

Pharmaceutical preparations meant for vaginal use must be non-irritating and thick enough to remain in the vaginal canal. As such they are always thickened creams, gels or suppositories. Even these thickened products are poorly accepted because they are messy and tend to leak. It is unlikely that even the most absorbent tampons would hold vodka sufficiently to prevent leakage. Leakage is messy, reduces the amount of alcohol available for absorption and increases the likelihood of detection by alert parents.

Tampons: A new, dangerous way for teenage girls to drink http://www.lehman.edu/provost/provostoffice/MLJ_211/mariacastrowebpage/tampons.htm accessed 3/28/07

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Editors: Rob Goetz, PharmD, DABAT
Editorial Board: Earl Siegel, PharmD, Marc Lowy, MA, Rob Goetz, PharmD, DABAT

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CCHMC
3333 Burnet Ave
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New, Unusual, or Developing Alternate Routes of Administration for Alcohol.

This issue of *Drugscope* details some of the more recent and curious routes of administration of our society's most abused drug, ethyl alcohol.

AWOL (Alcohol WithOut Liquid)

Prepared by: Marguerite Scheid and Megan Karnes, University of Cincinnati PharmD Candidates
Cincinnati Drug and Poison Control Center

AWOL, Alcohol WithOut Liquid, is a new concept that has recently reached the United States in which users get intoxicated through inhaling an alcoholic mist. The inhalation device has been termed AWOL, a play on the military term for Absent Without Leave. It originally appeared in Europe and Asia. The product is marketed by Spirit Partners, Inc. and was introduced to the United States in August 2004, at the Trust Lounge in New York City's Meat-Packing District.

These machines are now available for sale and distribution on the internet and dealerships are being established in Florida, California, and New York. A single user AWOL machine can be purchased for approximately \$300. Multiple user AWOL machines are also being marketed to commercial businesses and are sold for approximately \$3000.

AWOL consists of two components: an oxygen generator and a hand-held vaporizer. Tubes from the generator attach to the vaporizer. The user chooses an 80-proof spirit (i.e. vodka, whiskey), which is poured into the "diffuser capsule". Oxygen bubbles then pass through the diffuser capsule and mix with the alcohol. A hand-held vaporizer produces a fine alcoholic mist which is inhaled. The device is similar to a nebulizer machine that is used for asthmatic breathing treatments.

AWOL promotes a sense of well being and a mild euphoria similar to consumption of traditional alcoholic drinks. The continual inhalation of this mist over a 20 minute period is equivalent of taking one-half to one shot of distilled spirits. Purchasers are encouraged to allow the use of the machine no more than twice in a 24 hour period to avoid over consumption.

Besides being a new way to consume alcohol, marketers advertise AWOL as a way to achieve the euphoric effects of alcohol while reducing calories and carbohydrates. Through inhalation, the alcohol enters the bloodstream through the lungs rather than the stomach. It is important to remember, however, that distilled spirits are carb-free and there is no need to inhale them to avoid the carbs.

The marketers of AWOL also claim that using their device reduces the occurrence of hangovers. Hangovers are thought to be caused by direct physiological effects of alcohol on the brain, including inhibition of the release of vasopressin (anti-diuretic hormone) which leads to increased urine output from the kidneys possibly causing dehydration and electrolyte imbalance. The main metabolite of ethanol, acetaldehyde, and possibly fusel oils contained in distilled spirits are also likely to play a role in hangover production. The only real difference between drinking alcohol and using the AWOL device is the means of getting the drug into the body. Once the alcohol enters the bloodstream, it affects the body in the same way as drinking alcohol. AWOL just bypasses oral absorption in favor of absorption via the lungs. It makes just as much sense to claim that injecting alcohol directly into a vein reduces the likelihood of getting a hangover.

Opponents of AWOL fear that it might lead to an increase in alcohol misuse, drunken driving, and underage drinking. The possible health and safety risks of inhaling alcohol vapors are unknown and many legislators are pushing to ban alcohol

inhalation machines. Michigan has made it illegal to possess, sell or use an AWOL machine, and as of January 2007 sixteen other states have banned the device.

Another concern of AWOL opponents is that inhaled alcohol vapor may be absorbed into the body more quickly through the blood vessels in the nose and the lungs, creating a more intense effect. Some even go so far as to claim that the practice of inhaling alcohol vapor could cause brain damage. However, there does not seem to be any good evidence that AWOL would be worse for the brain than similar amounts of normally ingested alcohol. Additionally, the possible local effects of inhaled alcohol on the lungs are still unknown. It does seem reasonable to expect lung problems. Alcohol is irritating to the stomach and therefore is likely to be irritating to the lungs as well.

Finally, inhaling alcohol may bypass a drinker's normal methods of preventing overdrinking like the feeling of satiety associated with the liquid form. When consuming alcohol traditionally, drinkers are able to titrate their intake based on the feeling of stomach fullness. Inhaling the alcohol would eliminate this feeling, potentially leading to over consumption.

Marketers have stated, "We are not aware of any current evidence to suggest that use of the AWOL machine in accordance with the advice and instructions poses particular risks to the user over and above the risks that may be posed by consuming an equivalent amount of alcohol in an equivalent time period in a more traditional way."

There is no reason to think that this new route of administration for alcohol will be safer or in any way better than the oral route. Marketers' statements about current evidence and use in accordance with the advice and instructions are without substance. Once in widespread use, there is no reason to believe that the recommendation to use the product no more than twice in 24 hours will be followed. Current evidence of safety for an untested product not in wide use is of no real value, and allows the willing to be guinea pigs in what is no more than an uncontrolled trial.

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Abuse of Hand Sanitizer Gels

Several recent literature reports describe intoxication after misuse/abuse of hand sanitizer gels. These products typically contain 60-95% ethanol along with a smaller percentage of isopropyl alcohol (rubbing alcohol), water and other ingredients. These products are in widespread use among the general public, in hospitals and even in prisons.

Two reports of abuse of hand sanitizer gels in prisons have been published in the last several months. In a letter to the editor in the New England Journal of Medicine, a normally calm prisoner was found "red-eyed", "loony", "combative and intoxicated". The patient had been seen by guards and other inmates drinking from an available gallon jug of a hand sanitizer containing 62% ethanol by weight (approximately 70% by volume – 140 proof). His blood alcohol was measured at 335mg%. No other sources of alcohol were available. He recovered uneventfully with supportive care. A second letter in the same journal describes a similar intoxication in an individual who drank an isopropyl alcohol based hand sanitizer gel while he was a patient in a hospital

Findings of hand sanitizer abuse among prison inmates were also presented at the most recent North American Association of Clinical Toxicology Annual meeting in early October 2006. This report describes inmates using ordinary table salt to "break" the gel and produce "drinkable" alcohol. The process involves placing about 4 ounces of hand sanitizer gel in a sock, sprinkling a teaspoonful of table salt onto the gel and then straining the mixture through the sock. The investigators used the recipe and within seconds, produced a cloudy liquid that contained about 70% ethanol and 2% isopropyl alcohol

by volume. These investigators further surveyed prison staff in their state. Ethanol containing hand sanitizer gel was readily available to inmates at 22% of the institutions. 94% of prison staff were unaware of the abuse potential of these products.

DPIC has received calls from prison nurses and other health care providers about prisoners who have ingested disinfectant sprays to get high. Some of these products contain as much as 80% ethanol. Using the salt and filtering the liquid through a sock, clean or otherwise lends an air of bartending to the procedure, but is an unnecessary step. Squirting the product directly into the mouth will work, and is only a trifle less elegant. Perhaps most surprising to a pharmacist and poison control specialist are the associated survey results indicating that correction facility staff were unaware of the potential for abuse of gel hand sanitizers.

Doyon S, Welsh C. New England Journal of Medicine 2007 356(5) 529-530 Intoxication of a Prison Inmate with Ethyl Alcohol-Based Hand Sanitizer

Emadi A, Coberly L. New England Journal of Medicine 2007 356 (5) 530 – 531 Intoxication of a Hospitalized Patient with and Isopropanol-Based Hand Sanitizer

Roche KM, Barko IR et al. Clinical Toxicology 2006 44(5) 633-634 (Abstract) Hand Sanitizer Abuse

Vodka soaked tampons

Another rather odd ethanol administration technique is the practice of soaking tampons in vodka and inserting them vaginally. The practice is typically employed by teenage girls in the hope of getting high while avoiding detection by parents. Less commonly teenage boys and girls may insert vodka soaked tampons rectally. Some of the attraction of the practice is undoubtedly related to teenage sexuality, although there are no studies that address this. Its chief attractions are likely to be the transportability of the dosage form, and the abusing teen's perceived ability to deceive authority – parents, others. The use of vodka soaked tampons is not particularly new and has never really had a large following. There are good reasons that this practice has not become more prevalent. However, DPIC has received several recent calls about this alcohol abuse technique. It is possible that the form of alcohol abuse may be increasing.

A proposed benefit of the method touted on the internet is that the abuser is able to get high while avoiding the stomach upset associated with oral intake. It is true that vaginal or rectal administration of alcohol will minimize the stomach irritation commonly associated with drinking. However, putting what amounts to harsh chemicals – ethanol is an irritant solvent - into the vagina or rectum trades brief exposure to the relatively protected gastrointestinal tract for a more prolonged contact with the much more sensitive vaginal or rectal mucosa. Considering the burning sensation typically associated with oral ingestion of vodka, it is likely that vodka soaked tampons would cause significant vaginal or rectal discomfort. In addition to the initial burning sensation, the defatting and drying action of ethanol is likely to lead to prolonged discomfort and the potential for bleeding during normal functioning.

Internet sites also suggest that using vodka soaked tampons to get high prevents the smell of alcohol on the breath thus further reducing the risk of parental detection. This idea is just not true. Alcohol is partially eliminated from the body through the lungs. There is a constant ratio of alcohol between blood alcohol concentration and the concentration of ethanol in expired air. This is the basis of the breathalyzer test used during DUI arrests. Blood alcohol sufficient to cause inebriation will be detectable in exhaled breath.

Absorption of medicines and nutrients in the gastrointestinal tract occurs via passive diffusion across the intestinal wall. The absorptive surface of the intestinal wall is very large due to the presence of hair-like microvilli. It has been estimated that the absorptive area of the small intestine is roughly equivalent to that of a football field. Absorption of medicines or alcohol across the rectal and vaginal mucosa also depends on passive diffusion but the surface area available is quite small. A few medicines meant to treat systemic symptoms are available as rectal suppositories. However, absorption via this route is less reliable than that associated with the oral route.

Systemic absorption of drugs across the vaginal mucosa is known to occur, but medical literature documenting this is very sparse. Ethanol is soluble in both water and fats so it is likely to be well absorbed across the vaginal mucosa. However vaginal absorption of medicines in general depends upon both the thickness of the vaginal mucosa and the composition of the vaginal secretions, both of which vary over the course of the menstrual cycle. This is one of the reasons that most medicines applied vaginally are used to treat topical conditions of the vaginal mucosa, like yeast infections rather than systemic conditions.