ONLINE FACTS
Alcohol Overdose

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Alcohol is a central nervous system depressant that affects virtually every organ in the human body. Most people have general knowledge about the consequences of alcohol intoxication and risk for a fatal automobile crash, and some often-fatal medical consequences of long term alcohol abuse, such as liver disease or risk for cardiovascular disease. Fewer people realize that deaths from alcohol overdoses occur as often as for other drugs.

Alcohol can be produced in nature when airborne yeast combines with water and sugars from fruits, for example. Many years ago, some thirsty human probably stumbled onto a fruit tree or a puddle of water in which such natural fermentation occurred. The mild intoxicating effects from that first alcohol encounter were probably quite a surprise, but unlikely fatal, because fermentation stops naturally when alcohol from yeasts reach concentrations of about 15%. However, when large quantities of low concentration alcohol or smaller quantities of distilled alcohol are ingested, the risk for a fatal reaction is present. Fortunately, most people who drink alcohol, even to excess, do not die from acute intoxication. Yet about 50,000 reported cases of alcohol poisoning occur each year, and about once a week someone dies from alcohol poisoning. Understanding the symptoms and causes of a toxic reaction, and responding intelligently to such a situation, can avert a fatal overdose.

How Alcohol Kills
Death from alcohol overdose can occur through several physiological mechanisms. When the concentration of alcohol in the brain becomes high enough to depress the brain areas responsible for the control of consciousness and respiration, for example, the drinker lapses into a coma, stops breathing, and dies within minutes. As a central nervous system depressant, alcohol can kill just as easily as barbiturates, heroin or other depressants, because when organs that are necessary for life support fail, so does the patient. Even superficial examination of the term in-*toxic*-ation, should alert the consumer that alcohol is a toxin, and can be toxic (deadly). The consumption of even small quantities of non-beverage types of alcohol, such as methanol or rubbing alcohol, can be fatal (see Brick 2003).

In many cases, overindulgence will produce an early symptom of toxicity from alcohol: nausea and vomiting. Most people stop drinking after such a reaction. Athough tolerance to alcohol can significantly increase the threshold for this effect, the threshold for a fatal overdose does not increase in proportion to other behavioral effects of this drug.

Contrary to street wisdom, mixing drinks generally does not make you sick. However, people who mix drinks may be consuming more alcohol because they are sampling different kinds, which will increase their blood alcohol concentration. Drinking games, sweet tasting alcoholic drinks, or novelties such as Jello shots can be deceptive in terms of gauging alcohol consumption. Being caught up in the excitement, or having a significant delay between the consumption of a large quantity of alcohol and the eventual effect, can be dangerous. If blood alcohol concentrations increase very rapidly or reach high concentrations, specialized cells in the brain detect this change and send signals to the

stomach to violently contract. This is the brain's way of trying to save itself! Removing unabsorbed alcohol from the stomach through a vomit reflex will prevent blood alcohol levels from increasing further.

Although vomiting is certainly helpful in many overdose situations, it can also be fatal. As a depressant, high blood alcohol concentrations will produce depression, even coma. The drinker will no longer be able to maintain consciousness. If someone is in a deep sleep from the depressant effects of alcohol and vomits reflexively, he may asphyxiate on his own vomitus and be too intoxicated to know or respond effectively.

How Much is Too Much?
Scientists use the term "lethal dose" (LD) to describe the dose (or in the case of alcohol, the concentration) that produces death in half the population (LD:50). Most authorities agree that blood alcohol concentrations in the 0.40 - 0.50% range meet the requirements for the LD:50. The blood alcohol concentration is the percentage of alcohol in the blood that results after alcohol is absorbed from the stomach into the blood supply. Obviously, studies of lethal dosage cannot be tested empirically in the laboratory, so the LD:50 for alcohol is estimated from post-mortem cases in which alcohol poisoning was found to be the primary cause of death. However, there are documented cases of fatal overdoses from alcohol at blood alcohol concentrations lower than 0.40%. To place this in perspective, a 100-pound woman or man who consumed 9-10 standard drinks, respectively, in less than an hour would be in the LD:50 range. A 200-pound man would have to consume about 5-6 drinks per hour for 4 hours to reach the LD:50. Although such high rates of consumption are atypical of most situations, participating in drinking "games" or club "initiations" often involves highly unregulated alcohol consumption. Impaired judgment from intoxication, coupled with large amounts of alcohol, is a potentially fatal combination.

Symptoms of Alcohol Poisoning
The first symptom of alcohol poisoning is nausea, followed by vomiting. These indicia are messages from your body that you overdid it. In general increasing order of severity, the following list of signs and symptoms are indicative of alcohol poisoning.

- Nauseous
- Vomiting
- Passed Out
- Difficult to Awaken
- No withdrawal from painful stimuli (e.g., pinching)
- Slow, Shallow Breathing
- Reflexes absent

Action Plan
The most difficult part of saving someone from an alcohol overdose does not occur in the Emergency Room, nor does it involve a complex medical treatment. The most difficult aspect of an overdose case is making the decision to do something. Fear of possible legal implications (e.g., for underage drinkers), embarrassment, or not having the information to make a decision can also be fatal.

If someone who has been drinking heavily persists in falling asleep, waken him or her. If the person does not respond easily, it is time to call the police emergency number (911) and ask for assistance. Do not assume that your friend will sleep it off or would prefer not to be disturbed. Getting the person home and in bed is not a solution, and may actually place the drinker at risk, because he or she is no longer being observed. If you reasonably believe that other drugs were also ingested, be sure to tell the ambulance personnel. Alcohol in combination with other drugs accounts for about a third of all drug overdose cases in the US.

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