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Health Alert

Mercury Poisoning Linked to Use of Skin-Lightening Creams from Mexico

Certain skin-lightening or acne creams from Mexico have caused multiple cases of mercury poisoning throughout California. Cream users purchased the products on the street in California cities through informal networks of friends or they brought them into the USA from Mexico. These non-commercial creams are used for lightening the skin; fading freckles, blemishes, and age spots; and treating acne. Products usually come in plastic containers that either have no label or have hand-made labels (see photos on page 3). The poisoning cases have included several children and babies who were not cream users but who were exposed to mercury through contact with family members who used the products. The California Department of Public Health's Food and Drug Laboratory found creams to contain very high levels of mercury, up to 210,000 parts per million (ppm) or 21 percent. It is illegal to sell skin cream products in the USA that have 1 ppm or more of mercury.

Signs and Symptoms of Inorganic Mercury Poisoning

Because signs and symptoms associated with inorganic mercury poisoning are non-specific in nature, cases may go undiagnosed for weeks or months, and misdiagnosis has led to clinical treatments that did not address the underlying poisoning.

General Signs and Symptoms	Children with prolonged exposure
• Difficulty concentrating, memory loss • Nervousness, irritability, anxiety • Depression, insomnia • Headaches • Weight loss, fatigue	• Pink hands and feet • Desquamation of the skin • Excessive salivation or thirst, gingivitis • Irritability, anorexia • Poor muscle tone, leg cramps • Hypertension, rash
Neuromuscular Effects	**Renal Effects**
• Tremors, paresthesias • Numbness or tingling in hands, feet, or around the lips • Weakness in the extremities	• Proteinuria • Nephrotic syndrome • Renal tubular acidosis

The California Department of Public Health (CDPH) asks medical providers to consider mercury poisoning in their workup of patients with the above signs and symptoms.

Patients who use these creams and have symptoms of mercury poisoning should have their urine tested for mercury. Providers should urge patients to stop using unlabeled or hand-labeled products immediately. Because homes of skin cream users can become contaminated, other family members should be assessed for mercury poisoning. Any cases of mercury poisoning should be notified to the local public health or environmental health authorities.

Examples of Cases in California

1. In 2019, following a hospital admission, a 47-year-old Latino woman was found to have a blood mercury of 2,630 µg/L. Normal values are less than 5 µg/L. Her initial mercry urine levels were 120 µg/L. The patient presented to the emergency room with numbness in her hands and face, gait disturbances and slurred speech, which continued to worsen over the course of a few weeks. She went from being able to respond to verbal commands at admission to non-responsiveness, which progressed to moaning and thrashing. She was extremely agitated and had to be restrained to her bed. The cream she was using had 12,000 ppm of mercury. It was a Pond's cream purchased at a pharmacy in the State of Jalisco, Mexico where it was adulterated with mercury. Given the extreme Central Nervous System involvement, the cream was tested for organic mercury along with mercury salts. The cream contained methyl mercury idodide, explaining the serious health effects. Typically creams contain mercury salts, such as mercurous chloride.

2. In 2014, following two hospitalizations, a 20-month-old baby was diagnosed with mercury poisoning. The baby exhibited hypertension, refusal to walk, irritability, difficulty sleeping and required a nasogastric tube for poor appetite. The baby's mother used a skin-lightening cream from Mexico. The baby was most likely exposed to mercury through physical contact with the mother or from contact with contaminated household items. The cream used by the mother contained 38,000 ppm of mercury and the baby's mercury urine level was 52 µg/g creatinine. Through contact tracking of friends who also used the cream, an additional six households with 40 individuals, half of whom were children, were found to be exposed to mercury. Many of the family's personal belongings were discarded because they were contaminated with mercury.

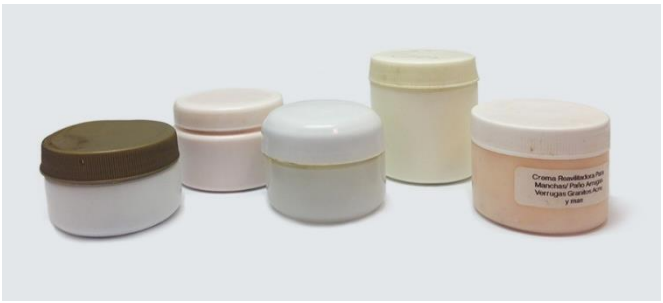
3. In 2013, following several emergency room visits, consultations with a neurologist, and a week-long hospitalization, a 16-year-old was admitted to a pediatric intensive care unit for almost a month after using a homemade cream from Mexico for acne. His symptoms progressed rapidly from weakness in his legs to involuntary muscle twitching. Later he developed severe back pain; diffuse and visible fasciculations of the extremities, tongue, and lips; unsteady gait; delirium; agitation; sleep disturbances; diaphoresis; persistent tachycardia; and hypertension. A renal sonogram revealed inflammation. The adolescent's mercury urine level was 144 µg/g creatinine from a spot urine and 208 µg/g creatinine from a 24-hour urine. The creams he used contained from 96,000 ppm to 210,000 ppm of mercury. He had only been using the acne cream twice a day for about six weeks before the onset of symptoms. Eleven family members were affected by mercury exposure, and almost all furniture and personal belongings were disposed of.

4. In 2010, a 39-year-old Latino woman and her four-year-old child were found to have elevated urine mercury levels after participating in a health study. The woman had 482 µg/g creatinine of mercury in urine and the four-year-old child had 107 µg/g creatinine. A clinical examination showed that the woman experienced mild to moderate symptoms of mercury toxicity, including numbness and tingling in her hands and lips, dizziness, forgetfulness, headaches, depression, irritability, and anxiety. The four-year-old appeared to be developing normally with no clinical symptoms of mercury toxicity. The woman had used a skin-lightening cream from Mexico for three years to fade freckles and age spots but her child did not use the cream. An additional twenty one friends and family were assessed for mercury poisoning and five homes were inspected for contamination. The creams used contained between 20,000 ppm and 57,000 ppm of mercury in the form of mercurous chloride.

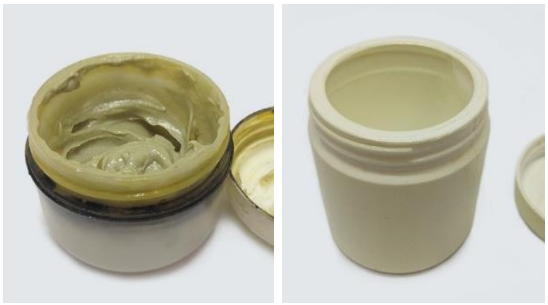
<u>Sources of these products</u>

All California cases have resulted from use of skin creams originating in Mexico. In some cases, the skin creams were purchased in either Jalisco or Michoacan, Mexico, and then brought into the USA. In other cases, the products were sold on the street in California cities, or through informal networks of friends. In two cases, a pharmacy in Mexico adulterated a commercial skin cream by adding powder and oil containing vitamins and other ingredients that included mercury; this product was then carried into California. In nearly all the cases, the skin creams were shared with family and friends and often used by adolescents for acne. Many of the creams seen in California are light in color and turn dark grey/green after prolonged exposure to light.

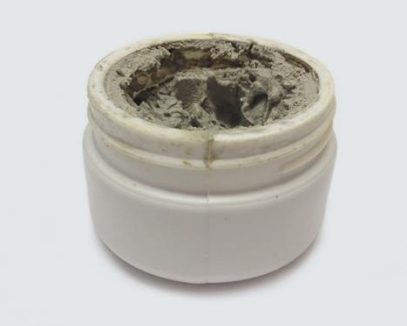
Examples of non-commercial skin-lightening or acne creams found in CA



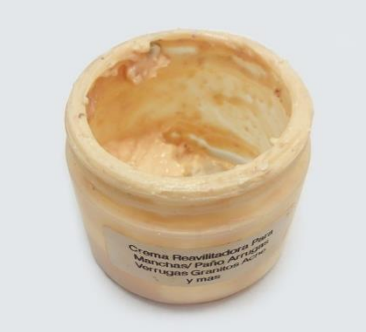
Creams come in all types of containers



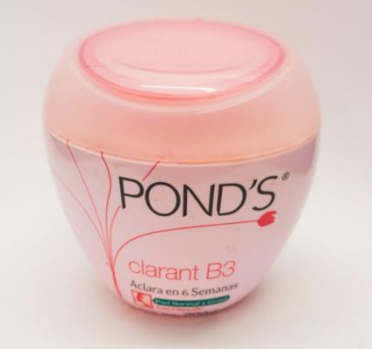
Unlabeled creams collected in 2010



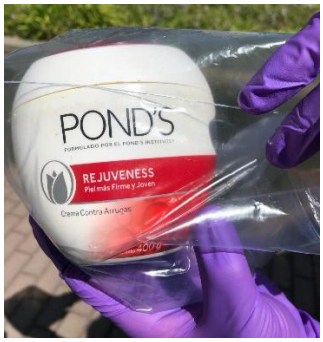
Unlabeled cream used by index case in 2013



Cream collected in 2014 with hand-made label



Pond's cream adulterated in Mexico in 2010.



Pond's cream adulterated in Mexico in 2019. Cream is particularly toxic due to the organic mercury content.

Mercury Absorption and Toxicity

The CDPH Environmental Health Laboratory identified inorganic mercury in the form of mercurous chloride (also known as calomel) found in most of the creams tested. This is different from organic mercury (methylmercury), which is found in the cream from 2019, but is usually found seafood. Inorganic mercury in skin cream is absorbed following application to the skin; it is retained in the body and toxic levels can develop gradually with prolonged use. Among young children, contact with adult cream users' skin, contaminated air and household items contribute to exposure via dermal absorption, inhalation and hand-to-mouth behavior. Breastfeeding could also contribute to exposure. The target organs for toxic effects are the central nervous system and kidneys. Organic mercury, such as that found in the 2019 cream usually Most inorganic mercury is excreted in the urine. The biological half-life is about 45-60 days.

However, in patients with mercury urine levels > 5 µg/g creatinine, testing for urinary mercury should be repeated every couple of months to confirm that levels are declining until the urine level is below 5 µg/g creatinine. If levels are not dropping accordingly, contamination of the home or continued cream use should be suspected.

Home Contamination

The mercury from these creams can easily spread from the skin of the affected user to clothing and bedding, and on to surfaces and furniture throughout the home where the creams are used. From these surfaces, through mechanisms that are poorly understood, some of the mercury gets into the air in the home. As a result, until the home is assessed

and decontaminated, every person in the home where these products are used is at risk for mercury poisoning.

Medical Testing

The most accurate method to confirm exposure to inorganic mercury is a urine test. A first morning void has up to an 85% correlation with a 24-hour collection, which is the most accurate test. The 95th percentile of urine mercury concentrations from the nationally representative National Health and Nutrition Examination Survey was 2.09 µg/g creatinine[1] (n=2865). Occupational studies have demonstrated non-specific symptoms when urine mercury levels are between 25-50 µg/L, renal tubular effects and changes in plasma enzymes at 50 µg/L, and objective tremor at 100 µg/L. However, in non-occupational cases in California, severity of symptoms of mercury poisoning do not correlate well with urinary mercury levels. Some individuals appear to be more sensitive than others to the development of symptoms associated with mercury exposure.

Renal function tests, including a urinalysis, creatinine, BUN, urine microglobulin, and microalbuminuria, should be performed in individuals with elevated urine mercury levels.

Mercury may also be measured in whole blood. However, blood mercury levels are not accurate indicators of inorganic mercury exposure. Total mercury in blood is normally less than 6 µg/L. Elevated blood mercury levels should be followed up with urine tests as described above.

Choose a laboratory to conduct repeated urinary mercury monitoring with detection limits below 5 µg/L. Laboratory normal values may not reflect a health protective level and we therefore recommend monitoring patients until urinary mercury levels fall below 5 µg/g creatinine or 5 µg/L .

Medical Treatment and Follow Up

Mild to moderate symptoms may resolve over a period of months without therapy. Since skin-lightening or acne creams are commonly used throughout the world, it is often difficult for affected patients to believe that these products can be harmful to their health or the health of their children. When signs and symptoms of neurologic or renal impairment are present, chelation therapy may be considered. Chelation should only be performed in consultation with medical toxicologists with expertise in heavy metals. Contact Poison Control (1-800-222-1222) or the Pediatric Environmental Health Specialty Unit (PEHSU) to be linked with a specialist at www.pehsu.net or at 1-888- 347-2632.

[1] Urine mercury may be reported as the mass of the metal per volume of urine (ie, mcg/L) or as the mass of the metal per gram of creatinine (ie, mcg/g creatinine). Adjustment for creatinine, which reduces the impact of variation in urine flow rate, can be of value in comparing serial measurements obtained in the same individual (eg, workplace biomonitoring) or in evaluating dose-response trends in small population studies. However, when one is assessing a "creatinine-corrected" result, the urine concentration of the metal (Hg/L) and of creatinine (g creatinine/L) should also be reviewed individually. Kosnett, Michael J, "Mercury" (http://www.accessmedicine.com)

Disposal

Any skin cream product that is suspected to contain mercury must be disposed of as household hazardous waste. The face cream container should be labeled "contains mercury," placed in a sealed plastic bag, and disposed of at local household hazardous waste collection facilities. A listing of local household hazard waste collection facilities can be found at the California Department of Toxic Substances Control website: https://dtsc.ca.gov/managing-hazardous-waste/. Poison Control can also be consulted on how to dispose of these creams.

Commercial Skin-lightening or Acne Creams

Elevated levels of mercury have also been found in commercial skin-lightening or acne creams, germicidal soaps, and other products that have been imported to the USA from China, Mexico, the Dominican Republic, and other countries. Users of these products often purchase them abroad or at ethnic markets in California and other states. In 2013, CDPH identified several mercury-containing skin creams sold in Oakland, San Francisco and San Jose. These products came primarily from China and tested as high as 29,000 ppm of mercury. In 1995-1996, 104 people in four southwestern states, including California, were found to have levels of mercury over 20 µg/L in urine from using a mercury-containing commercial skin cream product from Mexico. In some of these products, "mercury," "mercurio," or "calomel" (mercurous chloride) was listed on the label, but it is most often absent.

For Further Information

- CDPH, Environmental Health Investigations Branch's mercury in skin creams page: or call 510-620-3620. A general public one-page flyer is available in Spanish and English to download from this link.