

A tarnished toy story

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LETTER TO THE EDITOR

Little children frequently put things in their mouth or even forgo washing their hands before putting those hands in their mouth. It is hence intuitive that any form of transferable lead in toys is highly inadvisable. Children are far more prone than adults to the adverse effects of lead. Lead poses an environmental hazard especially in relation to cumulative exposure. Environmental lead is a significant public health concern. Lead exposure is associated with lower IQ and cognitive decline. Some researchers suggest there may be a connection with increased crime and childhood lead exposures.

In 1929, the Dutch Boy lead paint promotions by the National Lead Company were ongoing. Ironically the promotional booklets of the time such as 'A Magical Trip to Paint Land with the Dutch Boy Painter' and 'The Dutch Boy conquers Old Man Gloom' comprised the images of a young boy using the 91% pure lead paint. The Dutch boy painter was marketed portraying children who were seen handling the lead paint. The teachers in turn were given a decorative receptacle

made of lead and some chocolates. Lead paint was discontinued in 1978. The discontinuation came numerous years after there was data linking lead to toxicity.

Lead was extensively used in ancient Rome. More recently it has still been used in tetraethyl lead added to petrol (from the 1920s) before subsequently being phased out. Beyond the fun and games that toys tend to bring, some have been found to have high toxic lead content. The harbinger of joy, in those cases, being also the harbinger of potential toxicity.

Toddlers may lick paint on their toys and chew others. Colouring agents containing lead have frequently been implicated in toxicity. Lead even tastes sweet which does not deter further licking or inappropriate handling. Even charms and trinkets containing lead have been reported, and where small may be ingested by toddlers with disastrous consequences.

Toys should meet Regulatory thresholds and be compliant with Consumer Safety Product Commission (CPSC) regulations (1). Instances of tainted lead toys has been recorded for a while (2) and continued in various shapes or forms even beyond initial reports (3). A toy's lead that comes in contact with saliva, sweat, or if ingested, gastric juices can be quite hazardous to the developing child.

Various studies were conducted to assess the degree of lead tainting. Plastic toys were gathered from day care centers to assess for lead contamination. In this study, the colour yellow derived from lead chromate was hypothesized to be the colour most associated with contamination, as was increased risk with polyvinyl chloride plastics (4). In a separate study, from 460 toys screened from daycare centers 56 tested as above 100 ppm (5). In yet another study with other toys published in 2016, they all met the European Committee for Standardization and EU Directive requirements (6).

At one point in the United States toys tainted with lead were recalled (7). In Colombia a random toy sample from the Bogota market were analysed further. Brown paint and being manufactured in Columbia were factors that gave a higher lead level likelihood (8). Toys from three major online Chinese stores were also investigated (9). A select 100 toys were looked into and it emerged that there was a preponderance of lead tainting from one online selling platform versus the other two. Atomic absorption spectrophotometer was used to assess 24 different children's toys (10). Toys have also been tested with migration tests for lead and cadmium (11).

A toy necklace may also cause lead poisoning after inadvertent ingestion by a child (12, 13). Some such medallions were obtained from toy vending machines. A toy in question was subsequently recalled throughout a nation (14). Lead may not be found just in toy paint but also in colored crayons (15) as well as salvaged windows and even antique items (16). Cadmium and arsenic have also been reported in toys (17).

In spite of precautions, regulatory oversight and recalls, some such toys still lay lurking in old toy boxes and others may have remained on shelves. Like there is a sea of people, there also is a sea of toys. From vintage toys found in grandma's basement, to newer models. After a mass recall of a million of Mattel's toys some cautious parents said they would check online the safety of a toy they are purchasing for their child. From the variety of toys on the shelves to choose from, a certain train toothbrush and curious fireman toy were just two of the identified culprits which had originally appeared innocuous to unsuspecting parents.

The 4-year-old boy from Minneapolis who died of lead poisoning in 2006 after inadvertent ingestion of a lead trinket led to greater publicity of the issue. Some stuffed toys came with warning labels that they contain lead. Leeching

of lead from certain dishes into food has also been reported. The outer part of children's toys should have no more than 90 ppm lead content. Some noted that yellow and reddish-brown paints were more common to be culprits in certain investigations.

Lead poisoning may present with insidious symptoms and may be either acute or chronic. Symptoms may include cognitive decline, neuro-behavioral deficits, headaches, tremor, slurred speech, poor co-ordination, weight loss and abdominal pain, amongst others. Lead binds preferentially to sulphhydryl groups interfering with protein folding. It also interferes with cell signaling and nerve conduction.

Toys are used habitually, unknowingly a handful of mothers were left regretting the toxic gift with hidden dangers they gave their kid... in a dreaded, leaded toy story.

REFERENCES

1. Hillyer MM, Finch LE, Cerel AS, Dattelbaum JD, Leopold MC. Multi-technique quantitative analysis and socio-economic considerations of lead, cadmium, and arsenic in children's toys and toy jewelry. *Chemosphere*. 2014;108:205-13.
2. Rodgers GE, Landolt RG. Of lead, stuffed toys, amphetamines, and morality. An advanced topics seminar. *Journal of chemical education*. 1973;50(11):786.
3. Hazards in our environment: the continuing problem of lead in toys...and pressure-treated playground equipment may not pose a risk. *Child health alert*. 2004;22:4-5.
4. Greenway JA, Gerstenberger S. An evaluation of lead contamination in plastic toys collected from day care centers in the Las Vegas Valley, Nevada, USA. *Bulletin of environmental contamination and toxicology*. 2010;85(4):363-6.
5. Sanders M, Stolz J, Chacon-Baker A. Testing for lead in toys at day care centers. *Work*. 2013;44 Suppl 1:S29-38.
6. Leal MF, Catarino RI, Pimenta AM, Souto MR, Afonso CS, Fernandes AF. Lead migration from toys by anodic stripping voltammetry using a bismuth film electrode. *Archives of environmental & occupational health*. 2016;71(5):300-6.
7. Feng T, Keller LR, Wang L, Wang Y. Product quality risk perceptions and decisions: contaminated pet food and lead-painted toys. *Risk analysis: an official publication of the Society for Risk Analysis*. 2010;30(10):1572-89.
8. Mateus-Garcia A, Ramos-Bonilla JP. Presence of lead in paint of toys sold in stores of the formal market of Bogota, Colombia. *Environmental research*. 2014;128:92-7.
9. Shen Z, Hou D, Zhang P, Wang Y, Zhang Y, Shi P, et al. Lead-based paint in children's toys sold on China's major online shopping platforms. *Environmental pollution*. 2018;241:311-8.
10. Yu XM, Ye GJ. [Determination of lead and cadmium concentration in children's toys]. *Zhonghua yu fang yi xue za zhi [Chinese journal of preventive medicine]*. 1991;25(4):214-6.
11. Kawamura Y, Mutsuga M, Yamauchi T, Ueda S, Tanamoto K. [Migration tests of cadmium and lead from paint film of baby toys]. *Shokuhin eiseigaku zasshi Journal of the Food Hygienic Society of Japan*. 2009;50(2):93-6.
12. Merritt TA. Lead poisoning from a toy necklace. *Pediatrics*. 2005;116(4):1050-1; author reply 1.
13. VanArsdale JL, Leiker RD, Kohn M, Merritt TA, Horowitz BZ. Lead poisoning from a toy necklace. *Pediatrics*. 2004;114(4):1096-9.
14. Centers for Disease C, Prevention. Lead poisoning from ingestion of a toy necklace--Oregon, 2003. *MMWR Morbidity and mortality weekly report*. 2004;53(23):509-11.
15. Iliano B. [Lead and cadmium in paints on toys and coloring crayons]. *Archives belges de medecine sociale, hygiene, medecine du travail et medecine legale Belgisch archief van sociale geneeskunde, hygiene, arbeidsgeneeskunde en gerechtelijke geneeskunde*. 1980;38(3):163-8.
16. Brondum J. Older, lead-containing paint covering furniture, toys, salvaged windows, and other used objects found in antique shops, secondhand shops, and similar settings represent a previously unrecognized source of lead in middle- and upper-income homes. *Journal of environmental health*. 2008;70(10):80, 6.
17. Iliano B, Viaene M, Oudar AM. [Analysis of toys: 1. Lead, cadmium and barium migration. 2. Migration of coloring agents in artificial saliva]. *Archives belges = Belgisch archief*. 1988;46(7-8):336-46.