

Growing Cyanide Threat at Fires Gains National Attention



Hydrogen Cyanide is the killer that few in the fire-rescue service seem to know about.

AMANDA MILKOVITS, Journal Staff Writer
The Providence Journal (Rhode Island)

PROVIDENCE - The phone rang at 2:30 in the morning.



"This is the Providence Fire Department," Patricia Baker heard on the line. She started screaming.

Her husband of 31 years, Firefighter Kenneth E. Baker, had left for work hours earlier for an overnight shift. Fire Chief David Costa was talking to her, saying that her husband had been hurt.

"I was screaming, 'Is he burned? Is he burned?' He said 'No, but he's not doing good.' "

"I went crazy," Patricia Baker recalled later.

Kenneth Baker had worked at two house fires that night, going inside at one house and then manning the pump at the second fire. He collapsed beside a fire engine and was rushed to the hospital by other firefighters who fought to restart his heart.

Baker watched as the emergency room staff worked on her husband. His skin was ashen and he lay motionless, with tubes and IV lines snaking into his body.

The couple had been together since they met in the 10th grade at Tolman High School in Pawtucket. He'd wanted to be a firefighter for as long as she'd known him. She always pushed from her mind the thought that the job could kill him.

But the danger that had sent her 50-year-old husband into cardiac arrest on March 24 was caused by something she'd never considered. Baker and several other Providence firefighters had high levels of deadly cyanide in their bloodstream.

The chief of the Providence Fire Department had never heard of such a thing.

He wasn't alone.

HYDROGEN CYANIDE is the killer that few in the fire service seem to know about.

"The problem with firefighters is we've ignored the problem," said Bob Halton, editor in chief of Fire Engineering magazine.

"There's been no groundswell for education because it's boring. It's not like search and rescue. It's chemistry and physics."

This is a poison created by modern-day living, a deadly gas once used in wartime and now present in the plastics and polymers found in household goods, furnishings and home construction.

"As people introduce more and more plastics into homes, we're seeing it more and more," said Fire Chief John Sinclair of Ellensburg, Wash., who's on a cyanide task force for the International Association of Fire Chiefs.

Even when a fire smolders, those materials break down and emit poisonous gases, including hydrogen cyanide. When they burn,,

the smoke is deadly. When the fire is out, the dangerous fumes remain.

These are the same toxic fumes that killed most people in the Station nightclub fire, according to death certificates obtained by The Journal. The club's walls and ceiling were covered with highly flammable polyurethane foam -- a material that ignites like gasoline and gives off toxic fumes including hydrogen cyanide.

The poisoning of Baker and several other Providence firefighters a week and a half ago could have national implications, fitting into a growing effort to educate fire departments and hospitals nationwide about the dangers of cyanide in smoke.

At the same time, the U.S. Food and Drug Administration is expected to fast-track an antidote to cyanide that's been used for years in Europe.

The only antidote now on the market in the United States is known as the Lilly or Taylor kit, which includes a series of drugs to counteract and eliminate cyanide from the bloodstream. Rhode Island Hospital and Miriam Hospital have about 30 Taylor kits in their emergency rooms, said their spokeswoman.

But the antidote has serious side effects and can kill someone who is misdiagnosed. It contains amyl nitrite, which is inhaled, followed by sodium nitrite and sodium thiosulfate, which are given intravenously, said Dr. Frantz Gibbs, director of the Rhode Island Hospital emergency room. Both nitrates bind with hemoglobin to form methemoglobin, which binds with cyanide and releases the poison's grip on oxygen. The sodium thiosulfate converts the cyanide, which is expelled by urination, Gibbs said.

But methemoglobin also reduces the body's ability to carry oxygen, which is dangerous for patients who are suffering from carbon-monoxide poisoning -- and not cyanide, said Gibbs.

The antidote used in Europe is hydroxocobalamin, a precursor to Vitamin B-12. The drug is given intravenously and neutralizes cyanide to form cyanocobalamin, Vitamin B-12, which the body expels by urination.

North Carolina-based EMD Pharmaceuticals, whose parent company is Merck KGaA in Germany, has completed years of drug studies for the FDA, said spokeswoman Lauren Tortorete.

Las Vegas Deputy Fire Chief Ken Riddle, who is the past chairman of the International Association of Fire Chiefs' EMS Section, said protocols are being worked on that would allow first-responders to give the antidote at the scene for smoke-inhalation victims. The drug has been found to be safe, he said.

This summer, hydroxocobalamin is expected to get "fast drug" status, meaning it will be on the fast track for approval and could be authorized for use by Jan. 1, according to Halton.

The U.S. Department of Homeland Security is pushing to get the antidote approved, because of concern over terrorism, he said.

The common use, Halton predicts, will be saving the lives of thousands of people who perish every year from smoke inhalation, a bigger killer than burns from fires.

"Firemen need to understand that you can never, ever, ever breathe smoke," Halton said. "Smoke today is not your daddy's smoke. It's more toxic. It will kill you."

CHIEF COSTA remembers that, when he came on the Providence Fire Department nearly 30 years ago, most house fires were wood smoke, and inhaling a puff of smoke could cause a headache that the firefighters would shake off.

"I'll be totally frank with you, [the cyanide diagnosis] took me back a step because I haven't heard of this," he said. "I've been to the National Fire Academy every year for the past 10 years. If this was such a huge problem, you'd think you'd hear about it."

Days after the episode, Costa formed a task force of firefighters to investigate the three fires in which firefighters had elevated levels of cyanide, and contacted the National Institute for Occupational Safety and Health for assistance. What the task force learns may lead to changes in policies and procedures -- such as requiring firefighters to wear their air packs and masks at all times, inside and outside the fire, and even after the flames are out.

If that happens, Costa said, he'll need more firefighters at the scene to relieve each other as they replace their air tanks. The tanks typically last about 15 minutes or so during heavy use, he said.

Some say that's the only solution. Halton, for one, wants firefighters to wear air packs at all times, until the fire is cold, because the poisonous fumes remain even after the fire is out.

Out in Nevada, Henderson Fire Capt. Bruce Evans recalled another captain who died when a gust of smoke from a burning dice factory blew into his face. The smoke contained cyanide, he said, which prompted his department's awareness for protection from smoke inside and outside a fire.

"But the days of not wearing an air pack -- that's like Russian roulette," Evans said.

While hospitals may routinely check for carbon monoxide, the chiefs and firefighters' associations want doctors to also screen for cyanide poisoning.

At the Rhode Island Hospital emergency room, Dr. Andrew Sucov made the determination quickly and got the antidote to three firefighters, including Baker. Evans, who is on the EMD advisory board, was amazed to hear about it.

"Kudos to the folks in Rhode Island," Evans said.

AT THE Rhode Island Hospital emergency room, the staff understands about cyanide poisoning from smoke, said Gibbs. The staff knows about the toxic fumes that develop from plastics in fires.

Yet, it's a tricky diagnosis. Cyanide gets into the blood and binds with oxygen, preventing the body's cells from absorbing oxygen and effectively suffocating the body, especially the central nervous system.

Results from the cyanide tests take 11?2 to 2 hours -- too long when someone's health is rapidly deteriorating. So, Gibbs said, the medical staff relies on other factors: observation, the patient's symptoms, tests for blood gases, and knowing whether the person has been in a fire. The results of the test are used to confirm the diagnosis, he said.

Even after the antidote, survivors can have long-term effects from damage to their nervous system, Gibbs said.

LAST SUNDAY afternoon, Baker opened his eyes for the first time since his cardiac arrest. He recognized his wife and their two children, and began crying.

He's been visited daily by his family, the other firefighters, Chief Costa, and Mayor David N. Cicilline. He speaks, although his mind is unclear, Mrs. Baker said.

On Friday, he was moved from Rhode Island Hospital to a rehabilitation unit at Memorial Hospital of Rhode Island in Pawtucket, where his family lives, according to union president Paul A. Doughy.

The long-term effects from the cyanide poisoning are still unknown. So, Mrs. Baker thinks about how her husband bowled a perfect game with his league, the Starlighters, just recently. How he organized the motorcycle torch run for the Special Olympics every year. How he'd recently tuned up his Harley Davidson for summer riding.

All the family can do is wait, and hope, said Mrs. Baker.

"I tell him I love him, and he says he loves me back," she said. "So, I know he's getting better."

amilkovi@projo.com / (401) 277-7213

Copyright 2005 LexisNexis, a division of Reed Elsevier Inc. All rights reserved.

[Terms and Conditions](#) | [Privacy Policy](#)

News stories provided by third parties are not edited by "Site Publication" staff. For suggestions and comments, please click the Contact link at the bottom of this page.

- [RSS Feeds for EMSResponder.com: Top EMS News Section](#)

Printable version may be for personal use only. Content may not be duplicated, re-used or otherwise replicated without expressed, written consent from **EMSResponder.com** and/or the original author/source.

Visit **EMSResponder.com** at <http://www.emsresponder.com> for the latest industry news, commentary, features and more.

Copyright © 2007 All rights reserved.
Cygnus Interactive, a Division of Cygnus Business Media.