

# **Preventing Carbon Monoxide Poisoning**

A joint hearing of the Senate Transportation and Housing Committee  
and the Assembly Housing and Community Development Committee

November 27, 2007  
State Capitol, Room 112  
1:30 – 3:30 pm

## **BACKGROUND PAPER**

### **Purpose of the Hearing**

Carbon monoxide poisoning is preventable. The purpose of this hearing is to gather information on the dangers and prevalence of carbon monoxide poisoning, to explore prevention strategies, and to discuss whether or not California should require the installation of carbon monoxide monitors in dwellings.

### **Background**

#### *Carbon monoxide and its effects*

Carbon monoxide is a colorless, odorless, poisonous gas that is produced by the incomplete combustion of fuels. Carbon monoxide in the bloodstream prevents oxygen from binding to hemoglobin, thereby depriving the body of oxygen. Symptoms include headache, nausea, lethargy, and the inability to concentrate. Elevated levels of carbon monoxide can lead to unconsciousness, brain damage, and death.

Earlier this month, two separate carbon monoxide poisoning incidents were reported in the San Diego area. A malfunctioning water heater in a Carlsbad hotel caused two guests to pass out and

prompted a full evacuation of the facility. The next day in San Diego, a car left running overnight in a condominium garage sent to residents to the hospital, two of whom were unconscious and one of whom was very disoriented.

According to the Air Resource Board's (ARB) 2005 report on Indoor Air Pollution in California, an average of 30-40 deaths occur each year in the state due to unintentional carbon monoxide poisoning. In addition, ARB estimates that 175-700 persons are hospitalized or treated in emergency rooms for carbon monoxide poisoning and that hundreds to thousands more suffer from undiagnosed symptoms attributable to carbon monoxide exposure.

Some of the most common sources of carbon monoxide include malfunctioning furnaces, water heaters, ovens, stoves, and gas-fired dryers, unvented supplemental heaters, clogged chimneys, corroded flue pipes, and emergency generators. Automobiles left running in attached garages also pose a hazard, even if the garage doors are open. The carbon monoxide-related deaths that occurred in California over a ten-year period were attributed to the following causes:

Cause	Percentage of CO Deaths
Indoor Combustion Appliance	40
Vehicle	31
Charcoal Grill (Used Indoors)	13
Fire	5
Small Engine	5
Unknown	4
Camping Equipment	2

Source: Air Resources Board, "Indoor Air Pollution in California," July 2005. Page 58.

Within the category of deaths attributable to indoor combustion appliances, wall heaters were the source of 37% of these deaths, free-standing heaters 19%, stoves 16%, water heaters 9%, furnaces 9%, and floor heaters 7%.

### *Prevention strategies*

Carbon monoxide poisonings can be prevented. Prevention strategies include:

- **Education.** A significant number of carbon monoxide poisonings occur as a result of inappropriately using barbeques, generators, and other combustion equipment indoors. Others involve warming up automobile engines in garages attached to a home. Education campaigns that instruct consumers to keep such equipment outside and to run automobiles outside could significantly reduce the number of carbon monoxide poisonings.
- **Inspection.** Many poisonings result from faulty appliances within the home. Encouraging consumers to have such appliances inspected on a regular basis could also prevent poisonings.

- **Marketing.** A number of companies manufacture carbon monoxide alarms (also known as detectors or monitors) that alert consumers to the presence of carbon monoxide in the home or structure. These alarms can be hard-wired into the home or plugged in to electricity outlets. Purchasing and installing such alarms can cost between \$20 and \$200, depending on the model purchased and the need for wiring.
- **Leveraging.** At least one state agency, the Department of Community Services and Development, leverages home weatherization grant funds that it distributes to require that contractors install carbon monoxide alarms in homes that receive grants. More than 40,000 carbon monoxide monitors have been installed pursuant to the department's programs.
- **Mandates.** A number of states and municipalities have enacted laws or adopted building standards requiring the installation of carbon monoxide alarms in homes and structures where people sleep.

#### *National model codes and standards*

Two national standards that relate to carbon monoxide alarms are now in place. The Underwriters Laboratories, an independent, not-for-profit, product safety certification organization founded by the insurance industry, has developed UL 2034 to establish standards for the performance of carbon monoxide alarms. The National Fire Protection Association has developed NFPA 720, the standard for the installation of carbon monoxide detectors.

National model building codes, however, do not require the use of carbon monoxide alarms. At a recent meeting of the International Code Council, two proposals were submitted to require the installation of carbon monoxide alarms in new dwellings. Both proposals were disapproved, with the committee citing the lack of clear direction for placement of the alarms and the propensity for false alarm indications as the basis for its decision.

#### *Mandates in other jurisdictions*

The City of Chicago was one of the first jurisdictions to adopt a mandate for carbon monoxide alarms. In 1996, the city required all residential structures with fossil fuel-burning appliances to install carbon monoxide alarms within 40 feet of all sleeping areas. Since then, at least 15 states, 11 major municipalities, and an unknown number of smaller jurisdictions across the nation have enacted laws to mandate the installation of carbon monoxide alarms in homes or other types of structures. The 15 states are:

**Alaska:** Requires all residential structures with fossil fuel heating appliances, attached garages or enclosed parking to install carbon monoxide alarms. Effective January 1, 2004.

**Connecticut:** Requires carbon monoxide alarms be installed in all one and two-family homes that have building permit for new occupancy issued after October 1st. Effective October 1, 2005.

**Illinois:** Requires all residential dwelling to install at least one carbon monoxide alarm within 15 feet of sleeping areas. Effective January 1, 2007.

**Florida:** Requires carbon monoxide alarms in the new construction of every building that has a fossil fuel-burning heater or appliance, fireplace, or an attached garage. Carbon monoxide alarms must be installed within 10 feet of each room used for sleeping. In public lodging establishments, every enclosed space or room that contains a boiler located in any portion of the establishment that contains sleeping rooms must install carbon monoxide sensor devices. The carbon monoxide sensor devices must be integrated with the public lodging establishment's fire detection system. Effective July 1, 2008.

**Massachusetts:** Requires residential properties that contain fossil fuel-burning equipment or contain enclosed parking to install carbon monoxide alarms on every level of the home and within 10 feet of sleeping areas. Effective March 31, 2006.

**Maryland:** Requires carbon monoxide alarms be installed in a central location outside each bedroom of all one and two family dwellings, multi-family dwellings, hotels, motels and dormitories that are issued a building permit after January 1, 2008. Dwellings with a centralized alarm system may install carbon monoxide alarms near the source of carbon monoxide producing equipment permitted the alarm system emits an audible warning to occupants. Effective October 1, 2007 owners of existing dwellings upon the sale and transfer of the property must disclose the source of carbon monoxide combustion and whether carbon monoxide alarms are installed on the property.

**Minnesota:** All newly constructed single family homes and multifamily dwelling units for which building permits were issued on or after January 1, 2007 shall be provided with approved carbon monoxide alarms. Effective August 1, 2008, all existing single family homes shall be equipped with approved carbon monoxide alarms. Effective August 1, 2009 all other multifamily or apartment dwelling units shall be provided with approved carbon monoxide alarms.

**New York State:** Requires one and two single family homes and multi-family dwellings – both newly constructed and existing homes upon sale or transfer – to install at least one carbon monoxide alarm in the level of the home with the lowest sleeping area. Effective March 6, 2003.

**New Jersey:** Requires residential structures that use fossil fuel-burning appliances to install carbon monoxide alarms upon initial occupancy or upon sale or transfer. Effective June 1, 1998.

**Rhode Island:** Requires that every hotel, dormitory, apartment building, lodging, rooming house, one-, two-, and three-family dwellings, and daycare center be provided with hardwired or wireless carbon monoxide alarms in every guest room, living area, and sleeping room within a guest suite.

**Tennessee:** The installation and maintenance of a system of carbon monoxide and gas detectors are required in corridors, lounges, interior recreation areas, and sleeping rooms of child care centers. Effective June 20, 2006.

**Texas:** Each daycare center, group daycare home, and family home must be equipped with at least one carbon monoxide alarm. Effective 2004.

**Utah:** An amendment to the Utah Uniform Building Standard requires interconnected carbon monoxide alarms on every floor of any newly constructed single family dwelling with fossil fuel-burning appliances. Effective November, 2006.

**Vermont:** Requires residential structures to install carbon monoxide alarms upon initial occupancy or upon sale or transfer. Effective July 1, 2005.

**West Virginia:** Requires a newly constructed residential unit that has a fuel-burning heating or cooking source or any residential unit that is connected to a newly constructed building including a garage, storage shed, or bar that has a fuel-burning heating or cooking source to install carbon monoxide alarms. Effective July 1, 1998.

### **Conclusion**

The purpose of today's hearing is to explore the various prevention strategies for preventing carbon monoxide poisonings in order to better understand which strategies, if any, the state should seek to employ. During the hearing, the committee may wish to consider the following questions:

- What are the most effective strategies for preventing carbon monoxide poisonings?
- What are the costs and benefits of these various strategies?
- Is the technology of the current generation of carbon monoxide alarms reliable?