

# WHAT IS HEROIN?

## And How is it Tested?

**What is it?** Heroin was first synthesized in 1874 in Germany as an alternative to morphine. The objective was a synthetic opioid that was a more potent analgesic agent but less addictive than morphine. Only the former objective was met. The Bayer pharmaceutical company marketed heroin as an alternative to codeine as a cough suppressant, and as an alternative to morphine as an analgesic agent. The number of heroin addicts that resulted caused many governments to ban heroin by the 1920s.

Today heroin is synthesized from opium obtained from the flower pod of poppies (*papaver somniferum*) grown extensively in Southeast Asia. Most of the heroin in the United States is produced in clandestine laboratories located in Mexico (black tar heroin) or Colombia (white heroin). Heroin is readily available on the streets and is considerably cheaper than oxycodone and other opioids.



Heroin is a Schedule 1 drug with a high potential for physical dependency and addiction. It is, however, available in Canada and Great Britain for use as an analgesic agent in terminal cancer patients.

Across the United States, the number of first-time heroin users has **increased 60% in the last decade**, from about 90,000 to 156,000 new users a year, according to the Substance Abuse and Mental Health Services Administration (SAMHSA).\*

\* David DiSalvo, "Why Is Heroin Abuse Rising While Other Drug Abuse Is Falling?" Forbes (January 1, 2014), <http://www.forbes.com/sites/daviddisalvo/2014/01/14/why-is-heroin-abuse-rising-while-other-drug-abuse-is-falling/>.

For more information, visit [www.cordantsolutions.com](http://www.cordantsolutions.com), email [info@cordanth.com](mailto:info@cordanth.com) or call 1-855-625-3778.

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**How is it used?** Heroin may be smoked, snorted, or injected. Many heroin addicts inject the drug intravenously for a rapid-onset high.

Heroin overdose deaths have spiked, **increasing 45% from 2006 to 2010**, according to the most recently available data from the Drug Enforcement Administration.\*

\* US Department of Justice, "Attorney General Holder, Calling Rise in Heroin Overdoses 'Urgent Public Health Crisis,' Vows Mix of Enforcement, Treatment," press release (March 10, 2014), <http://www.justice.gov/opa/pr/2014/March/14-ag-246.html>.

**Metabolism and detection in urine:** Heroin (diacetylmorphine) is rapidly converted into 6-acetylmorphine (6-AM), which has a plasma half-life of approximately 10–20 minutes and is rapidly metabolized into morphine with a half-life of 2–5 hours.

Due to its very short half-life, heroin is difficult to test in urine. 6-AM is detectable in urine up to 16 hours after use. Morphine has a detection window of approximately 3–5 days in urine.

According to the Substance Abuse and Mental Health Services Administration, SAMHSA, heroin use has been rising since 2007, **growing from 373,000 yearly users to 669,000 in 2012**.

**Tests for heroin use:** The presence of 6-AM in a urine specimen is absolute proof that heroin was used, but the detection window is very short and 6-AM may not be detectable if the morphine concentration is less than 5,000 ng/mL.

The absence of 6-AM does not rule out use of heroin.

Codeine (a component of opium) and morphine are biomarkers that may be used to detect heroin use. The presence of morphine and codeine where the morphine level is greatly in excess of the codeine level is consistent with heroin use. Hydromorphone, a minor metabolite of morphine, may also be present, especially if heroin use is chronic.

An enzyme immunoassay screening test is available for 6-AM with a 10 ng/mL cutoff, and opiate screens for codeine and morphine are available with a cutoff of 300 ng/mL.

Cordant has confirmatory tests available for 6-AM, codeine, and morphine with turnaround times of 48 hours.

Last year, there were approximately 84,000 heroin-related visits to emergency rooms in the United States.\*

\* <http://www.intheknowzone.com/substance-abuse-topics/heroin/statistics.html>

**Toxicity:** The potency and purity of "street heroin" is highly variable and is responsible for many overdose deaths in the United States. The primary cause of death is respiratory failure.

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