

Eliminating Mercury in Lighting: A Win-Win for Health and the Environment

Minamata Convention

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Clean
Lighting
Coalition

Mercury in Fluorescent Lighting





UNNECESSARY HEALTH RISKS
AND ACTIONABLE SOLUTIONS



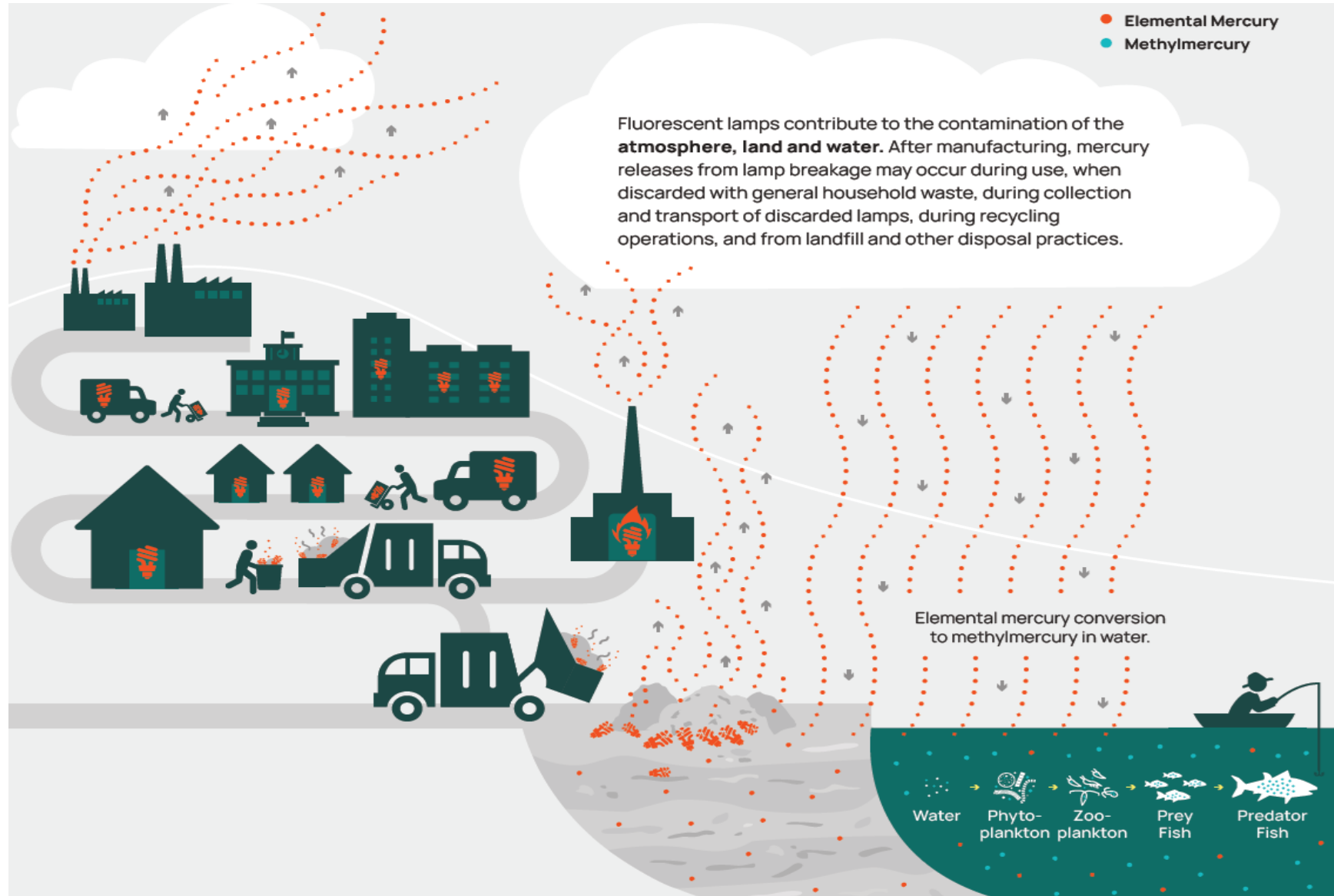
Mercury
Policy Project



Typical mercury content of fluorescent lamps

TYPE OF FLUORESCENT LAMP	CHARACTERISTICS	MERCURY CONTENT PER LAMP
 T12 (1.5 inches in diameter) Linear Fluorescent Lamp	Relatively low energy efficiency and high mercury content; oldest of the fluorescent tubes.	5 mg up to 90 mg
 T8 (1 inch in diameter) Linear Fluorescent Lamp	The most commonly used fluorescent tube on the market, especially 4-foot lengths.	10 mg or less
 T5 (5/8 inch in diameter) Linear Fluorescent Lamp	Introduced in the mid-1990's as a more efficient alternative to T8 fluorescent tubes.	5 mg or less
 Compact Fluorescent Lamp	Introduced around 1980 in response to the oil-shocks of the early 1970's; promoted in the past as a more efficient alternative to incandescent lamps. Has either a screw base or pin base.	5 mg or less

Mercury releases into the environment from fluorescent lamp use



Mercury exposure risks from fluorescent lamp breakage: Groups of most concern

- Sensitive populations, esp. developing fetuses, infants, children, and women who are pregnant or breast-feeding
- Vulnerable people, esp. those who have underlying health conditions, are disadvantaged, and/or are chronically exposed to a range of pollutants
- Workers involved in fluorescent lamp manufacturing, transportation, collection, processing, recycling, and disposal



Mercury exposure risks to sensitive populations

- Fetuses and infants are at higher risk of low-level mercury vapor uptake due to a number of factors
- Fetuses and infants are particularly vulnerable to developmental disabilities
- The initial release of mercury vapor from a broken lamp is the most immediate concern, since mercury levels are most likely to be more elevated
- In an unventilated space, infants at floor level are likely to have the highest mercury exposure from a broken lamp
- A broken lamp can generate mercury vapor in indoor air well above state and federal safety guidelines

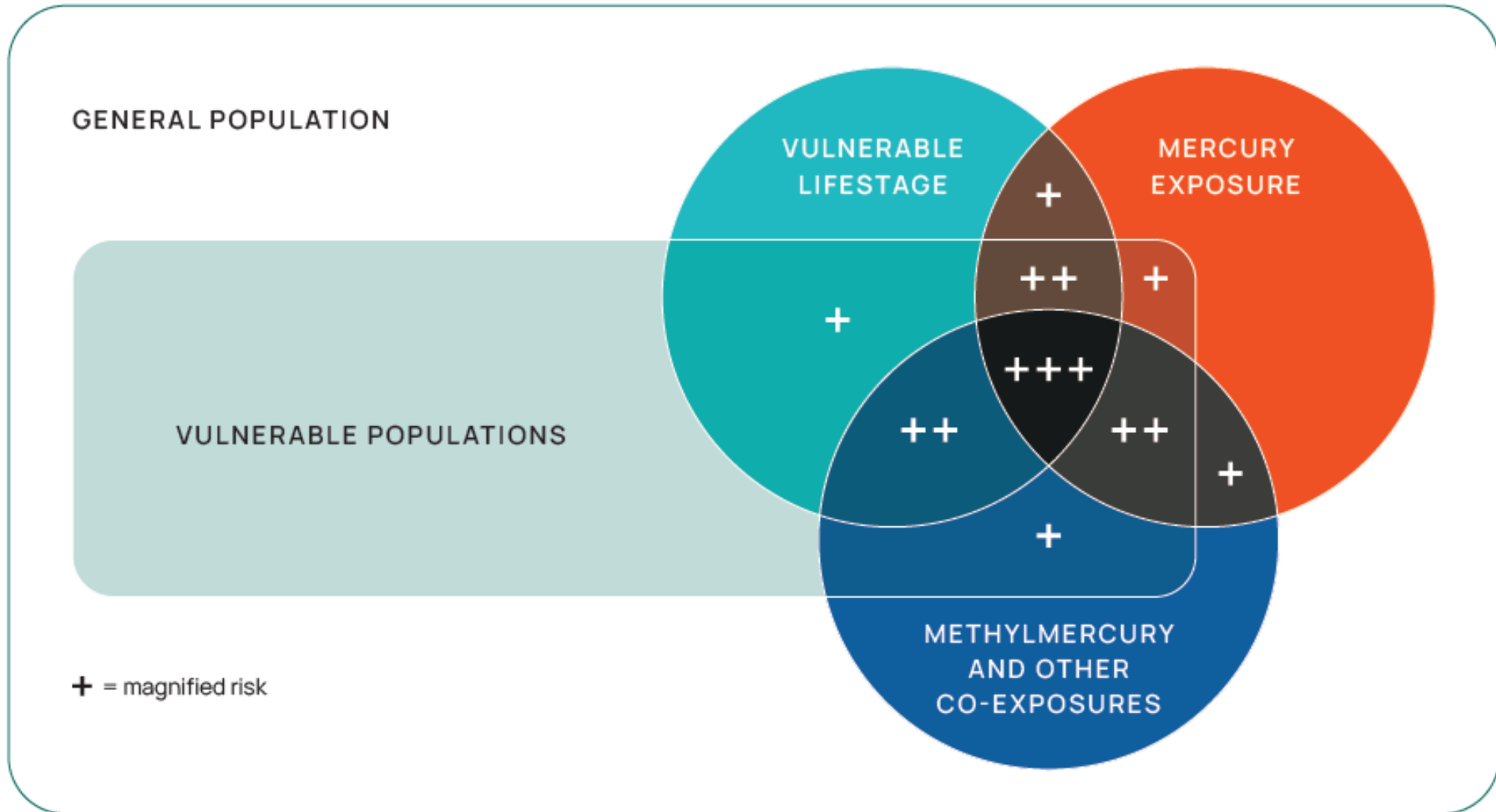


Workers exposed to mercury during the entire life-cycle of a fluorescent lamp, including:

- Primary mercury mining
- Lamp manufacture
- Disposal of lamps into waste bins
- Lamp collection, transport, and recycling
- Municipal waste collection, transport and processing (e.g., at transfer stations)
- Waste disposal (e.g., at the landfill face and incinerator ash disposal sites)



Magnified health risks of mixed exposures for vulnerable populations



Key mercury exposure pathways and effects

MERCURY FORM	KEY EXPOSURE PATHWAYS	TYPICAL SOURCES	TOXIC EFFECTS OBSERVED IN
Elemental (metallic)	<ul style="list-style-type: none"> Inhalation 	<ul style="list-style-type: none"> Emissions from coal-fired power plants Broken fluorescent lamps Broken thermometers Dental amalgams 	<ul style="list-style-type: none"> Central nervous system Immune system Kidneys Lungs
Inorganic (primarily mercuric chloride)	<ul style="list-style-type: none"> Ingestion Dermal 	<ul style="list-style-type: none"> Laxatives Cosmetic products Antiseptics 	<ul style="list-style-type: none"> Kidneys Skin (acrodynia) Central nervous system Gastrointestinal tract
Organic (primarily methylmercury)	<ul style="list-style-type: none"> Ingestion (oral) Parenteral (other ingestion) Placental 	<ul style="list-style-type: none"> Fish (accumulated through the food chain) Insecticides Fungicides 	<ul style="list-style-type: none"> Central nervous system Cardiovascular system

Note: Inorganic compounds illegally used in skin-lightening products may include mercuric iodide, mercurous chloride, ammoniated mercury, or others.

Mercury exposure limits

Over the years, a variety of mercury exposure limits have been recommended:

- by different government agencies, scientific and standardization organizations
- to protect groups with varying sensitivities and/or vulnerabilities
- to consider exposures over longer (“chronic”) or shorter (“acute”) time periods
- using various safety margins, and
- generally lacking broad consensus

Recommended limits for safe exposure to mercury vapor in air

AGENCY AND/OR EXPLANATION OF EXPOSURE LIMITS	MERCURY CONCENTRATION IN AIR (ng/m ³)*
Typical U.S. ambient (outside) air	1 - 10
California Chronic Reference Exposure Level (REL), Office of Environmental Health Hazard Assessment	30
Agency for Toxic Substances and Disease Registry (ATSDR), a branch of the Centers for Disease Control, Minimal Risk Level (MRL), e.g., chronic exposure for children	200
California acute (short-term = 1-hour ave.) REL	600
American Conference of Governmental and Industrial Hygienists ACGIH (occupational exposure 8 h, 5-day week)	25,000

*All units are given in nanograms, or billionths of a gram, per cubic meter of air.

When a lamp breaks...



In research carried out by the State of Maine, following the breakage of a single CFL, the mercury concentration in the study room air often exceeded the Maine Ambient Air Guideline of 300 ng/m^3 , with short episodes over $25,000 \text{ ng/m}^3$, and sometimes briefly exceeding $50,000 \text{ ng/m}^3$.

<https://www.maine.gov/dep/homeowner/cflreport/cflreport.pdf>

What NEVER to do when cleaning up a mercury spill



- Never use a vacuum cleaner or broom.



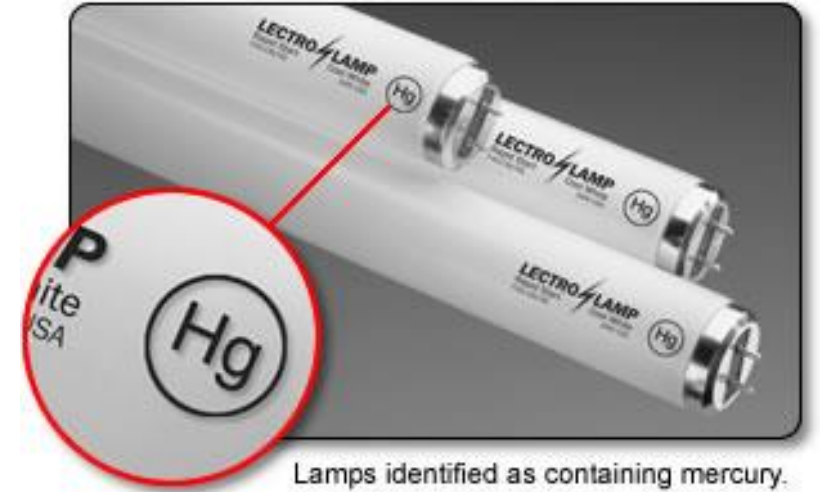
- Never pour mercury down a drain.



- Never allow people who are wearing mercury-contaminated shoes or clothing to walk around the house.



- Never use a washing machine to launder clothing or other items that may have come in contact with mercury.



How to clean up a small mercury spill

How to Clean Up a Small Mercury Spill

(a broken thermometer, thermostat or compact fluorescent light bulb)

Step 1: Isolate the spill and ventilate the area right away.



- The person who will clean up the spill should have everyone else, **especially children**, leave the spill area, including pets. **Don't** let anyone take the mercury on their way out.
- Open all windows and doors that open to the outside of the house.
- Close all doors between the room where the mercury was spilled and the house.
- Close all cold air returns so that mercury vapor is not carried throughout the house.
- Turn down heaters and turn up single-room air conditioners, but don't use air conditioning.
- Use fans to blow mercury-contaminated air outside. Turn off fans that blow air to the outside.

Step 2: Get the items needed to clean up a small mercury spill.

You will need the following items:

1. 4 or 5 zipper-top plastic bags
2. trash bags (2 to 6 mm thick)
3. rubber, nitrile or latex gloves
4. paper towels
5. cardboard or squeegee
6. eye dropper
7. duct tape, or shaving cream and small paint brush
8. flashlight
9. powdered sulfur (optional)



Step 3: Cleanup spill.



- Put on rubber, nitrile or latex gloves.
- Pick up any broken pieces of glass and place them on a paper towel. On a paper towel, place it in a zipper-top bag, and seal the bag.
- Clean up the beads of mercury. Use a squeegee or cardboard to slowly push beads onto a sheet of paper. An eye dropper can also be used to collect beads. Slowly squeeze mercury from the eye dropper onto a damp paper towel. Put the paper towel, paper, eye dropper, or anything else that has mercury on it into a zipper-top bag, and seal the bag.

Step 3: continued

- After you remove larger beads, put shaving cream on top of a small piece of paper and gently blot the affected area to pick up smaller hard-to-see beads. You can also use duct tape or masking tape to collect smaller hard-to-see beads. Push the paint brush or tape into a zipper-top bag.
- It is **OPTIONAL** to use commercially available powdered sulfur to absorb mercury that is too small to see. The sulfur does two things: (1) it makes the mercury easier to see since there may be a color change from yellow to brown (2) it binds the mercury so that it can be easily removed, and it helps prevent mercury that may have been missed during the cleanup from vaporizing in the room.

Mercury spill kits that contain sulfur can be purchased from laboratory and hazardous materials response supply manufacturers. Read and follow the instructions on how to use the cleanup kit before using.

Note: Powdered sulfur may stain fabrics. Also, when using powdered sulfur, avoid breathing in the powder as it can be moderately toxic.

Step 4: Look for mercury that may have been missed during the cleanup.



- Take a flashlight, hold it at a low angle close to the floor in a darkened room and look for additional glistening beads of mercury that may be sticking to the surface or in small cracks. **Note:** Mercury can move surprising distances on hard and flat surfaces, so be sure to carefully inspect the entire room while you are searching.

Step 5: Remove contaminated carpet and throw away.



- Place outside the house in a safe place until household trash is picked up.

Step 6: Remove mercury from shoes, clothing, and skin.



- If mercury had touched your skin, shoes or clothing, remain still and do not wash. Bring you a plastic trash bag and wet paper towels. Wipe off any visible mercury with the wet paper towels and then put them into the trash bag. Wash contaminated shoes and clothing and place them in a trash bag. Seal the bag and place it in another bag.

Step 7: Properly dispose of contaminated cleanup materials.



- Place all materials used in the cleanup, including gloves, in a trash bag. Place the zipper-top bags that contain mercury and other objects into the trash bag. Close and seal the trash bag and place it in a safe place outside your house. Label the bag as directed by your local health or fire department.
- Contact your local health department, municipal waste authority, or your local fire department for proper disposal in accordance with local, state and federal laws.

Step 8: Determine if additional action needs to be taken following cleanup of spill.



- Keep the area well ventilated to the outside (i.e., windows open and fans in exterior windows running) for at least 24 hours after cleaning up the spill. Continue to keep pets and children out of the cleanup area. If anyone gets sick, call your doctor or the **Poison Control Center** at (888) 222-1222 immediately.
- You may want to hire a contractor who has monitoring equipment to screen for mercury vapors. Consult your local environmental or health agency to inquire about contractors in your area.
- If young children or pregnant people are in the house, seek additional advice from your local or state health or environmental agency.

What to Do for Mercury Spills Greater Than the Amount in a Thermometer, Thermostat or Compact Fluorescent Light Bulb

Mercury is heavy. Just two tablespoons weigh nearly one pound. If more than the amount of mercury in a thermometer or thermostat or a compact fluorescent light bulb is spilled in your house, be sure to follow these steps:



- Have everyone else leave the area; **don't** let anyone walk through the mercury on their way out.
 - Open all windows and doors to the **outside**.
 - **Turn down** the heater in winter and **turn up** the air conditioner in summer.
 - Shut all doors to other parts of the house, and leave the area.
 - Call your local or state health or environmental agency for help.
- If more than two tablespoons of mercury are spilled, it is mandatory to call the National Response Center (NRC), available 24 hours a day, 1-800-424-8802.
- If you have health-related questions about mercury, call the Agency for Toxic Substances and Disease Registry (ATSDR) at 800-232-4636 or TTY: 888-232-6348, or by email to cdcinfo@cdc.gov.
- If you have questions about cleaning up a mercury spill of any size, call US EPA at 202-564-3850.



Recommendations

- Websites and other platforms that now encourage the use of fluorescents should be updated to support LED lighting instead.
- Parties to the Minamata Convention on Mercury should support the proposed African amendment to phase out fluorescent lamps by 2025.
- **States and local governments** should adopt and enforce mercury reduction policies to phase out the sale of fluorescent lamps.
- **Schools, child care and healthcare facilities, public housing facilities, etc.** should replace fluorescent lamps, especially where sensitive populations are present.

Recommendations (continued)

- **Lighting manufacturers and distributors** should stop selling fluorescents, remove promotional info from their websites and accept phase-out legislation.
- **Utilities** should advocate for federal, state and local policies that phase out fluorescent lamps.
- **Environmental groups** should advocate for policies at all levels that phase out the manufacture and sale of fluorescent lamps in the United States – and globally.

Questions? Comments?

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