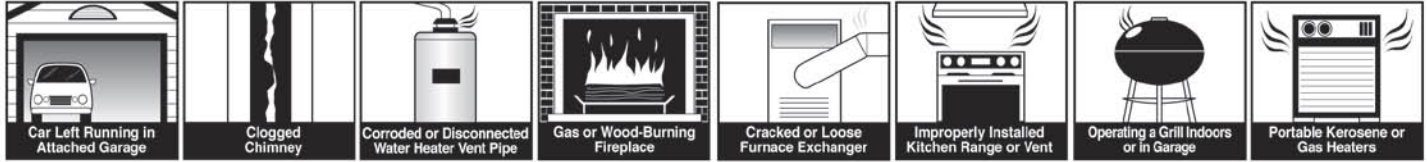


# CARBON MONOXIDE POISONING: HELP PROTECT YOUR FAMILY FROM THE SILENT KILLER

Carbon monoxide (CO) is the leading cause of accidental poisoning deaths in America. Every year more than 10,000 people die or seek medical attention due to CO poisoning from home-related products, according to the Consumer Product Safety Commission (CPSC). Often called the "Silent Killer," carbon monoxide is odorless, tasteless, and invisible. The only safe way to detect CO in your home is to install a CO alarm.

## Sources of Carbon Monoxide



## Know the Facts

- CO is produced anytime a fossil fuel [like gasoline, wood, oil, or propane] is burned, and becomes lethal when a product malfunctions or is not properly ventilated. Potential sources include furnaces, water heaters, space heaters, clothes dryers, barbecue grills, fireplaces, wood-burning stoves, gas ovens, generators, and vehicle exhaust fumes.
- More than two-thirds of Americans use gas, wood, kerosene or another fuel as their home's major heat source.
- 65% of CO poisoning deaths from consumer products are due to heating systems. (CPSC)
- Only 27% of homes in America have carbon monoxide alarms, according to the Hardware/Homecenter Research Industry.

## Health Risks and Symptoms

At high concentration levels, carbon monoxide can be fatal in minutes. When breathed in, CO passes through the lungs and bonds with hemoglobin in your bloodstream, displacing the oxygen that cells need to function. Because symptoms often mimic the flu, CO poisoning is easily misdiagnosed.

Minor Symptoms	Moderate symptoms (in addition to minor symptoms)	Severe symptoms (in addition to moderate symptoms)
Headache	Drowsiness	Increased Heart Rate
Nausea	Weakness	Loss of consciousness
Vomiting	Dizziness	Convulsions/Seizure
Irritability	Fainting	
Blurred Vision	Severe Headache	
	Difficulty Thinking	

## Safety Tips

- Install at least one battery-powered CO alarm or AC-powered unit with battery backup on each level of your home and near sleeping areas.
- Install fuel-burning appliances properly, operate according to manufacturer's instructions, and have a licensed professional inspect them annually.
- Keep chimneys clear of animal nests, leaves and residue to ensure proper venting. Have all fireplaces cleaned and inspected annually.
- Do not block or seal the exhaust flues or ducts used by water heaters, ranges and dryers.
- Do not power an engine or use a charcoal/gas grill inside the home, in an attached garage or porch, or outdoors near a window where CO fumes could seep in through a window.
- Do not use ovens or stoves to heat your home.
- Check all carbon monoxide alarms in your home. Do they need new batteries? Like all appliances, CO alarms do not last forever, and technology advances. Replace alarms built before 2001 every five years, and alarms built after 2001 every seven years in order to benefit from the latest technology upgrades

# CDC Presents Model Communities

## LINKING EMS AND PUBLIC HEALTH

**T**he Centers for Disease Control and Prevention (CDC) has selected seven communities as models of how emergency medical services can work with other safety and public health agencies in times of disaster. As part of CDC's TIIDE Project (Terrorism Injuries: Information, Dissemination and Exchange), model communities identify where relationships between the emergency care community and public health are established and operate at levels that effectively respond to events that may cause large numbers of injuries.

### TIIDE Project

Constructed around the interrelated activities of partnership building, learning lessons from previous terrorist events, and disseminating information, the TIIDE Project was established to address the urgent need to develop and exchange information about injuries from terrorism. That information includes community strategies to improve public safety, public health, clinical management and healthcare system preparedness in the event of mass casualty incidents.

### Model Communities

Twenty communities from across the nation submitted applications. Applications were reviewed by a panel of representatives from the TIIDE Project and the National Center for Injury Prevention and Control, Division of Injury Response (proposed).

### The selected communities include:

- **Clark County Health District, Las Vegas, Nevada**, <http://www.cchd.org/ems/ems.htm>
- **Erie County, New York**, <http://www.erie.gov/depts/community/smart/html/about.htm>
- **Livingston County, New York**, <http://www.co.livingston.state.ny.us/ems.htm>
- **Monroe County, New York**, <http://www.monroecounty.gov/org289.asp?orgID=289&storytypeid=&storyID=&>
- **Louisville, Kentucky**, <http://www.loukymetro.org/Department/EMS/default.asp>
- **Boston, Massachusetts**, <http://www.bostonems.com/>
- **Eau Claire County, Wisconsin**, Email: [echealth@co.eau-claire.wi.us](mailto:echealth@co.eau-claire.wi.us)

Each of the communities listed above has been successful in strengthening the relationship and collaboration between public health and the emergency care community to improve routine operations and preparedness for the citizens of their communities. Many of these communities shared common features. Some of these include:

- **Strong medical oversight in both public health and emergency care;**
- **A desire and an effort to educate both emergency care and public health providers about each others' role;**
- **Recognition of the role of and a commitment toward the development of and maintenance of long term relationships between key leadership through regular meetings, teambuilding exercises, and planning;**
- **Bringing community stakeholders (businesses, clinics, universities, etc.), into the planning process;**
- **Creating disaster plans that were developed locally, involve public health and emergency care, and that are drilled repeatedly; and**
- **Aggressively pursuing and securing funding.**

**Email questions and comments about CDC's TIIDE Project to [dardinfo@cdc.gov](mailto:dardinfo@cdc.gov).**



Community officials from across the nation recently presented model systems at a CDC conference in Atlanta.





Photos courtesy of Boston EMS,  
"Where Public Health Meets Public Safety"

## CDC Acute Injury Care Research Agenda: GUIDING RESEARCH FOR THE FUTURE

In 2003, the National Center for Injury Prevention and Control, CDC's Injury Center, identified gaps in the area of acute injury care and updated the CDC Injury Research Agenda (2002) to clearly state CDC's highest priorities for acute care research. That same year, the Injury Center began to update its Research Agenda by focusing on research that will ultimately make a difference in improving acute injury care systems and the care individuals receive when they are injured. After a two-year process of engaging injury care and public health experts, the revised Acute Injury Care Research Agenda was released at the National Injury Prevention and Control Conference in Denver on May 11, 2005.

Caring for the acutely injured is a public health issue that encompasses prehospital care through the provision of land- or air-based emergency medical services; emergency department assessment, treatment, and stabilization of injured patients; and in-

hospital care for the surgical and medical management of acute injuries among all age groups.

Implementing this Agenda will be a challenge, but improved infrastructure among our nation's trauma systems is vital to public health. This Agenda identifies priorities and will help guide research efforts to prevent needless deaths, lessen adverse health effects from injuries, and potentially reduce the cost of medical care to the injured. The Agenda is also intended as a reference for policy makers, educators, service providers and others interested in learning more about the impact of acute injury care.



To order a free copy or download the Acute Injury Care Research Agenda, go to:  
<http://www.cdc.gov/ncipc/didop/didop.htm>.

# FAMILY GUIDE TO DISASTER PREPAREDNESS

**T**HERE ARE SIX BASICS YOU SHOULD STOCK FOR YOUR HOME: WATER, FOOD, FIRST AID SUPPLIES, CLOTHING AND BEDDING, TOOLS AND EMERGENCY SUPPLIES, AND SPECIAL ITEMS. KEEP THE ITEMS THAT YOU WOULD MOST LIKELY NEED DURING AN EVACUATION IN AN EASY-TO-CARRY CONTAINER, SUCH AS A LARGE COVERED TRASH CONTAINER, A CAMPING BACKPACK OR A DUFFLE BAG.

## WATER

Store water in plastic containers, such as soft drink bottles. **Avoid using containers that will decompose or break, such as milk cartons or glass bottles.** A normally active person needs to drink at least two quarts of water each day. Hot environments and intense physical activity can double that amount. Children, nursing mothers and ill people will need more. Store one gallon of water per person per day. **Keep at least a three-day supply of water per person (two quarts for drinking, two quarts for each person in your household for food preparation/sanitation).**

## FOOD

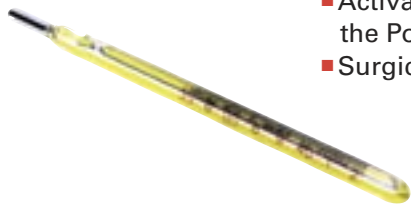
**Store at least a three-day supply of non-perishable food.** Select foods that require no refrigeration, preparation or cooking, and little or no water. If you must heat food, pack a can of sterno. Select food items that are compact and lightweight. Good choices include ready-to-eat canned meats, fruits and vegetables; canned juices; staples (salt, sugar, pepper, spices, etc.); high-energy foods; vitamins; food for infants and comfort/stress foods.



## FIRST AID SUPPLIES

**Assemble a first aid kit for your home and one for each car.**

- Sterile adhesive bandages in assorted sizes
- Assorted sizes of safety pins
- Cleansing agent/soap
- Latex gloves (2 pairs)
- Sunscreen
- 2-inch sterile gauze pads (4-6)
- 4-inch sterile gauze pads (4-6)
- Triangular bandages (3)
- 2-inch sterile roller bandages (3 rolls)
- 3-inch sterile roller bandages (3 rolls)
- Scissors
- Tweezers
- Needle
- Moistened towelettes and/or antiseptic wipes
- Antiseptic
- Thermometer
- Tongue blades (2)
- Tube of petroleum jelly or other lubricant
- Aspirin or non-aspirin pain reliever
- Anti-diarrhea medication
- Antacid (for stomach upset)
- Laxative
- Activated charcoal (use if advised by the Poison Control Center)
- Surgical or N95 masks



*This handout is brought to you by Moore Medical Corporation.*



## CLOTHING AND BEDDING

Include at least one complete change of clothing and footwear per person, including sturdy shoes or work boots, rain gear, blankets or sleeping bags, hat and gloves, thermal underwear and sunglasses.



## TOOLS AND EMERGENCY SUPPLIES

- Mess kits, or paper cups, plates and plastic utensils
- Emergency preparedness manual
- Battery-operated radio and extra batteries
- Flashlight and extra batteries
- Cash or traveler's checks, change
- Non-electric can opener, utility knife
- Fire extinguisher: Small canister ABC type
- Tube tent
- Pliers
- Tape
- Compass
- Matches in a waterproof container
- Aluminum foil
- Plastic storage containers
- Signal flare
- Paper, pencil
- Needles, thread
- Medicine dropper
- Shut-off wrench to turn off household gas and water
- Whistle
- Plastic sheeting
- Map of the area (for locating shelters)
- Toilet paper, towelettes
- Soap, liquid detergent
- Feminine supplies
- Personal hygiene items
- Plastic garbage bags, ties (for personal sanitation uses)
- Plastic bucket with tight lid
- Disinfectant
- Household chlorine bleach



## SPECIAL ITEMS

**Remember family members with special requirements,** such as infants and elderly or disabled persons. Special items for an infant might include formula, diapers, bottles, powdered milk and medications. Special items for adults with medical needs might include heart and high blood pressure medication, insulin, prescription drugs, denture needs, contact lenses and supplies and extra eyeglasses. Ask your physician or pharmacist about storing prescription medications.

# HAND HYGIENE

## CLEANING AND DECONTAMINATING HANDS IN THE PREHOSPITAL SETTING

**P**roper hand hygiene in healthcare is the single most important means for prevention of infection transmission.

**For decades, improving compliance with hand hygiene practices has been a challenge for infection control professionals whether in the hospital or in the prehospital setting.**

The availability and use of alcohol-based hand sanitizing products as recommended by the Centers for Disease Control and Prevention (CDC), *Guideline for Hand Hygiene in Health-Care Settings* has stimulated interest in improving hand hygiene practices in health care settings. The guideline recommends the use of alcohol-based rub-in handwashes (gels, rinses, and foams) for routine hand decontamination in most clinical situations.<sup>1</sup>

Researchers report that alcohol-based hand rubs are not appropriate for use when hands are visibly dirty or contaminated with proteinaceous materials.<sup>1,2,3</sup> In these situations, it is recommended that hands should be washed with plain soap and water or antimicrobial soap and water. Based on these guidelines, EMS and first responder personnel are at a disadvantage since handwashing facilities are usually not available when hands become contaminated with organic matter or visible soil.

### A CALL TO ACTION

To remedy this situation, Sani-Dex ALC Antimicrobial Alcohol Gel Wipes were developed to provide both the ability to clean hands if contaminated with organic matter or visible soil; and to kill 99.99% of germs that may cause cross-contamination and infection transmission. Sani-Dex ALC provides the mechanical friction to physically remove soil and bacteria from hands, an important function that rub-in alcohol handwashes cannot accomplish. Gels, foams, and rinses kill germs, but leave debris and soil behind.

The technique used for applying alcohol-based hand products also contributes to the efficacy of the product. Frequently, the user of alcohol-based handrubs applies an inadequate volume of product to the hands, thus not covering all surfaces and repeated applications may be necessary to ensure efficacy. A study conducted with trained infection control profes-

### Notes:

<sup>1</sup> Boyce JM, Pittet D. Guideline for hand hygiene in healthcare-settings: recommendations of the Healthcare Infection Control Practices Advisory Committee and the HIPAC/SHEA/APIC/IDSA Hand Hygiene Task Force. MMWR 2002.

<sup>2</sup> McDonald LC. Hand hygiene in the new millennium: drawing the distinction between efficacy and effectiveness. *Infect Control Hosp Epidemiol* 2003; 24:157-59.

<sup>3</sup> Larson EL, APIC Guidelines Committee. APIC guideline for handwashing and hand antiseptics in health care settings. *Am J Infect Control* 1995; 23:251-69.

<sup>4</sup> Widmer AF, Dangel, M. Alcohol-based handrub: evaluation of technique and microbiological efficacy with international infection control professionals. *Infect Control Hosp Epidemiol* 2004; 25:207-209.



sionals resulted in 63% of the participants having detectable bacteria after hand antiseptics.<sup>4</sup> However, users of alcohol gel hand wipes have a greater tendency to reach those frequently missed areas. Sani-Dex ALC Antimicrobial Alcohol Gel Hand Wipes are presaturated with the sufficient volume of alcohol to cover all areas of hands and using the wiping motion enhances proper technique.

PDI, Professional Disposables International, is dedicated to developing infection control products for the many situations encountered in the prehospital setting. Sani-Dex ALC is our latest contribution to the advancement in hand hygiene. To learn more, visit [www.pdipi.com](http://www.pdipi.com) or call **800-999-6423**.



# Proper Hand Sanitizing Technique

## When Using A Sani-Dex<sup>®</sup> ALC Antimicrobial Hand Wipe



1

Pull wipe up and tear to one side at perforation. Close lid tightly.



2

Wipe fingertips and nails individually.



3

Wipe between all fingers of both hands.



4

Wipe both thumbs.



5

Wipe palms of both hands thoroughly.



6

Wipe backs of hands.



7

Wipe both wrists and forearms.



8

Discard wipe in appropriate container.



**Professional Disposables International**  
PDI, The Healthcare Division of  
Nice-Pak Products, Inc.  
An ISO 9001:2000 Certified Company  
Two Nice-Pak Park  
Orangeburg, NY 10962-1376  
Phone: (845) 365-1700  
Fax: (845) 365-1729  
1-800-999-6423 in USA  
1-800-263-7067 in Canada  
+44 (0) 1352-736700 in Europe  
[www.pdipdi.com](http://www.pdipdi.com)

Wet wipes are  
the best choice  
for infection  
control.



**IMPORTANT NOTE:** Be sure to use every portion of the wipe.

# Home Safety Tips from

# First Alert®

## HOW TO PREVENT CARBON MONOXIDE EMERGENCIES

A public service message brought to you by BRK Brands, Inc., makers of First Alert® home safety products.

**M**aintaining the safety of your home is an important task, and one that must receive constant attention to protect you and the ones you love. **The good news is that with a little bit of planning and preparation, you can avoid one of the deadliest and most common household emergencies: carbon monoxide poisoning.**

Carbon monoxide, also called CO, is an invisible, odorless gas. It is a common by-product of incomplete combustion, produced when fossil fuels like wood, coal, charcoal, gasoline, kerosene, natural gas or oil burn.

Carbon monoxide can be produced by gas or oil appliances, like a furnace, gas-powered generator, clothes dryer, range, oven, water heater or space heater. When appliances and vents work properly, and there is enough fresh air in your home to allow complete combustion, the trace amounts of CO produced are typically not dangerous.

However, conditions such as the ones listed below can cause CO gas levels to grow, potentially creating a dangerous condition.

- **Appliance malfunction, like a cracked heat exchanger on your furnace.**
- **Gas-powered generator used indoors or near home without proper ventilation.**
- **Vent, flue or chimney that is blocked by debris or even snow.**
- **Fireplace, wood-burning stove or charcoal grill that is not vented properly.**
- **Vehicle that is left running in an attached garage with the door open or shut.**
- **Several appliances running at the same time, competing for limited fresh air, potentially causing incomplete combustion and producing dangerous levels of CO, even if all appliances are in good working order.**



### Potential Sources of Carbon Monoxide in the Home

For more home-safety information, visit [www.homesafetychallenge.com](http://www.homesafetychallenge.com)

## CO POISONING

**E**veryone is at risk from carbon monoxide poisoning, but some people are more vulnerable. **Unborn babies, infants, children, seniors, and people with heart or lung problems are at higher risk from CO poisoning.**

Carbon monoxide is dangerous because it robs your blood of oxygen. Over time, exposure to CO can make you sick. Victims exposed to enough carbon monoxide can suffer brain damage, or even die in as little as 15 minutes. The Centers for Disease Control and Prevention report that about 500 people die from accidental CO poisoning each year and another 15,000 get sick. For this reason, it's important to outfit your home with CO alarms.

## INSTALL A CO ALARM

**W**hen choosing an alarm, consider the following:

**What power source is needed?** Determine where you wish to mount the product. Is there an outlet available? If not, the battery-operated products are easily mounted. Weigh the benefits of battery vs. plug-in/battery vs. hardwire, as well as digital display vs. none.

New **First Alert® ONELINK™** alarms allow homeowners to wirelessly interconnect their alarms so when one alarm sounds, all alarms sound, giving homeowners an early warning.

**How do you maintain CO alarms?** To ensure the proper functioning of your alarms over time, implement the following basic maintenance procedures:

- **Replace CO alarms every five years.**
- **Replace batteries at least once every six months.**
- **Test alarms at least once a month by pressing and holding the Test/Silence button until the alarm sounds (takes up to 20 seconds for alarm to respond).**
- **Never remove the battery or unplug the unit to silence the alarm.**

If the alarm signals a malfunction, first check to see if the battery is installed properly in battery-operated and battery-backup units. If this does not fix the malfunction, replace the alarm.

To learn more about protecting your family from carbon monoxide, visit [www.firstalert.com](http://www.firstalert.com)

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# KEEP TEENAGERS SAFE BEHIND THE WHEEL

**G**ETTING A CELL PHONE AND LEARNING TO DRIVE ARE RITES OF PASSAGE FOR TODAY'S TEENAGERS. BUT LIKE DRINKING AND DRIVING, TEENS WHO TALK ON THE PHONE WHILE DRIVING RISK HARMING THEMSELVES AND OTHERS.



TALK ON THE PHONE WHILE DRIVING RISK HARMING THEMSELVES AND OTHERS.

Research shows that driving while using a cell phone can pose a serious cognitive distraction and degrade driver performance. This holds true whether the cell phone is hand-held or hands-free. Although the data are insufficient to quantify crashes caused by cell phone use specifically, the National Highway Traffic Safety Administration estimates that driver distraction from all sources contributes to 25 percent of all police-reported traffic crashes.

As a general rule, drivers should make every effort to move to a safe place off the road before using a cell phone. However, in emergency

situations, drivers must use their judgment regarding the urgency of the situation and the necessity to use a cell phone while driving.

## Drowsy Driving Also Poses a Risk

Cell phones are not the only cause of driver distraction. Drowsiness, particularly when combined with alcohol, results in significant decreases in alertness and performance. Young people ages 16 to 29, especially males, are at particular risk.

Generally speaking, any activity that draws a driver's attention from the primary task of driving can increase the risk of automobile accidents. Manipulating the radio or CD player, reaching for objects inside the vehicle and eating and drinking also have been implicated in crashes. Because teen drivers are particularly vulnerable to accidents caused by distraction, they should be very careful to avoid doing anything other than driving when behind the wheel.

## Keep Teen Drivers Safe

### Strategy One: *Wear Safety Belts*

Most teens support primary enforcement of safety belt laws, which allow law enforcement officers to stop a vehicle and issue a citation when the officer observes an unbelted driver or passenger. In a nationwide survey conducted in 2003, 64% of young people aged 16 to 20 voiced their support for primary enforcement laws.

### Strategy Two: *Graduated Licensing*

Many jurisdictions in the United States have adopted Graduated Driver Licensing (GDL), a system designed to delay full licensure while beginners obtain their initial experience under lower-risk conditions. Graduated licensing has three stages:

- 1) a minimum supervised learner's period;
- 2) an intermediate license; and
- 3) a full-privilege driver's license after successful completion of the first two stages.

#### *The intermediate license stage generally includes:*

- passing a behind-the-wheel road test;
- zero alcohol while driving;
- all occupants must wear seat belts;
- supervised night driving;
- remaining violation and crash free at least 12 months;
- completing advanced driver education;
- license distinctive from a regular license; and
- supervised practice.

*For more information on safety belts and graduated licensing, visit [www.nhtsa.dot.gov/people/injury/newdriver/TeenBeltUse/index.htm](http://www.nhtsa.dot.gov/people/injury/newdriver/TeenBeltUse/index.htm)*

## Teenage Driving Fatality Facts

- *In 2003, young drivers between the ages of 15 and 20 accounted for 6.3 percent (12.4 million) of the total number of licensed drivers in the United States.*
- *Motor vehicle crashes are the leading cause of death for 15- to 20-year-olds (based on 2002 figures, which are the latest mortality data currently available from the National Center for Health Statistics).*
- *In 2004, 7,898 15- to 20-year-old drivers were involved in fatal crashes.*
- *In 2004, 3,620 drivers aged 15 to 20 were killed, and an additional 303,000 injured, in motor vehicle crashes.*
- *Driver fatalities for this age group increased by 5 percent between 1994 and 2004.*
- *For young males, driver fatalities rose by 1 percent, compared with a 15 percent increase for young females.*

*This handout is brought to you by the National Highway Traffic Safety Administration.*

# HOW YOU CAN HELP IN A MEDICAL EMERGENCY

## MAKING THE CALL

### 1 Is This a Medical Emergency?

*Call an ambulance if the patient has the following problems:*

- Choking or trouble breathing
- A seizure/attack
- Won't respond or move when you talk to him/her
- Sudden or intense pain
- Heavy bleeding
- Severe or persistent vomiting or diarrhea
- Coughing or vomiting up blood
- Chest pain or pressure
- Neck or back injury
- Confusion or mental change
- Fainting
- Sudden dizziness, weakness or change in vision
- Patient is suicidal or homicidal

*If it's **life-threatening**, CALL 911 or your emergency number*

*If you're **not sure** whether it's an emergency, CALL 911 or your emergency number*



### 2 What to Tell the Emergency Dispatcher

*When you call 911, your local emergency number or "0" for the operator:*

- Describe the emergency; speak slowly and calmly
- Give your name and phone number
- Give exact location/address and nearby landmarks
- Give name, age and number of patient(s), if known
- Follow the dispatcher's instructions and answer his/her questions
- Don't hang up until you are told to
- Don't leave the scene until help arrives

### 3 What to Do While Waiting for the Ambulance to Arrive

*What to do for the patient:*

- Stay calm, keep patient calm
- Keep patient awake and warm
- Do not give the patient anything to eat or drink
- Do not move a victim who has been in a car accident, had a serious fall or has been found unconscious, unless he/she is in immediate danger
- Perform first aid if you are willing and able

*What to do for the emergency responders:*

- Light your location with a porch light, flare or bright cloth
- If possible, send someone to the street to flag down the ambulance
- Clear a route to the patient; move cars, furniture, plants, etc. if needed
- Close off pets from rescuers/put pets in another part of the house
- Gather or write down all the patient's medications and allergy information to give to first responders
- Gather the patient's medical history form
- Note the time:
  - When did you last talk to the patient?
  - How long has he/she had this medical problem?
  - If unconscious, how long has he/she been unconscious?
- Check if the patient has any advance directives (such as Do Not Resuscitate (DNR) orders)



*What to do for yourself and your family:*

- Arrange for children to stay with a friend or neighbor
- Pack a small bag for yourself
- Bring insurance cards and family/friends contact information
- Lock up the house, turn off appliances

*This handout is brought to you by the American College of Emergency Physicians.*

## ***Where There's Smoke . . . There May Be Cyanide!***

- Cyanide poisoning is an important but often underappreciated result of smoke inhalation.
- Exposure to hydrogen cyanide in fire smoke is the most common cause of acute cyanide poisoning that an Emergency Medicine professional is likely to encounter.
- Hydrogen cyanide is produced by the incomplete combustion of both natural fibers (such as wool and silk) and synthetic polymers (such as polyurethane, polyacrylonitrile, nylon and melamine) widely used in building materials and home furnishings.
- Synthetic polymers are increasingly used in very large quantities in residential and commercial buildings as well as vehicles such as cars and airplanes. Many contain nitrogen or halogen, resulting in the release of hydrogen cyanide and inorganic acids in fire smoke. In an enclosed-space fire, toxic levels of cyanide are known to contribute to death.
- Studies have shown that cyanide may play a significant role in causing death in some smoke inhalation victims.

## ***Cyanide . . . A Deadly Combination With Carbon Monoxide***

- Both carbon monoxide and cyanide in smoke act as chemical asphyxiates. A synergistic effect occurs when both are present, resulting in increased mortality.
- Toxic effects of hydrogen cyanide are most evident in the brain and heart, producing nausea, headache, dizziness, disorientation, tachycardia, arrhythmia, hypertension, seizure and cardiopulmonary arrest.
- Exposure to sublethal concentrations of hydrogen cyanide gas from smoke inhalation can result in:
  - incapacitation of a person trying to escape, resulting in greater likelihood of burn injuries
  - reduced speed of escape with prolonged exposure to toxic gases
  - disorientation—resulting in their choosing a longer escape path

Each of the above can limit the ability to escape, to survive and to continue in good health after the fire.

## ***Smoke Inhalation—A Threat At Home***

- Up to 4,000 deaths and over 20,000 injuries occur annually in the United States from smoke inhalation—ranking the U.S. as having one of the highest fire-death rates in the industrialized world.
- Most fire deaths (75%) are not due to burns but are due to toxic gas effects and oxygen deprivation, loosely known as smoke inhalation. The mortality rate following smoke inhalation is currently estimated to be 45% to 78%.
- At least 80% of all fire deaths occur in a residence. Fire deaths in homes outnumber fire deaths in all other buildings by 20 to 1.





- One third of fatal fires start with upholstered furniture, mattresses or bedding—all of which are highly likely to contain synthetic materials that release hydrogen cyanide when they degrade.
- Senior citizens age 65 and over and children under the age of 5 have the greatest risk of fire death. The fire death risk among seniors over age 65 is more than double; over age 75 triple; and over age 85 is 3.5 times the average population.



## ***Could Cyanide Poisoning From Smoke Inhalation Be Treatable***

- Current U.S. treatment protocols for smoke inhalation don't specifically address cyanide due to the safety issues with the currently available cyanide poisoning antidote.
- In some European countries, large doses of hydroxocobalamin have been used successfully to treat smoke inhalation victims for cyanide exposure.
- In these countries, prehospital emergency care providers are able to treat smoke inhalation-associated cyanide poisoning on an empiric basis.
- Hydroxocobalamin is currently in development for potential use in the United States.

## ***What Saves Lives Now?***

- A working smoke alarm dramatically increases a person's chance of surviving a fire. Also, residential sprinklers have become more cost effective for homes, but few homes are currently protected by them.
- Home fire escape routes should be planned and practiced. Plan for two exits from every room. All family members should be taught to leave the house immediately and meet at a predetermined point across the street and to never reenter a burning building!
- Children should be taught to stay low as they evacuate and to feel closed doors before opening them. If the door is hot, the child should use another route. If the door is not hot, the child can crawl out of the room.

[www.emdpharmaceuticals.com](http://www.emdpharmaceuticals.com)

Much of the information in this fact sheet is based upon:

1. US Fire Administration, National Fire Data Center, Topical Fire Research Series 2004-2005
2. Sublethal Effects of Smoke on Survival and Health, Gann, Richard G. et al., National Institute of Standards and Technology.
3. Herndon, David N, Ed., Total Burn Care, Second Edition, London, England; Saunders, 2002.
4. Koschel, Mary Jo, Where There's Smoke, There May Be Cyanide, AJN, August, 2002, Vol.102, No. 8

