

E-cigarette nicotine refill cartridges pose danger for toddlers

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The safety of nicotine refill cartridges used in electronic cigarettes needs to be improved to prevent toddlers accidentally swallowing the contents and potentially coming to serious harm, warn doctors in *Archives of Disease in Childhood*.

The warning follows their treatment of a suspected case in the UK and emerging US data on the substantial rise of unintentional [nicotine](#) poisoning from e-cigarettes among the under 5s.

The UK toddler was brought into the emergency care department of Good Hope Hospital in Birmingham after the child's mother had spotted her picking up an e-cigarette nicotine refill cartridge and placing it in her mouth.

The mother acted quickly, snatching away the cartridge, and the child vomited shortly afterwards, but unsure as to how much nicotine the little girl might have swallowed, her mother decided to get doctors to take a look at her.

The child was kept under observation for several hours, during which time she developed no further symptoms, and was subsequently discharged. But the case prompted the authors to search for other similar cases.

Figures released by the US Centers for Disease Control and Prevention (CDC) earlier this year show what the authors describe as a "massive

rise" in calls to poison centres related to accidental swallowing of liquid nicotine contained in e-cigarette refill cartridges.

These rose from one in September 2010 to 215 a month by February 2014. More than half the calls involved children under the age of 5.

The authors point out that nicotine can be lethal in adults at doses as low as 40 mg, with the threshold for children likely to be much lower at around 1mg per kg of weight.

Nicotine cartridge refills are available in various strengths, ranging from 6 mg/l (0.6%) to 36 mg/l (3.6%), and at the higher strength, just a few drops could have serious side effects in a child under 5, they warn.

Severe nicotine poisoning can cause dangerous irregular heartbeat, coma, convulsions, and prompt the heart to stop its pumping action (cardiac arrest).

"Our case highlights an important emerging issue related to the use of increasingly popular e-cigarettes," write the authors.

"The exploratory nature of young children and the attractive packaging of refills is a dangerous combination likely to lead to a growing incidence of accidental exposure to concentrated nicotine solution," they add.

"The risk posed by nicotine liquid to children needs to be recognised, acknowledged and acted upon by all. This includes public education and legislation to improve the safety profile of e-liquid containers," they conclude.

Early signs of accidental nicotine poisoning include:

- Burning in the mouth and throat
- Nausea and/or vomiting
- Confusion and dizziness
- Weakness and excess spittle

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