ng/mL	Up to 3 days
	Hydroxyzine	50 ng/mL	Up to 7 days
	Ketamine	1 ng/mL	Up to 3 days
	Methylphenidate	50 ng/mL	Up to 3 days
	Mirtazapine	10 ng/mL	Up to 7 days
	Nicotine	125 ng/mL	Up to 5 days
	Pregabalin	5 mcg/mL	Up to 5 days

DRUG CLASS	DRUG	REPORTING LIMIT	PERIOD OF DETECTION
Miscellaneous (cont.)	Trazodone	100 ng/mL	Up to 3 days
Mixed Opioid Agonists/ Antagonists	Butorphanol Nalbuphine Pentazocine	1 ng/mL 1 ng/mL 25 ng/mL	Up to 2 days Up to 2 days Up to 3 days
Muscle Relaxants	Baclofen Carisoprodol Chlorzoxazone Cyclobenzaprine Dantrolene Meprobamate Metaxalone Methocarbamol Tizanidine	500 ng/mL 200 ng/mL 50 ng/mL 10 ng/mL 50 ng/mL 200 ng/mL 50 ng/mL 500 ng/mL 5 ng/mL	Up to 3 days Up to 5 days Up to 2 days Up to 5 days Up to 7 days Up to 5 days Up to 3 days Up to 2 days Up to 2 days
Opioid Antagonists	Naloxone Naltrexone	1 ng/mL 1 ng/mL	Up to 3 days Up to 5 days
Opioids	Buprenorphine Codeine Dihydrocodeine Fentanyl Hydrocodone Hydromorphone Levorphanol Meperidine Methadone Morphine Oxycodone Oxymorphone Tapentadol Tramadol	1 ng/mL 100 ng/mL 100 ng/mL 5 ng/mL 100 ng/mL 100 ng/mL 50 ng/mL 100 ng/mL 200 ng/mL 100 ng/mL 100 ng/mL 100 ng/mL 100 ng/mL 100 ng/mL	Up to 7 days Up to 5 days Up to 5 days Up to 5 days Up to 5 days Up to 5 days Up to 5 days Up to 5 days Up to 10 days Up to 5 days Up to 5 days Up to 5 days Up to 5 days Up to 5 days
Sedative Hypnotics	Eszopiclone/Zopiclone Zaleplon Zolpidem	4 ng/mL 4 ng/mL 4 ng/mL	Up to 24 hours Up to 24 hours Up to 3 days
SNRIs	Desvenlafaxine Duloxetine Milnacipran/Levomilnacipran Venlafaxine	50 ng/mL 5 ng/mL 5 ng/mL 5 ng/mL	Up to 7 days Up to 7 days Up to 7 days Up to 7 days
SSRIs	Citalopram Fluoxetine Paroxetine Sertraline	50 ng/mL 50 ng/mL 50 ng/mL 50 ng/mL	Up to 7 days Up to 7 days Up to 7 days Up to 7 days
Tricyclic Antidepressants	Amitriptyline Clomipramine Desipramine Doxepin Imipramine Nortriptyline Protriptyline Trimipramine	10 ng/mL 10 ng/mL 10 ng/mL 10 ng/mL 10 ng/mL 10 ng/mL 10 ng/mL 10 ng/mL	Up to 7 days Up to 7 days Up to 7 days Up to 7 days Up to 7 days Up to 7 days Up to 7 days Up to 7 days

*Note: Drug detection periods will vary, depending on whether the drug is taken intermittently or chronically, and on many patient-specific factors. The above period of detection estimates are not intended to cover implants or long-acting injectables.

**Please refer to the Special Note on Marijuana section for further information related to its expected period of detection.

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