[Template:Distinguish-otheruses](/wiki/Template:Distinguish-otheruses" \o "Template:Distinguish-otheruses) [Template:Pp-semi-indef](/wiki/Template:Pp-semi-indef) [Template:Use dmy dates](/wiki/Template:Use_dmy_dates) [Template:Drugbox](/wiki/Template:Drugbox)

**Heroin**[Template:#tag:ref](/wiki/Template:#tag:ref) is an [opioid](/wiki/Opioid) [pain killer](/wiki/Analgesic). It is also used less commonly as a [cough suppressant](/wiki/Cough_suppressant) and as an [antidiarrhoeal](/wiki/Antidiarrhoeal). Heroin is used as a [recreational drug](/wiki/Recreational_drug) for its [euphoric](/wiki/Euphoria) effects. Frequent and regular administration is associated with [tolerance](/wiki/Drug_tolerance) and [physical dependence](/wiki/Physical_dependence). In some countries it is also [given to long-term users](/wiki/Heroin_maintenance) as a form of [opioid replacement therapy](/wiki/Opioid_replacement_therapy) alongside [counseling](/wiki/Counseling).[[1]](#cite_note-1) Administered [intravenously by injection](/wiki/Intravenous_therapy), heroin is two to four times more potent than [morphine](/wiki/Morphine) and is faster in its [onset of action](/wiki/Onset_of_action).[[2]](#cite_note-2) Illicit heroin is sometimes available in a matte-white powder [freebase](/wiki/Free_base) form.[[3]](#cite_note-3) Because of its lower [boiling point](/wiki/Boiling_point), the freebase form of heroin is [smokable](/wiki/Smoking). It is the 3,6-[diacetyl](/wiki/Acetate) [ester](/wiki/Ester) of morphine.

Heroin was first made by [C. R. Alder Wright](/wiki/Charles_Romley_Alder_Wright) in 1874 by adding two [acetyl](/wiki/Acetyl) groups to the [molecule](/wiki/Molecule) morphine, a natural product of the [opium poppy](/wiki/Papaver_somniferum). Internationally, heroin is controlled under Schedules I and IV of the [Single Convention on Narcotic Drugs](/wiki/Single_Convention_on_Narcotic_Drugs).[[4]](#cite_note-4)

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### Maintenance prescription[[edit](/index.php?title=(none)&action=edit&section=4)]

[Template:Main](/wiki/Template:Main)

Diamorphine is also used as a [maintenance drug](/wiki/Heroin_maintenance) to assist the treatment of opiate addiction, normally in long-term chronic intravenous (IV) heroin users. It is only prescribed following exhaustive efforts at treatment via other means. It is sometimes thought that heroin users can walk into a clinic and walk out with a prescription, but the process takes many weeks before a prescription for diamorphine is issued. Though this is somewhat controversial among proponents of a [zero-tolerance](/wiki/Zero-tolerance) [drug policy](/wiki/Drug_policy), it has proven superior to [methadone](/wiki/Methadone) in improving the social and health situations of addicts.[[11]](#cite_note-11) The UK Department of Health's [Rolleston Committee](/wiki/Rolleston_Committee) Report[[12]](#cite_note-12) in 1926 established the British approach to diamorphine prescription to users, which was maintained for the next 40 years: dealers were prosecuted, but doctors could prescribe diamorphine to users when withdrawing from it would cause harm or severe distress to the patient. This "policing and prescribing" policy effectively controlled the perceived diamorphine problem in the UK until 1959 when the number of diamorphine addicts doubled every 16 months during the ten years from 1959 to 1968.[[13]](#cite_note-13) In 1964 the [Brain Committee](/wiki/Brain_Committee) recommended that only selected approved doctors working at approved specialised centres be allowed to prescribe diamorphine and benzoylmethylecgonine ([cocaine](/wiki/Cocaine)) to users. The law was made more restrictive in 1968. Beginning in the 1970s, the emphasis shifted to abstinence and the use of [methadone](/wiki/Methadone); currently only a small number of users in the UK are prescribed diamorphine.[[14]](#cite_note-14) In 1994 Switzerland began a trial [diamorphine maintenance](/wiki/Heroin-assisted_treatment) program for users that had failed multiple withdrawal programs. The aim of this program was to maintain the health of the user by avoiding medical problems stemming from the illicit use of diamorphine. The first trial in 1994 involved 340 users, although enrollment was later expanded to 1000 based on the apparent success of the program.

The trials proved diamorphine maintenance to be superior to other forms of treatment in improving the social and health situation for this group of patients.[[15]](#cite_note-15) It has also been shown to save money, despite high treatment expenses, as it significantly reduces costs incurred by trials, incarceration, health interventions and [delinquency](/wiki/Wikt:delinquency).[[16]](#cite_note-16) Patients appear twice daily at a treatment center, where they inject their dose of diamorphine under the supervision of medical staff. They are required to contribute about 450 [Swiss francs](/wiki/Swiss_franc) per month to the treatment costs.[[17]](#cite_note-17) A [national referendum in November 2008](/wiki/Swiss_referendum,_November_2008) showed 68% of voters supported the plan,[[18]](#cite_note-18) introducing diamorphine prescription into federal law. The previous trials were based on time-limited executive ordinances. The success of the Swiss trials led German, Dutch,[[19]](#cite_note-19) and Canadian[[20]](#cite_note-20) cities to try out their own diamorphine prescription programs.[[21]](#cite_note-21) Some Australian cities (such as Sydney) have instituted legal diamorphine [supervised injecting centers](/wiki/Safe_injection_site), in line with other wider [harm minimization](/wiki/Harm_minimization) programs.

Since January 2009, Denmark has prescribed diamorphine to a few addicts that have tried [methadone](/wiki/Methadone) and [subutex](/wiki/Subutex) without success.[[22]](#cite_note-22) Beginning in February 2010, addicts in [Copenhagen](/wiki/Copenhagen) and [Odense](/wiki/Odense) became eligible to receive free diamorphine. Later in 2010 other cities including [Århus](/wiki/Århus) and [Esbjerg](/wiki/Esbjerg) joined the scheme. It was supposed that around 230 addicts would be able to receive free diamorphine.[[23]](#cite_note-23)However, Danish addicts would only be able to inject heroin according to the policy set by Danish National Board of Health.[[24]](#cite_note-24) Of the estimated 1500 drug users who did not benefit from the then-current oral substitution treatment, approximately 900 would not be in the target group for treatment with injectable diamorphine, either because of "massive multiple drug abuse of non-opioids" or "not wanting treatment with injectable diamorphine".[[25]](#cite_note-25)[Template:Update inline](/wiki/Template:Update_inline)

In July 2009 the German [Bundestag](/wiki/Bundestag) passed a law allowing diamorphine prescription as a standard treatment for addicts; a large-scale trial of diamorphine prescription had been authorized in that country in 2002.[[26]](#cite_note-26)

## Routes of administration[[edit](/index.php?title=(none)&action=edit&section=5)]

|  |
| --- |
| **Recreational uses:**   * [Euphoria](/wiki/Euphoria_(emotion))   **Medicinal uses:**   * [Powerful analgesic](/wiki/Analgesic) (pain killer) * [Cough suppressant](/wiki/Cough_suppressant) * Anti-[diarrheal](/wiki/Diarrhea) |
| [**Contraindications**](/wiki/Contraindication)**:**   * [Ethanol](/wiki/Ethanol) ([alcoholic beverages](/wiki/Alcoholic_beverage)), [isopropanol](/wiki/Isopropanol), [2M2B](/wiki/2M2B) * [Barbiturates](/wiki/Barbiturate) and [benzodiazepines](/wiki/Benzodiazepines) * [Stimulants](/wiki/Stimulant) * Other [opioids](/wiki/Opioid) |
| ***Central nervous system:***   * [Drowsiness](/wiki/Drowsiness) * [Disorientation](/wiki/Disorientation) * [Delirium](/wiki/Delirium)   ***Neurological:***   * [Analgesia](/wiki/Analgesia) * [Tolerance](/wiki/Drug_tolerance) * [Addiction](/wiki/Drug_addiction) * [Dependence](/wiki/Drug_dependence)   ***Psychological:***   * [Anxiolysis](/wiki/Anxiolysis) * [Confusion](/wiki/Confusion) * [Euphoria](/wiki/Euphoria_(emotion)) * [Somnolence](/wiki/Somnolence)   ***Cardiovascular & Respiratory:***   * [Bradycardia](/wiki/Bradycardia) * [Hypotension](/wiki/Hypotension) * [Hypoventilation](/wiki/Hypoventilation) * [Shallow breathing](/wiki/Shallow_breathing) * [Respiratory depression](/wiki/Hypoventilation)   ***Gastrointestinal:***   * [Nausea](/wiki/Nausea) * [Protracted](/wiki/Wikt:protracted) vomiting * [Constipation](/wiki/Constipation) * [Dyspepsia](/wiki/Dyspepsia) (heartburn)   ***Musculoskeletal:***   * [Analgesia](/wiki/Analgesia) * [Ataxia](/wiki/Ataxia) * [Muscle spasticity](/wiki/Muscle_spasticity)   ***Skin:***   * Itching * Flushing/Rash   ***Miscellaneous:***   * Dry mouth ([xerostomia](/wiki/Xerostomia)) * [Miosis](/wiki/Miosis) (pupil constriction) * [Urinary retention](/wiki/Urinary_retention)   [thumb|Diamorphine ampoules for medicinal use](/wiki/File:Diamorphine_ampoules.JPG) |

The onset of heroin's effects depends upon the [route of administration](/wiki/Route_of_administration). Studies have shown that the subjective pleasure of drug use (the reinforcing component of addiction) is proportional to the rate at which the blood level of the drug increases.[[27]](#cite_note-27) Intravenous injection is the fastest route of drug administration, causing blood concentrations to rise the most quickly, followed by smoking, [suppository](/wiki/Suppository) (anal or vaginal insertion), [insufflation](/wiki/Insufflation_(medicine)) (snorting), and [ingestion](/wiki/Ingestion) (swallowing).

Ingestion does not produce a [rush](/wiki/Rush_(psychology)) as forerunner to the high experienced with the use of heroin, which is most pronounced with intravenous use. While the onset of the rush induced by injection can occur in as little as a few seconds, the oral route of administration requires approximately half an hour before the high sets in. Thus, with both higher the dosage of heroin used and faster the route of administration used, the higher potential risk for psychological addiction.

Large doses of heroin can cause fatal respiratory depression, and the drug has been used for suicide or as a murder weapon. The serial killer [Harold Shipman](/wiki/Harold_Shipman) used diamorphine on his victims, and the subsequent [Shipman Inquiry](/wiki/Shipman_Inquiry) led to a tightening of the regulations surrounding the storage, prescribing and destruction of controlled drugs in the UK. [John Bodkin Adams](/wiki/John_Bodkin_Adams) is also known to have used heroin as a murder weapon.

Because significant tolerance to respiratory depression develops quickly with continued use and is lost just as quickly during withdrawal,[Template:Mcn](/wiki/Template:Mcn) it is often difficult to determine whether a heroin lethal overdose was accidental, suicide or homicide. Examples include the overdose deaths of [Sid Vicious](/wiki/Sid_Vicious), [Janis Joplin](/wiki/Janis_Joplin), [Tim Buckley](/wiki/Tim_Buckley), [Hillel Slovak](/wiki/Hillel_Slovak), [Layne Staley](/wiki/Layne_Staley), [Bradley Nowell](/wiki/Bradley_Nowell), [Ted Binion](/wiki/Ted_Binion), and [River Phoenix](/wiki/River_Phoenix).[[28]](#cite_note-28) Chronic use of heroin and other opioids has been shown to be a potential cause of [hyponatremia](/wiki/Hyponatremia), resultant because of excess [vasopressin](/wiki/Vasopressin) secretion.

### Oral[[edit](/index.php?title=(none)&action=edit&section=6)]

Oral use of heroin is less common than other methods of administration, mainly because there is little to no "rush", and the effects are less potent.[[29]](#cite_note-29) Heroin is entirely converted to [morphine](/wiki/Morphine) by means of [first-pass metabolism](/wiki/First-pass_metabolism), resulting in [deacetylation](/wiki/Deacetylation) when ingested. Heroin's oral bioavailability is both dose-dependent (as is morphine's) and significantly higher than oral use of morphine itself, reaching up to 64.2% for high doses and 45.6% for low doses; opiate-naive users showed far less absorption of the drug at low doses, having bioavailabilities of only up to 22.9%. The maximum plasma concentration of morphine following oral administration of heroin was around twice as much as that of oral morphine.[[30]](#cite_note-30)

### Injection[[edit](/index.php?title=(none)&action=edit&section=7)]

[Injection](/wiki/Drug_injection), also known as "slamming", "banging", "shooting up", "digging" or "mainlining", is a popular method which carries relatively greater risks than other methods of administration. Heroin base (commonly found in Europe), when prepared for injection, will only dissolve in water when mixed with an acid (most commonly citric acid powder or lemon juice) and heated. Heroin in the east-coast United States is most commonly found in the hydrochloride salt form, requiring just water (and no heat) to dissolve. Users tend to initially inject in the easily accessible arm veins, but as these veins collapse over time, users resort to more dangerous areas of the body, such as the [femoral vein](/wiki/Femoral_vein) in the groin. Users who have used this route of administration often develop a [deep vein thrombosis](/wiki/Deep_vein_thrombosis).[Template:Medcn](/wiki/Template:Medcn) Intravenous users can use a various single dose range using a [hypodermic needle](/wiki/Hypodermic_needle). The dose of heroin used for recreational purposes is dependent on the frequency and level of use: thus a first-time user may use between 5 and 20 mg, while an established addict may require several hundred mg per day. As with the injection of any drug, if a group of users [share a common needle](/wiki/Needle_sharing) without sterilization procedures, blood-borne diseases, such as HIV or [hepatitis](/wiki/Hepatitis), can be transmitted. The use of a common dispenser for water for the use in the preparation of the injection, as well as the sharing of spoons and/or filters can also cause the spread of blood-borne diseases. Many countries now supply small sterile spoons and filters for single use in order to prevent the spread of disease.[[31]](#cite_note-31) A small percentage of heroin smokers, and occasionally IV users, may develop symptoms of [toxic leukoencephalopathy](/wiki/Toxic_leukoencephalopathy). The cause has yet to be identified, but one speculation is that the disorder is caused by an uncommon [adulterant](/wiki/Adulterant) that is only active when heated.[[37]](#cite_note-37)[[38]](#cite_note-38)[[39]](#cite_note-39) Symptoms include slurred speech and difficulty walking.

[Cocaine](/wiki/Cocaine) is sometimes used in combination with heroin, and is referred to as a [speedball](/wiki/Speedball_(drug)) when injected or *moonrocks* when smoked together. Cocaine acts as a [stimulant](/wiki/Stimulant), whereas heroin acts as a [depressant](/wiki/Depressant). Coadministration provides an intense rush of [euphoria](/wiki/Euphoria) with a high that combines both effects of the drugs, while excluding the negative effects, such as [anxiety](/wiki/Anxiety) and [sedation](/wiki/Sedation). The effects of cocaine wear off far more quickly than heroin, so if an overdose of heroin was used to compensate for cocaine, the end result is fatal [respiratory depression](/wiki/Respiratory_depression).[Template:Citation needed](/wiki/Template:Citation_needed)

<gallery> File:Heroin.JPG|Preparing heroin for injection File:Anal Heroin.jpg|Modified syringe for suppository administration File:Heroin Stamp.jpg|One stamp of heroin File:chunkyno3.jpg|Chunky "No.3" heroin </gallery>

### Withdrawal[[edit](/index.php?title=(none)&action=edit&section=12)]

[Template:Main](/wiki/Template:Main) The [withdrawal](/wiki/Drug_withdrawal) syndrome from heroin (the so-called "[cold turkey](/wiki/Cold_turkey)") may begin within 6–24 hours of discontinuation of the drug; however, this time frame can fluctuate with the degree of tolerance as well as the amount of the last consumed dose. Symptoms may include:[[40]](#cite_note-40) [sweating](/wiki/Sweating), [malaise](/wiki/Malaise), [anxiety](/wiki/Anxiety), depression, [akathisia](/wiki/Akathisia), [priapism](/wiki/Priapism), extra sensitivity of the genitals in females, general feeling of heaviness, excessive [yawning](/wiki/Yawning) or [sneezing](/wiki/Sneezing), [tears](/wiki/Tears), [rhinorrhea](/wiki/Rhinorrhea), sleep difficulties ([insomnia](/wiki/Insomnia)), cold sweats, chills, severe muscle and bone aches, nausea, vomiting, [diarrhea](/wiki/Diarrhea), [cramps](/wiki/Cramps), watery eyes,[[41]](#cite_note-41) fever and cramp-like pains and involuntary spasms in the limbs (thought to be an origin of the term "kicking the habit"[[42]](#cite_note-42)).

## Overdose[[edit](/index.php?title=(none)&action=edit&section=13)]

Heroin overdose is usually treated with an [opioid antagonist](/wiki/Opioid_antagonist), such as [naloxone](/wiki/Naloxone) (Narcan), or [naltrexone](/wiki/Naltrexone). This reverses the effects of heroin and other opioids and causes an immediate return of consciousness but may result in [withdrawal](/wiki/Drug_withdrawal) symptoms. The [half-life](/wiki/Half-life) of naloxone is shorter than most opioids, so that it has to be administered multiple times until the opioid has been metabolized by the body.

Depending on drug interactions and numerous other factors, death from overdose can take anywhere from several minutes to several hours. Death usually occurs due to [lack of oxygen](/wiki/Hypoxia_(medical)) resulting from the lack of breathing caused by the opioid. Heroin overdoses can occur because of an unexpected increase in the dose or purity or because of diminished opioid tolerance. However, many fatalities reported as overdoses are probably caused by interactions with other [depressant](/wiki/Depressant) drugs such as alcohol or [benzodiazepines](/wiki/Benzodiazepine).[[43]](#cite_note-43) It should also be noted that since heroin can cause nausea and vomiting, a significant number of deaths attributed to heroin overdose are caused by aspiration of vomit by an unconscious person. Some sources quote the [median lethal dose](/wiki/Median_lethal_dose) (for an average 75 kg opiate-naive individual) as being between 75 and 600  mg.[[44]](#cite_note-44)[[45]](#cite_note-45) Illicit heroin is of widely varying and unpredictable purity. This means that the user may prepare what they consider to be a moderate dose while actually taking far more than intended. Also, tolerance typically decreases after a period of abstinence. If this occurs and the user takes a dose comparable to their previous use, the user may experience drug effects that are much greater than expected, potentially resulting in an overdose. It has been speculated that an unknown portion of heroin-related deaths are the result of an overdose or allergic reaction to [quinine](/wiki/Quinine), which may sometimes be used as a cutting agent.[[46]](#cite_note-46)

## Pharmacology[[edit](/index.php?title=(none)&action=edit&section=14)]

[thumb|](/wiki/File:Heroin_black_tar.jpg)[Black tar heroin](/wiki/Black_tar_heroin) When taken orally, heroin undergoes extensive [first-pass metabolism](/wiki/First-pass_metabolism) via [deacetylation](/wiki/Acetylation), making it a [prodrug](/wiki/Prodrug) for the systemic delivery of morphine.[[2]](#cite_note-2) When the drug is injected, however, it avoids this first-pass effect, very rapidly crossing the [blood–brain barrier](/wiki/Blood–brain_barrier) because of the presence of the acetyl groups, which render it much more [fat soluble](/wiki/Lipophilicity) than morphine itself.[[47]](#cite_note-47) Once in the brain, it then is deacetylated variously into the inactive 3-monoacetylmorphine and the active [6-monoacetylmorphine](/wiki/6-monoacetylmorphine) (6-MAM), and then to morphine, which bind to [μ-opioid receptors](/wiki/Mu_opioid_receptor), resulting in the drug's euphoric, [analgesic](/wiki/Analgesia) (pain relief), and [anxiolytic](/wiki/Anxiolytic) (anti-anxiety) effects; heroin itself exhibits relatively low affinity for the μ receptor.[[48]](#cite_note-48) Unlike hydromorphone and oxymorphone, however, administered intravenously, heroin creates a larger histamine release, similar to morphine, resulting in the feeling of a greater subjective "body high" to some, but also instances of [pruritus](/wiki/Itch) (itching) when they first start using.[[49]](#cite_note-49) Both morphine and 6-MAM are [μ-opioid](/wiki/Mu_opioid_receptor) [agonists](/wiki/Agonist) that bind to receptors present throughout the brain, [spinal cord](/wiki/Spinal_cord), and [gut](/wiki/Gut_(zoology)) of all [mammals](/wiki/Mammal). The μ-opioid receptor also binds endogenous [opioid peptides](/wiki/Opioid_peptide) such as [β-endorphin](/wiki/Beta-endorphin), [Leu-enkephalin](/wiki/Leu-enkephalin), and [Met-enkephalin](/wiki/Met-enkephalin). Repeated use of heroin results in a number of physiological changes, including an increase in the production of μ-opioid receptors (upregulation). [Template:Citation needed](/wiki/Template:Citation_needed) These physiological alterations lead to tolerance and dependence, so that stopping heroin use results in uncomfortable symptoms including pain, anxiety, muscle spasms, and insomnia called the opioid [withdrawal](/wiki/Drug_withdrawal) syndrome. Depending on usage it has an onset 4–24 hours after the last dose of heroin. Morphine also binds to [δ](/wiki/Delta_opioid_receptor)- and [κ](/wiki/Kappa_opioid_receptor)-opioid receptors.

There is also evidence that 6-MAM binds to a subtype of μ-opioid receptors that are also activated by the morphine metabolite morphine-6β-glucuronide but not morphine itself.[[50]](#cite_note-50) The third subtype of third opioid type is the mu-3 receptor, which may be a commonality to other six-position monoesters of morphine. The contribution of these receptors to the overall pharmacology of heroin remains unknown.

A subclass of morphine derivatives, namely the 3,6 esters of morphine, with similar effects and uses, includes the clinically used strong analgesics [nicomorphine](/wiki/Nicomorphine) (Vilan), and [dipropanoylmorphine](/wiki/Dipropanoylmorphine); there is also the latter's [dihydromorphine](/wiki/Dihydromorphine) analogue, [diacetyldihydromorphine](/wiki/Diacetyldihydromorphine) (Paralaudin). Two other 3,6 diesters of morphine invented in 1874–75 along with diamorphine, [dibenzoylmorphine](/wiki/Dibenzoylmorphine) and [acetylpropionylmorphine](/wiki/Acetylpropionylmorphine), were made as substitutes after it was outlawed in 1925 and, therefore, sold as the first "[designer drugs](/wiki/Designer_drugs)" until they were outlawed by the League of Nations in 1930.

## Physical and chemical properties[[edit](/index.php?title=(none)&action=edit&section=15)]

### Detection in body fluids[[edit](/index.php?title=(none)&action=edit&section=16)]

The major metabolites of diamorphine, 6-MAM, morphine, morphine-3-glucuronide and morphine-6-glucuronide, may be quantitated in blood, plasma or urine to monitor for abuse, confirm a diagnosis of poisoning or assist in a medicolegal death investigation. Most commercial opiate screening tests cross-react appreciably with these metabolites, as well as with other biotransformation products likely to be present following usage of street-grade diamorphine such as 6-acetylcodeine and codeine. However, chromatographic techniques can easily distinguish and measure each of these substances. When interpreting the results of a test, it is important to consider the diamorphine usage history of the individual, since a chronic user can develop tolerance to doses that would incapacitate an opiate-naive individual, and the chronic user often has high baseline values of these metabolites in his system. Furthermore, some testing procedures employ a hydrolysis step before quantitation that converts many of the metabolic products to morphine, yielding a result that may be 2 times larger than with a method that examines each product individually.[[51]](#cite_note-51)

## History[[edit](/index.php?title=(none)&action=edit&section=17)]

[thumb|Advertisement for](/wiki/File:BayerHeroin.png) [Bayer](/wiki/Bayer) Heroin

[Template:See also](/wiki/Template:See_also)

The [opium poppy](/wiki/Opium_poppy) was cultivated in lower [Mesopotamia](/wiki/Mesopotamia) as long ago as 3400 BCE.[[52]](#cite_note-52) The chemical analysis of [opium](/wiki/Opium) in the 19th century revealed that most of its activity could be ascribed to two [alkaloids](/wiki/Alkaloids), [codeine](/wiki/Codeine) and [morphine](/wiki/Morphine).

Diamorphine was first synthesized in 1874 by [C. R. Alder Wright](/wiki/C._R._Alder_Wright), an English chemist working at [St. Mary's Hospital](/wiki/St_Mary's_Hospital_(London)) Medical School in London. He had been experimenting with combining morphine with various acids. He boiled anhydrous morphine alkaloid with [acetic anhydride](/wiki/Acetic_anhydride) for several hours and produced a more potent, [acetylated](/wiki/Acetylated) form of morphine, now called *diacetylmorphine* or *morphine diacetate*. The compound was sent to F. M. Pierce of Owens College in Manchester for analysis. Pierce told Wright:

[Template:Quote](/wiki/Template:Quote)

[thumb|left|Bayer Heroin bottle](/wiki/File:Bayer_Heroin_bottle.jpg) Wright's invention did not lead to any further developments, and diamorphine became popular only after it was independently re-synthesized 23 years later by another chemist, [Felix Hoffmann](/wiki/Felix_Hoffmann).<ref name=HoffmanBio>Chemical Heritage Foundation [Felix Hoffmann biography](http://www.chemheritage.org/discover/online-resources/chemistry-in-history/themes/pharmaceuticals/relieving-symptoms/hoffmann.aspx) Page accessed 26 April 2015</ref> Hoffmann, working at [Bayer](/wiki/Bayer) pharmaceutical company in [Elberfeld](/wiki/Elberfeld), Germany, was instructed by his supervisor [Heinrich Dreser](/wiki/Heinrich_Dreser) to acetylate morphine with the objective of producing [codeine](/wiki/Codeine), a constituent of the opium poppy, pharmacologically similar to morphine but less potent and less addictive. Instead, the experiment produced an acetylated form of morphine one and a half to two times more potent than morphine itself. The head of Bayer's research department reputedly coined the drug's new name, "heroin," based on the German *heroisch*, which means "heroic, strong" (from the ancient Greek word "heros, ήρως"). Bayer scientists were not the first to make heroin, but their scientists discovered ways to make it, and Bayer led commercialization of heroin.[[53]](#cite_note-53) From 1898 through to 1910, diamorphine was marketed under the trademark name **Heroin** as a non-addictive morphine substitute and cough suppressant.<ref name=TimesUnion>Deborah Moore for the TimesUnion. 24 August 2014 [Heroin: A brief history of unintended consequences](http://www.timesunion.com/518life/article/Heroin-A-brief-history-of-unintended-consequences-5705610.php)</ref> In the 11th edition of Encyclopædia Britannica (1910), the article on morphine states: "In the cough of phthisis minute doses [of morphine] are of service, but in this particular disease morphine is frequently better replaced by codeine or by heroin, which checks irritable coughs without the narcotism following upon the administration of morphine."

In the U.S., the [Harrison Narcotics Tax Act](/wiki/Harrison_Narcotics_Tax_Act) was passed in 1914 to control the sale and distribution of diacetylmorphine and other opioids, which allowed the drug to be prescribed and sold for medical purposes. In 1924, the United States Congress banned its sale, importation, or manufacture. It is now a [Schedule I substance](/wiki/Schedule_I_controlled_substance), which makes it illegal for non-medical use in signatory nations of the [Single Convention on Narcotic Drugs](/wiki/Single_Convention_on_Narcotic_Drugs) treaty, including the United States.

The Health Committee of the [League of Nations](/wiki/League_of_Nations) banned diacetylmorphine in 1925, although it took more than three years for this to be implemented. In the meantime, the first [designer drugs](/wiki/Designer_drugs), viz. 3,6 diesters and 6 monoesters of morphine and acetylated analogues of closely related drugs like [hydromorphone](/wiki/Hydromorphone) and [dihydromorphine](/wiki/Dihydromorphine), were produced in massive quantities to fill the worldwide demand for diacetylmorphine—this continued until 1930 when the Committee banned diacetylmorphine analogues with no therapeutic advantage over drugs already in use, the first major legislation of this type.[Template:Citation needed](/wiki/Template:Citation_needed)

Later, as with [Aspirin](/wiki/Aspirin), Bayer lost some of its trademark rights to heroin under the 1919 [Treaty of Versailles](/wiki/Treaty_of_Versailles) following the German defeat in [World War I](/wiki/World_War_I).[[54]](#cite_note-54)[Template:Citation needed](/wiki/Template:Citation_needed)

## Etymology[[edit](/index.php?title=(none)&action=edit&section=18)]

In 1895, the German drug company [Bayer](/wiki/Bayer) marketed diacetylmorphine as an [over-the-counter drug](/wiki/Over-the-counter_drug) under the trademark name Heroin.[[55]](#cite_note-55) The name was derived from the Greek word [*heros*](/wiki/Hero) because of its perceived "heroic" effects upon a user.[[55]](#cite_note-55) It was developed chiefly as a [morphine](/wiki/Morphine) substitute for [cough suppressants](/wiki/Cough_medicine) that did not have morphine's addictive side-effects. Morphine at the time was a popular recreational drug, and Bayer wished to find a similar but non-addictive substitute to market. However, contrary to Bayer's advertising as a "non-addictive morphine substitute," heroin would soon have one of the highest rates of [addiction](/wiki/Addiction) among its users.[[56]](#cite_note-56)

## Society and culture[[edit](/index.php?title=(none)&action=edit&section=19)]

### Legal status[[edit](/index.php?title=(none)&action=edit&section=20)]

#### Asia[[edit](/index.php?title=(none)&action=edit&section=21)]

In Hong Kong, diamorphine is regulated under Schedule 1 of [Hong Kong's](/wiki/Hong_Kong) Chapter 134 *Dangerous Drugs Ordinance*. It is available by prescription. Anyone supplying diamorphine without a valid prescription can be fined $10,000 ([HKD](/wiki/Hong_Kong_dollar)). The penalty for trafficking or manufacturing diamorphine is a $50,000 (HKD) fine and life imprisonment. Possession of diamorphine without a license from the Department of Health is illegal with a $10,000 (HKD) fine and/or 7 years of jail time.[[57]](#cite_note-57)

#### Europe[[edit](/index.php?title=(none)&action=edit&section=22)]

In the Netherlands, diamorphine is a List I drug of the [Opium Law](/wiki/Opium_Law). It is available for prescription under tight regulation exclusively to long-term addicts for whom [methadone maintenance](/wiki/Methadone_maintenance) treatment has failed. It cannot be used to treat severe [pain](/wiki/Pain) or other illnesses.[[58]](#cite_note-58)[Template:Better source](/wiki/Template:Better_source)

In the United Kingdom, diamorphine is available by prescription, though it is a restricted [Class A drug](/wiki/Class_A_drug). According to the 50th edition of the [British National Formulary](/wiki/British_National_Formulary) (BNF), diamorphine [hydrochloride](/wiki/Hydrochloride) may be used in the treatment of acute pain, [myocardial infarction](/wiki/Myocardial_infarction), acute [pulmonary oedema](/wiki/Pulmonary_oedema), and [chronic pain](/wiki/Chronic_pain). The treatment of chronic non-[malignant](/wiki/Malignant) pain must be supervised by a specialist. The BNF notes that all opioid analgesics cause dependence and tolerance but that this is "no deterrent in the control of pain in terminal illness". When used in the [palliative care](/wiki/Palliative_care) of cancer patients, diamorphine is often injected using a [syringe driver](/wiki/Syringe_driver).[[59]](#cite_note-59)

#### Australia[[edit](/index.php?title=(none)&action=edit&section=23)]

In Australia diamorphine is listed as a schedule 9 prohibited substance under the [Poisons Standard](/wiki/Standard_for_the_Uniform_Scheduling_of_Medicines_and_Poisons) (October 2015).[[60]](#cite_note-60)