

# Electronic Cigarette Refill Liquids and Child-resistant Packaging: Selected Findings

## A Brief Report to the ND Center for Tobacco Prevention and Control Policy

### Selected Purposes of Study

1. To determine the accuracy of the labeled quantity of the nicotine content labelling of the e-liquids sold in unlicensed vape stores in North Dakota.
2. To determine whether the packaging of e-liquids sold within the vape stores was child-resistant.

### Design and Setting

Cross-sectional study of e-liquids sold by 16 North Dakota vape stores. Data was collected June 9–26, 2015.

### Nicotine Content in E-liquid Containers

Measured by the NDSU Core Synthesis & Analytical Services Facility using a high-performance liquid chromatography method.

Results allow a +/- 10% variation in nicotine concentration

- 70 e-liquid containers claimed to contain nicotine ranging from 3 – 24 mg/mL
  - 51% of the containers had nicotine content outside of the labelled amount by +/- 10%
    - 34% had less and 17% had more than by +/- 10%
  - Actual content of nicotine ranged from 66% under the labeled concentration to 172% over the labeled concentration.
- 23 e-liquid containers claimed to contain 0 mg/mL of nicotine
  - 43% contained nicotine; average of 0.19 mg/mL; highest level at 0.48 mg/mL

**Table 1 Nicotine content of common concentrations**

	6 mg/mL (n = 15)	12 mg/mL (n = 14)	18 mg/mL (n = 14)	24 mg/mL (n = 8)
Mean (mg/mL)	5.49	11.02	17.30	24.21
SD (mg/mL)	1.22	2.84	3.23	1.82
Range (mg/mL)	2.02-7.64	4.22-13.73	11.38-24.76	22.39-26.81
>10% below label, n (%)	7 (46.67%)	4 (28.57%)	4 (28.57%)	0 (0.00%)
>10% above label, n (%)	1 (6.67%)	2 (14.28%)	2 (14.28%)	2 (25.00%)

**Figure 1**

**E-Liquid refill containers labeled as 6 mg nicotine, with warning, “may contain up to 35 mg of nicotine per mL”**



This image was published in the Journal of Pediatric Nursing, Buettner-Schmidt, K., Miller, D., & Balasubramanian, N., Electronic cigarette refill liquids: Child-resistant packaging, nicotine content, and sales to minors, p. 1-7, Copyright Elsevier (2016) Advanced online publication April 12, 2016. doi: 10.1016/j.pedn.2016.03.019

Detailed information about the study can be found at <http://www.ncbi.nlm.nih.gov/pubmed/27079973> and at <http://www.sciencedirect.com/science/article/pii/S0882596316000774>

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