URINE DRUG TEST INFORMATION SHEET
OPIATES

Classification: Narcotics

Background: The milky residue collected from the opium poppy plant (opium) is the natural material from which the opiate compounds are extracted or synthesized. Opium contains morphine and codeine in a ratio of about 10 to 1. The semi-synthetic opiates derived from opium include (among others): Hydrocodone, Hydromorphone, Oxycodone and Heroin. Opiates are characterized by their analgesic properties, their similar chemical structure, and the tendency for users to form a physical dependency and develop tolerance with extended use. Codeine is a commonly prescribed analgesic taken orally, frequently in combination with acetaminophen, aspirin or other prescription drugs. Codeine is converted in the body to morphine and both are excreted in the urine. Morphine is used primarily in hospital settings as a powerful short term pain reliever. Heroin is an illicit drug no longer used therapeutically in the U.S. Heroin is rapidly converted in the body to 6-acetylmorphine (6-AM) and then to morphine. Since 6-AM is unique to heroin metabolism, its presence is evidence of heroin use, however, the absence of 6-AM in a specimen does not necessarily exclude the use of heroin.

Poppy Seeds: Poppy seeds contain enough codeine and morphine so that their consumption can result in both morphine and codeine detected in the urine. Poppy seed consumption always results in a morphine level less than 2000 ng/mL whereas following heroin use the morphine level will be much higher. The morphine/codeine ratio is similar following both heroin and poppy seed use (the morphine level about five to ten times the codeine level), thus an interpretation problem arises unless 6-AM is detected in the same specimen. The federal government raised the mandatory cutoff level for opiates on workplace drug testing from 300 to 2000 ng/mL in December 1998 to avoid the need to interpret many ambiguous test results.

Example Interpretation
1. Morphine (Mor) and Codeine (Cod) present
   a) Codeine ≥ Morphine Codeine use likely
   b) Morphine > 10000 and Mor/Cod ≥ 10:1 Heroin use likely
   c) Morphine < 10000 and Mor/Cod ≥ 10:1 Morphine or Heroin use possible

2. Only Morphine present
   a) Morphine > 10000 Morphine or Heroin use
   b) Morphine < 2000 Difficult to determine a likely source

Detection in Urine: 2-5 days

Physiological Effects: Analgesia (pain relief), respiratory depression, constipation. Long time use leads to dependence and tolerance so that a dramatic increase in dose is necessary for the same analgesic effect. Tolerance begins after the initial dose but is usually significant only after the second week of chronic use. A 35 fold increase in dose may be necessary for the same
effect. Withdrawal symptoms may begin 6-8 hours after the last dose and reach a peak at 36–72 hours.

**Toxicity:** Respiratory depression/failure is the greatest risk associated with opiate abuse aside from the risk of infection associated with illicit intravenous drug use.

**Psychological Effects:** Sedation, euphoria, mental clouding

**Cutoff Levels:**
- Immunoassay screen test: 2000 (or 300) ng/mL
- LC/MS/MS confirmation test: 2000 (or 300) ng/mL
- LC/MS/MS test for 6-AM: 10 ng/mL

**Other Opiates:** Oxymorphone (Numorphan), Levorphanol (Dromoran), Butorphanol (Stadol), Nalbuphine (Nubain), and Buprenorphine (Buprenex), are classified as narcotics. Dextromethorphan is not a narcotic and is used as an antitussive. Naltrexone (Trexan) and Naloxone block the narcotic effects of heroin and other opiates.

**Non-Opiate Narcotics:** Propoxyphene (Darvon), Meperidine (Demerol) and Methadone all exhibit narcotic analgesic properties similar to opiates. Although these drugs are sometimes classified as opiates, they do not share the same opiate chemical structure and therefore are classified separately for testing purposes.

**Summary:** The high potential for dependence and tolerance are the hallmark of the opiates. Although heroin is best known for its addictive properties, people also become dependent upon prescription drugs containing codeine, morphine and hydrocodone and oxycodone.

**HEROIN**

**Legally Obtained as:** NO LEGAL SOURCE

**Appearance:** Powder or Rock

**Mode of Use:** Injection or nasal insufflation (snorting) (up to 200 mg daily)

**Metabolism:** In the body, Heroin readily crosses the blood/brain barrier and is rapidly converted to 6-Acetylmorphine (6-AM) (within a few minutes). 6-AM is further metabolized to morphine (within hours).

Heroin usually contains codeine because it is manufactured from opium which contains morphine and codeine in a ratio of approximately 10 to 1. Heroin is rapidly metabolized in the body, first to 6-acetylmorphine (6-AM) and then finally to morphine. Heroin, the parent drug, is so rarely detected in the urine following heroin use that laboratories do not normally test for it. 6-AM is a unique metabolite of heroin and its presence is unambiguous evidence of heroin use. However, it is usually only detected in the first 12 hours following heroin use. When the morphine level is less than 2000 ng/mL, performing the test for 6-AM could be futile. However, the absence of 6-AM does not rule out heroin use.

**Specific Issues:** Following either heroin use or poppy seed consumption, morphine and codeine are detected in the urine with the morphine level approximately 10 times the codeine level. However, poppy seed consumption alone rarely results in a morphine level greater than 2000 ng/mL. When the codeine level is greater than ~1/2 the morphine level, the source is probably codeine use. When only morphine is detected the source is probably pharmaceutical morphine.
CODEINE
Legally Obtained as: Tylenol-3, Methylmorphine, Robitussin-AC, some non-prescription cough syrups (in limited states), Combined with many other prescription drugs

Mode of Use: Orally

Metabolism: The principle metabolites of Codeine are Morphine, Norcodeine and to a small extent hydrocodone. All three are excreted in the urine. Codeine is normally present in the urine at levels greater than Morphine. However, in the last 6-12 hours of the elimination process, as the levels drop toward zero, the morphine level can surpass the codeine level complicating the interpretation of the urine drug test results.

MORPHINE
Legally Obtained as: Morphine-sulfate, MS-Contin, Duramorph, Astramorph, Roxanol

Appearance: Pills, suppositories, injectable solutions

Metabolism: About 87% of a dose of Morphine is eliminated in the urine as the parent drug or as its glucuronide conjugate. Morphine does NOT metabolize to Codeine. Following Morphine use only Morphine is reported as detected in the urine.

HYDROCODONE
Legally Obtained as: Vicodin, Lortab, Anexsia, Panacet, Dihydrocodeine, and combined with other prescription drugs.

Mode of Use: Orally

Metabolism: The principle metabolite of Hydrocodone is Hydromorphone. Both are excreted in the urine. The detection time window is 3-4 days following use.

HYDROMORPHONE
Legally Obtained as: Dilaudid, Dihydromorphinone

Mode of Use: Orally, injection or as suppositories

Metabolism: Hydromorphone is excreted in the urine principally as the parent drug and its glucuronide conjugate. The detection time window is 3-4 days following use.

OXYCODONE
Background: The milky residue collected from the opium poppy plant (opium) is the natural material from which opiate compounds are extracted or synthesized. Oxycodone is a semi-synthetic opiates derived from opium. Oxycodone, like other opiates is characterized by its analgesic properties, and the tendency for users to form a physical dependency and develop tolerance with extended use. It is a commonly prescribed analgesic taken orally, frequently in combination with acetaminophen or aspirin. OxyContin, the time-release form of oxycodone, is supplied in 80 mg doses and is often called “hillbilly heroin”. When the pills are crushed, the contents can be snorted or dissolved in water and injected. Its use as a “Club Drug” is reported as on the increase.
Legally Obtained as: Precocet, Roxicet, Oxycontin, Tylox, .

Street names: Oxy; OC; hillbilly heroin

Detection in Urine: 1-3 days

Physiological Effects: Analgesia (pain relief), respiratory depression, constipation. Long time use leads to dependence and tolerance so that a dramatic increase in dose is necessary for the same analgesic effect. Tolerance begins after the initial dose but is usually significant only after the second week of chronic use. A 35 fold increase in dose may be necessary for the same effect. Withdrawal symptoms may begin 6-8 hours after the last dose and reach a peak at 36–72 hours.

Toxicity: Respiratory depression/failure is the greatest risk associated with opiate abuse aside from the risk of infection associated with illicit intravenous drug use.

Psychological Effects: Sedation, euphoria, mental clouding

Cutoff Levels: Immunoassay screen test: 300 ng/mL
LC/MS/MS confirmation test: 300 ng/mL

Mode of Use: Orally, Crushed and snorted or dissolved and injected

Metabolism: Oxycodone is excreted in the urine principally as the parent drug, its glucuronide conjugate and its metabolite, oxymorphone. The detection time window is 1-3 days following use.