Understanding more about the human health effects from exposure to toxic metals are of primary importance to UW-SRP investigator Harvey Checkoway, PhD. It is well established that impairments to the central nervous system in humans have been linked to high doses of metals – such as manganese. Symptoms of nervous system impairment due to manganese include muscle rigidity, tremor, and slowed movement, which are similar to characteristics found in parkinsonism, which is a debilitating neurodegenerative disorder.

The Checkoway lab has had the opportunity to gain important information about the relationship between neurotoxicant exposure and parkinsonism through an ongoing study of parkinsonian features among professional welders. Manganese is a common component of welding fumes, and welders routinely encounter manganese exposures substantially greater than those occurring in the population-at-large. Dr. Checkoway’s research team conducted standardized neurological examinations of welders, and compared findings with those of a non-exposed group of workers from other occupations. The results showed that welders demonstrated a high prevalence of parkinsonism compared to the non-exposed workers, and that the clinical parkinsonian characteristics seen among the welders are similar to those found among Parkinson’s Disease patients with no history of welding.

These findings may have important implications for predicting nervous system effects among community residents who have environmental exposures to manganese from Superfund hazardous waste sites or other sources. This work may ultimately provide valuable new scientific information that will shed light on the causes of parkinsonism, and ideally, lead to its prevention.

What are neurotoxicants?
These are chemical compounds that can cause damage to the central nervous system in humans and other animals. Dr. Checkoway’s research focuses on toxic effects of manganese exposure and the role this plays in parkinsonism, an incurable neurodegenerative disorder that affects several million people in the US.

How do neurotoxicants enter the environment?
Manganese is ubiquitous in the environment and is an essential nutritional element for humans. However, manganese is toxic to the nervous system at high exposure concentrations. Manganese compounds are used in the production of steel, batteries and ceramics. Manganese can be found in our air as a combustion product of coal burning, mining and motor vehicle use.

What does this research have to do with Superfund site hazardous chemicals?
The Superfund is a federal program that was established to clean up the nation’s priority hazardous waste sites. The UW-SRP addresses a range of toxicants that include metals and pesticides. Manganese is a widespread contaminant in air, soil, and water and is found at many Superfund waste sites.

What is already being done to protect the environment?
Manganese compounds are listed on the 2005 Priority List of Hazardous Substances for the Comprehensive Environmental Response, Compensation, and Liability Act section 104 (i), as amended by the Superfund Amendments and Reauthorization Act. If you are interested in learning about manganese in your community please use this EPA website as a reference.

Linked resources for further information:
University of Washington Superfund Research Program: http://depts.washington.edu/sfund/
NIEHS Superfund Research Program: http://www.niehs.nih.gov/research/supported/srp/index.cfm
ATSDR Toxic Substance Portal: http://www.atsdr.cdc.gov/substances/toxsubstance.asp?toxicid=hich:af0\dbch\af31505\loch\f0 = 23
EPA Superfund sites information: http://www.epa.gov/superfund/sites
EPA summary of the Toxic Substances Control Act: http://www.epa.gov/lawsregs/laws/tsca.html

These findings may have important implications for predicting nervous system effects among community residents who have environmental exposures to manganese from Superfund hazardous waste sites or other sources. This work may ultimately provide valuable new scientific information that will shed light on the causes of parkinsonism, and ideally, lead to its prevention.