

Enclosed space fires and the risk of cyanide exposure



Each year there are more than **1.3 million fires** in the US



3,390 civilian fire deaths



81% of civilian deaths are from residential fires¹



Smoke inhalation is a factor in **85%** of fire fatalities²



Enclosed space fires can lead to smoldering combustion of plastic, vinyl, acrylic, neoprene, rubber, and insulation and the production of cyanide^{3,4}



Hydrogen cyanide is detectable in approximately **one-half of people** exposed to enclosed space fires^{5,6}

Suspect cyanide toxicity if^{7,8}



Altered mental status: lethargy, weakness, drowsiness in conscious patients



Soot in around the nose or mouth
— suspect cyanide poisoning in any unconscious patient removed from a burning building with this feature



Coughing up carbonaceous sputum



Shortness of breath, rapid, deep breaths (oxygen saturation may be normal)



Prolonged loss of consciousness which does not improve when patient is free from a burning structure



Hypotension



Cardiac abnormalities including cardiac arrest



Seizures (carbon monoxide poisoning rarely causes this)



Elevated blood lactate levels (prehospital determination often not available)

Initial management of suspected cyanide exposure



Remove the individual(s) from the scene



Assess oxygen level
— initial resuscitation priorities are administration of 100% oxygen with a tracheal tube if airway is at risk



Utilize lung-protective ventilation strategies and consider early bronchoscopic washout



Careful administration of fluid therapy to avoid over/under-resuscitation



Administer antidote for patients with suspected cyanide poisoning

Cyanide antidotes⁹



- Sodium nitrite + sodium thiosulfate
- Hydroxocobalamin

	Hydroxocobalamin ¹⁰⁻¹²	Sodium nitrite + sodium thiosulfate ^{13,14}
Dose	5g IV over 15 minutes May repeat dose if patient response is inadequate or poisoning is severe (max dose 10g)	300 mg sodium nitrite (IV infusion), immediately followed by 12.5g sodium thiosulfate (IV infusion)
Adverse events	<ul style="list-style-type: none"> • Skin and urine may be colored red for up to 15 days • Rare anaphylaxis • Cases of acute renal failure reported 	<ul style="list-style-type: none"> • Risk of excess methemoglobinemia resulting in further decrease in oxygen carrying capability • Vasodilation, hypotension, tachycardia, dizziness, nausea, vomiting

Hydroxocobalamin is considered more suitable for prehospital administration¹⁴