Carbon monoxide (CO) is a colorless, odorless gas formed as a byproduct of incomplete combustion. A component of motor vehicle exhaust, as much as 95% of outdoor concentrations may be attributed to vehicle emissions in urban areas. Carbon monoxide may also concentrate indoors as a result of improperly functioning home appliances such as furnaces, water heaters, and gas stoves. When inhaled, carbon monoxide affects the body’s ability to bind oxygen to hemoglobin in the blood, depriving the body of oxygen. At low levels of exposure, symptoms associated with decreased oxygen availability may result; for example, CO may trigger an attack in angina patients. Extreme exposures can result in asphyxiation and death.

What's at risk?
The general population is exposed to low levels of carbon monoxide in the ambient (outdoor) air. Residents of urbanized areas are exposed to slightly higher levels, as are any individuals spending time in locations with a high concentration of vehicles (e.g., parking garages, traffic congestion). Households with gas appliances may be exposed to concentrations up to 15 times greater than ambient outdoor levels. Elderly residents are at increased risk of congestive heart failure resulting from the effects of CO exposure. The approximately 35,000 angina sufferers in urban New Jersey counties are particularly susceptible to the effects of carbon monoxide at observed levels. Smoking cigarettes increases personal exposure to CO significantly. 6% of congestive heart failures in urban areas may be associated with elevated CO levels. At very high levels of exposure, CO can be deadly. Based on national estimates, about 400 New Jerseyans require medical attention for CO poisoning each year, with 4-25 deaths resulting. These exposures are generally due to intentional exposures to vehicle exhaust in enclosed areas, or malfunctioning home appliances.

What are the human health impacts in New Jersey?
The National Ambient Air Quality standard for carbon monoxide is 9 parts per million (ppm) averaged over an 8-hour period, and 35 ppm maximum over a 1-hour period. Annual averages in New Jersey are in the 1-2 ppm range. About 1% of the time, urban counties may show slightly elevated concentrations, while remaining below the national standard. Health effects at these levels include the aggravation of angina or other conditions that are associated with decreased oxygen availability. About 35,000 urban residents suffer from chronic angina. Carbon monoxide has also been linked to congestive heart failure, especially among the elderly. About 6% of congestive heart failures in urban areas may be associated with elevated CO levels. At very high levels of exposure, CO can be deadly. Based on national estimates, about 400 New Jerseyans require medical attention for CO poisoning each year, with 4-25 deaths resulting. These exposures are generally due to intentional exposures to vehicle exhaust in enclosed areas, or malfunctioning home appliances.

What are the socioeconomic impacts in New Jersey?
The principal socioeconomic impacts of CO are the costs of health care associated with accidental exposures, heart failure, and treatment of other conditions that may be attributed to elevated levels of carbon monoxide. While it is difficult to estimate the incidence of health problems in New Jersey that are related to carbon monoxide levels, available information suggests these costs may total several million dollars per year.

What's being done?
Carbon monoxide is regulated under the National Ambient Air Quality Standards program. Emissions requirements have resulted in significant improvements over the last 30 years, and maximum recorded levels of CO in New Jersey have remained below the health standard since 1995. Household appliances are constructed to minimize CO generation, but poorly maintained burners may cause significant emissions and are not currently the subject of regulation.