

Accidental Carbon Monoxide Poisoning from Portable Electric Generators: A Nationwide Series of 264 Cases

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UHMS CO Poisoning Surveillance System

(2008-2011)

Generator CO Poisoning

- Well-known source of CO poisoning
- Current recommendation is operation > 25 feet from house
- Speculated reasons for hazardous operation: fear of theft, potential for weather damage, inadequate extension cord, lack of knowledge about risk
- UL laboratory was developing warning label in 2005 and asked if our facility had treated any such patients and why they had pursued such hazardous activity

Carbon Monoxide Poisoning from Portable Electric Generators

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Background: While the overall death rate from unintentional carbon monoxide (CO) poisoning has decreased in the United States due to improved automobile emissions controls and a decline in CO poisonings from motor vehicles, exposures have not changed from some sources of CO. One of these is the operation of portable electrical generators in poorly ventilated spaces. This study sought to describe the population poisoned from CO produced by portable electric generators, and to determine the reasons that generators are operated in a hazardous fashion.

Methods: Cases of CO poisoning referred for treatment with hyperbaric oxygen at Virginia Mason Medical Center in Seattle from November 1978 to March 2004 were reviewed. Those cases that resulted from portable generator use were selected for analysis.

Results: Sixty-three patients aged 2 to 85 years were treated for CO poisoning from portable electric generators. They included 34 males and 29 females who were poisoned in 37 separate incidents. Thirty-four lost consciousness with the exposure. Of the 63 total patients, 60 spoke English. Generators were typically used when normal electrical service was disrupted by a storm or in remote locations. In 29 of 37 incidents, the generator was operated in the home environment, most commonly in the garage. Lack of awareness of the dangers of CO poisoning or lack of knowledge of ventilation requirements were the most commonly identified reasons.

Conclusions: CO poisoning from portable electric generators occurs in a characteristic population, in a few typical locations and for a limited number of reasons. This information may help target prevention efforts for this form of poisoning, such as warning labels or educational programs.

(Am J Prev Med 2005;28(1):123–125) © 2005 American Journal of Preventive Medicine

Am J Prev Med 2005

Major Findings

- 63 patients in 37 incidents
- 60 of 63 spoke English
- Typically used generators during storm-related power outages
- Lack of awareness of CO risk or lack of knowledge regarding ventilation requirements were most common reasons

DANGER

Using a generator indoors CAN KILL YOU IN MINUTES.

Generator exhaust contains carbon monoxide. This is a poison you cannot see or smell.



NEVER use inside a home or garage, EVEN IF doors and windows are open.



Only use OUTSIDE and far away from windows, doors, and vents.



WHEN THE POWER GOES OUT, KEEP YOUR GENERATOR OUTSIDE

Portable back-up generators produce the poison gas carbon monoxide (CO). CO is an odorless, colorless gas that kills without warning. It claims the lives of hundreds of people every year and makes thousands more ill. Follow these steps to keep your family safe.

PORTABLE GENERATORS

- ✓ Never use a generator inside your home or garage, even if doors and windows are open.
- ✓ Only use generators outside, more than 20 feet away from your home, doors, and windows.

CO DETECTORS

- ✓ Install battery-operated or battery back-up CO detectors near every sleeping area in your home.
- ✓ Check CO detectors regularly to be sure they are functioning properly.

CARBON MONOXIDE (CO) POISONING



CAN'T BE
SEEN



CAN'T BE
SMELLED



CAN'T BE
HEARD



CAN BE
STOPPED

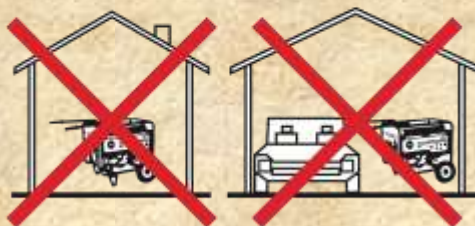


U.S. Department of
Health and Human Services
Centers for Disease
Control and Prevention

DANGER!

POISON GAS - POISON GAS - POISON GAS
CARBON MONOXIDE HAZARD

Using a generator indoors
WILL KILL YOU IN MINUTES.
Exhaust contains a poison gas
you cannot see or smell.



Never use a generator
indoors, in garages,
or carports.



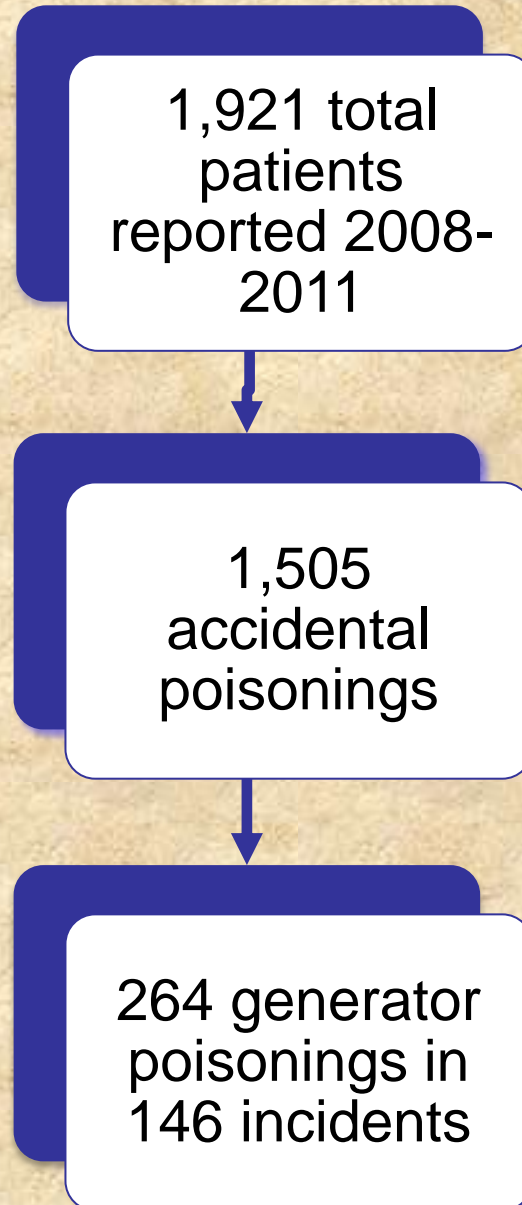
ONLY use outdoors and
far from open windows,
doors, and vents.

Recommendations from the Centers for Disease Control and Prevention

Generators Continue to Kill

- ~700 deaths in US 2002-2012
- Warning label mandated in 2007 and has been felt to have had little effect
- 321 deaths 2002-2006
- 309 deaths 2008-2012
- CPSC has directed UL to develop new standard for generators, to possibly include development of low emissions generators, addition of catalytic converters, CO sensors with auto shut-off, ?
- Industry opposed to changes due to cost

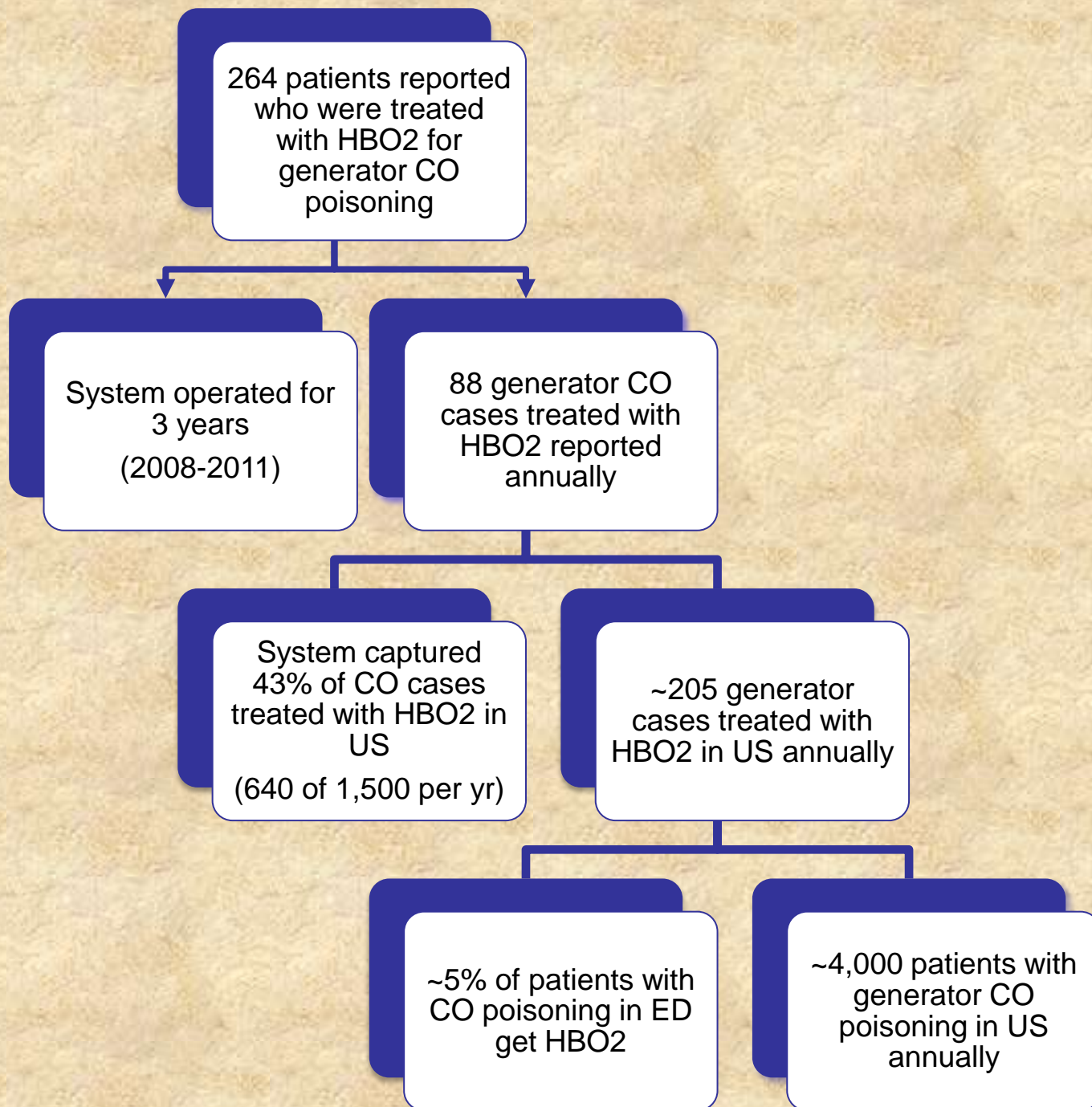
UHMS CO Surveillance Program





Gender	Male 146 (55%)
Age	37 ± 20 years
Race/Ethnicity	Non-Hispanic White 155 (45%)
	Black 57 (22%)
	Hispanic White 52 (20%)
	Asian 4 (2%)
	Native American 4 (2%)
Primary Language	English 228 (86%)
	Spanish 26 (10%)
	Vietnamese 2 (1%)
	Unknown 8 (3%)
	Spoke English 253 (96%)

Activity	Domestic 101 incidents
	Work 34
	Recreation 5
Symptoms	Headache 62%
	Dizziness 52%
	LOC 50%
	Nausea/vomiting 49%
	Confusion 27%
Intubation	18 (7%)
Carboxyhemoglobin	22.7 ± 9.0% (range 2.3% to 43%)
Cardiac Ischemia	36 (14%)



Conclusions

- Perhaps 4,000 individuals poisoned with CO from generators in US annually
- 700 deaths 2002-2012 (63 per year)
- Contrast with 13 deaths from faulty ignition switches on GM cars 2003-2013 (fine \$35M)
- UL will develop a new generator standard
- “The reason for this task group is to improve the safety of portable generators. Cost or economic feasibility will not be the deciding factor in the development of this language.”





Deaths per Year

