1.5 Guidance
Why children's exposure to chemicals of concern (CoCs) in toys is of particular concern

This document is part of the *International Chemicals Management Toolkit for the Toy Supply Chain* developed by the United Nations Environment Programme (UNEP) in collaboration with the Baltic Environmental Forum (BEF) within the framework of the Global Environment Facility (GEF) project ID: 9771 on Global Best Practices on Emerging Chemical Policy Issues of Concern under the Strategic Approach to International Chemicals Management (SAICM).

This guidance supports the understanding why CoCs in toys should be avoided and what particular damage could occur to children. It may also help convince others like the company's CEO, suppliers, or customers to act towards the sound management of chemicals.

Guidance on how to identify CoC is provided here and in the checklist.

CoCs are substances and compounds which have hazardous properties and cause concern to human health or the environment. Among CoCs, three categories can be distinguished: chemicals for which risk reduction action has been agreed on at an international level; chemicals for which scientific evidence exists to advance risk reduction action, including chemicals that have been regulated at national or at regional level, and chemicals for which evidence for risk to human health or the environment is currently emerging from scientific research, but which have not yet been regulated.

Toys are of utmost importance in a child's life – and making them safe is possible

Most of their active time, children play. Their surroundings are filled with furniture and – toys. They use them every day – all day. Therefore, children are exposed to chemicals in toys over a long time and/or several times a day.

Toys do not need to fulfil specifically high technical performance requirements. Therefore, there are many alternatives on how a certain function can be fulfilled. For example, there are many different pigments that can be used to colour a polymer for a toy – and the non- or least harmful ones can be selected without risking the toy being of lower technical quality.

Children are creative and therefore use toys in various ways, including ones that were not necessarily intended during toy design. Toys and toy parts are put into the mouth, they may be left in places with conditions that support release of hazardous substance (e.g., putting plush toys on radiators or heating devices) or they may be damaged during use, leading to potential release of materials or substances from the inside of the toy product. We cannot foresee how children use toys and therefore toys should be as safe as possible.

Chemicals can only harm children when they enter the body; if there is an exposure. The pathway of exposure could be as follow (Figure 1):

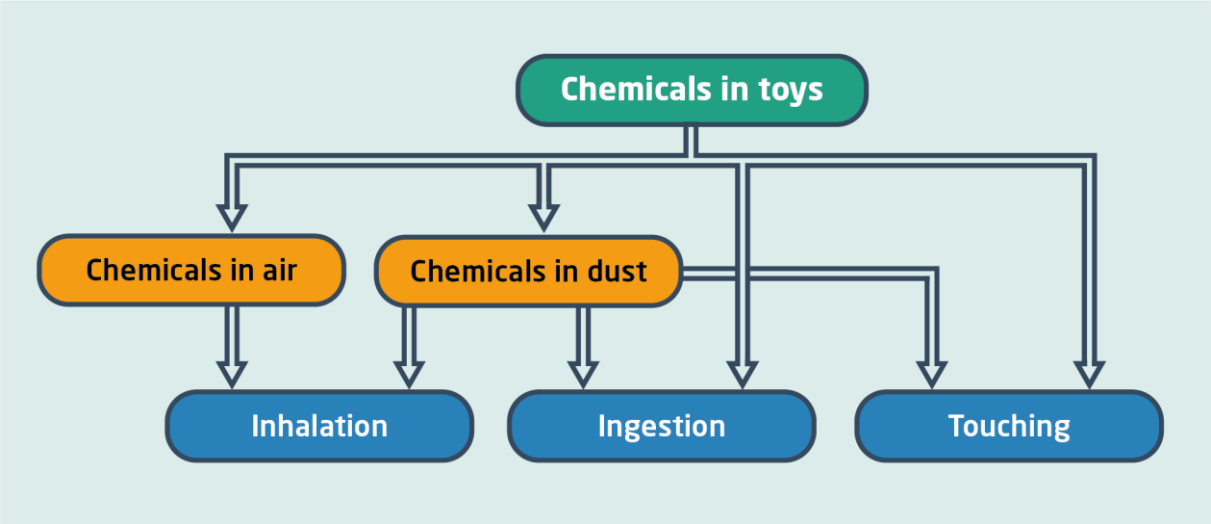

Figure 1. The different pathways of exposure from toys.

Children can be particularly vulnerable to potential health impacts of chemicals

Children suffer from the same health effects as adults but for a longer time

If a chemical has a harmful effect on the health of a child, the negative impact will last longer due to the longer life expectancy of a child compared to an adult.

Children are especially vulnerable to potential impacts of chemicals on their development

- Children's bodies are still developing, including the immune and nervous systems. Chemicals interfering with this development therefore have the potential to cause considerable negative impacts on a child's health.
- Chemicals that can interfere with the development of a child include, for example, endocrine disrupting chemicals (EDC). Children partly have very low levels of hormones; therefore, even very low exposure to endocrine disruptors may disbalance the endocrine functions at that stage of the development (United Nations Environment Programme 2012).
- Some chemicals can be transferred from mother to foetus already during pregnancy and may cause damage to the very first cells forming the basis of future organs.

For example, some chemicals that may be used in toys have been identified by the EU Chemicals Agency (ECHA) as endocrine-disrupting chemicals (ECHA 2021a; ECHA 2021b)

a) Certain phthalates (DEHP, BBP, DBP, DIPB), which are used as softeners in some plastic materials
b) Bisphenol A, which may be included in epoxy resins used for /in toys.

Exposure, uptake and elimination of chemicals in children's bodies can be different from adults

- In relation to their body weight, children breathe more air and eat more food than adults. This means that children can take up more chemicals per kg of their body via breathing (inhalation) or eating (ingestion, sucking on toys). Due to this higher uptake in relation to bodyweight, chemicals in children's bodies can sooner reach levels where they might cause harm, compared to adults (Landrigan and Miodovnik 2011).
- In contrast to adults, children touch many more things in their environment and may touch objects for longer times. The babies' skin is also considerably thinner than that of adults and the function of the skin as a barrier is not fully developed. Therefore, the uptake of chemicals via the skin (dermal contact) is considered a more significant pathway for exposure compared to adults (Sangeetha, Vimalkumar and Loganathan 2021).
- Some chemicals, such as lead or mercury can be transferred from the mother to the foetus during pregnancy. Some chemicals can also be transferred from the mother to the child through breastfeeding (Chen *et al.* 2014).
- The "removal systems" of chemicals from children's bodies are not yet fully developed (detoxification in the liver, excretion via the kidneys and also clearance of the lung); therefore, once taken up, CoCs are likely to remain in a child's body for a longer period of time (Meeker 2012).

Further information

Here are some links to additional sources of information on endocrine disrupting chemicals and their effects on children.

https://www.edc-free-europe.org/pregnancy-and-children:
Comprehensive information on the effects of EDCs on children and pregnant women, guidance on how to avoid EDCs

https://endocrinenews.endocrine.org/april-2014-edcs-interrupting-childhood/
Well understandable summary of scientific concerns about exposure of children to EDCs

https://chemtrust.org/edcs_brain_development/
Report on the effects of EDCs on the brain development of children

References:

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Landrigan, P.J. and Miodovnik, A. (2011). Children's Health and the Environment: An Overview. *Mount Sinai Journal of Medicine* 78(1), 1-10. https://onlinelibrary.wiley.com/doi/10.1002/msj.20236.

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Sangeetha, S., Vimalkumar, K. and Loganathan, B.G. (2021). Environmental Contamination and Human Exposure to Select Endocrine-Disrupting Chemicals: A Review. *Sustainable Chemistry* 2, 343–380. https://doi.org/10.3390/suschem2020020.

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