

Citizens Guide to Chromium Exposure and Health Effects Dust Study

Background

During much of the twentieth century, waste material from the production of chromate was deposited in many locations in Jersey City. Some of this material was used as fill in conjunction with construction and some of this material was simply disposed in convenient locations. This waste material contained hexavalent chromium, a known human carcinogen as well as the trivalent form of chromium, which is generally considered to have little toxicity. The locations where this waste was used or disposed eventually became characterized as waste sites. Nearly all of these waste sites have been remediated, either by excavation and removal, or by capping of the site. In a few cases, the capping of the sites is still considered interim. Studies conducted by NJDEP and its academic collaborator, the Environmental and Occupational Health Sciences Institute (EOHSI) of Rutgers/UMDNJ, in the 1990's showed that the level of total chromium (hexavalent plus trivalent) in house dust was related to proximity to known chromium waste sites. These studies also showed that elevated levels of chromium in house dust were also associated with elevated levels of chromium in the urine of young children in those houses. After remediation of those waste sites, however, follow-up studies showed that levels of chromium in house dust returned to background levels.

Questions and concerns among residents of Hudson County continue to be raised, however, regarding the adequacy of these remediations and the possibility of, as yet, undiscovered waste sites. These concerns are tied to the possibility of continued human exposure to chromium waste, particularly hexavalent chromium. Because of these concerns, NJDEP agreed to fund a study with EOHSI to determine whether there is evidence of ongoing exposure to hexavalent chromium from chromium waste sites. As with the studies conducted in the 1990's, this study was focused on house dust as an indicator of exposure potential.

More than 200 dust samples were collected from 100 households. Participants in the study have received their individual results per the Internal Review Board. Individual results were not released to anyone but the investigators and the individual residents. Letters to residents detailing individual results were mailed when laboratory analysis was completed.

What are the overall study results of the Jersey City dust study?

The overall study results show that hexavalent chromium was found in household dust in all locations investigated in the study. However, nearly all the concentrations of hexavalent chromium in the dust were below the current NJDEP soil cleanup criterion for Hexavalent chromium which is 20 ppm, and do not appear to be linked to COPR sites in Jersey City.

The few samples that did exceed this level were confined to specific surfaces in isolated houses. Also, there does not appear to be major differences in hexavalent chromium levels among the samples taken, whether households were near or far from COPR sites. This suggests that households are not being impacted by chromium sites in Jersey City.

What is an acceptable hexavalent chromium number for dust for protection of public health?

There is no formal standard for hexavalent chromium in dust. The current clean up number for soil of 20 ppm is being used as a guidance. This number represents the lowest of the soil cleanup numbers for all routes of exposure including inhalation, ingestion and dermal exposure. Given the assumptions used to derive this number for soil exposure, this value is equally applicable to dust exposure. However, very recent data from animal testing may result in a lower soil cleanup number based on cancer risk from ingestion. As the implications of these recent results become clearer, we will revisit this value.

What is the normal *background* level of hexavalent chromium in the dust of Jersey City?

While information is available on total chromium levels in dust, this is the first study measuring hexavalent chromium levels in dust and as a result there is not an established number for normal background levels.

What are the health effects from exposure to dust with hexavalent chromium in it?

Hexavalent chromium is known to increase the risk of lung cancer when inhaled. Very recent evidence from animal studies also strongly suggests that when ingested, hexavalent chromium can increase the risk of some digestive system cancers in humans. Hexavalent chromium can also result in allergic responses in some people when exposure occurs on the skin. The extent of the risks of health effects depends on the amount of exposure.

Since I'm pregnant (or planning to get pregnant) is it safe to live here?

Hexavalent chromium is not known to have specific reproductive or developmental effects.

Can people be tested for chromium?

The NJDEP in cooperation with EOSHI is in the process of recruiting participants for a Phase Two study. This study will collect urine samples as well as dust samples from households. The results will help us further understand possible exposure from hexavalent chromium.

Should I contact my physician about health effects from possible chromium exposure and possibly getting my urine tested for chromium levels?

At the levels of hexavalent chromium detected in this study, there would be no health effects or medical signs that would be identifiable. Urine testing can provide information on chromium exposure. However, hexavalent chromium is converted to the other, trivalent, form in urine and trivalent chromium also comes from the normal diet. Therefore, in a situation such as that in Jersey City, urine sampling alone may not provide useful information about exposure to hexavalent chromium. Urine sampling is most

useful when results from many different people are combined and compared to levels of hexavalent chromium in their house dust. This is the purpose of the Phase 2 study.

Where is the hexavalent chromium in dust coming from?

It is not yet determined what the source of the hexavalent chromium is in the dust or if its presence is unique to Jersey City. It appears that dust containing hexavalent chromium may be typical of background levels found in urban communities. To determine if this is so, another dust study was initiated in the summer of 2008 in other urban communities similar to Jersey City. Dust samples have been collected in those households and results from this study are expected in February.

What areas in Jersey City were selected for the study?

Five neighborhoods in Jersey City were identified for the study. Two neighborhoods—Droyer's Point and Garfield Avenue were selected because they had residences adjacent to capped chromium sites. Three additional neighborhoods in proximity to chromium sites—Freedom Pl., Lafayette and Society Hill were identified based on concerns raised by citizens at public meetings. In addition, citizens throughout Jersey City requested that sampling be done in their home.

How was the dust collected from the homes?

Dust samples were taken from three locations where possible in each house—the window well, a living area (living room, bedroom, dining room) and the basement. In order to determine if any hexavalent chromium was present, samples were taken from places in the home that tend to collect a lot of dust. Often these are places that people don't usually touch or routinely clean such as the top of a tall bookcase or closet shelf. This helped to ensure that the dust that was collected represented accumulation over time and would contain hexavalent chromium that may have entered the home at different times.

What can people do to remove chromium dust from their homes?

General dust reducing procedures like using doormats at the entrances to the home (to keep out outdoor dust) and mopping floors with a damp mop (rather than sweeping) and damp wiping surfaces, are useful. Reducing dust in your home is the best short term solution. Regularly washing hands and washing any toys that children may put in their mouths is also helpful in reducing exposure.

Has a hexavalent chromium dust study ever been done before?

No, because until recently, laboratory methods had not been developed to accurately measure hexavalent chromium. Past studies of community exposure have measured total chromium, not hexavalent chromium. The results of those studies indicated that excavation of contaminated soil would result in lower levels of total chromium in house dust and therefore lower human exposure to chromium.

How were people recruited for the study?

People in the study were recruited through a variety of methods. A brochure about the study issued in English and Spanish was posted on the NJDEP chromium website and distributed to the Mayor and Council of Jersey City. The study was discussed at community meetings, and sign-up sheets were available for any interested resident. People living next to some chromate waste sites were contacted by letter to inform them about the study. People also learned about the study through their friends and neighbors.

Did property owners other than residential property owners participate (i.e., commercial and business)?

No. The study was restricted to residential properties.

What additional studies will result from the findings from this study?

In addition to the study to find out whether small amounts of hexavalent chromium in house dust are common to urban environments in general (see above), a childhood urine study is being conducted to further understand possible health effects from exposure to hexavalent chromium dust. Researchers from EOSHI are currently recruiting volunteers for this study.

Should I move?

The results are reassuring that risks are low and people do not need to leave their homes because of chromium levels.

Will my property values go down?

The presence of the chromium sites is a matter of public record. Interested buyers may already be aware of any former chromium waste sites located near your home. Having your home tested may provide reassurance that chromium levels in the home are below safety guidelines.

Who conducted the household dust study?

The study was conducted by the Environmental and Occupational Health Sciences Institute of Robert Wood Johnson Medical School and Rutgers University in Piscataway, NJ.