

“Haz-Comm” Training

Purpose:

To inform employees of a) the potential chemical hazards that exist in a laboratory setting and b) the ways employees protect themselves from such hazards.

- Chemical Toxicity
- Routes of Entry
- Hazard Categories
- Personal Protective Equipment
- Labeling
- NFPA Stickers
- MSDS
- Hazardous Waste
- Chemical Hygiene Plan



Scientists stunned by fatal mercury poisoning of

Lethal compound penetrated gloves, invaded her body

By J.M. Hirsch
ASSOCIATED PRESS

HANOVER, N.H. — A Dartmouth College scientist whose specialty was the dangers of heavy metals died of mercury poisoning this week, 10 months after as little as a drop of a rare toxic compound apparently seeped through her rubber gloves.

Karen Wetterhahn, 48, had been hospitalized since January, when tests showed 80 times the lethal dose of mercury in her blood, a college investigation showed.

After she was diagnosed on Jan. 28, Wetterhahn told investigators she remembered spilling one to several drops of dimethylmercury in August, Chemistry Department Chairman John S. Winn said yesterday.

After the diagnosis, Winn said Wetterhahn's attitude seemed to be: "I know what it is, I know what to do about it. I'm in a good place. I'm getting good care."

Three weeks after she was diagnosed, she went into a coma that

lasted until her death Sunday at Dartmouth-Hitchcock Medical Center in Lebanon.

"Whether she knew the peril she was in at that time, I don't think we will ever know," Winn said.

Wetterhahn, a cancer researcher, was using the compound to examine the effects of toxic metals on human cells. At the time of the accident, she was studying how mercury prevents cells from repairing themselves, much like cancer does.

Wetterhahn had two episodes of nausea and vomiting about three months after the spill, but Winn said no one will ever know whether the mercury caused them.

Mercury attacks the central nervous system well before the victim shows symptoms, and Wetterhahn began losing her balance and having trouble speaking and hearing in January, five months after the spill in the lab, Winn said.

Tests by an independent laboratory after the spill showed that the rare compound, first synthesized in 1841, can pass through rubber latex gloves quickly, and usually without damaging them, Winn said.

"It's not like a discolored spot appears, the glove rips open or smoke and fire comes out of the glove," he said.

That finding has shocked other scientists.

"I think all of us here at the chemistry department and colleagues of hers in this area of research around the world have all been stunned that the gloves she was wearing at the time were not sufficient protection," Winn said.

He said dimethylmercury looks like water but is three times as dense. More so than regular mercury, once standard in thermometers, the compound is attracted to the oil in human skin and is readily absorbed by the body.

In a letter published last month in the newsletter of the American Chemical Society, Dartmouth officials urged anyone working with the compound to wear neoprene gloves with long cuffs and to have their blood and urine tested frequently.

The U.S. Occupational Safety and Health Administration also is investigating and will have a report by October.

A Dartmouth faculty member for 21 years, Wetterhahn had been dean of graduate studies and associate dean of the science faculty and was recognized internationally in her field, Winn said.

She also was a past officer of the American Association for Cancer

Research and the author of more than 85 research papers.

"For the scientific community, Karen's death represents the loss of one of its brightest lights," college President James Freedman said.

Wetterhahn lived in Lyme with her husband, Leon Webb, and their two young children. Webb, a building contractor, said that despite working extremely long hours, his wife was outgoing and had a keen sense of humor.

"I never heard her say anything bad about anyone," Webb said. "She could have a conversation with anyone — the president of the United States or a bum on the street."

Dartmouth officials said they found only one other report of a researcher dying of dimethylmercury poisoning in this century — a Czech scientist in 1971.

Winn said perhaps 100 laboratories worldwide work with dimethylmercury.

"One of our concerns is that what we have learned here become known," he said. "Another of our concerns is that it not be too well-known — because, if you think about the insidious nature of this compound, it has nefarious uses in the hands and minds of some dangerous person."



Poisoned: Professor Karen Wetterhahn died of the dangers of heavy metals. Her death was an accidental dimethylmercury poisoning.

Learning From Mistakes

Lab incident at UCLA highlights need to disseminate accident information and increase safety awareness

[Jyllian N. Kemsley](#)

THE ACADEMIC chemistry community lost one of its own last month when Sheharbano (Sheri) Sangji, a 23-year-old research assistant in [Patrick Harran](#)'s lab at the University of California, Los Angeles, died on Jan. 16 from injuries sustained in a laboratory fire.

[UCLA](#) officials declined to provide C&EN with specific details of the incident, pending an investigation. But according to a Dec. 30, 2008, e-mail to C&EN from department Chair [Albert J. Courey](#), university investigators believe that on Dec. 29, Sangji was drawing tert-butyl lithium from a bottle into a syringe when the plunger came out of the syringe barrel ([C&EN Online Latest News, Jan. 22](#)). The chemical, which ignites spontaneously in air, splashed onto Sangji's clothes and set them on fire. Her hands, arms, and upper torso—about 40% of her body—suffered burns.

Most chemists I know, when they hear about someone getting hurt in a lab, immediately want to know all the details: How much material was she working with? What reaction was she trying to do? How was she trained? Was anyone else around? In Sangji's case, we should find out. Sangji was neither a student nor a postdoctoral researcher and therefore was clearly an employee of the university. Consequently, the [California Division of Occupational Safety & Health](#) is investigating the incident and should make its report public when the inquiry is complete. Other chemists may then learn from what went wrong at UCLA.

But most academic lab researchers—grad students and postdocs—often are not considered to be university employees. As a consequence, state or federal agencies may not have the jurisdiction to investigate accidents involving them. Left on their own, many universities keep incidents quiet, perhaps out of fear for their reputation or of liability. There are exceptions: [Dartmouth College](#), for example, felt a moral and ethical responsibility to disseminate widely the results of its investigation into chemistry professor Karen E. Wetterhahn's 1996 methylmercury exposure ([C&EN May 12, 1997, page 7](#)), says Michael B. Blayney, Dartmouth's environmental health and safety (EH&S) director. But more often, all that researchers hear is murmuring through the grapevine.



Courtesy of Naveen Sangji

Sangji received a bachelor's degree in chemistry from Pomona College in May 2008.



Common Sense Safety

- ❖ USD Public Safety x2222 – know where phones are located in the lab.
- ❖ Fire extinguishers – know where these are located in the lab.
- ❖ No eating or drinking in labs and instrument rooms, ever!
- ❖ Chemical spills - notify your advisor know immediately.
- ❖ Eyewash stations – located at the sinks and at the safety shower - locate.
- ❖ Needles/sharps – use with care and dispose in sharps containers.
- ❖ Broken/used glass – dispose in glass waste box – rinse if used.
- ❖ Clothing fires – wear cotton, blue lab coats, use safety shower.
- ❖ Injuries/mishaps – notify your advisor know immediately.
- ❖ Clean up after yourself.



Common Sense Safety

- ❖ Never, ever, ever, ever work alone in the research lab!
 - ❖ Use the buddy system.
 - ❖ Know where to find your advisor or post-doc at all times.
 - ❖ Never perform a reaction for the first time while unsupervised.
 - ❖ Never perform a dangerous reaction/procedure unsupervised.
 - ❖ If you find yourself in trouble, reach out to any faculty or staff member for help.



Chemical Toxicity

Definition:

The extent to which a chemical will cause harmful effects.

A function of:

- amount of exposure
- sensitivity
- chemical combinations
- length of exposure:
 - acute: short exposure
 - chronic: long exposure

Chemicals can enter your body via:

- clothing/skin contact
- ingestion
- inhalation

Hazard Categories

Safety rule of thumb:
Treat all chemicals as hazardous.

Health Hazards

- acute toxins
- chronic toxins
- carcinogens
- mutagens
- teratogens
- sensitizers
- corrosives
- irritants

Physical Hazards

- oxidizers
- flammables/combustibles
- explosives
- reactives
- pyrophorics
- compressed gases
- cryogenics



Personal Protective Equipment (PPE)



- ❖ Goggles
- ❖ Gloves
- ❖ Lab coat
- ❖ Closed-toed shoes
- ❖ Pony-tail holders/tie hair back

- ❖ Fume hood

- ❖ Safety shield
- ❖ Respirator