

"HOT SHEET"



4TH QUARTER - 2025

Objective: The goal of this, and subsequent bulletins, is to provide information regarding identified changes in drug trends, and/or to educate and forewarn about newly identified substances.

Subject Matter: This release provides information regarding the volatile chemicals called alkyl nitrites ("poppers"), which are readily available throughout American retail channels. Due to their widespread availability, this information is presented to provide guidance on understanding what poppers are, and their potential threat to public health and safety.

What is a Popper?

Poppers refer to a group of volatile chemicals called alkyl nitrites that people inhale for recreational effects.^[1] Originally developed as a medical treatment for angina pectoris (chest pain) in the 1860s^[2], these substances have been misused for non-medical purposes since the 1960s.^[1]

The term "poppers" originated from the popping sound made when glass amyl nitrite capsules were crushed between the fingers to release vapors.^[1] Chemically, poppers include several variations such as amyl nitrite, butyl nitrite, isobutyl nitrite, and isopropyl nitrite.^[1]

They typically come as yellowish liquids in small screw-top bottles, emitting a strong smell that some describe as sweet, like ripe bananas, while others compare the odor to rotten apples or dirty socks.^[3]

Source: Board of Trustees of the Science Museum



"Tin of Vaporole amyl nitrite ampoules as they were sold at the beginning of the 20th Century"

Health Officials Link Poppers to Brain and Heart Damage

Federal agencies now warn about severe neurological damage from popper use. The Food and Drug Administration (FDA) has documented a troubling rise in deaths and hospitalizations linked to these substances.^[4] Medical evidence shows poppers can cause lasting brain damage, with adverse effects ranging from confusion and headaches to delirium and central nervous system depression.^[5]

The neurological risks are particularly severe. When inhaled or ingested, poppers can trigger methemoglobinemia, a life-threatening condition that reduces oxygen transport to the brain and other organs.^[6] This oxygen deprivation can lead to users feeling "lightheaded or have chest pain, difficulty breathing, or headaches. In severe cases, death can occur."^[6] Long-term cognitive consequences have also been identified. Studies suggest poppers may damage areas of the brain responsible for memory and learning.^[7]

The risk of long-term cardiovascular damage is substantial, as these chemicals strain the heart, potentially causing tachycardia (increased heart rate of >100 beats per minute), and irregular rhythms.^[2] The risk increases dramatically when poppers are combined with medications for ADHD, blood pressure, or erectile dysfunction, i.e. sildenafil (Viagra) or tadalafil (Cialis), potentially triggering fatal drops in blood pressure, strokes, or heart attacks.^[2] Consequently, neurologists and emergency physicians consider poppers particularly dangerous because their heart-damaging effects can manifest rapidly — sometimes with just one use.^[2]

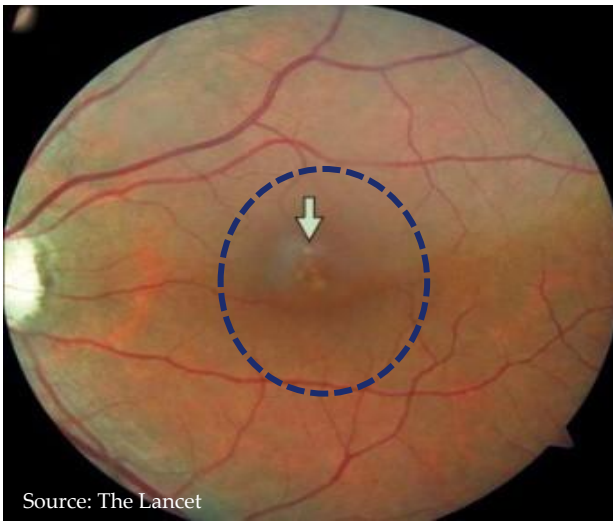


How Do Poppers Affect the Brain and Body

Poppers immediately release nitric oxide in the body upon inhalation, causing rapid vasodilation (dilation of blood vessels) that decreases blood pressure while increasing heart rate.^[1] This chemical reaction creates a brief euphoric sensation lasting only 5-10 minutes.^[1] This short-lived physiological reaction explains why users must repeatedly inhale the substance to maintain the sensation. However, these short-lived effects mask serious physiological dangers.

Beyond the neurological and cardiovascular dangers, poppers can permanently damage vision. Multiple studies have documented maculopathy, deterioration of the central retina, following popper use.^[8] This damage manifests as yellowish spots at the fovea (a small centrally located pit in the retina that is responsible for detailed vision) and disruption of photoreceptor cells, sometimes resulting in persistent blind spots.^[8] Additionally, skin contact can result in chemical burns and contact dermatitis, particularly around the mouth and nose.^[9]

Popper Maculopathy



Source: The Lancet

Popper Use Induced Contact Dermatitis



Source: British Journal of Dermatology

Furthermore, alkyl nitrites directly harm neural tissue. Research demonstrates they impair learning, memory functions, and motor coordination in laboratory studies.^[7] The brain's glutamatergic pathways, especially in the hippocampus region, appear especially vulnerable^[7]; glutamatergic refers to anything in the brain or nervous system that involves glutamate, the main chemical messenger used to "excite" or activate other brain cells.

What Makes Poppers Especially Risky Today?

Today's market for poppers presents unique dangers beyond their inherent health risks. Unlike previous decades, modern popper formulations vary widely in chemical composition. Many manufacturers have switched from traditional amyl nitrite to alternatives like isopropyl nitrite, which studies link to increased vision impairment. The lack of FDA regulation means no quality control exists to verify ingredients or potency.^[10]

Notably, today's users frequently combine poppers with multiple substances. Nearly 75% of users report mixing poppers with club drugs or erectile dysfunction medications.^[11] Unfortunately, despite these escalating risks, poppers remain widely available online and in stores for \$10-30 per bottle.^[11]



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Perhaps most alarming is the recent packaging trend mimicking energy drinks, leading to accidental ingestion rather than inhalation. ^[4] This deceptive marketing creates dangerous misconceptions about their safety. ^[1] A study of National Poison Data System data reveals ingestion causes more major adverse outcomes than inhalation. ^[12] The FDA has noted a disturbing increase in deaths and hospitalizations related to this confusion. ^[4]

Examples of Poppers



Source: FDA

Example of Product Placement



Source: Taylor & Francis

Legal Status and Age Restrictions

Currently in the United States, these substances exist in a troubling regulator gap, being legally sold as "room deodorizers," "air fresheners" or "leather cleaners" to circumvent drug laws. While personal possession of poppers is not prohibited by law, utilizing them as an intoxicant, whether by inhalation or consumption, is illegal. ^[10]

Regarding age limitations, although federal regulations do not mandate a specific age for purchasing these chemical substances, retailers can implement their own guidelines, commonly requiring purchasers to be 18 or 21 years old to match restrictions on other adult-orientated products. State and municipal regulations may differ, with certain jurisdictions enforcing specific rules about selling dangerous inhalants to underage individuals. Age verification through state-issued identification is frequently mandatory. ^[13]

Conclusion

Poppers, though seemingly innocent substances, pose severe risks to the brain and body, with documented cases of permanent neurological damage, vision loss, and death. ^{[1][8]} Scientific data confirms that poppers can trigger methemoglobinemia. ^[6] Additionally, their ability to cause maculopathy highlights another devastating consequence of their use. ^[8] Manufacturers market these potent chemicals as "room deodorizers" or "leather cleaners" while packaging them to resemble energy drinks, thus creating deadly confusion among consumers. ^{[1][4]} The risk of permanent brain damage, blindness, or death simply makes them too dangerous for any use. ^[4] Medical professionals therefore urge complete avoidance of these substances, regardless of how they are marketed or their perceived popularity in certain communities. ^[4]

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Key Takeaways

Health officials are documenting alarming increases in deaths and brain damage from poppers, revealing these substances pose far greater risks than many users realize.

- Poppers cause methemoglobinemia, a life-threatening condition that deprives the brain of oxygen, leading to seizures, coma, and potential brain death. ^[6]
- These substances can cause permanent vision loss through maculopathy and lasting neurological damage affecting memory and learning functions. ^{[7][8]}
- Modern poppers are unregulated and often packaged like energy drinks, creating deadly confusion between inhalation and ingestion methods. ^[4]
- Combining poppers with erectile dysfunction medications, ADHD drugs, or blood pressure medications can trigger fatal strokes or heart attacks. ^[2]
- Despite being marketed as "room deodorizers," poppers are dangerous recreational drugs with no quality control over their chemical composition or potency. ^{[1][10]}

References:

1. Corkery JM, Copeland CS, Ream S, Streete P, Schifano F. An Update on Deaths in the United Kingdom from 'Poppers' (Alkyl Nitrites), with a Particular Focus on 'Swallowing' Fatalities. *J Clin Med*. 2025 Jan 10;14(2):427. doi: 10.3390/jcm14020427. PMID: 39860433; PMCID: PMC11765549; <https://pmc.ncbi.nlm.nih.gov/articles/PMC11765549/>
2. Cleveland Clinic (July 8, 2022), Living Healthy, Sex & Relationships, "What are Poppers?"; <https://health.clevelandclinic.org/what-are-poppers-and-are-they-dangerous>
3. Alcohol and Drug Foundation (June 6, 2025), "What are Alkyl nitrites?"; <https://share.google/CogzpmHAFcJKscS4I>
4. Food & Drug Administration (July 15, 2021), Consumer Update, "Ingesting or Inhaling Nitrite 'Poppers' Can Cause Severe Injury or Death," <https://www.fda.gov/consumers/consumer-updates/ingesting-or-inhaling-nitrite-poppers-can-cause-severe-injury-or-death>
5. California Department of Public Health (December, 2024), Health Alert, "'Poppers' Psychoactive Inhalant Drugs," <https://www.cdph.ca.gov/Programs/CEH/DFDCS/CDPH%20Document%20Library/FDB/DeviceandDrugSafetyProgram/HealthAlertPoppers.pdf>
6. Johnson-Arbor, K. MD (2025), National Capital Poison Center, Poison Control, "Dangers of Poppers," <https://www.poison.org/articles/dangers-of-poppers>
7. Hye Jin Cha, Yun Ji Kim, Seo Young Jeon, Young-Hoon Kim, Jisoon Shin, Jaesuk Yun, Kyoungmoon Han, Hye-Kyung Park, Hyung Soo Kim, "Neurotoxicity induced by alkyl nitrites: Impairment in learning/memory and motor coordination", *Neuroscience Letters*, Volume 619, 2016, Pages 79-85, ISSN 0304-3940, <https://doi.org/10.1016/j.neulet.2016.03.017>
8. Rao, Vasudha OD (July 14, 2024), Review of Optometry, "A Case of Poppers Maculopathy," <https://www.reviewofoptometry.com/article/a-case-of-poppers-maculopathy>
9. Vincent A. Pecora BA, Sara Abdel Azim BS, Erika McCormick BS, Adam Friedman MD FAAD (September 11, 2024). *Journal of Drugs in Dermatology*, George Washington University Medical Faculty Associates, Department of Dermatology, "A Brief Report of 13 Cases of Poppers Dermatitis," <https://jddonline.com/articles/brief-report-of-13-cases-of-poppers-dermatitis-S1545961624P8412X>
10. Guarnotta, E. PsyD (March, 2024), GoodRx, "Poppers: What Are They, and Are They Dangerous?"; https://www.goodrx.com/well-being/substance-use/are-poppers-side-effects-risks?srsltid=AfmBOOrFqUwBB9H_azpUYmL5Kv2HlHsWupdFRBV_fhEitAYjFPjjj_sx
11. Pepper, N., Zúñiga, M.L. & Corliss, H.L. Use of poppers (nitrite inhalants) among young men who have sex with men with HIV: A clinic-based qualitative study. *BMC Public Health* 24, 1741 (2024). <https://doi.org/10.1186/s12889-024-19284-1>
12. Olinde, A., Hayman, C., Ivanov, I., Schwartz, L., Bloom, J., Su, M. K., & Biary, R. (2025). A survey study of urban retailers selling alkyl nitrites ("poppers") in the New York City area which led to public health interventions. *Clinical Toxicology*, 63(4), 273–277. <https://doi.org/10.1080/15563650.2025.2455531>
13. Wiginton, K., Benisek, A. (August 14, 2025), WebMD, "Poppers: Side Effects, Uses, and Risks of Amyl Nitrite;" <https://www.webmd.com/mental-health/addiction/what-are-poppers>