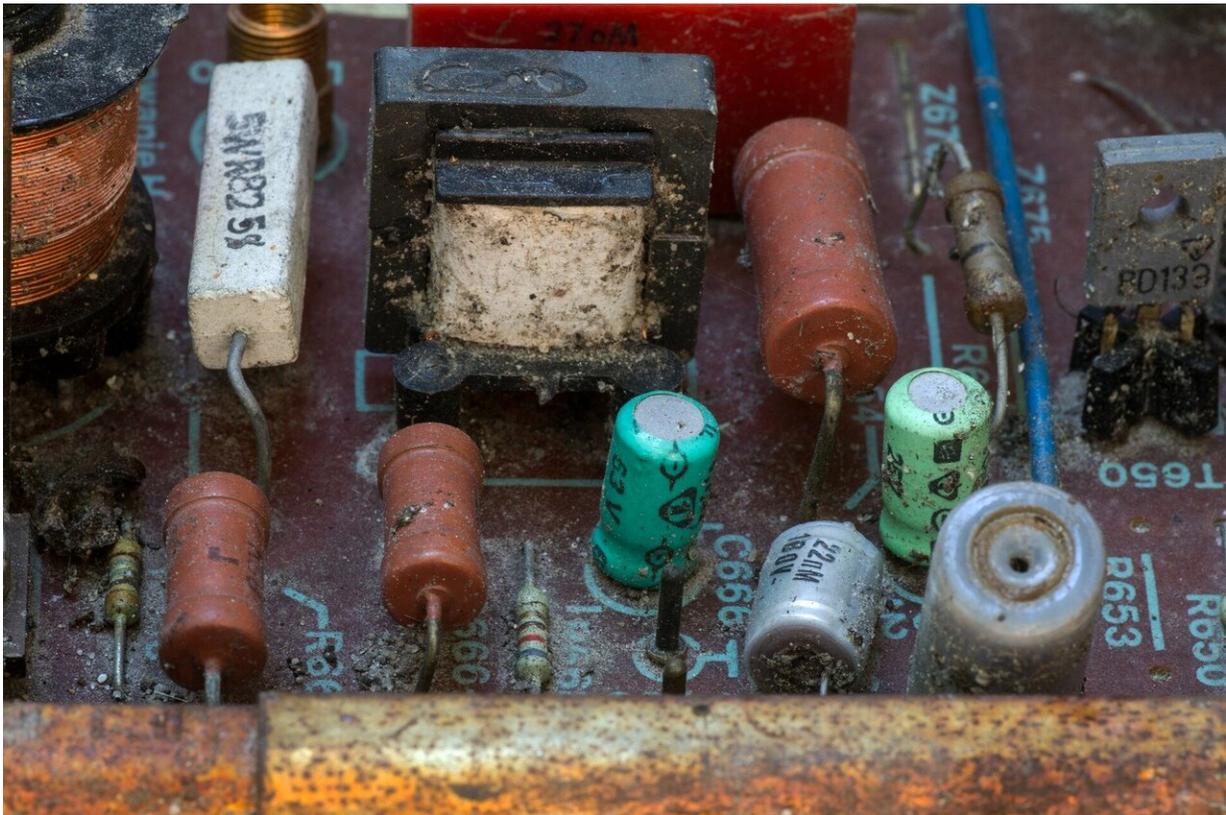


# Mobile e-shredding may pose risks for workers: study

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Credit: CC0 Public Domain

First-ever study of electronic waste shredding trucks shows the need for better safety guidelines.

A new Boston University School of Public Health study published in *Annals of Work Exposure and Health* is the first to evaluate the exposures faced by workers in mobile e-shredding, a new service to securely destroy hard drives, laptops, and other electronics containing confidential information on site.

Even proper electronic waste disposal still exposes workers to [toxic metals](#) such as lead and cadmium, as well as toxic chemicals—all of it usually ground into a fine powder that's easy to melt down for new gadgets, but also easy to inhale or even absorb through skin.

Dr. Diana Ceballos, assistant professor of environmental [health](#) at the Boston University School of Public Health (BUSPH), saw the growing use of mobile e-shredding trucks to destroy e-waste on site, including on university campuses, and was worried.

"I became particularly concerned with the almost non-existent safety measures, and potentially dangerous working conditions," Ceballos says.

She noticed workers not wearing masks or eye protection as they ground electronics to dust inside trucks that had no ventilation other than an open back door.

Ceballos and colleagues from the Harvard T.H. Chan School of Public Health evaluated the exposures during and after a 65-minute shredding job by one worker in a truck in the Greater Boston area.

Ceballos collected air samples (at the level of the worker's head) and surface wipes in different parts of the truck. The researchers found the concentrations of metal in the air near the shredder peaked at 2,500 ultrafine particles per cubic meter, including 2.9 micrograms of lead per cubic meter. "These exposures are similar to those experienced during a fire, or when using a diesel generator at a campsite," Ceballos says, "but

the biggest challenge for the worker is that these levels are inside a truck and could accumulate to dangerous levels."

There were 171 micrograms of particulate matter 2.5 millimeters or less in diameter (known as PM2.5) per cubic meter. For comparison, the air in downtown Boston generally has 10-30 micrograms of PM2.5 per cubic meter, with notable and sometimes fatal effects.

After the job, the shredder and surfaces near it were coated with 1,190 micrograms of lead per square centimeter, and Ceballos found lead and other metals on surfaces as far away and separated from the shredder as the truck's cabin. Ceballos didn't take samples from the worker's clothes or skin, but notes that such contaminants can also come home with a worker and harm family members.

At least the generator powering the shredder in this truck was a new hybrid; with an older diesel generator and a differently configured truck, Ceballos says, a [worker](#) could be exposed to potentially fatal levels of carbon monoxide as well.

The verdict: Ceballos and colleagues found that the levels of metals and other contaminants in the truck were comparable to what they and other researchers have found in regulation-abiding, non-mobile e-recycling facilities. But workers in those facilities are supposed to wear protective equipment, and the facilities have exhaust ventilation (not just an open door) and regular cleaning.

(Ceballos says the trucks don't pose a risk to passersby out in the open air.)

"These trucks have become very popular and are a great service," Ceballos says. "My goal with this publication is to work with industry certifications to improve on their guidelines to strengthen the health and

safety in these trucks."

But she says it isn't enough to just bring the trucks up to the same safety levels as non-mobile facilities.

E-recycling standards still aren't strict enough to fully protect the health of workers, in large part because the industry is so new, growing so quickly, and handling ever-changing technology, leaving government regulations in the dust.

The workers are also disproportionately "vulnerable," according to a new commentary in the *American Journal of Industrial Medicine* by Ceballos and colleagues at academic and government institutions including the Harvard Chan School, the University of Montreal, the National Institute for Occupational Safety and Health (NIOSH), and the Institut de recherche Robert-Sauvé en santé et en sécurité du travail (IRSST) in Quebec.

E-recycling workers, much like workers in many other high-risk and low-paying jobs, are much more likely to be members of racial/ethnic minorities, immigrants, under 25 years old, not fluent in English, and/or have physical or mental disabilities, the commentary authors write. Many are also currently or formerly incarcerated, including workers at nearly a dozen prison e-recycling sites in the US.

Ceballos says the e-recycling industry is one more example of how new hazards most affect groups who already face other health inequities. "Perhaps the public can understand this more clearly now during the pandemic," she says, "where the most vulnerable populations are those that have had the hardest time tackling the new virus."

**More information:** Diana Ceballos et al, Metals and Particulates Exposure from a Mobile E-Waste Shredding Truck: A Pilot Study,

*Annals of Work Exposures and Health* (2020). DOI: [10.1093/annweh/wxaa058](https://doi.org/10.1093/annweh/wxaa058)

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