Cocaine

Cocaine is one of the oldest known drugs in human history. *Erythroxylon* coca leaves, which are the source of pure cocaine, have been used for thousands of years by civilizations in areas where coca leaves are indigenous. Cocaine hydrochloride, which is the extraction of the pure chemical from the coca leaf, has been a substance of abuse for more than a century. Once extracted from coca leaves, the potency of the drug increases, along with its potential for abuse and dependence. Cocaine was first extracted in the mid-19th century. In the 1880’s, cocaine’s ability to constrict blood vessels as well as provide an anesthetic effect made it useful for eye, nose, and throat surgeries. At the turn of the 20th century, cocaine was a main ingredient in many tonics and elixirs that were used to treat all types of illnesses. After the discovery of its addictive qualities, the Drug Enforcement Administration classified cocaine as Schedule II drug. This means the drug has a high potential for abuse, but a doctor can prescribe its use in some medical procedures. Some of the more current slang terms for cocaine include: blow, C, coke, flake, toot, lady, nose candy, and snow.

Cocaine Abuse
Cocaine can be abused by snorting a powder form of the substance, dissolving the substance in water and injecting it into the bloodstream, or by inhaling cocaine vapors from a free-base made for smoking (also known as crack-cocaine). The duration and intensity of the effects of cocaine depend on the method of use. Injection and smoking of cocaine produce immediate and very intense reactions, but the high experienced by users is short lived. It may last for five to ten minutes. Snorting cocaine creates a high anywhere from fifteen to twenty minutes, but the intensity of the drug is not as great. Regardless of the duration of the effects, all methods of cocaine use involve large risks to the user.

How Cocaine Affects the Brain
In the brain, dopamine is released from brain cells, or neurons, when a rewarding event happens to a person. Rewarding events cause dopamine to be discharged from neurons into the synapse, or space between neurons. The chemical then connects to the dopamine receptors of the neighboring neuron. The rest of the dopamine that did not bind to a receptor is recycled by the dopamine transporter back to the neuron that released the chemical. Cocaine alters this process of dopamine regulation. When cocaine is used, it hinders this process by blocking the dopamine transporter, and limits the ability of the neuron to recycle dopamine back into the neuron. This causes dopamine levels to increase in the synapse and thus creates continuous stimulation to the receiving neurons. This large amount of dopamine in the space between neurons is linked to the pleasurable effects the user experiences while using cocaine.

Funding in part provided by the City of Manhattan
Short-term health effects
Cocaine is a central nervous system stimulant. It is the strongest known stimulant of natural origin. While under the influence of cocaine, many people report euphoric feelings of hyperstimulation, reduced fatigue, and mental clarity. As a stimulant, cocaine can negatively affect the body in many ways. Some short-term physical effects are increases in heart rate, blood pressure, and body temperature. Cocaine also causes blood vessels to constrict and the pupils to dilate. It can result in headaches, abdominal pain, and nausea. Some people also experience loss of appetite, blurred vision, muscle spasms, insomnia, restlessness, anxiety, irritability and loss of interest in sexual activity. Repeatedly taking cocaine at increasingly higher doses, also known as bingeing, can result in paranoid psychosis. This is when the user loses touch with reality and has hallucinations.

Long-term health effects
Snorting cocaine can lead to a loss of sense of smell, problems with swallowing, nosebleeds, hoarseness, and chronically inflamed, runny nose. Extended snorting of cocaine can even lead to severe damage to the mucous membranes in the nasal septum, which can cause it to collapse. Smoking cocaine can lead to respiratory problems including shortness of breath, coughing, severe chest pains, and bleeding in the lungs. Compulsive use of cocaine may occur even more quickly when smoking the drug. Injection of cocaine increases the chance of contracting and/or transmitting infectious diseases, such as hepatitis C and HIV, due to using non-sterile needles. Injecting cocaine has been linked recently to lower immune response in the body. This results in more illnesses in cocaine users as well as more time needed to recover. Regardless of the method, using cocaine on a long-term basis can result in skin disorders, malnutrition, pregnancy problems, ulcers, kidney damage and strokes. Cocaine use is also associated with different types of heart disease.

Addiction
Using cocaine can result in psychological addiction and physical tolerance of the effects of the drug. As many as 75 percent of people who try cocaine will later become addicted to the substance. Many addicts report attempting to replicate the feelings they experienced during the first use of cocaine, but claim they can never find the same high. As tolerance builds, a person needs increased doses and more frequent use of cocaine for the brain to experience the same level of euphoric feelings. At the same time, the body is becoming more sensitive to the anesthetic and convulsing effects of the drug. This means that negative side effects occur with less amounts of the drug. Therefore, the user needs more cocaine to feel euphoric while at the same time the harmful reactions in the body can be triggered with less of the drug. This dynamic is one that can lead to overdose, and may explain why some people die from using a small amount of cocaine.

Overdose
In a fatal overdose, what normally occurs is quick, continuous convulsions or cardiac arrest, which is then followed by respiratory arrest. This onset of symptoms can quickly occur after cocaine has been ingested. In some cases, it can happen on a person's first use of cocaine. Strokes triggered by cocaine use are also known to result in death. There is no known antidote for a cocaine overdose. Therefore, when cocaine reaches toxic levels that impact the brain, there is no known method to extract the drug from the body. Once the levels of cocaine have reached this point in the body, the most likely outcome is death.

Cocaine and Alcohol
An added danger to using cocaine involves the mixture of cocaine and alcohol in the body. When these two drugs are used together, the body converts the two substances into a third substance called cocaethylene. Cocaethylene intensifies the euphoric effects of cocaine and typically stays active in the brain for a longer period of time. The toxicity of cocaethylene is greater than either alcohol or cocaine alone and it may increase the chance of sudden death. Although research on the effects of cocaethylene need to be expanded, it is known that the mixture of cocaine and alcohol is the most commonly reported drug mixture that results in drug-related deaths from combining two drugs.
Scope of Cocaine Use
Cocaine is the second most illicit drug used in the United States, surpassed only by marijuana. The National Survey on Drug Use and Health found that in 2003, 34.9 million Americans age 12 and over reported using cocaine at least once in their lifetime. This represents almost 15 percent of the population 12 years old and older. It was also found that 5.9 million Americans had used cocaine in the past year. The survey estimates that 2 million Americans are current users of cocaine and 1.5 million Americans, or 75 percent of current users, fit the criteria for dependence or abuse of cocaine.

Of current cocaine users, adults 18 to 25 years old have higher rates of use than any other age group. Approximately 15.4 percent of people in this age group report using cocaine in their lifetimes. In 2002, the average age for first use of cocaine was 20 years old. A survey from the Centers for Disease Control (CDC) found in a national survey given to high school students that cocaine use has increased in this population in the past decade. Approximately 9.4 percent of high school students admit to using cocaine at least once in their lifetime, while 4.2 percent said they have used cocaine in the past 30 days. The Drug Abuse Warning Network (DAWN) monitors drug related visits to hospital emergency rooms around the country. This public health surveillance system found cocaine to be the most frequently mentioned illicit substance reported by hospital emergency departments nationwide. In 2002, cocaine was present in 30 percent of drug episodes at emergency departments in America. Cocaine mentions at emergency rooms has increased nearly 50 percent since 1995.

Treatment
Cocaine abuse and addiction is a complicated problem that involves many aspects, including biological changes in the brain, social, familial, and environmental factors. Thus, treatment of cocaine addiction must address all of these aspects. There are no medications on the market today that are used to primarily treat cocaine addiction. However, because a common early side effect of withdrawal from cocaine is depression, antidepressants are often prescribed to help with mood changes. Residential and outpatient approaches to cocaine treatment often use behavioral treatments. In behavioral treatments, a treatment plan includes help with addiction as well as other areas that may need assistance. For example, if someone were unemployed, behavioral treatments would look to address this problem by giving career counseling or vocational rehabilitation, as well as help with the addiction. Cognitive-behavioral therapy is another common, effective treatment to cocaine addiction. This treatment technique emphasizes the patient’s recognition of situations in which cocaine is most likely to be used, plan ways to avoid these situations, and utilize different methods of coping with problems that often trigger the need to use cocaine.

Factoids
• In September of 2004, it was reported that drug officials discovered a new strain of coca plant during an anti-drug sting in Colombia. The new plant was developed through crossbreeding and genetic engineering, and can yield up to four times the amount of cocaine of a regular coca plant. In addition, the plant is resistant to the chemicals used by officials to exterminate drug crops in Colombia.
• Cocaine has surpassed coffee as Colombia’s number one export. This illicit industry is a $35 billion business.
• One in ten workers in the United States claims to know someone who uses cocaine while on the job.
• FBI chemists have discovered that traces of cocaine can be found on almost every dollar bill in the United States. Cocaine is a substance that binds with the ink in paper currency.