LIOEHC
LONG ISLAND OCCUPATIONAL & ENVIRONMENTAL HEALTH CENTER
STONY BROOK UNIVERSITY MEDICAL CENTER

Occupational Health Update

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Winter is Coming – Button Up and Stay Warm

With winter right around the corner, workers who work outside and in cold environments such as refrigerated warehouses need to be concerned about cold stress. Cold stress produces tissue damage that results from environmental temperatures lower than the body.

There are two major disorders associated with cold stress, hypothermia and frost bite. The extent and severity of these disorders on the human body will be dependent on the air temperature, the wind velocity, dampness of clothing, water temperature and the amount of skin surface exposed.

What's Hypothermia?

All warm blooded organisms such as humans must generate internal heat to survive. Hypothermia, defined as a low heat condition, occurs because the body is losing more heat than it can produce. It is generally believed that hypothermia occurs at low air temperatures. However, hypothermia can occur at higher land temperatures such as 50 degrees Fahrenheit, if the wind speed is high, say 40 miles per hour.

Hypothermia occurs when the body's temperature drops to or below 95 degrees Fahrenheit. When this temperature is reached, the body begins to shiver in an effort to create heat. Mild hypothermia may be associated with shortness of breath, rapid heart rate, difficulty walking and impaired judgment. When an individual's core body temperature continues to fall, below 90 °F, responses start to slow, shivering stops and the individual may begin to undress. The skin may also develop a blue tint to it. Once the body temperature reaches 82 °F, life threatening heart arrhythmias and unconsciousness may occur. At core body temperatures of 78 ° F or less, death is highly probable.

Hypothermia can occur when workers do not wear the proper clothing while on land or when they fall directly into or are covered by cool water.

What's the First Aid Treatment for Hypothermia?

If you suspect a worker with hypothermia on land, you should:

- Call for help, dial 911 or summon an ambulance;
- Get the person to a warm dry area and remove any wet clothing. Replace the wet clothing with dry clothing or warm blankets;
- Do not leave the person alone;
- Get them to drink a warm sweet drink if they are alert. Avoid drinks that contain any alcohol or caffeine;

Warm up the trunk first by placing warm water bottles or hot packs in the arm pits, groin, neck and head. DO NOT rub the part or immerse it in water.

If a worker falls into the water during the spring, fall and winter months, hypothermia is a distinct possibility. You should:

- Call for help, dial 911 or summon an ambulance. You may need assistance retrieving the person out of the water;
- Get the person out of the water as soon as possible. Body heat is lost 25 times faster in water than in the air. While they are waiting for retrieval, have them keep their arms as close to the torso as possible and have them keep their legs together to minimize heat loss and keep them horizontal;
- Do not encourage the worker in the water to swim unless a floating object or another person is near by. Swimming uses up and expends body heat, reducing survival time by 50 percent.

Do not remove any clothing from the worker while they are in the water. The layer of trapped water between the worker's body and the clothing acts as an insulator.

What's the Treatment for Frost Bite?

If you suspect a worker with frost bite, you should:

- Move the person to a warm dry area. Don't leave the person alone.
- Remove any wet or tight fitting clothing that may cut off the blood circulation to the affected area.
- Do not rub the affected area. Rubbing will cause damage to the skin and affected tissue.
- Gently place the affected area in a warm water bath (105 degrees Fahrenheit) and monitor the temperature.
- Don't pour warm water on the affected area because it will warm the tissue too fast. Warming takes about 25 to 40 minutes.
- After the affected area has been warmed, it may become puffy and blister. The affected area may have a burning feeling or numbness.

When normal feeling, movement and skin color have returned, the affected area should be dried and wrapped to keep it warm.

Continued on Page 2

Article Summaries

Cold Stress

- *Cold temperatures can affect worker health, causing hypothermia or frost bite.*
- *Treat hypothermia and frost bite as serious conditions, don't ignore them!*
- *Prevent cold stress by dressing in layers, wearing a hat and keeping exposed skin to a minimum.*

Diesel Exhaust

- *Although newer diesel engines emit less pollutants, the pollutants are still toxic.*
- *Reduce your exposure to diesel exhaust by properly maintaining the engine.*
- *Survey your facility and verify that diesel and vehicle exhaust is not entering the work place through supply air vents.*
- *Plan out the location of any stationary diesel engine to ensure it does not lead to indoor air quality complaints.*

Winter Is Coming— Button Up and Stay Warm (Continued)

If there is a possibility that the skin will get cold again, do not warm the skin. Severe tissue damage results when the cold skin is warmed and then is cooled off again

Who's at Risk?

All workers are at risk for cold stress. However, older workers are at higher risk since they generate heat much more slowly. Also, workers using certain types of prescribed medication are at risk as well. Certain types of heart medications, anti depressants and tranquilizers will actually reduce the amount of heat produced by the body.

Preventing Hypothermia and Frost Bite

Prevention is the key to avert hypothermia and frost bite. Plan for cold weather by obtaining weather forecasts and observing the local weather conditions.

Wear the right protective clothing and in a layered fashion. Experts recommend three layers of clothing to protect you from cold stress. In summary, these three layers of clothing are:

- An outer layer to break the wind and allow for some ventilation.
- A middle layer of down or wool to absorb the sweat and to provide insulation, even when wet.
- An inner layer of cotton or synthetic weave clothing to allow for ventilation.

Don't wear tight fitting clothing. Loose clothing provides more ventilation than tight fitting clothing. Wear a hat. Forty percent of the body heat is lost through the head. Wear gloves, exposed fingers are susceptible to frost bite. Wear insulated foot wear with heavy wool socks.

Maintain good work practices and work in teams of two if possible. Drink plenty of liquids but avoid drinks containing alcohol and caffeine. Use work - rest regimes to reduce exposure to the cold and try to schedule cold related work during the warm parts of the day. Establish warm rooms were workers can temporarily rest from the cold weather. When rest areas are established, ensure that liquids are available to the workers. Don't smoke in cold environments and be aware that some medications may contribute to cold stress.

Employers can use a number of engineering controls to reduce cold stress. Employers and employees must exercise caution when using some of these engineering controls.

Radiant heaters are sometimes used in rest areas to provide warmth.

Radiant heaters are to be inspected prior to use and only properly functioning heaters are to be used. Combustible and flammable materials are not to be stored or used near radiant heaters. If room heaters powered by fossil fuels are used, the employer must provide adequate ventilation to eliminate the possibility of carbon monoxide exposure. Tarps can be used in open areas to cut down wind however, adequate ventilation to the work area must still be provided. Additionally, unsecured tarps can act like sails. Workers must use care when trying to fasten unsecured tarps during windy days. Insulated handles can also be installed on equipment handles when the ambient air temperature reaches below 30 degrees Fahrenheit.

For these controls to be effective, workers must be able to identify when to use and how to use them. Workers are to be trained to recognize the signs and symptoms of hypothermia. Workers require training on how to implement engineering controls and any hazards associated with them. Implementing engineering controls and work practices, and using protective equipment will reduce the potential for worker injury.

Volume 1, Issue 2

Diesel Exhaust, Air Quality and Your Health

Diesel engines have been in use in western society for over a hundred years. They are used in practically every aspect of our society today, from transportation to electric power generation.

Many of our homes are also heated with diesel fuel (number 2 fuel) as well. There isn't a day where diesel powered equipment hasn't impacted our lives.

Health Concerns Diesel engines release various types of air contaminants.

The most frequently referenced air contaminants found in diesel engine exhaust are carbon dioxide, carbon monoxide, oxides of nitrogen, sulfur dioxide, formaldehyde, polycyclic aromatic hydrocarbons and particulate matter.

Continued on Page 3

Diesel Engine Exhaust—Any Concerns?

Carbon monoxide (CO) poisoning is one of the leading causes of poisoning death in the United States. Diesel by products can cause headaches, upper and lower airway irritation, cardiovascular damage and carbon monoxide exposure can lead to permanent neurological damage and death. Workers who experience headache (the most common presenting symptom), malaise, nausea, and dizziness when potentially exposed to CO need to remove themselves from exposure, and obtain immediate assistance for themselves and evaluation of the source of exposure. Because Carbon monoxide (CO) is an odorless, tasteless, and nonirritating gas, many workers can suffer adverse health effects before the source of exposure is identified and corrected.

Workers need to use appropriate engineering controls and personal protective equipment to minimize exposure to diesel engine exhaust which is a likely carcinogen. Although new diesel engines are more efficient, they still emit toxic air contaminants.

Reducing the Exposure by Improving Diesel Engine Performance

By properly maintaining the diesel engine, exhaust emissions and your exposure to them can be reduced. Workers should inspect the diesel engine at regular intervals, concentrating on four areas. These four areas are the air intake system, the fuel system, engine adjustments and the exhaust system.

The air filter and air intake system should be visually examined regularly. Where required, air filters are to be replaced. When the diesel engine is operated in dusty environments, air filters will have to be changed out at higher frequencies.

Using low sulphur fuel with a centane rating above 40 will also reduce emissions. Diesel fuel containing less than 0.05 % sulphur not only improves emissions, it prolongs engine life, reduces corrosion to the exhaust system and improves fuel economy. Like the octane rating for gasoline, the centane rating denotes the quality of the diesel fuel or the amount of aromatic hydrocarbons. The lower the centane rating, the higher the concentration of aromatic hydrocarbons that contributes to increased exhaust emissions. Maintaining the fuel filter will also minimize damage to the fuel injectors from dirt, reducing exhaust emissions further.

Ensure the timing and amount of fuel injection, as well as cylinder valves are properly adjusted to improve efficiency and lower emissions. Diesel engine exhaust emissions can be further decreased with emission control devices such as exhaust gas recirculation valves, catalytic converters, diesel exhaust particulate filters and urea injection systems.

Improving Work Place Ventilation

Stationary diesel engines used for emergency power and other support functions should not to be installed near the fresh air intakes of a ventilation system of an occupied facility. If the installation is not configured in this manner and the operation is only temporary, facility managers should fully close the fresh air intakes during the operation of the stationary diesel engine and for 5-10 minutes after operations, up to 30 minutes. If the stationary diesel engine will be operational for longer periods, re-route the fresh air intake duct to the ventilation system to another location, away from the diesel engine and other combustion equipment and its exhaust.

Facility managers should survey the building and notify employees of areas where motor vehicles cannot idle. Trucks should not idle at loading docks with building air intakes. Signs indicating "Do Not Idle Motor Vehicles" can be installed in those areas were motor vehicles should not be idling.

Local exhaust capture systems should be installed in vehicle storage garages and vehicle service centers. Typically these systems attach to the vehicle exhaust stack, directly capturing and collecting vehicle emissions. These systems have been installed in fire stations and vehicle repair shops where the vehicle's engine is operated while the vehicle is stationary in the building.

Conclusion

Diesel powered engines are common in workplaces, emit significant hazards, including carbon monoxide, and require regular maintenance, vigilance and appropriate engineering controls to ensure worker health and safety. Through engine maintenance, proper facility planning and work place surveys, workers can reduce their exposure to diesel engine exhaust significantly.

Happy Holidays— Have a Safe Drive and Arrive Alive!

The staff of the Long Island Occupational and Environmental Health Center wishes all of you a happy holiday and a joyous new year.

Please remember to follow some of those age old holiday tips. Remember to winterize your vehicle. Check the tire pressure, the battery, the wind shield wipers and the anti-freeze. Replace worn items as required. Don't forget to pack an ice scraper, a small shovel, a container of ice melt or sand and blanket.

Clean off the snow and ice from all your vehicle windows and snow from the top of your vehicle before you operate it. Make sure your front and rear lights are free of snow.

Use your safety belt and designate a driver if you are going to a party where alcohol is being consumed.

Please have a safe drive and arrive alive.

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Protecting the Work Force Through Knowledge

Welcome to LIOEHC– What we can do for you!

The Long Island Occupational and Environmental Health Center (LIOEHC) was established in 1986 to prevent occupational illness and injury by providing comprehensive occupational and preventive health services to both employees and employers. LIOEHC is part of the NYS Occupational Health Clinic Network, which provides expert occupational health diagnostic services to all in need, regardless of ability to pay.

Comprehensive occupational medical services are provided at our facility. Our physicians and medical staff can supply your organization with consultative or ongoing services for all your occupational and environmental health concerns.

Our team includes occupational medicine physicians who are all board certified in occupational medicine, some with additional expertise in internal medicine, family medicine, acupuncture, an industrial hygienist, social worker, nursing and administrative staff.

A partial list of our services includes:

- Workplace injury and illness care
- Pre-placement physical examinations and screening tests
- Occupational and environmental medicine evaluations
- Respirator certification
- Compliance with OSHA regulations
- Impairment and disability assessments
- Workers' compensation evaluations and hearing testimony
- Chronic work-related disability evaluations
- Hazardous material exposure and surveillance evaluations
- Independent Medical Exams (IME's)
- Return-to-work and fitness-for-duty evaluations
- Worksite health promotion and wellness services
- Travel medicine and immunizations
- Executive health and wellness services.

Our Certified Industrial Hygienist and safety specialist can conduct industrial hygiene surveys for your organization. These services include area and personal air monitoring for a wide range of airborne contaminants, assessment for ergonomic hazards, personal protective equipment needs and indoor air quality surveys can be performed as well. We also deliver safety training programs on areas including hazard communication, lock out tag out, electrical safety, hearing protection, respiratory protection, blood borne pathogens, HAZWOPER and confined spaces. Contact us at 631-444-6250 if we can be of service to you.