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Lead, Chromium Rob Millions of Health

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The damage to the mental and physical health of children and adults from lead, chromium and other toxic wastes has emerged as equal to the risk of malaria in three Asian countries -- India, Indonesia and the Philippines -- a new report shows.

The study, by experts from New York City's Mt. Sinai Medical School and the Blacksmith Institute, was published May 4 in the respected peer-reviewed journal Environmental Health Perspectives (EHP). It [reports](#) that the loss of healthy years of life from lead and chromium is greater than from malaria.

The study focused on three countries that together have about 1.5 billion people. However the spreading of industrial development that produces the toxic wastes is taking place across Latin America, Africa and the Middle East as well as in Asia.

Lead is released by several industries but a main source is the unsupervised recycling of car batteries, often employing children to smash open old batteries to extract the roughly \$10 worth of lead inside.

The three Asian countries in the study have all seen an explosion in ownership of cars in recent years. Each car has a battery that must be replaced every three to five years, leaving millions of used-up batteries in need of recycling. In many areas, that recycling is done by small-scale and unsupervised operations that release tons of lead in the soil, to be blown about as dust into water, food and homes.

We have known since ancient times that lead in eating vessels can cause illness, retardation and death. In the 1980s, the United States outlawed lead additives to gasoline and paint after finding that children who ingest the toxic substance suffer neurological damage, loss of [intelligence and behavioral problems](#).

Hexavalent chromium, which after lead is the second leading cause of disability and death cited in the report, is released by tanning leather and other industries. It is the same substance that poisoned children in California and was exposed in the film Erin Brockovich.

"Lead and hexavalent chromium proved to be the most toxic chemicals and caused the majority of disease, disability and mortality among the individuals living near the sites," said Dr. Chatham-Stephens, first author of the study published in EHP May 4.

The study was conducted by physicians and other experts from New York's Mt. Sinai Medical School and the Blacksmith Institute, an NGO funded by the World Bank and other donors that cleans up toxic waste sites in more than 40 developing countries.

Chemicals were sampled and collected at nearly 400 toxic waste sites in 2010. The samples were then measured for pollutant levels in the soil and water and then compared with the 8.6 million individuals who were at risk of exposure around these sites in order to calculate the loss of years of equivalent full health.

Researchers calculated healthy years of life lost due to ill-health, disability or early death, in disability-adjusted life years (DALYs), a measure used by the World Health Organization. One DALY represents the loss of one year of full health.

In this study, the total number of lost years of full health or DALYs was 829,000. In comparison, malaria in the same countries caused 725,000 lost years of full health according to Dr. Chatham-Stephens of [Mt. Sinai](#).

"The number of DALYs estimated in our study potentially places toxic waste sites on par with other major public health issues such as malaria ...," said Dr. Chatham-Stephens.

His colleague, Dr. Philip Landrigan, Dean for Global Health at the Icahn School of Medicine at Mount Sinai and one of the authors of the study, said "This study highlights a major and previously under-recognized global health problem in lower and middle income countries.

"The next step is targeting interventions such as cleaning up the sites and minimizing the exposure of humans in each of these countries where toxic chemicals are greatly present."

Richard Fuller, president of Blacksmith and a co-author of the study, said that the developing countries such as those in the study must work with international organizations and donor nations to respond to the threat of lead and other toxic substances to children and the vulnerable.

He noted that for a small cost, Blacksmith has worked with local ministries of health and environment in Asia, Africa and Latin America to clean up contaminated soil. Local experts have been trained to test soil and blood samples. And local engineers have used bulldozers and dump trucks to remove contaminated soil. Furthermore Blacksmith works with recyclers to train them to work without releasing contaminants.

The study leader, Kevin Chatham-Stephens, MD, Pediatric Environmental Health Fellow at the Icahn School of Medicine at Mount Sinai, presented the findings at the Pediatric Academic Societies annual meeting in Washington, DC. on May 7.

The study, titled "The Burden of Disease from Toxic Waste Sites in India, Indonesia, and the Philippines in 2010," was a joint research partnership between Mount Sinai and the Blacksmith Institute.

Children and women of child-bearing age made up two-thirds of the population in the study. "If a woman is pregnant, the fetus may be exposed to these toxic chemicals," said Dr. Chatham-Stephens. "This data is relevant because the prenatal to early childhood period is the time when individuals are very vulnerable to some toxic exposures, such as lead's impact on the developing nervous system."

Lead can damage the brains of children, causing behavior and learning problems, previous studies have shown. High levels of chromium are associated with lung cancer.

What is most remarkable about the new study is that these problems in developing countries follow a major clean up in the wealthy countries such as the United States that has greatly reduced lead in blood of children.

"Our research shows that chemical pollutants from toxic waste sites are insufficiently studied in lower and middle income countries and that disease and death caused by these chemicals can contribute to loss of life," said Dr. Chatham-Stephens.

Ben Barber is a communications advisor to Blacksmith Institute.