IPEN Chemicals in Products Initiative

Summary of Center for Public Health and Environmental Development (CEPHED) & IPEN Nepal Toy Report

Overview

A detailed study of chemicals in products was carried out by CEPHED[1] and IPEN[2] from January-June 2018 using XRF[3] screening of heavy metals in 52 children's toys and laboratory analysis of 13 phthalates in 5 children's toy samples. The resulting analysis revealed that a high percentage of children's toys studied contained at least one harmful heavy metal above the legal limit set by the Nepalese Toy Standard and the smaller analysis for phthalates revealed extremely high levels of the endocrine disrupting plasticizer in all toys sampled.

These toxic metals and chemical contaminants are known to damage the nervous system and reproductive system, cause lung and kidney diseases, affect the immune system, and reduce intellectual capacity, and have been associated with permanent brain damage and cancer. Young children are likely to put toys in their mouths and thus ingest chemicals at a period of rapid neurological development, making children under 5 especially vulnerable to the impacts of toxic exposures.

Background: Nepal's Toy Standard

On January 16, 2017 the government of Nepal adopted a precedent-setting mandatory toy standard that set allowable limits for 12 harmful substances and toxic heavy metals, including lead, cadmium, chromium, barium, zinc, bromine, bisphenol A (BPA) and several phthalates. The law was enforced six months later, on July 15, 2017. The standard is the first in the world to limit metals in children's toys based on a total concentration standard, the same way countries regulate lead in paint. [4]

[1] http://cephed.org.np/index.php?t=HOME&i=1
[2] www.ipen.org
[3] A portable X-ray fluorescence analyzer (XRF) can rapidly measure elements in consumer products, coatings, soil, metals, and other materials. The device shoots an X-ray into the material to be analyzed and then measures the fluorescent spectrum to identify and quantify more than 20 elements simultaneously. The chemical elements include antimony, arsenic, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, silver, and zinc. Measurements can be made in 30 seconds.
[4] Total concentration expresses mg substance per kg of product (or product part). This approach is usually used in regulating toxic metals in soil or lead in consumer products and paint.

Summary of Chemicals in Toys Analysis, Material and Methods:

No. of toy samples tested for heavy metals = 52

No. of toy samples tested for phthalates = 5

Cities where samples were purchased: Janakpur, Bharatpur, Nepalgunj, Kathmandu, Lalitpur and Bhaktpur

Places where samples were purchased: Educational centers, shopping mall, street vendors, retailers, dealers, department stores, cosmetic shops, gift shops and toy shops

Countries of origin: Selected toys were manufactured in China (88%), India (10%) and Thailand (2%)

Toys made of: Selected toys are made of hard plastics (50%), rubber (27%), soft plastic (7%), wood (6%), metals (4%), foam (2%), cotton (2%) and fabric (2%).

Heavy metals screening: Screening was done via XRF analyzer at GON, MOICS, NBSM & FHAN Laboratory, Kathmandu, Nepal

Phthalates screening: Phthalates were screened at SGS, Taiwan Ltd. Chemical Laboratory, Taipei using method (CPSC-CH=C1001-09.3+ (2010) by GC/MS.

Results:

- High concentrations of lead, cadmium, chromium, zinc, barium and bromine were identified in 32 out of 52 toy samples. Some samples of toys contained very high levels of toxic heavy metals such as lead[5] (4688 ppm), cadmium[6] (363 ppm), chromium[7] (3348

[5] Lead is a well-known neurotoxicant with no safe level of exposure. The harms from childhood lead exposure are irreversible and persist into adolescence and adulthood. Lead has sensory, motor, cognitive and behavioral impacts, including learning disabilities; attention deficits; disorders in a child's coordination, visual, spatial and language skills; and anemia. In 2012, the US Center for Disease Control lowered the defining limit for lead poisoning in children from 10 to 5 micrograms per deciliter of blood and emphasized "…preventing lead exposure rather than responding after the exposure has taken place".
http://www.cdc.gov/nceh/lead/ACCLPP/CDC_Response_Lead_Exposure_Recs.pdf

[6] Cadmium is a known human carcinogen and associated with cancers of the breast, kidney, lung, pancreas, prostate and urinary bladder. The State of California recognizes cadmium as a reproductive toxicant. Cadmium is taken up by various crops including potatoes, root crops, leafy vegetables, and fruits. Other toxic endpoints include lung damage, renal dysfunction, hepatic injury, bone deficiencies, and hypertension.
http://oehha.ca.gov/prop65/prop65_list/Newlist.html
http://www.oehha.ca.gov/prop65/pdf/CD-HID.pdf
http://www.oehha.ca.gov/prop65/pdf/CD-HID.pdf

[7] XRF does not distinguish between the two common forms of chromium; chromium III and chromium VI. Chromium III is an essential element in humans but can display moderate toxicity in acute animal tests. Chromium VI is a known human carcinogen. Dermal exposure to chromium VI can cause dermatitis and ulceration of the skin and chronic inhalation or oral exposure can decrease lung function and affect the liver, kidney and immune systems. Lab studies link chromium VI to birth defects and reproductive problems.
http://www.epa.gov/ttnatw01/hlthef/chromium.html
http://www.inchem.org/documents/iarc/vol49/chromium.html
http://www.epa.gov/ttnatw01/hlthef/chromium.html
http://www.atsdr.cdc.gov/toxfaqs/TF.asp?id=61&tid=17

ppm) and other substances such as zinc[8] (78820 ppm), barium[9] (3030 ppm) and bromine[10] (462 ppm), which significantly exceed the national standard limits set by the government of Nepal in 2017.

- 37 out of 52 toys (71%) contained at least one toxic metal. 32 out of 52 toys (62%) contained toxic chemicals above the Nepalese standard (noncompliance) and 20 out of 52 toys (38%) have toxic chemicals below than standards (compliance) of the standard.
- Some toys were contaminated with 1 to 3 toxic metals in concentrations exceeding the national standards: 32 out of 52 toys (62%) contained 1 toxic metal; 7 out of 52 toys (13%) contained 2 toxic metals ; and 2 out of 52 toys (4%) contained 3 toxic metals
- Lead was found in 7 toy samples out of 37 contaminated samples (19%). 6 out of 7 samples (86%) have lead levels higher than the national standard limit of 90 ppm. 1 out of 6 samples (17%) had a lead level 52-fold higher than the national standard.
- Cadmium was found in 3 toy samples out of 37 contaminated samples (8%). All 3 samples (100%) contained cadmium in concentrations higher than the national standard limit of 75 ppm. 1 out of 3 samples (33%) contained cadmium at levels 5-fold higher than the national standard.
- Chromium was found in 4 toy samples out of 37 contaminated samples (11%). 3 out of 4 samples (75%) have chromium levels higher than the national standard limit of 60 ppm. 1 out of 3 samples (33%) contained chromium at levels 56-fold higher than the national standard.
- Zinc was found in 25 toy samples out of 37 contaminated samples (68%). All 25 samples (100%) have zinc levels significantly higher than the national standard limit of 3.75 ppm. 1 out of 25 samples (4%) contained zinc at a concentration 21,000-fold higher than the national standard.
- Barium was found in 5 toy samples out of 37 contaminated samples (14%). 1 out of 5 samples (20%) contains barium at a concentration 3-fold higher than the national standard of 1000ppm.
- Bromine was found in 6 out of 37 contaminated samples (16%). 2 out of 6 samples (33%) have bromine levels higher than the national standard limit of 100 ppm. 1 out of 2 samples (50%) contained bromine at levels 4.6-fold higher than the national standard of less than 100ppm.
- All 5 toy samples analyzed for phthalates contained several phthalates banned in many countries, including the US and EU, in concentrations higher than the Nepal standard of

[8] Zinc appears to affect the male reproductive system (sperm count). Prolonged or repeated contacts can cause dermatitis with drying and cracking of the skin.
https://nj.gov/health/eoh/rtkweb/documents/fs/2021.pdf

[9] Effects such as numbness, muscle weakness, and paralysis may occur following exposure to high levels of barium or soluble barium compounds by inhalation or ingestion.
https://www.atsdr.cdc.gov/MMG/MMG.asp?id=321&tid=57

[10] Bromine is corrosive to human tissue in a liquid state and its vapors irritate eyes and throat. Bromine vapors are very toxic with inhalation. Humans can absorb organic bromines through the skin, with food and during breathing.
https://www.lenntech.com/periodic/elements/br.htm

less than 100 ppm (less than 0.01%) and the limit set up by the US Consumer Product Safety Improvement Act (CPSIA) of 0.1 %.

- One toy contained lead at levels 52-fold higher than the national standard, cadmium at levels 5-fold higher than national standard, chromium at levels 56-fold higher than the national standard, zinc at levels 21,000-fold higher than the national standard, bromine at levels 4.6-fold higher than the national standard and di-(2-ethylhexyl) phthalate (DEHP) at levels 3710-fold higher than the national standard of less than 0.01%.
- Only 42.3 % (22 out of 52) toy samples had labels with information on choking hazards and the appropriate child's age for playing with the toy.
- None of the toy samples had labels containing information on the chemical composition. This undermines the recommendations of UN Environment's Chemicals in Products Programme[11], which has been adopted by more than 100 governments, including the government of Nepal in 2015.[12]

Toxic chemicals identified in children's products threaten the health of infants and children, who are especially vulnerable as they are more sensitive to the effects of toxic chemicals when their organs are still developing, and their bodies are less able to detoxify.[13] The presence of these substances in children's products violates the fundamental right of children to health ensured by the Constitution of Nepal and the Convention on the Rights of the Child (CRC), of which Nepal has been a Party for over 25 years.

Recommendations

To protect the health of children and ensure their right to health, the following recommendations have been developed to reduce risks from exposure to toxic chemicals in toys.

- The 2017 Nepal toy standard should be reinforced and effectively implemented.
- Regular compliance monitoring should be conducted of toxic chemicals in toys and the results should be made publicly available.
- Information on the chemical ingredients in toys on labels should be mandatory under Nepal's Toy Standard.
- Non-governmental organisations and civil society groups should cooperate with government agencies to raise public awareness on toxic chemicals in toys and their impacts on human health and environment.
- Full information disclosure on chemicals contained in toys and other children's products should be provided throughout the life cycle of the products.

[11] http://www.saicm.org/Default.aspx?tabid=5473
[12] http://www.saicm.org/About/ICCM/ICCM4/tabid/5464/language/en-US/Default.aspx
[13] http://www.uniteforsight.org/environmental-health/module2

- The national standard on phthalates should be enforced to ensure all toys meet the national limit of less than 0.01% for phthalates in toys.
- The government of Nepal should become an official member of the Chemicals in Products Programme developed in the frame of SAICM and adopted at ICCM4 in 2015, and ensure its implementation in Nepal.
- The implementation of SAICM and its emerging policy issues and other issues of concern in Nepal should be strengthened, with a priority focus on chemicals in products, endocrine disrupting chemicals, and hazardous substances within the lifecycle of electrical and electronic products.

Discussion of Current Efforts to Roll Back Protections and Conclusion

The initial response from key ministerial bodies to the 2017 Mandatory Toys Standard law was positive. Several ministers welcomed the new standard. Secretary, Ministry of Forest and Environment [the then Ministry of Population and Environment (MoPE)] said, "The ministry will play an active coordinating role with all the concerned government agencies and business communities for its effective implementation."

Additionally, the Ministry of Federal Affairs and Local Development (MoFALD) directed all respective local bodies to prevent the import, production, sale, storage, distribution and use of toys that contain toxic chemicals and heavy metals exceeding the limits set by the enforced Mandatory Toys Standard law.

However, after the law went into effect, private sector lobbyists stepped up pressure on the government to weaken the new toy standard. They have demanded that the government exclude BPA[14] and phthalates[15] from the list of chemicals controlled by the new law. In addition, they have urged the government to change the way the toxic substances are measured, demanding a total concentration limit of heavy metals in toys to migratory concentration based on the "extractable elements" approach, which is cumbersome and expensive, and relies on numerous assumptions that do not prevent exposure – particularly in children.[16]

The recommendations made above will strengthen public health and ensure reduction of dangerous chemical exposures to children through reducing chemicals in products in Nepal. Furthermore, they are important steps towards effective implementation of the Strategic Approach to International Chemicals Management (SAICM)[17] in the country.

[14] https://www.niehs.nih.gov/health/topics/agents/sya-bpa/index.cfm
[15] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3747651/
[16] The extractable elements approach requires an extensive preparation procedure to extract metals from certain size particles of a children's product into an acid solution at a certain temperature to attempt to imitate the acidic environment of the stomach. The assumption of the method is that exposure only occurs if a child swallows a portion of the product. However, children can be exposed to toxic metals from dust on the surface of products or by chewing and sucking directly on them. Furthermore, the procedure itself is cumbersome and not appropriate for small- to medium-sized enterprises and developing and transition countries that need a rapid, clear approach to regulation that does not burden already-strained infrastructures.
[17] http://www.saicm.org/About/ICCM/ICCM4/tabid/5464/language/en-US/Default.aspx