Trends in Occupational and Adult Lead Exposure in Wisconsin 1988 - 2005

Description of Presentation
Lead is a malleable metal that has been used by humans for more than 3 millennia. The poisonous effects of inhalation of lead fume or ingestion of lead products was well known to the early Greeks and Romans. Colic, neuropathy, nephropathy, sterility and coma were noted by Hippocrates. Such early descriptions of disease among miners make lead poisoning among the oldest recognized occupational health hazards. The historic impact of lead poisoning was recently highlighted when the Energy Department's Argonne National Laboratory outside of Chicago analyzing hair and skull fragments from the composer Beethoven confirmed earlier hints that lead may have caused decades of poor health, which culminated in a long and painful death in 1827 at age 56. 1

In recognition of the experience with the health hazards of lead exposure, lead poisoning was on the 1911 first listing of Wisconsin public health reportable diseases. Although reportable, it was not until Wisconsin established an Occupational and Environmental Health Epidemiology program in 1979. Wisconsin’s public health statutes were revised, modern reporting levels adopted; physician and laboratory reporting promoted and publicized, and elevated blood lead report tracking initiated. In 1987 Wisconsin was among the first states to successfully compete for ABLES funding and has continuously maintained this NIOSH partnership.

Purpose of Presentation
OBJECTIVES:
Describe Adult Blood Lead Surveillance Program and characterize occupational lead exposure in Wisconsin.

METHODS:
The OSHA lead standard medical monitoring provision facilitated state-based adult blood lead surveillance. OSHA requires the testing to be done, but does not require reporting of the results to any governmental authority. To link the OSHA required testing with public health surveillance programs required states to individually establish reporting requirements. In 1979 Wisconsin Statute 151 was created to place all lead-related activities (child and adult lead poisoning) in a single statute. It g/dL or greater mandatory. In 1987, the reporting level was lowered to 25 test results became reportable. The statute requires all health care providers to be responsible for reporting. In 1987 the National Institute for Occupational Safety and Health (NIOSH) established a state-based program (Adult Blood Lead Epidemiology and Surveillance – ABLES) to systematically track adult blood lead reports. Wisconsin has received NIOSH ABLES funding support since the inception of the program. The Wisconsin ABLES program is located within the Wisconsin Department of Health and Family Services (DHFS), Division of Public Health (DPH), Bureau of Environmental and Occupational Health (BEOH). The program receives statutorily required laboratory reports of blood lead testing of adult Wisconsin residents aged 16 and older.

RESULTS:
For the past seventeen years, the ABLES program has performed blood lead surveillance for Wisconsin residents aged 16 and older. 71,622 reports and 37,694 new individuals entered into the system during this period (1988-2005). “Total number of reports” includes all reports entered into the database for that year and includes some individuals with more than one reported result. “A new individual” is defined as someone who had not had a blood lead test entered into the system in the previous two years. The increase in numbers of reports in 1995 and 1996 are the result of the 1993 reporting revisions which made all blood lead tests g/dL and greater reported fromμreportable. There were 435 cases of BLL’s of 40 g/dL andμ1988 through 2005. A decreasing trend in the number of reports over 40 g/dL can be seen (graph not included).μg/dL and 60μespecially those over 50 Results also show that the male had higher rates in all age groups compared to female. There was a decrease in mean blood lead level during this period.
Education Stanford University, Stanford, CA BA 1968 Biology University of Wisconsin Medical School, Madison, Wisconsin MD 1972 Medicine Positions and Employment 6/72-6/73 Straight Medical Internship, Dept. of Medicine, Montefiore Hospital and Medical Center, Bronx, NY 6/73-6/76 Resident in Occupational and Environmental Medicine, Mount Sinai School of Medicine, New York 6/73-6/76 Research Fellow, Dept. of Community Medicine, Mount Sinai School of Medicine, New York 1/76-1/77 Research Fellow, Dept. of Medicine, Mount Sinai School of Medicine, New York 1/76-1/77 Assistant, Dept. of Community Medicine, Mount Sinai School of Medicine, New York 1/77-1/78 Instructor, Dept. of Community Medicine, Mount Sinai School of Medicine, New York 1/77-6/80 Clinical Assistant, Dept. of Medicine, Mount Sinai School of Medicine, New York 1/78-6/80 Asst Prof of Community Medicine, Environmental Sciences Laboratory, MSSM, New York 6/80-6/85 Adjunct Assistant Professor of Preventive Medicine, University of WI Medical School, Madison, WI. 6/85-6/89 Adjunct Associate Professor, Institute for Environmental Studies, University of Wisconsin, Madison 6/80-10/91 Chief, Section of Environ. and Chronic Disease Epidemiology, WI Division of Health, Madison 6/89-current Adjunct Professor of Population Health, University of Wisconsin Medical School, Madison. 6/89-current Adjunct Professor, Institute for Environmental Studies, University of Wisconsin, Madison 6/80-current State Epidemiologist for Occupational & Environmental Disease, WI Division of Public Health, Madison 10/91-current Chief Medical Officer for Occupational & Environmental Health, WI Division of Public Health, Madison Specialty Board Certification: 1977 American Board of Preventive Medicine, sub-specialty – Occupational and Environmental Health 1983 Fellow, American College of Epidemiology 1984 Certified “B" reader for Pneumoconiosis Radiographs under Federal Mine Safety and Health Act of 1977 and its amendments. Recertified July 1989, July 1993, July 1997, July 2001, July 2005. Current Experience and Appointed Positions: Chairperson, Board of Scientific Councilors, National Institute of Occupational Safety and Health, (CDC) 2004- current Childrens' Health Protection Advisory Council (USEPA FACA Committee), 2004 - current; Advisory Board on Radiation and Worker Health (Presidential FACA Committee), 2001 – current; Association of State and Territorial Health Officials (ASTHO) - Environment Policy Committee, 1986 - current; National Academy of Sciences "Committee to Evaluate Measures of Health Benefits for Environmental, Health, and Safety Regulation" 2004-2006; National Academy of Sciences "Committee on Toxicity Testing and Assessment of Environmental Agents " 2004-06 President: Wisconsin Preventive Medicine Society, 1986-current, member 1982-current Wisconsin Medical Society Committee on Health of the Public, 2000 - current Wisconsin Medical Society Committee on Occupational and Environmental Health, 2005 - current Wisconsin Cancer Council, 1985 - current. Associate Editor - American Journal of Industrial Medicine, 1981-current Editorial Board Health and Environment Digest, 1986-present Editorial Board Cancer Prevention International, 1993-present

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**Occupational Health Survey of Massachusetts Vocational Autobody Repair Programs**

**Description of Presentation**
In the U.S. there are approximately 60,000 auto paint refinishing shops. Older cars and trucks commonly have lead-containing paints, especially in the electrocoat (the initial coat applied), and many auto re-finishing paints still are lead-based. Many other toxic components, such as chromates, isocyanates and solvents are used as well. Surface preparation – including grinding, sanding and abrasive blasting of old coats of paint – can produce large quantities of dust. The spray application of re-finishing paints generates high air concentrations of solvents and pigments.

The health effects of lead include peripheral nerve damage, loss of cognitive ability, hypertension, reproductive system damage, anemia, kidney damage, and in severe cases, encephalopathy. Recent evidence suggests that lead also causes cancer, peripheral arterial disease and cataracts. Chromates can cause lung cancer, other respiratory illness and skin disorders. Isocyanate exposure can lead to skin and respiratory allergies, cancer, reproductive problems, loss of lung function and loss of memory.

Nationwide, approximately 1400 technical high schools have autobody repair and re-finishing programs. Students learn all aspects of autobody repair and painting, and are therefore potentially exposed to a wide variety of health and safety hazards.

**Purpose of Presentation**
Objectives: The Massachusetts Department of Education and Division of Occupational Safety (DOS) conducted a survey of autobody programs to learn the extent to which lead- and chromium-based paints are used, and to what extent adequate controls are implemented. The survey was also designed to stimulate awareness of autobody repair hazards and to serve as a catalyst for requesting DOS on-site consultations.

Methods: Survey questionnaires were mailed to all 41 school systems thought to have autobody repair programs. Three school systems indicated that they no longer had such a program. Of the remaining 38, 37 returned a completed questionnaire. The questionnaire was divided into several sections: general background; equipment used; sanding, grinding and welding operations; paints, paint systems and surface preparation; and work practices. Results of the survey, with recommendations for controlling health hazards, were then sent to the schools, along with an offer to provide technical assistance.

Results: Few (15%) schools applied lead-based paints, but about a quarter (29%) used chromates. None of the instructors had periodic blood lead tests. All schools had a spray painting booth; however, some painting was performed outside of the booth. Slightly less than 2/3 of the schools had vacuum attachments on their sanders. All schools reported that they had a hazard communication program; however, 31% of the teachers had not had training in the past year. Although all programs provided respirators to their students, only 1/3 had respirators for sanding operations. Only about ¼ of the programs reported that they had showers and change rooms and required their use. HEPA vacuums were used for clean-up in less than 20% of the autobody schools.

A report with survey results and recommendations was issued and sent to all of the autobody programs. The Massachusetts Department of Education and the Division of Occupational Safety also sent a letter urging the schools to take advantage of DOS’s health and safety consultation service, and about 15 responded. On-site visits are ongoing, and results of the consultations will be presented.

**Speaker 1**
Richard Rabin
Lead Registry Coordinator
Massachusetts Division of Occupational Safety
Richard Rabin has been coordinator of the Occupational Lead Poisoning Registry at the Massachusetts Division of Occupational Safety since 1990. In that position makes presentations on lead poisoning to physicians and workers and conducts workplace inspections. He also conducts indoor air quality investigations. Previously, he worked at the Boston Childhood Lead Poisoning Program as a grant writer, outreach worker and researcher.
Lead is used commonly in industrial processes and products, with lead usage being the fifth highest metal used worldwide with millions of tons being produced or processed every year in the United States (NTP, 2003). Lead poisoning has been recognized as both a significant occupational and community health hazard throughout history, but federal regulations in the United States of this toxic metal did not begin until the 1970’s (Needleman, 1992). The Occupational Safety and Health Administration (OSHA) General Industry Lead Standard was passed and promulgated in 1989, and stipulated several requirements that included a Permissible Exposure Limit (PEL) of 50 µg/m³, an action level of 30 µg/m³, and various hygiene and employee monitoring/notification schemes for those facilities above the action limit or PEL (OSHA, 29 CFR 1910.1025 Lead). It is noteworthy that the requirement to comply with the OSHA General Industry Lead Standard is triggered by air borne contaminant levels, with no requirement to comply with any provisions of the standard if personal air samples collected during the initial determination are below the action limit or no requirement to comply with many of the standard’s provisions if air samples are below the PEL (OSHA, 29 CFR 1910.1025).

Our objective was to determine characteristics about lead usage, handling, and controls among companies listed in our Adult Blood Lead Epidemiology and Surveillance (ABLES) registry using a previously designed and validated survey. We analyzed returned surveys from companies that are listed in our ABLES blood lead registry.

We found that greater then one quarter of the surveyed companies with significant potential for inhalation and dermal exposures that also had at least one employee with an elevated blood lead value higher the 25 micrograms per deciliter did not employ commonly used and simple hygiene practices. In addition, we found that 24 % of these companies had not taken an air sample within the last three years, which is the primary trigger for compliance with the OSHA general industry lead standard. In addition, only 17% of these companies have ever been cited for a violation of the OSHA lead standard, and only 46% of these companies have ever had an OSHA inspection. State-based surveillance should be better linked to OSHA enforcement activity and elevated blood lead values should be considered as a trigger for required compliance with the OSHA general industry lead standard.

James Blando is currently employed by the New Jersey Department of Health and Senior Services (NJDHSS) in the Division of Environmental and Occupational Health as a Research Scientist. This Division conducts research, public service, and assists in policy development within the State of New Jersey. Dr. Blando obtained a B.S. degree in Environmental Science at Rutgers University – Cook College in 1992, a Master of Health Science degree in Environmental Health from Johns Hopkins University- School of Hygiene and Public Health in 1995, and a Ph.D. in Environmental Science from Rutgers University in 1999. Prior to and during graduate school he held several full-time positions and internships within industry and government, that included industrial hygiene and environmental responsibilities at Schering-Plough Corporation, Bell Laboratories, Exxon Lubricants, and the New Jersey Department of Environmental Protection. After completing his doctoral degree he held a post-doctoral
research fellowship at DuPont Haskell Laboratory and conducted toxicology studies of polymer decomposition products and their resulting ultrafine particles.