



**HEADS UP**  
**REAL NEWS**  
**ABOUT DRUGS**  
**AND YOUR BODY**

# POISON



# VAPORS:

# THE TRUTH ABOUT INHALANTS

**Inhalants can cause harm to the whole body,  
including long-lasting damage to the brain,  
physical disabilities, and even death.**

Photo credits: spray from aerosol can © Hardy/zeta/CORBIS; household products inset © Custom Medical Stock Photo; ball and chain © Paul Hardy/CORBIS.

## One Harmful Effect of Inhalants

### WHAT IS AN INHALANT?

Inhalants are toxic—that is, **poisonous**—chemical vapors that can be misused to produce mind-altering effects, often with disastrous results.

These harmful vapors can be found in a variety of common household and office products, including nail polish remover, gasoline, aerosol sprays, correction fluid, whipped cream canisters, computer spray cleaners, paint thinners, and markers. Even when used for their intended purposes, such as cleaning or painting, these products are so toxic that they are recommended for use only in well-ventilated areas. That's to prevent people from accidentally breathing in the poison. When they are intentionally inhaled in order to experience a "high," they are known as **inhalants**, and can cause serious harm to the whole body. Abuse of certain inhalants may result in irreversible effects, including hearing loss, limb spasms, bone marrow damage, and damage to the central nervous system and brain. Serious but reversible effects may include liver and kidney damage and depletion of oxygen in the blood. An adequate blood oxygen level is critical to the function of every organ and tissue in our bodies.



### HEADS UP: ONE TIME IS ONE TOO MANY

Inhalants are incredibly effective poisons. They enter the bloodstream quickly and are then distributed throughout the brain and body. They have direct effects on both the central nervous system (brain and spinal cord) and the peripheral nervous system (nerves throughout the body).

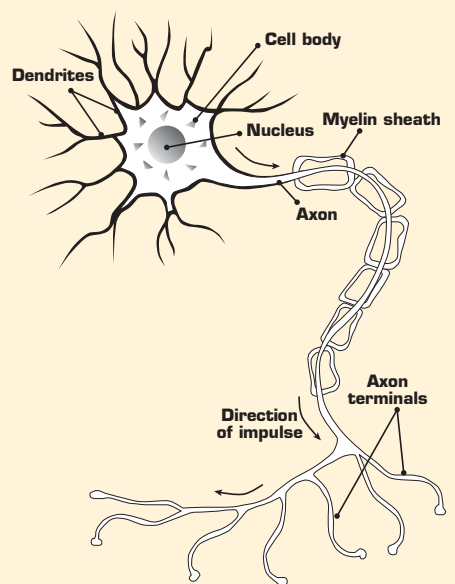
How severely can inhalants harm you? According to Dr. David Shurtleff, who heads the Division of Basic Neurosciences and Behavior Research at the National Institute on Drug Abuse (NIDA), they can affect your ability to think, talk, remember, hear, and even walk. They may be addictive, and they can wreak havoc on a healthy body from head to toe, causing hearing loss, vision loss, convulsions, and damage to the lungs, liver, kidneys, heart, bone marrow, and muscles.

Most frightening is that just one time can be one too many with inhalants. As explained by Dr. Nora D. Volkow, director of NIDA, "Even in an otherwise healthy person, a single session of abusing highly concentrated amounts of certain inhalants can lower oxygen levels enough to cause asphyxiation, or disrupt heart rhythms and cause death from cardiac arrest." There's a chilling name for this: *sudden sniffing death*. There are people—including teens and pre-teens—who have used inhalants and paid the ultimate price.

Consider Kyle Williams, a 14-year-old who kissed his mom goodnight and headed to his room one evening in March 2005. The next morning his

Inhalants destroy nerve fibers throughout an inhalant abuser's brain, which can lead to muscle spasms and difficulty with basic activities like walking and talking. How do inhalants destroy nerve fibers? Primarily by causing the myelin around them to deteriorate. Myelin is typically found in a thick layer around the axons, the long parts of nerve fibers through which impulses flow. If you picture nerve cells as your body's electrical wiring, then think of myelin as the rubber insulation that protects an electrical cord. When myelin breaks down, nerves become much less capable of transmitting messages. What happens? Imagine attaching heavy weights to your ankles just before leaving the starting blocks in a fifty-yard dash. When there's a normal heavy layer of myelin around the axon, nerve impulses travel as fast as 120 meters per second. Without myelin, these impulses slow to a crawl of only about 2 meters per second. Do the math—that's a deceleration of over 95 percent! In short, a losing pace.

### Inhalant Abuse Breaks Down the Myelin Sheath Surrounding Nerve Fibers



# INHALANTS: POISON VAPORS



## HEADS UP REAL NEWS ABOUT DRUGS AND YOUR BODY

mother went in to wake Kyle up. Instead, she found him dead in bed, with a straw from the can of computer cleaner he had inhaled still in his mouth. One of Kyle's friends had shown him how to get high this way about a month before. Some might think such cans contain nothing but compressed air. They couldn't be more mistaken.

### HOW INHALANTS DO THEIR DAMAGE

Inhalant vapors often contain more than one chemical, increasing the risk of serious harm. Some chemicals leave the body quickly, but others are absorbed by fatty tissues in the nervous system, including the brain. They can stay there for a long time.

One of these fatty tissues is myelin—a protective cover that surrounds many of the body's nerve cells (neurons). Nerve cells in your brain and spinal cord send and receive messages that control just about everything you think and do. Deterioration of myelin can lead to muscle spasms, tremors, or even difficulty with basic actions such as walking, bending, and talking.

Toluene, one of the most common chemicals in inhalants, is found in glue, spray paint, paint thinner, and a number of other products known as solvents.

Toluene can damage myelin—and also the liver, the kidneys, and the ability to hear.

Other inhalants such as benzene (found in gasoline) can compromise the body's ability to produce blood

## Heads Up: Inhalants Are Poisons That Affect the Whole Body

Check out this diagram to learn about the damage the chemicals in inhalants can do.

### Blackouts

Inhalants can cause rapid changes in blood pressure, which can lead to blackouts and fainting.

### Hearing Loss

Inhalants can cause hearing loss, perhaps by damaging the hairs of the inner ear or by harming the protective coating (myelin) on the nerves that carry sound impulses to the brain.

### Damage to Central Nervous System

Fumes from inhalants can change brain chemistry and permanently damage the central nervous system (brain and spinal cord).

### Liver and Kidney Damage

Inhalants can cause serious harm to these organs, which have many vital functions, including filtering harmful substances out of the body.

### Bone Marrow Damage

Inhalants can damage bone marrow, where blood cells are made, increasing the risk of leukemia and aplastic anemia (potentially fatal illnesses).

### Limb Spasms

Inhalants break down the myelin needed for nerves to transmit messages, resulting in muscle spasms and tremors in arms and legs.

Inhalant	Sources	Harmful Effects
Toluene	<ul style="list-style-type: none"> <li>Spray paint</li> <li>Glue</li> <li>Dewaxer</li> <li>Fingernail polish</li> </ul>	<ul style="list-style-type: none"> <li>Hearing loss</li> <li>Damage to central nervous system</li> <li>Liver and kidney damage</li> </ul>
Trichloroethylene	<ul style="list-style-type: none"> <li>Cleaning fluid</li> <li>Correction fluid</li> </ul>	<ul style="list-style-type: none"> <li>Hearing loss</li> <li>Liver and kidney damage</li> <li>Vision damage</li> </ul>
Hexane	<ul style="list-style-type: none"> <li>Glue</li> <li>Gasoline</li> </ul>	<ul style="list-style-type: none"> <li>Limb spasms</li> <li>Blackouts</li> </ul>
Nitrous Oxide	<ul style="list-style-type: none"> <li>Whipped cream dispensers</li> <li>Gas cylinders</li> </ul>	<ul style="list-style-type: none"> <li>Limb spasms</li> <li>Blackouts</li> </ul>
Benzene	<ul style="list-style-type: none"> <li>Gasoline</li> </ul>	<ul style="list-style-type: none"> <li>Bone marrow damage</li> <li>Immune system damage</li> </ul>



cells, which can lead to a life-threatening disease called aplastic anemia. Various chemicals in other inhalants can also cause hepatitis, liver failure, weight loss, muscle weakness, disorientation, inability to concentrate, loss of coordination, irritability, and depression. In short, *inhalants can seriously mess you up.*

## **H**HEADS UP: THERE ARE NO SAFE INHALANTS

Some teens who understand the dangers of inhaling glue or computer cleaner may believe that inhaling nitrous oxide is safe—maybe because medical professionals sometimes administer it. **They are wrong.** Nitrous oxide, also known as laughing gas, is an odorless gas used by dentists as a painkiller, but when abused, it can be as dangerous as any other inhalant. It can damage your peripheral nerves, causing numbness, tingling, and even paralysis. It also causes blackouts.

When you breathe in pure

nitrous oxide, it binds with the oxygen in your blood. This means your body's tissues can't get the oxygen they need. Dentists never give pure nitrous oxide to patients. They always mix it with oxygen. People who sell balloons or little canisters filled with nitrous oxide on the street or at concerts don't know how to do this—and even if they did, they wouldn't bother. If you inhale nitrous oxide outside of a dentist's office, you'll likely be flooding your body with sulphuric acid, ammonia, and nitric oxide—all toxic substances.

## **H**HEADS UP: YOUNGER TEENS ARE MOST AT RISK

It is vitally important that you tell your friends what you've learned about the risks of inhalants. While recent studies show that overall drug abuse is down among teens, the abuse of inhalants has increased, especially among younger teens. According to the most recent Monitoring the Future

survey, a study of youth drug trends sponsored by NIDA, twice as many 8th-graders as 12th-graders are using inhalants. In 2004, more than 17 percent of this age group reported having used inhalants at least once in their lives—a statistically significant increase compared with the previous year.

A key problem revealed by the Monitoring the Future survey is that more than **38 percent of 8th-graders didn't realize that regular use of inhalants is harmful.** More than 66 percent of this age group didn't think that using inhalants once or twice was risky. This lack of awareness can set the stage for disastrous health consequences. The more kids know about the harmful effects of inhalants, the more likely they'll be able to make the smart choice and avoid inhalants altogether.

**For help with a drug problem or to locate treatment centers, go to [www.findtreatment.samhsa.gov](http://www.findtreatment.samhsa.gov) or call the national hotline at 1-800-662-HELP.**

## Cutting Edge: Drug-Abuse Statistics

**To find out the data about dangers for teens regarding inhalants and other drugs of addiction, check out these Web sites for the latest statistics:**

**[www.drugabuse.gov](http://www.drugabuse.gov)** Scientific information from NIDA about all drugs of abuse and advice on how to quit.

**<http://monitoringthefuture.org>** Here you'll find data from the latest Monitoring the Future survey. Funded by NIDA, this survey of youth drug-use trends has been conducted annually by the University of Michigan's Institute for Social Research for more than 25 years.

**[www.nida.nih.gov/about/organization/CEWG/CEWGH.html](http://www.nida.nih.gov/about/organization/CEWG/CEWGH.html)** Established by NIDA in 1976, the Community Epidemiology Work Group (CEWG) provides ongoing community-level surveillance of drug abuse through analysis of quantitative and qualitative research data.

**[www.drugabusestatistics.samhsa.gov](http://www.drugabusestatistics.samhsa.gov)** Enter this site to access findings from the National Survey on Drug Use and Health, which investigates national drug-use trends among the general population age 12 and older.

**[www.cdc.gov/healthyyouth/yrbs/index.htm](http://www.cdc.gov/healthyyouth/yrbs/index.htm)** This will take you to the Youth Risk Behavior survey, which collects data from students in grades 9–12 nationwide. It includes questions on a variety of health-related risk behaviors, from drug use to seat-belt use.



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