INHALANT ABUSE

And What To Do About It
What Is Inhalant Abuse?

1. Deliberate inhalation of fumes, vapors or gases to “get high”
2. “Sniffing,” “Huffing,” or “Dusting”
3. More than 1,400 household products
4. High of choice for 6-12 year olds
5. 26% (1 in 4) children in 6th grade have used inhalants
6. Fourth most abused substances after cigarettes, alcohol, and marijuana
7. Can lead to later abuse of illegal drugs
Substances Inhaled...

HOUSEHOLD HIGH/S
Substances Inhaled...
Commonly Abused Products

- **Gases**
  - Nitrous oxide, helium, refrigerants, propane, amyl nitrate (poppers)

- **Cleaning Agents**
  - Spot remover, degreaser

- **Solvents and Fuels**
  - Butane, propane, nail polish remover, paint thinner/removed, correction fluid, permanent markers, gasoline, engine octane boosters
Commonly Abused Products, cont.

- **Aerosols**
  - Spray paint, hair spray, air freshener, deodorant, fabric protector, computer keyboard cleaners

- **Adhesives**
  - Model airplane glue, rubber cement, PVC cement

- **Foods**
  - Cooking spray, aerosol whipped cream toppings
<table>
<thead>
<tr>
<th>Street Terms for Inhalants</th>
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<tbody>
<tr>
<td>Amys</td>
</tr>
<tr>
<td>Bolt</td>
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<tr>
<td>Bullet</td>
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<tr>
<td>Glading</td>
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<tr>
<td>Hardware</td>
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<tr>
<td>Hippie crack</td>
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<tr>
<td>Locker room</td>
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<tr>
<td>Poppers</td>
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<td>Snappers</td>
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</table>

Examples of Abusable Products

**Kitchen**
- Whipped cream
- Whippets (Nitrous oxide cartridges)
- Cooking spray
- Insecticides
- Spray (aerosol) cleaners

**Basement or workshop**
- Spray lubricants
- Fabric protector
- Paint, cans or spray (especially gold or silver spray paint)
- Paint and Lacquer thinner
- Toluene, mineral spirits
- Paint remover, stripper
- Contact cement

**School and art supplies**
- Computer gas duster
- Correction fluid & thinner
- Permanent magic markers
- Dry erase markers
- Contact and rubber cement
- Airplane or model glue
- Spray adhesive

**Bathroom**
- Hair spray
- Air freshener
- Nail polish and remover
- Spray deodorant
- Spray cleaners

**Garage**
- Stove fuel
- Propane (from barbeque grills, portable torches)
- Gasoline
- Carburetor cleaner
- Charcoal starter fluid
- Car starter fluid
- Flat tire repair aerosol cans

**Miscellaneous**
- Any spray (aerosol) cans
- Mothballs
- Freon from air conditioners, refrigerators
- Halon (from fire extinguisher)
- Gas cigarette lighters
- Gas cigarette lighter refills (butane)
- Lighter fluid
- Dry cleaning fluid and spot removers

**Anesthetics**
- Nitrous oxide
  - Balloons & tanks
  - “whippets” (mini-tanks)
  - whipped cream
- Ether
- Chloroform

**Nitrites**
- Amyl nitrite
- Butyl nitrite
How It’s Done......
Mechanisms of Abuse

4 Sniffing from a container, bag, cans, clothing:
   - “Bagging” - paper or plastic bag containing inhalant held to nose, head or over head

4 Inhaling from a chemical-soaked rag, open container or balloon:
   - “Huffing” - Solvent applied onto nasal mucosa or nearby surface (shirt collar); Using familiar innocuous containers to conceal product and inhaling fumes out of soft drink can or nitrous-oxide-filled balloons

4 Aerosol sprayed directly into mouth or nose:
   - “Dusting” - canister straw placed into nose or mouth
How It’s Done......
Mechanisms of Abuse, cont.

• Fast onset of “high”

• Different products operate differently on the body
  – Some stimulate dopamine release
  – Some dilate blood vessels
  – Some stimulate the GABA receptors and inhibit NMDA receptors, slowing CNS
  – Some contribute to toxic fumes replacing oxygen in the lungs (asphyxia)
Inhalation Abuse
What is the high like?

- Capable of producing a quick generally pleasurable sensory experience
- Rapid dissipation
- Minimal “hangover” symptoms
- Widely available, convenient, cheap, easily concealed, legal for specific uses
Epidemiology of Inhalant Abuse

- **Peak age is 14-15 y/o**
  - Onset young as 5-6
  - Use declines by 17-19
  - Use continued into adulthood
    - Work related hazard
    - Men having sex with men

- **Annual survey of drug use in US**
  - 72.3% of Inhalant abusers were younger than 18 (16 = mean)
  - No significant changes since 2002
  - Prevalence of lifetime inhalant use ("ever used") among 12th graders has ranged from 10.3% (1976) to 18% (1990).
  - 2006 rate 11.1%
  - According to recent NIDA data, fewer 8th and 10th graders view inhalant use as dangerous, potentially leading to an upswing in use.
Past Month Drug Use Rates

Source: NIDA, Monitoring the Future, Nat’l Results on Adolescent Drug Use, 2004
Percentages of Youths Aged 12 or 13 Who Participated in Delinquent Behaviors, by Lifetime Inhalant Use

- Serious Fight at School or Work: 20.3% (Lifetime Use), 45.0% (Never Used)
- Group-Against-Group Fight: 15.0% (Lifetime Use), 38.7% (Never Used)
- Attacked Someone with Intent to Seriously Hurt Them: 5.6% (Lifetime Use), 20.2% (Never Used)
- Stole or Tried to Steal Anything Worth More Than $50: 1.7% (Lifetime Use), 10.2% (Never Used)
- Sold Illegal Drugs: 0.6% (Lifetime Use), 3.2% (Never Used)
- Carried a Handgun: 2.1% (Lifetime Use), 7.6% (Never Used)
Data from the NSDUH

- Male and female adolescent rates similar.
- Rural use is highest. Native Americans have the highest rates followed by Whites and Hispanics. Blacks have very low rates.
- About 35% of youths aged 12 or 13 who used inhalants in their lifetime also used another illicit drug compared with 7.5% of youths aged 12 or 13 who had never used inhalants in their lifetime.
- Adolescents with a history of foster care were 5x more likely to become inhalant dependent than those never placed away from home.
- Adolescents who were treated for mental health problems in the past year were 4x more likely to be dependent on inhalants than those who received no service.
Short and Long Term Effects
Signs & Symptoms
Short Term Effects

- Headache
- Muscle weakness
- Abdominal pain
- Severe mood swings
- Violent behavior
- Slurred speech
- Numbness and tingling in hands and feet
- Fatigue
- Lack of coordination
- Apathy
- Impaired judgment
- Dizziness
- Loss on consciousness
Signs & Symptoms

Long Term Effects

- Short-term memory loss
- Emotional instability
- Cognitive impairment
- Slurred & “scanning” speech
- Tremor
- Loss of sense of smell
- Diffuse cerebral, cerebellar, & brainstem atrophy
- Optic neuropathy
- Weight loss
- Muscle weakness
- Staggering or stumbling
- Wide-based ataxic gait
- Irritability
- Depression
- Hearing loss
Additional Damage Caused By Inhalants

- Chronic inhalation of nitrous oxide (whipped cream propellant) and hexame (found in some glues and camp stove fuels) results in damage to the peripheral nerves. Symptoms can include numbness, a tingling sensation or total paralysis.

- Toluene destroys cells that relay sound to the brain. Chronic abusers can become deaf.
Additional Damage Caused By Inhalants, cont.

- Repeated use of spray paint as an inhalant can cause lung damage.
- Some substances like nitrites and methylene chloride (paint thinner) chemically block the oxygen carrying capacity of the blood.
- Toluene appears to affect the ophthalmic nerve causing sight disorders.
- Inhalant damage to the cerebellum results in loss of coordination & slurred speech.
Additional Damage Caused By Inhalants, cont.

- “Sudden sniffing death syndrome” is due to a sudden, unexpected disturbance of the heart’s rhythm. **ALL inhalants can produce sudden death syndrome.**

- Cellular death in the brain causes permanent personality changes, memory impairment, hallucinations & learning disabilities.

- Chronic abusers experience tremors and uncontrollable shaking.

- Chronic abuse also leads to muscle wasting.
Causes of Death from Inhalant Abuse

**Acute:**

- Direct Causes: immediate or postponed “Sudden Sniffing Death Syndrome.”
- Indirect Causes: suffocation, aspiration, trauma, drowning, fire, other
Sudden Sniffing Death Syndrome

- Not dose dependent
- Ramsey et al. (1989) noted it in 22% of inhalant abusers
- Leading cause of death among inhalant abusers

Mechanism of Sudden Sniffing Death:
- Hydrocarbons and other inhalants sensitize the myocardium to epinephrine
- Stressor causing increased epinephrine causes fatal arrhythmia
Causes of Death from Inhalant Abuse

Delayed

- Cardiomyopathy
- Central nervous system toxicity: toluene dementia and brainstem dysfunction
- Hematologic: aplastic anemia, leukemia
- Hepatocellular carcinoma
- Renal toxicity: nephritis, nephrosis, tubular necrosis
This is your brain....on Inhalants

Brain images show marked atrophy (shrinkage) of brain tissue in a toluene abuser (B) compared to a nonabusing individual (A). Note the smaller size and the larger empty (dark) space within the toluene abuser's brain. (The white outer circle in each image is the skull.)
Inhalant Abuse and Mental Health Disorders
Prevalence (%) of lifetime mood disorders among adult lifetime inhalant users, by gender

- Major depression
  - Male: 38
  - Female: 48
- Dysthymia
  - Male: 16
  - Female: 24
- Mania
  - Male: 15
  - Female: 15
- Hypomania
  - Male: 9
  - Female: 5

P = .05
Prevalence (%) of lifetime anxiety disorders among adult inhalant users, by gender

- Panic disorder w/ agoraphobia
  - Male: 4%
  - Female: 3%

- Panic disorder w/o agoraphobia
  - Male: 11%
  - Female: 25%
  - *P<.01*

- Social phobia
  - Male: 11%
  - Female: 16%

- Specific phobia
  - Male: 14%
  - Female: 28%
  - *P<.01*

- Generalized anxiety disorder
  - Male: 9%
  - Female: 15%
Prevalence (%) of lifetime personality disorders among adult lifetime inhalant users, by gender

- Avoidant
  - Male: 8
  - Female: 9

- Dependent
  - Male: 2
  - Female: 2

- Obsessive-compulsive
  - Male: 15
  - Female: 18

- Paranoid
  - Male: 12
  - Female: 13

- Schizoid
  - Male: 7
  - Female: 8

- Histrionic
  - Male: 8
  - Female: 7

- Antisocial
  - Male: 35
  - Female: 22

P < .01
Prevalence (%) of lifetime personality disorders among adult lifetime inhalant users, by age of onset of first inhalant use.
### Prevalence (%) of past-year psychiatric disorders among adult lifetime inhalant users, by age of onset of first inhalant use

<table>
<thead>
<tr>
<th>Disorder</th>
<th>Before 18 years old</th>
<th>18 or older</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major depression</td>
<td>20.3</td>
<td>15.1</td>
</tr>
<tr>
<td>Dysthymia</td>
<td>9.3</td>
<td>5.6</td>
</tr>
<tr>
<td>Mania</td>
<td>6.6</td>
<td>6.2</td>
</tr>
<tr>
<td>Hypomania</td>
<td>6.5</td>
<td>3.2</td>
</tr>
<tr>
<td>Panic disorder w/ agoraphobia</td>
<td>3</td>
<td>1.2</td>
</tr>
<tr>
<td>Panic disorder w/o agoraphobia</td>
<td>6.1</td>
<td>5.3</td>
</tr>
<tr>
<td>Social phobia</td>
<td>8.5</td>
<td>6.9</td>
</tr>
<tr>
<td>Specific phobia</td>
<td>12.5</td>
<td>7.4</td>
</tr>
<tr>
<td>Generalized anxiety disorder</td>
<td>15</td>
<td>4.4</td>
</tr>
</tbody>
</table>

**Mood disorders**

**Anxiety disorders**
Warning Signs
Warning Signs

- “Highs” are temporary
- First clues
  - Change in behaviors at home and school
  - Drop in grades, loss of interest in favorite activities
  - Change in group of friends or activities
- Medical signs are often non-specific
  - Healthcare professionals often baffled by symptoms
  - No quick diagnostic tests available
Warning Signs, cont.

- Chemical odor on body and clothes or in room
- Red, glassy, or watery eyes & dilated pupils
- Slow, thick, or slurred speech
- Staggering gait, disorientation, spastic movements
- Inflamed nose, nosebleeds & rashes around nose & mouth
- Pains in chest & stomach, headaches
- Intoxication, irritability, aggression
- Seizure, coma
- Shortness of breath
- Ink on nail beds
Prevention and Treatment Challenges
Legal Substances

1. Inhalants have widespread legitimate uses for which they are legal.
   - Illegal to use as a drug in some states.

2. Legal manufacturing and distribution system
   - Manufacturers
   - Retail
   - Teachers
   - Youth leaders
   - Parents
Inhalants are ubiquitous

- Retail
- Schools
- Homes
- Offices
- Medical Settings
- Treatment Programs
Misconceptions Persist

- Used inside the body/home so can’t be dangerous
  - Air freshener, cooking spray, whipped cream, nail polish, markers, paint
- Not viewed as harmful or addictive
- Thought to be rare; Doesn’t arouse suspicions of adults
- Risks unknown to many parents, adolescents, providers
Treatment Options are Limited

- Traditional drug treatment facilities do not like to admit inhalant abusers
  - Failure rate is very high
  - Testing difficulties
  - Treatment takes months, possibly years

- Inhalant abusers differ from drug abusers
  - Often have multiple problems
  - They’re typically younger
  - May be cognitively damaged by inhalants
  - Treatment progress can be slower due to cognitive impairment
  - Most treatment facilities not equipped or skilled enough to handle complexity of abusers’ needs
Inhalation Abuse Detection...

- **Thorough History and Physical**
  - Networked with knowledgeable medical personnel

- **Blood tests:**
  - Elevated LFT(s)
  - Specific urine testing
    - Urine metabolite
      - Benzene- check for phenol
      - Toluene- check for hippuric
Prevention Strategies

- Regulation and Legislation
- Product Reformulation and Labeling
- Awareness/Prevention/Education
Product Labeling
Fellowes®
AIR DUSTER™

DIRECTIONS: Can must be upright when spraying. Do not lift more than 40° while spraying or shake can during use. Before use, press actuator to clear valve from any liquid product especially when using on photographic negatives. Use extension tube in tight areas. Use short burst to prevent melting of can. Do not breathe fumes. Avoid contact with skin and eyes. Store in a cool dry place.

CAUTION: CONTENTS UNDER PRESSURE. This product is not defined as flammable by 16 CFR, 1900.3, Consumer Products Safety Commission Regulations. HOWEVER THIS PRODUCT CAN BE IGNITED UNDER CERTAIN CIRCUMSTANCES. Keep away from flames. Do not use while smoking. Do not spray in or around paper shredders or electrical motors as vapors may ignite. Do not expose can to heat or store at temperatures above 122°F (50°C). Do not store in direct sunlight or in enclosed vehicles. Exposure to heat may cause can to burst. Do not puncture or incinerate container even if considered empty as can may explode. Liquid contents may cause frost bite on contact with skin; therefore do not store in pockets, do not lift, shake, or turn upside down before or during use. Contact physician if frostbite occurs. Avoid contact with flame or hot surfaces which can cause toxic vapor formation. Use only in a well ventilated area. Do not spray into enclosed spaces, such as inside cabinets, chests, or within small enclosures, as vapors may collect and exceed safe breathing levels. Vapors heavier than air and displace oxygen available for breathing.

Contains Dichloromethane CAS: 75-37-2
KEEP OUT OF REACH OF CHILDREN.

INTENTIONAL MISUSE BY DELIBERATELY INHALING CONTENTS CAN BE FATAL.

PARENTS: STOP INHALANT ABUSE
SEE www.inhalants.org


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INTENTIONAL MISUSE BY DELIBERATELY INHALING CONTENTS CAN BE FATAL.
Public Awareness

- Individuals
- Schools
- Families
- Community
Community

- Business/retailers
- Health/medical personnel
- Law enforcement
- First responders
- Poison Control
- Faith-based
- Community agencies
- Volunteer organizations
- Media
SNIFFING MARKERS DESTROYS YOUR BRAIN.

Sniffing stuff like spray paint or markers can cause brain damage, lung damage, even death.

SNIFFING CORRECTION FLUID CAN STOP YOUR HEART.

If you sniff to get high, you're inhaling poisons that do definite damage. So stop. Before your heart does.
Assessment & Treatment Considerations

- Medical Screening
  - Impairments in liver, kidneys, motor coordination, CNS, lungs, heart, hearing, vision, smell/touch

- Neurological Tests
  - Brain damage can occur from even occasional use

- Mental Health/Emotional Problem Screening

- Cognitive Tests
Assessment & Treatment Considerations

Modalities specific to inhalation abuse not well studied so we tend to use the usual interventions with them:

- CBT
- Multi-system family therapy
- 12 step facilitation
- Motivational Enhancement techniques
Treatment Considerations: Inhalation Abuse

Recovery Model
- Carl Bell M.D.
- “Risk Factors are not Predictive Factors because of Protective Factors”
- Bell et al 2007
  • Identified five
Treatment Considerations: Inhalation Abuse

Bell et al 2007

- Identified five empirically supported intervention principles that should be used to guide and inform intervention and prevention efforts at the early to mid-term stages for mass trauma intervention.

Promoting:

- 1. sense of safety
- 2. calming
- 3. sense of self and community efficacy
- 4. connectedness