



# Surveillance of hazardous exposures to electronic cigarettes in Italy



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**INTRODUCTION:** Liquid solutions (e-liquids) used in electronic cigarettes (e-cigarettes) represent a potential source of toxic exposures to nicotine. This study provides a description of human exposures to e-liquid to the Italian National Poison Control Centre in Milan (PCCM) in 2010-2013.

**METHODS:** The PCCM database was searched to identify human cases exposed to e-liquid from January 2010 to June 2013. Each case of interest was reviewed and classified according to the Poisoning Severity Score<sup>1</sup>.

**RESULTS:** A total of 185 cases were identified. One case was reported in 2010 and 2011, respectively, 42 cases in 2012 and 143 during the first 6 months of 2013. Some 15% of cases (Figure 1) were aged 5 years or less, 7% 6-19 years, 64% 20-49 years, and 11% 50 years or more. About 58% of cases were men and 41% women. The route of exposure (Figure 2) was 80% ingestion, 9% inhalation and ocular, respectively, 4% dermal. About 38% of cases developed signs/symptoms possibly related to e-liquid exposure. Clinical effects (Figure 3) most frequently reported were oropharyngeal irritation (10%), nausea (7%), ocular irritation (6%), vomiting (5%). In all symptomatic cases severity of medical outcomes was minor, but in two cases it was moderate. These last ones included: a 2-year-old child who developed ataxia, vomiting, and tachycardia following ingestion of a 3.6% nicotine solution; a 34-years-old patient who suffered headache, vertigo, gastric pyrosis, and dyspnea following unintentional e-liquid ingestion while inhaling from an e-cigarette.

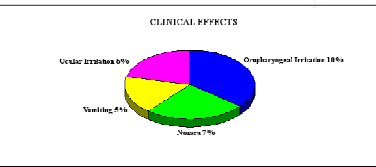
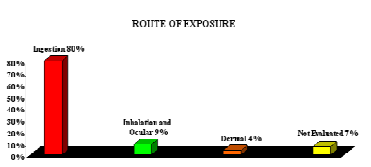
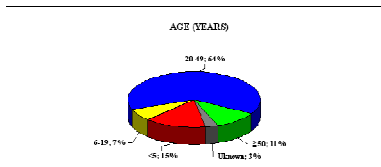


Figure 1. Distribution of cases of exposure by age

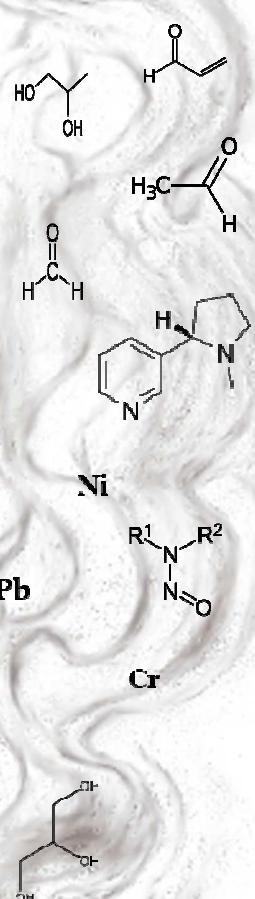
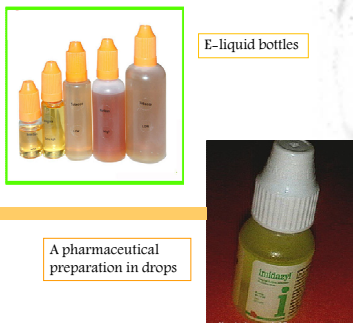
Figure 2. Distribution of cases by route of exposure

Figure 3. Distribution of the observed clinical effects

Most of exposures were unintentional (96%) and occurred while the victim was using an e-cigarette (78%). Uncontrolled access to e-liquid by a young child accounted for 16% of cases, while 4% were victims of therapeutic error due to exchanging an e-liquid dropper bottle with an ocular or otological preparation in drops, i.e.. Two cases developed allergic reactions. Intentional exposure occurred in 3% of cases including two cases of suicide attempt and three cases of abuse (Table 1).

Table 1. Distribution of cases of exposure and poisoning by reason for exposure

REASON FOR EXPOSURE	CASES OF EXPOSURE (No. 172)		CASES OF POISONING (No. 61)		
	No.	%	No.	%	
Unintentional No. 165, 96%	While using an e-cigarette	116	67.4	44	72.1
	Uncontrolled access by young a child	31	18.0	3	4.5
	General error	5	2.9	2	3.3
	Therapeutic error	7	4.1	5	8.1
	Pouring from the original container	4	2.4	1	1.6
Intentional No. 7, 4%	Allergic reaction	2	1.2	2	3.3
	Suicide attempt	2	1.2	0	0.0
	Abuse	5	2.9	4	6.6



**CONCLUSIONS:** Although most of the observed cases of exposures did not developed severe clinical outcomes, it should be considered that e-liquids containing high nicotine concentrations which may pose a serious health threat especially to children. Ongoing collection of surveillance data from PCs should be considered as an informative support for establishing the safety profile of e-liquids on the market.

REFERENCES: 1. Persson HE, Sjoberg GK, Haines JA, et al. Poisoning Severity Score. Grading of acute poisoning. J Toxicol Clin Toxicol 1998;3.