

For Health Professionals

Health Alerts

Health Advisory #48 - Potential Terrorist Use of Nicotine and Solanine Toxins - 09/05/2003

Over the past several years, various reports have described a growing terrorist interest in the use of two plant toxins as potential mass poisoning agents. These kinds of poisons have been associated with training for limited-scope attacks, such as assassination. These poisons, nicotine and solanine, are naturally occurring toxins obtained from tobacco and potatoes, respectively. References to nicotine and solanine appear in numerous terrorist training manuals and documents seized in Afghanistan. There are no known instances of actual use of either poison by Islamic terrorist organizations; however, nicotine was used in a recent domestic criminal poisoning incident, resulting in the sickening of nearly 100 people in Michigan. The acute toxicity of nicotine is well documented as a result of a number of accidental poisonings. While comparatively less toxic than cyanide, botulinium toxin or ricin, both substances can be lethal in high doses or if medical treatment is significantly delayed. Both toxins occur naturally in established agricultural products making their availability and ease of chemical separation the key attractions for terrorists. The most likely technique for nicotine or solanine poisoning would be food, beverage, or water contamination; however, nicotine can also be absorbed through the skin and mouth and the digestive and respiratory tracts.

Terrorist manuals detail simple instructions on how to produce both nicotine and solanine poisons. Nicotine is widely available, inexpensive, and uncomplicated--it can be produced using a basic knowledge of chemistry. Nicotine is a fast-acting poison, absorbed through the digestive and respiratory tracts, as well as through the skin and mouth. The lethal dose of purified toxin is estimated in adult humans to be approximately 40-60 milligrams; however, individuals exposed to nicotine in small doses through smoking/chewing tobacco may build up a tolerance to the toxic effects. Solanine is a toxin that occurs naturally in "greened" potatoes, produced when the potato is old or exposed to sunlight for lengthy periods of time. A large dosage of solanine is necessary to be fatal. Law enforcement officers should be aware of any suspicious incidents that could possibly be related to the production of nicotine or solanine poisons. The presence of tobacco plants or purified nicotine (a colorless to pale-yellow oily liquid, with a burning taste and pungent/tobacco-like odor) could indicate nicotine production. However, because many home-made pesticides require the use of purified nicotine, further investigation would be necessary to determine intent. A supply of potatoes inconsistent with an amount that would be normal for a food supply could indicate an attempt to manufacture solanine. Fully refined solanine poison appears in the form of a gray-green liquid.

Acute nicotine poisoning will cause central nervous system depression, neuromuscular paralysis, lowered blood pressure, slowed heart rate and death from paralysis of the respiratory muscles. More common symptoms of nicotine poisoning include nausea, vomiting, abdominal pain, diarrhea, headache, fatigue and heart palpitations. In severe cases, victims experience dizziness, weakness, prostration, collapse, and respiratory failure. Common symptoms of solanine poisoning occur 2-24 hours after exposure and include a harsh, scratchy sensation in the mouth and throat, nausea, vomiting, diarrhea, headache, drowsiness, hypothermia, and dehydration.

Severe cases include cramps, fever, and difficulty breathing and can result in coma and death. Individuals suffering from these symptoms should immediately receive medical treatment.

If nicotine or solanine poisoning is suspected, first responders can call (800) 222-1222 to contact the nearest regional poison control center. If the method of nicotine poisoning is believed to be through the skin by aerosol or liquid form, first responders should ensure that all individuals are immediately removed from the contaminated environment. Tainted clothing should be removed and affected individuals should be hosed down with water.