

What occupations are associated with cadmium exposure?

- * Refining and smelting
- * Electroplating using cadmium
- * Making nickel-cadmium batteries
- * Welding, burning, torch-cutting, grinding, or abrasive blasting surfaces that are either coated with cadmium plating or paint containing cadmium
- * Soldering with silver solder or brazing (for hobbies too!)
- * Making or using cadmium pigments for coloring plastics, ceramic glazes, paints, and enamels
- * Making or using cadmium stabilizers, catalysts, or phosphors
- * Cleaning up or working with hazardous wastes such as flyash
- * Wrecking and demolition where cadmium is present
- * Making or using colored decals containing cadmium
- * Recycling cable coated with plastic containing cadmium

What are the health implications of cadmium exposure?

Adverse effects of excessive cadmium exposure may include:

Acute Effects

Exposure to high air levels may result in delayed (4-10 hours) pneumonitis, and/or pulmonary edema.

Chronic Effects

The principle target organ is the kidney. Toxic effects, generally seen after 6-10 years exposure, may include:

- proximal tubular dysfunction, with excretion of low molecular weight proteins;
- Fanconi syndrome (amino aciduria, glycosuria, phosphaturia, renal tubular acidosis);
- hypercalciuria with nephrolithiasis;
 - renal insufficiency;
 - osteomalacia.

Reported pulmonary effects include emphysema and pulmonary fibrosis.

Epidemiologic data suggest an excess risk of prostatic and respiratory cancers in exposed workers.

What is the treatment of cadmium intoxication?

Acute effects: supportive therapy

Chronic effects: Removal from exposure usually halts disease progression.

Chelation is not recommended.

What are physicians' responsibilities under the OSHA Cadmium Standard?

- Familiarity with the OSHA Standard and its Appendices A, D, and F;
- Familiarity with employees' duties, exposures, personal protective equipment, previous medical results;
- Administration of required medical examinations and biological monitoring tests. Frequency of testing depends upon results;
- Completion of a written medical opinion concerning employees' risk from further cadmium exposure and whether individuals should be removed from exposure;
- Provision of results to employees; and
- Selection of a proficient laboratory to analyze biological monitoring samples.

What constitutes a medical evaluation under the OSHA Cadmium Standard?

- MEDICAL AND WORK HISTORY, including use of potentially nephrotoxic drugs;
- SMOKING HISTORY;
- PHYSICAL EXAMINATION with emphasis on blood pressure, lungs and urinary system, and prostate palpitation for males over 40;
- BIOLOGICAL MONITORING, including:
 - cadmium in urine (CdU), cadmium in blood (CdB), beta-2-microglobulin in urine (B₂-M),
 - blood urea nitrogen, complete blood count, serum creatinine,
 - urine albumin, glucose, proteins;
- CHEST X-RAY; and
- PULMONARY FUNCTION TESTS.

What biological monitoring levels are of concern?

Under the OSHA Cadmium Standard, an employee is assigned to category A if monitoring results for all three markers fall at or below those shown in the chart below; B if any fall within the range shown; and C if any fall above the levels shown. Biological monitoring and medical examinations become more frequent with each higher category. Medical removal is discretionary for category B and mandatory for category C.

Biological Marker	Monitoring Result Categories		
	A	B	C
Cadmium in urine (CdU) (ug/g creatinine)	≤3	>3 & <15	>15
B ₂ -microglobulin (B ₂ -M) (ug/g creatinine)	≤300	>300 & <1500	>1500
Cadmium in blood (CdB) (ug/liter whole blood)	≤5	>5 & <15	>15

What are employers' responsibilities under the OSHA Cadmium Standard?

Employers must control employees' exposure to cadmium to safe levels through the use of:

- * Regulated areas
- * Engineering controls
- * Work practices
- * Protective clothing
- * Showers, locker rooms, lunch rooms
- * Exposure monitoring
- * Employer information and training
- * Recordkeeping
- * Emergency and compliance plans
- * Good housekeeping

The Occupational Safety and Health Administration (OSHA) of the U.S. Department of Labor has promulgated a new OSHA Cadmium Standard.

As a physician you have primary responsibility for evaluating cadmium toxicity if you are involved in medical surveillance of workers currently or previously exposed on the job to cadmium.

For More
Information Contact:

The Cadmium Project
Occupational Health Service
(609) 984-1863

Contacts & Information

- * The Occupational Health Service of the New Jersey Department of Health is involved in surveillance of workers exposed to cadmium. The surveillance program involves collection of data from clinical laboratories and hospitals and identification of workplaces using cadmium. Follow-up is done with reported individuals, their physicians, unions, and employers.

(609) 984-1863

A detailed guide for physicians and other health care providers entitled Medical Surveillance Guidelines for Workers Exposed to Cadmium is available at no cost.

- * U.S. Department of Labor, Occupational Safety and Health Administration (OSHA).

(202) 219-4667 (Publications office)

Copies of the Cadmium Standard (Federal Register, September 14, 1992) and publication 3136, Occupational Exposure to Cadmium are available at no cost from OSHA.

Enforcement of the Cadmium Standard is performed by OSHA Area Offices. In New Jersey these are: Avenel (908) 750-3270, Parsippany (201) 263-1003, Hasbrouck Heights (201) 288-1700, and Marlton (609) 757-5181.

- * U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR).

(404) 639-6204

ATSDR publishes a series of Case Studies in Environmental Medicine, including one on Cadmium Toxicity (#10). Continuing education credit is available to health professionals who use these monographs and complete the post test.

- * Quebec Toxicology Center, Interlaboratory Comparison Program.

(418) 654-2254

An interlaboratory comparison program for toxic substances in human biological fluids, including an OSHA Cadmium Proficiency Testing Program, is operated by the Quebec Toxicology Center (QTC). A list of proficient laboratories is available from QTC upon request.

What
Physicians
Need To Know About

Occupational Cadmium Exposure



Occupational Health Service