# Cyanide Toxicity and the Working Canine

Cyanide toxicity most commonly occurs via ingestion or inhalation and can occur via accidental exposure or through malicious intent (ie terrorist attack). Contact poisoning is less common, but contributes to the potential for inhalation or ingestion. Cyanide salts are used in many industries, combustion of plastics/rubber may release cyanide gasses, Seeds of apples, cherries, plums and apricots contain cyanide and ingestion of 5 – 25 seeds may cause signs of toxicity. In general, terrorist activity will utilize cyanide in a gaseous state for its rapid dispersal and, in general, higher lethality. Two gaseous forms of cyanide are hydrogen cyanide and cyanogen chloride. Hydrogen Cyanide is a gas that is lighter than air and distributes readily. Cyanogen Chloride is heavier than air and will have higher concentrations in lower levels (subway stations, basements).

Cyanide and its compounds prevent oxygen from being utilized at the cellular level creating tissue hypoxia resulting in cellular and systemic suffocation.

The approximate Lethal Doses of Cyanide exposure: Ingestion 2 mg/kg or 200 mg total dose. Inhalation 110 ppm.

In the case of confirmed or suspected cyanide exposure, appropriate personal safety measures MUST be implemented prior to attempting any diagnostic or therapeutic measures on the working canine. Safety of personnel must always be a priority.

## SIGNS OF CYANIDE TOXICITY:

Rapid breathing (tachypnea), difficulty breathing (dyspnea), bright red or blue mucous membranes (cyanosis), seizures (convulsions), loss of consciousness/coma, respiratory arrest, acute patient death

*The severity of the clinical signs depends on the concentration of the exposure and the route of exposure. In general, ingested cyanide toxicity occurs within an hour of ingestion. Inhalation toxicity is potentially much more lethal, with signs often noted after just a few breaths; death can occur within minutes.*

*The smell of bitter almonds is reported, but may not be present!*

*The information contained in this article is designed for Law Enforcement use only. All doses and protocols must be verified by appropriate medical authorities. This article is meant as a general information guide and is not intended to replace or supercede any existing protocols. Developing a protocol incorporating information from your Hazardous Materials teams as well as your own veterinarian is strongly recommended. Treatment by someone other than a Veterinarian is NOT recommended. 

## TREATMENT FOR CYANIDE TOXICITY:

**Personal Safety!!**

REMOVE the patient from the contaminated environment immediately

Seek Veterinary Care Immediately and contact Poison Control if possible and safe to do so for most current recommendations

**DO NOT perform mouth to mouth for respiratory arrest due to risk of contamination to the first responder**

Give supplemental facial oxygen if possible, and institute intravenous fluid therapy if properly trained

Initiate decontamination if necessary (with caution).

Closely monitor (and record) patient's vital signs (heart rate, respiratory rate and effort, mucous membrane color, mental state)

**General Ingested Toxin Treatment:**

Induce vomiting and administer activated charcoal if patient is conscious and alert

Do not perform any oral treatments if patient is unconscious, having significant difficulty breathing, or appears to be having a seizure or losing consciousness .

**Specific Inhalation and Ingested Toxin Treatment:**

Because of limited information regarding its use in animals and difficulties in appropriate administration, Amyl Nitrite antidote therapy is NOT recommended in animals

Sodium Thiosulfate (25% solution) is given at a dose of 1.65 ml/kg intravenously. Sodium thiosulfate has a good safety margin and is relatively safe if given and then cyanide exposure is subsequently ruled out.

**If Cyanide exposure/toxicity is CERTAIN:**

Sodium Nitrite is given at a dose of 16.0 mg/Kg intravenously. *Giving Sodium nitrite can be fatal if given without the presence of cyanide.*

***Second doses of both medications can be given at half strength thirty minutes later if clinical signs are not resolving.***