

ARD-5

2012

## Motor Vehicles and Toxic Air Pollutants

### What are Toxic Air Pollutants?

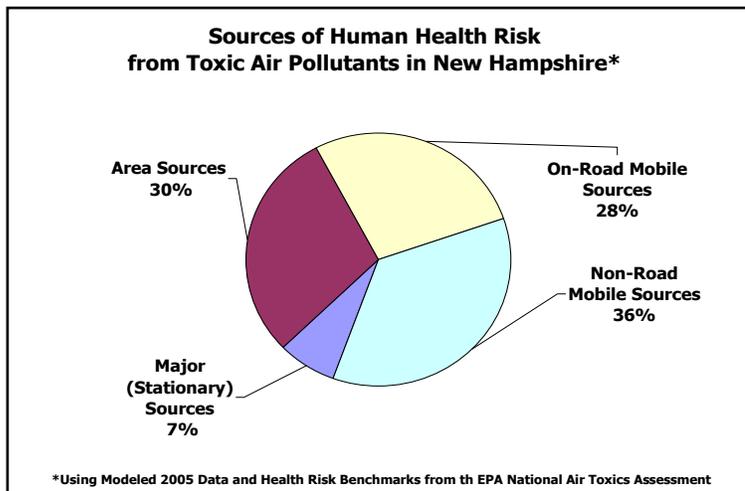
Toxic air pollutants (TAPs), or hazardous air pollutants (HAPs), are those pollutants that have the potential to cause serious adverse health effects in humans; for example, neurological, cardiovascular, liver, kidney, and respiratory effects or effects on the immune and reproductive systems. The U.S. Environmental Protection Agency classifies these pollutants based on their potential cancer risk due to inhalation as either *possible*, *probable*, or *known human carcinogens*. Motor vehicle exhaust contains numerous TAPs, such as benzene, formaldehyde, 1,3-butadiene, and diesel particulate matter. Some additional TAPs emitted by motor vehicles include acrolein, cadmium, chromium and lead.

### Air Toxics and Public Health

Motor vehicles are such an integral part of our society that everyone is exposed to their emissions. Using 1996 data, EPA estimates that on-road mobile sources (cars, trucks, and buses) are responsible for over 3,000 cases of cancer; and non-road mobile sources (construction equipment, recreational vehicles, boats, trains, aircraft) are responsible for an additional 1,850 cases of cancer each year in the US. Using this data for New Hampshire, almost 65 percent of all human health risk from toxic air pollutants comes from on-road and non-road mobile sources.

### How are Toxic Air Pollutants from Motor Vehicles Formed?

TAPs are typically emitted from cars and trucks through four mechanisms. First, some TAPs, such as benzene, toluene and xylenes, are components of gasoline that can be emitted into the air when gasoline evaporates during refueling or when gasoline remains in a hot engine after it is shut off. Second, these same compounds can also be emitted through the tailpipe and crankcase when the fuel is not completely burned in the engine, or as engine “blow-by.” Third, a significant amount of benzene, formaldehyde, and acetaldehyde emissions from automobiles is

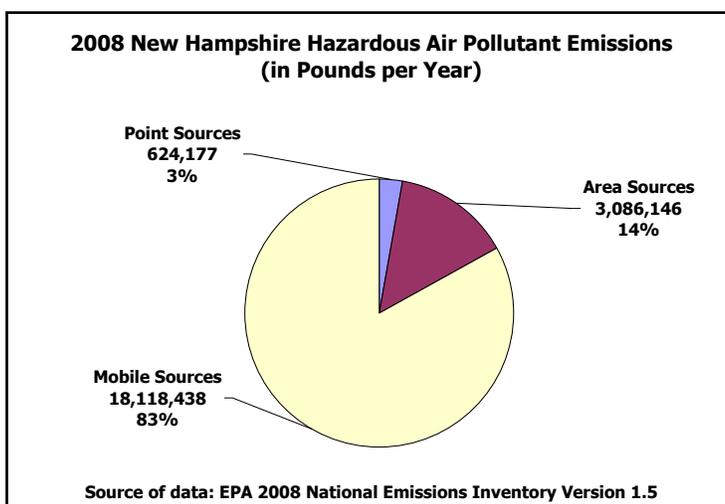


formed in the exhaust as a result of the chemical reactions that occur when other components of gasoline are not completely burned in the engine. Finally, some TAPs, such as formaldehyde and acetaldehyde, can also be formed through a secondary process when other toxic pollutants from car and truck engines undergo chemical reactions in the atmosphere.

### **What's Been Done to Control Toxic Air Pollutant Emissions from Motor Vehicles?**

The control of air toxics emissions from motor vehicles has been addressed at both the federal and state level. Federal requirements mandate cleaner burning fuels and technological controls on motor vehicles such as catalytic converters. Pre-1975 vehicles without catalytic converters (and even pre-1981 vehicles with simple catalysts) emit far more air toxics than newer vehicles. The required removal of lead from gasoline, which began in the mid-1970s, has essentially eliminated mobile source emissions of this highly toxic substance. Reformulated gasoline, introduced in 1995, and Tier 2 gasoline, introduced in 2004 have greatly reduced toxic emissions from vehicles. From 2006 to 2010, federal requirements led to the phase-in of ultra low sulfur diesel fuels as well as advanced emission control devices. These actions reduced exhaust emissions by as much as 90 percent, compared to pre-2007 diesel engines.

At the state level, New Hampshire implemented an inspection and maintenance program affecting all light duty (less than 8,500 pounds) gasoline and diesel vehicles as well as a roadside diesel opacity testing program. Starting in 2006, New Hampshire began its on-board diagnostics (OBD) test program for all 1996 and newer vehicles. In this program, sophisticated computer modules track dozens of engine functions, warning the driver when a component is either malfunctioning or about to malfunction. During the required annual OBD test, specialists download engine monitoring information to ensure the engine monitoring components are working and the engine running properly. Motor vehicles are now in cleaner-running condition and it is estimated that as of 2009, cleaner burning engines reduced hydrocarbon emissions by almost a ton per day, and nitrous oxides by more than three quarters of a ton per day. New Hampshire also has a roadside diesel opacity program that became effective in 1999. Under this program, State inspectors routinely check heavy-duty diesel trucks to ensure their particulate emissions meet proper standards. For more information, see fact sheet [ARD-30, On-Board Diagnostics, A New Generation of Motor Vehicles](#).



The good news is that today's new cars, trucks, and buses emit 90 percent less hydrocarbons and 50 percent less toxic air pollutants over their lifetimes than earlier uncontrolled models. Also, according to EPA's National Emissions Inventory (see chart on next page), total emissions of toxic air pollutants from mobile source in New Hampshire decreased from over 24 million pounds in 2002 to approximately 18 million pounds in 2008. Despite these improvements, if the number of cars and the miles they drive increase at a rate that offsets the benefits of current mandates, overall emissions of air toxics may again begin to rise.

## What Else Can Be Done?

In July 2011, the Federal Government released mandatory new fuel standards for motor vehicles. By 2016, the average car must achieve 35.5 miles per gallon and by 2025, 54 miles per gallon. These increases in efficiency will save the owner of a new vehicle \$8,200 in fuel costs over the life of the vehicle. Nationally, over the lifetime of the program, over 6 billion tons of carbon dioxide emissions will be eliminated. In spite of federal mandates and state programs, consumers need to continue to implement additional strategies to reduce their use of fossil fuels:

- Carpooling, using public transportation, combining trips, biking and walking.
- Eliminating unnecessary idling.
- Keeping speeds to 65 mph or lower.
- Avoiding aggressive driving habits, such as jack rabbit starts and stops.
- Keeping tires inflated to their recommended pressure.
- Buying the most efficient vehicle available that meets one's needs.
- Using cleaner burning alternative fuels or advanced technologies such as natural gas, propane, electric or hybrid vehicles.

Community planners are promoting “planned urban development” neighborhoods where housing, retail services, schools and even places of employment are all located within the neighborhood thus eliminating the need for long distance traveling. Ultimately, however, each of us needs to change our behavioral attitude toward driving, going from a “drive everywhere” lifestyle to one of “thrifty driving only when necessary.”

For more information on air toxics from automobiles, contact the DES Air Resources Division at (603) 271-1370, or visit the EPA Office of Transportation and Air Quality website at [www.epa.gov/otaq/toxics.htm](http://www.epa.gov/otaq/toxics.htm).