Western Australian Poisons Information Centre

Electronic cigarettes (e-cigarettes) nicotine solutions

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Introduction

The Western Australian Poisons Information Centre (WAPIC)* has serious concerns regarding the risks posed, particularly to young children, by concentrated nicotine solutions used in e-cigarettes. The recent death of an 18-month old boy following ingestion of e-cigarette liquid underscores safety concerns (1).

Nicotine

The toxicity profile of nicotine is well established. Nicotine is rapidly absorbed across body surfaces (lungs, skin and membranes of the mouth, nose and stomach). High doses of nicotine are highly toxic. Features of toxicity include nausea, tachycardia, hypertension, cardiac dysrhythmias, seizures, respiratory failure and death[2]. Severe toxicity has been reported in children ingesting doses of 1.4 – 1.9 mg/kg of body weight [2]. For an average 2 year old, this would amount to approximately 20 mg of nicotine. Ingestion of a single millilitre of concentrated nicotine solution can be lethal for a child.

Refill solutions are available in a range of concentrations commonly 3 to 24 mg/ml. Concentrated nicotine solutions of 100 mg/ml are available on line and available in containers as large 55 Gallons (200 Litres).

Cases of exposure to e-cigarettes and their refill solutions

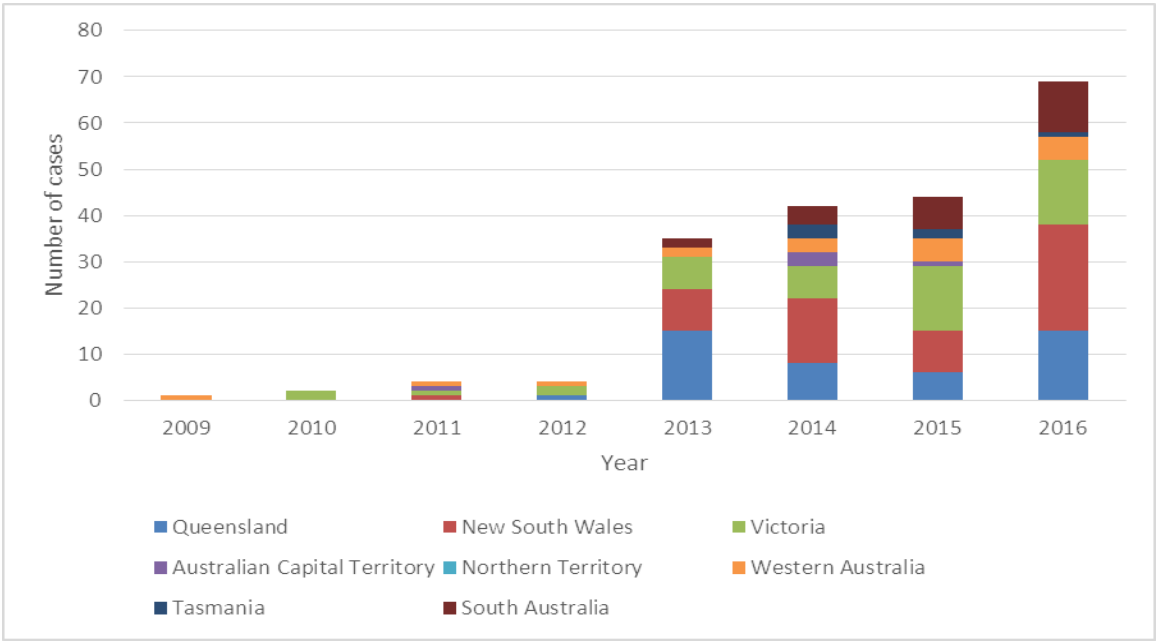
1. Retrospective analysis of all cases handled by the Australian PIC network - 2009 and 2016.

The Australian PIC network undertook a retrospective analysis of calls to the network from 2009 to 2016 involving exposures to e-cigarettes and their refill solutions. A total of 202 cases were identified – see figure. Case numbers increased considerably over the study period. Of these, 38% involved children less than 15 years of age. Most exposures involved ingestions (n= 110). Twenty four involved buccal exposures, smaller numbers involved dermal and ocular exposures. The presence of nicotine was confirmed per product labelling in 43 cases, with concentrations ranging from 0.06 mg/mL to 200 mg/mL. The average estimated paediatric dose was 1.25 mg/kg (n=5). Most patients were experiencing only mild feature at the time of the call to the PIC. Twelve cases had moderate toxicity.

2. WAPIC case data January to October 2018

Analysis of the WAPIC database for the period January to October 2018 identified 25 cases. Calls were received from WA 10, SA 8, Victoria 4 and one case each from NT, NSW and Tasmania. The age group of victims: Infant 2, Toddler 6, Child 1, Adult 15, Elderly person 1. The route of exposure was ingestion in 16 cases. The estimated volume of liquid ingested ranged from 0.1 to 120 ml. One case involved an 11 month old infant who was reported to have ingested 25 mls of *Royal Classic e juice.* Four cases involved eye exposures, 2 involved mucosal buccal exposure (child was found sucking on an e cigarette) and 3 involved skin exposures. Sixty percent of victims were exhibiting symptoms (14 mild features, 1 severe). For all cases involving children the child was either in hospital at the time of the call or referred to an emergency department.

Cases reported to the Australian PIC network 2009 to 2016 involving e-cigarettes & nicotine re-fills by state of origin [3]



References

1. Eddleston, W., Nacca, N. Stork, C.M and Marraffa, J.M. (2016) Pediatric death after unintentional exposure to liquid nicotine for an electronic cigarette. *Clinical Toxicology*, 54(9), pp. 890–891.
2. Poisindex, MICROMEDEX, USA ® IBM Corporation 2018 [accessed 20/11/2018]
3. Wylie, C., Heffernan, A., Brown J.A., Cairns, R., Lynch, A-M and Robinson, J. (2018) Exposures to e-cigarettes and their refill: calls to Australian Poisons Information Centres, 2009-2016. Doi:10.5694/*mja*.12032

* The WAPIC provides an emergency phone service to the general public and health professionals of WA, SA and the NT, handling on average 40,000 phone calls per year. WAPIC cooperates with the other 3 Australian PICs to handle out of hours Australian wide calls.