

Urine Drug Testing for Chronic Pain Management

Introduction

This resource includes three tables of information that can be used by clinicians to inform conduct of urine drug testing for opioids and other drugs. The first table provides information about two drug testing techniques, immunoassay and gas chromatography mass spectrometry, and includes a brief description of each technique and their advantages and disadvantages. A second table lists three classes of opioids: natural, semi-synthetic, and synthetic, and notes that standard immunoassays can detect only natural opioids. The third table lists five common classes of drugs and information related to their detection in a urine drug test (i.e., primary metabolites, typical detection cut-off, potential sources of false positives, and length of time they can be detected in urine).

Urine drug testing in the management of chronic pain

Adapted from:

Urine Drug Testing in Clinical Practice (2010) Gourlay DL Heit HA. Caplan, YH

http://www.familydocs.org/files/UDTMonograph_for_web.pdf

Manchikanti I et. Al. Pain Physician 2008 Opioids Special Issue 11:S155-S180

Table: Drug Testing Techniques

Drug Testing Techniques	Characteristics	Advantages	Disadvantages
Immunoassays	<ul style="list-style-type: none"> Engineered antibodies bind to drug metabolites Most commonly used technique in all settings, including hospital labs 	<ul style="list-style-type: none"> Easy to use in many settings including office-based testing Less expensive Available for specific drugs, or a panel of drugs 	<ul style="list-style-type: none"> Qualitative testing positive or negative only Often have high cut-off levels, giving false negative results Risk of cross reactivity with other agents, giving false positive results
GCMS (Gas Chromatography, Mass Spectrometry)	<ul style="list-style-type: none"> Directly measures drugs and drug metabolites 	<ul style="list-style-type: none"> Very specific, less cross-reactivity, minimizes false positives Very sensitive, detects low levels of drug, minimizes false negatives Quantitative testing 	<ul style="list-style-type: none"> Requires advanced laboratory services Very expensive

Table: Natural and Synthetic Opioids

Natural Opiates <i>from opium</i>	Semi Synthetic Opioids <i>Derived from opium</i>	Synthetic Opioids <i>Manufactured, not from natural opium</i>
Morphine Codeine Thebaine	Hydrocodone Oxycodone Hydromorphone Oxymorphone Buprenorphine Diacetylmorphine (heroin)*	Methadone Propoxyphene Fentanyl Meperidine

Typical opiate immunoassays detect only natural opiates that are metabolized to morphine, and do not detect semi-synthetic or synthetic opioids

* Heroin is metabolized to morphine, and therefore can be detected using a standard opiate immunoassay

Table: Drug metabolites, typical cut-off levels and time of detection in urine

Drug	Primary Metabolite	Typical cutoff mg/ml	Potential source of false positive	Time of detection in urine
Opiates	Morphine	300-2,000	Poppy seeds Rifampin Chlorpromazine Dextromethorphan	2-4 days
Cocaine	Benzoylcegonine	300	Very specific metabolite	1-3 days
Amphetamine Methamphetamine	Amphetamine	1,000	Ephedrine Phenylpropanolamine Methylphenidate Trazadone Bupropion Ranitidine	2-4 days
Marijuana	Tetrahydrocannabinol (THC)	50	NSAIDS Marinol Pantoprazole	1-3 days for intermittent use, up to 50 days in chronic use
Benzodiazopines	Standard assays measures oxazepam, diazepam <i>Poor detection of newer agents</i>	200	Oxaprozin	Varies with half-life agent