

True STORY

Chicago Paramedics Gain 'Third Eye' with New Standard for Detecting Deadly Carbon Monoxide Gas

It was a warm summer day on the Saturday before Father's Day in June 2012. Veteran paramedic Anne Gradolf responded to a call for an ambulance on the southeast side of Chicago. The boyfriend of a young woman, who was sick with severe flu-like symptoms, placed the call. At the scene, Gradolf noticed both the woman and her boyfriend appeared lethargic. The woman refused to go to the hospital, insisting she just had the flu and needed to stay home and rest. After checking her vital signs and not finding anything amiss, Gradolf had the woman sign a medical release and headed back to her vehicle.

"I had done what I was supposed to do, but there was just something about the way they were acting," said Gradolf. "Their sluggish appearance haunted me. It was just a gut instinct that something else was going on here; it just didn't feel right."

Before reaching her vehicle, Gradolf made an about-face and went back to the residence. On her return, others in the home were awakened and she noticed everyone had a similar "dazed and

lethargic look." She also discovered there were 10 people in the home, ranging in age from 70 years old to a baby about one year old.

She called for a fire company, which used a portable gas-detection instrument to quickly determine the

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presence of carbon monoxide (CO), an odorless and highly toxic gas. It turned out the occupants in this home were sick from CO poisoning. With readings at 400 parts per million (ppm), it would not have taken long for this incident to turn lethal.

"It was summertime, so you are not necessarily thinking CO," said Gradolf, whose gut instinct saved the lives of everyone in the home that day. A malfunctioning water heater was discovered to be the source of the toxic gas. Everyone went to the hospital, including three of the residents with exposure severe enough to require treatment in a hyperbaric chamber.



"This could have been a major tragedy," acknowledged Fire Chief Robert Anthony of the Chicago Fire Department (CFD). He cites the incident to explain why he instituted a new standard that requires on-duty paramedics to wear CO gas-detection monitors. The new standard and related protocols were implemented May 1 and impact all 75 of the city's front-line ambulances that cover Chicago streets 24/7.

Invisible Threat

For the City of Chicago, with its bone-chilling winters that keep residents sealed indoors with gas heaters and fireplaces blasting, this incident is just one of many each year involving CO poisoning. While CO incidents primarily occur during the seasonally cold months, they can occur year-round, as Gradolf discovered first-hand.

CO is a colorless, odorless gas formed when materials fail to completely burn, and often comes from water heaters, gas appliances, furnaces or fireplaces. It

can render victims unconscious or in a coma before causing long-term health damage or becoming lethal. In the U.S., fire-fighters and emergency medical service (EMS) professionals deploy gas-detection monitors to keep their personnel and the public safe from exposures.

"I had to rely on instinct before... Having a monitor is like having a third eye."

In one national study, conducted over a five-year period by the U.S. Centers for Disease Control and Prevention, 16,447 unintentional deaths related to CO poisoning occurred countrywide between 1999 and 2004, accounting for an average of about 3,280 deaths a year during the study period.

"Our responders enter situations all the time where somebody's not feeling good or there's a person down and unconscious," said Chief Anthony. "Unless it's verified with a gas-monitoring device, the potential is always there for our people to get hurt from carbon monoxide exposure. It's a dangerous, invisible threat."

Size matters

Anthony said he instantly realized the potential for protecting paramedics in the field when he first saw the compact size of RAE Systems' ToxiRAE 3 single-gas monitor. The device is about the same size as the shoulder radio worn by first responders. After investigating



The City of Chicago's Fire Chief Robert Anthony presents veteran paramedic Anne Gradolf with a dedicated monitor for detecting carbon monoxide (CO) gas. Last year, Gradolf's "gut instincts" saved the lives of 10 people suffering from CO poisoning in a home in southeast Chicago.

Photo courtesy of the Chicago Fire Department.

REAL- Time

the monitor and evaluating competitors, he requested funds to purchase the units for the large fleet of ambulances under his direction.

“Its small size was perfect for ambulance use,” Anthony said. “We ran with single-gas monitors on our engines many years ago, but it was a clunky, big device. This compact gas monitor was perfect.”

While many EMS professionals often carry monitors in their vehicles or bags, the devices seldom get used because technicians “get caught up in the problems of the moment,” Anthony said, and forget to turn the unit on. In contrast, the CFD’s latest addition to its standard operating procedures (SOPs) uniquely requires paramedics to keep the ToxiRAE 3 gas monitor for CO on and attached to their radio straps throughout

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their shift – positioned on their chests – to provide protection from CO in their breathing zone. Paramedics follow start-up protocols for the monitors at the beginning of their day, but don’t even realize it’s there the rest of the time, said Anthony.

Prior to issuing the monitors, the CFD conducted a 30-day trial with five ambulances to ascertain the best protocols based on actual usage. Training also was conducted to familiarize the EMS teams with the simple two-button operation, bump testing



The Chicago Fire Department implemented new standards May 1 requiring paramedics to wear a small detector on their radio straps that alarm and provide readings on levels of carbon monoxide, a dangerous gas that accounts for thousands of deaths nationally each year.

Photo courtesy of the Chicago Fire Department.

and calibration protocols, in addition to how to interpret readings.

The IDLH (Immediately Dangerous to Life or Health) threshold for the CFD is 100 ppm for CO, a level that requires responders to put on self-contained breathing apparatus (SCBA) and remove people from the location. At lower readings where there are elevated levels of CO, responders typically can address the issue by improving ventilation. In both instances, the gas company is called to the scene to address gas leaks.

For paramedic Gradolf, who has been with CFD for 21 years, the new single-gas monitors for detecting CO were a welcome safety tool.

“I had to rely on instinct before,” she said. “Now we have gas monitors that give us real-time alerts so we can catch things that we wouldn’t have always caught, even with our training and medical skills. Having a monitor is like having a third eye.”

Small Monitor Performs Big Job

Chicago is not alone in its effort to reduce the threat of CO poisoning by equipping emergency medical service (EMS) teams with single-gas meters to detect the deadly gas. Seth Martin, a paramedic and lieutenant for the Ketchum Fire Department in Idaho, said lives have been saved using the ToxiRAE 3 single-gas monitor for CO from RAE Systems. One month after deploying the monitor in 2009, he and his team entered a residence where they found two victims – one unconscious and the other sick and confused.

“Almost instantly, our ToxiRAE 3 started alarming,” he said. “This confirmed we had an environment that was immediately dangerous to life and health, and we rapidly removed the two

victims and ourselves from the home. The instrument ended up saving their lives, and kept us safe. They were both evacuated by air ambulance to a hyperbaric chamber.”

Rugged and compact single-gas meters stay out of the users’ way to allow them to do their job without having to deal with the device. Loud audible alarms, bright flashing lights and vibration alerts instantly warn them to an immediate threat, while exposures, exposure times and alarms can be recorded. RAE Systems’ ToxiRAE 3 single-gas monitors provide the fastest response time on the market, for better protection and worker safety.

RAE Systems by Honeywell

Keeping emergency responders safe gets easier when you have the right gas-detection solutions.

Real-Time Information is Critical

When disaster strikes, incident commanders and emergency responders are tasked with making critical, split-second decisions about how and where to deploy limited resources.

RAE Systems instruments – including multi-gas monitors – can be used as stand-alone devices or connected to RAE Systems’ wireless ProRAE Guardian Real-time Wireless Safety System or EchoView Host closed-loop team network to leverage its unique five-way alarm system.

RAE Systems’ ProRAE Guardian network allows incident commanders to quickly

set up and establish a “mobile command center,” receive real-time gas and radiation readings from more than 500 remote sensors, alarm status, responder location and biometric information from multiple teams and immediately evaluate the situation and better protect responders and the public.

RAE Systems’ proven real-time safety and threat detection systems have been deployed by leading organizations, helping save lives and maintain safety in more than 120 countries. The company’s industry-leading gas sensors and radiation detection solutions are widely recognized for their performance and reliability.

RAE Systems can help you prevent an incident from becoming a disaster. Learn more at <http://www.raesystems.com/firstresponder/>



Real-time gas detection
For real-time decisions