



# Youth and young adult vaping: Big concerns and small promises

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# Question

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By how much did youth vaping increase between 2017 and 2018 in Canada ?

~74%



# What are e-cigarettes?

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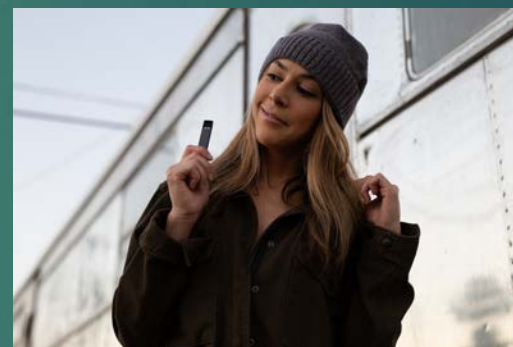
- ▶ Battery-operated device
- ▶ Delivers nicotine (most), THC, other
  - ▶ Activate the heating element
- ▶ Different forms
  - ▶ Flavors
  - ▶ Disposable or reusable form



# Pods: The youth magnet

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- ▶ Chemical properties
  - ▶ Benzoic acid
    - ▶ Less harshness
    - ▶ Stronger nicotine punch
    - ▶ Explosive flavor
- ▶ Physical characteristics
  - ▶ Small = discrete
  - ▶ USB like = era fit



Chen, L. (1976) pH of Smoke: A Review, Report Number N-170, internal document of Lorillard Tobacco Company, 18 pp, Bates nos. 00118164/8181, <https://www.industrydocumentslibrary.ucsf.edu/tobacco/docs/#id=ykhn0101>

Pankow, J.F., Kim, K., McWhirter, K.J., Luo, W., Escobedo, J.O., Strongin, R.M., Duell, A.K, and Peyton, D.H. (2017). Benzene formation in electronic cigarettes. PLOS ONE, 12(3), e0173055. doi: 10.1371/journal.pone.0173055

Duell, A., Pankow, J., and Peyton, D. (2018). Free-Base Nicotine Determination in Electronic Cigarette Liquids by <sup>1</sup>H NMR Spectroscopy. Chem. Res. Tox. 31(6), 431-434.



# Statistics: 30 days

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- ▶ Grades 7-12
  - ▶ PEI: 17%
  - ▶ Highest in NF: 22.4%
  - ▶ Canadian average: 10%



# Possible reasons

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# Gaps in legislation

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- ▶ Poor enforcement
  - ▶ Access from shops; online
- ▶ Advertisement (esp. social media)
  - ▶ Partial restrictions
- ▶ Flavours and nicotine
  - ▶ Youth and addiction
- ▶ No taxation
  - ▶ Affordability and price sensitivity





# Impact of advertisement

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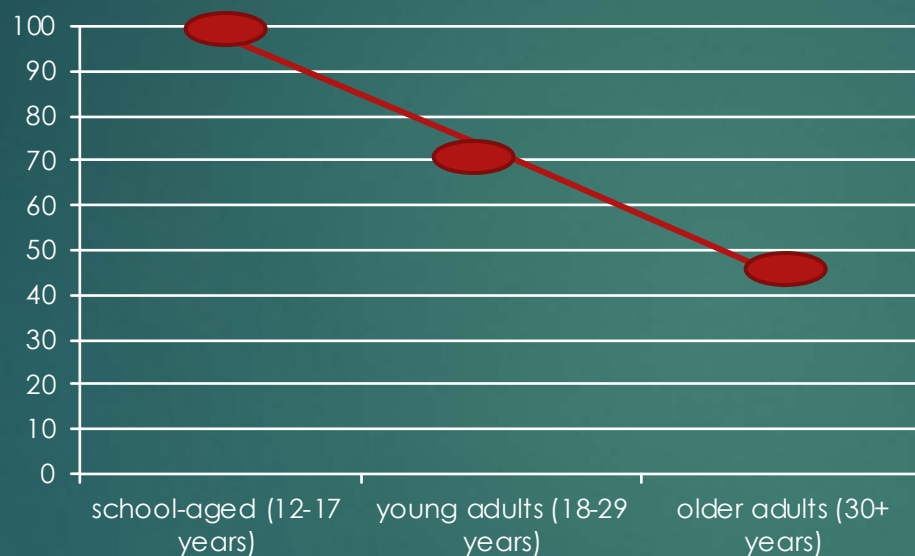
- ▶ Exposure to vaping advertisement
  - ▶ Increases temptation to try e-cigarettes
    - ▶ cigarette smokers and non-smokers
  - ▶ Decreases perceived harms of tobacco
    - ▶ youth non-users

Petrescu, D. C., Vasiljevic, M., Pepper, J. K., Ribisl, K. M., & Marteau, T. M. (2017). What is the impact of e-cigarette adverts on children's perceptions of tobacco smoking? An experimental study. *Tobacco control*, 26(4), 421-427.

Ratneswaran, C., Judge, R., Colquhoun, M., Steier, J., & Khong, T. K. (2015). S78 Electronic cigarette advertising impacts adversely on smoking behaviour within a London student cohort: a cross-sectional survey

# Flavors by age group

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Harrell, M. B., Weaver, S. R., Loukas, A., Creamer, M., Marti, C. N., Jackson, C. D., ... & Eriksen, M. P. (2017). Flavored e-cigarette use: Characterizing youth, young adult, and adult users. *Preventive medicine reports*, 5, 33-40.

# Toxins

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- ▶ Cytotoxins = up to 41
  - ▶ Some = probable causes of cancer
- ▶ Dual use > toxins = cigarette use alone
- ▶ E-cigarette < harmful than cigarette use
  - ▶ With respect to toxin delivery



Goniewicz, M. L., Smith, D. M., Edwards, K. C., Blount, B. C., Caldwell, K. L., Feng, J., ... & van Bommel, D. (2018). Comparison of Nicotine and Toxicant Exposure in Users of Electronic Cigarettes and Combustible Cigarettes. *JAMA network open*, 1(8), e185937-e185937.

Grana, R., Benowitz, N., & Glantz, S. A. (2014). E-cigarettes: a scientific review. *Circulation*, 129(19), 1972-1986.

# Harms: MI

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- ▶ Myocardial infraction
- ▶ Every day use of e-cigarettes
  - ▶ 1.7 times higher (vs. never users)
- ▶ Dual use of e-cigarettes and tobacco
  - ▶ 4.62 times times (vs. never users)



Alzahrani, T., Pena, I., Temesgen, N., & Glantz, S. A. (2018). Association between electronic cigarette use and myocardial infarction. *American journal of preventive medicine*, 55(4), 455-461.

# Harms: Pulmonary ailments

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- ▶ 1800+ reported cases in the US
- ▶ Possibly: No known cause
- ▶ Deaths and some hospitalizations

Haddock SD, Cirulis MM, Callahan SJ, et al. Pulmonary lipid-laden macrophages and vaping. *N Engl J Med*. 2019.

Layden JE, Ghinai I, Pray I, et al. Pulmonary illness related to e-cigarette use in Illinois and Wisconsin—preliminary report. *N Engl J Med*. 2019.

Centers for Disease Control and Prevention. Outbreak of Lung Disease Associated with E-Cigarette Use, or Vaping. In: *Smoking & Tobacco Use*. 2019.





# Smoking cessation

- ▶ Inconclusive evidence
- ▶ E-cigarettes: nicotine vs. nicotine-free
  - ▶ Former = more likely to reduce cigarette smoking
- ▶ E-cigarettes vs. NRT > reduce smoking
  - ▶ Abstinence rate and continued use of quit method
- ▶ Review
  - ▶ e-cigarette perpetuates smoking

Diemert L. et al. /(2019). E-Cigarette Use for Smoking Cessation Scientific Evidence and Smokers' Experiences  
[https://www.otru.org/wp-content/uploads/2019/02/special\\_vape\\_quit .pdf](https://www.otru.org/wp-content/uploads/2019/02/special_vape_quit.pdf)

Hajek, P., Phillips-Waller, A., Przulj, D., Pesola, F., Myers Smith, K., Bisal, N., ... & Ross, L. (2019). A randomized trial of e-cigarettes versus nicotine-replacement therapy. *New England Journal of Medicine*.

# Smoking initiation

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- ▶ New smokers after starting e-cigarette use
  - ▶ Population level
- ▶ May offset gains in cessation from vaping

Berry, K. M., Fetterman, J. L., Benjamin, E. J., Bhatnagar, A., Barrington-Trimis, J. L., Leventhal, A. M., & Stokes, A. (2019). Association of electronic cigarette use with subsequent initiation of tobacco cigarettes in US youths. *JAMA network open*, 2(2), e187794-e187794.

# Re-normalization

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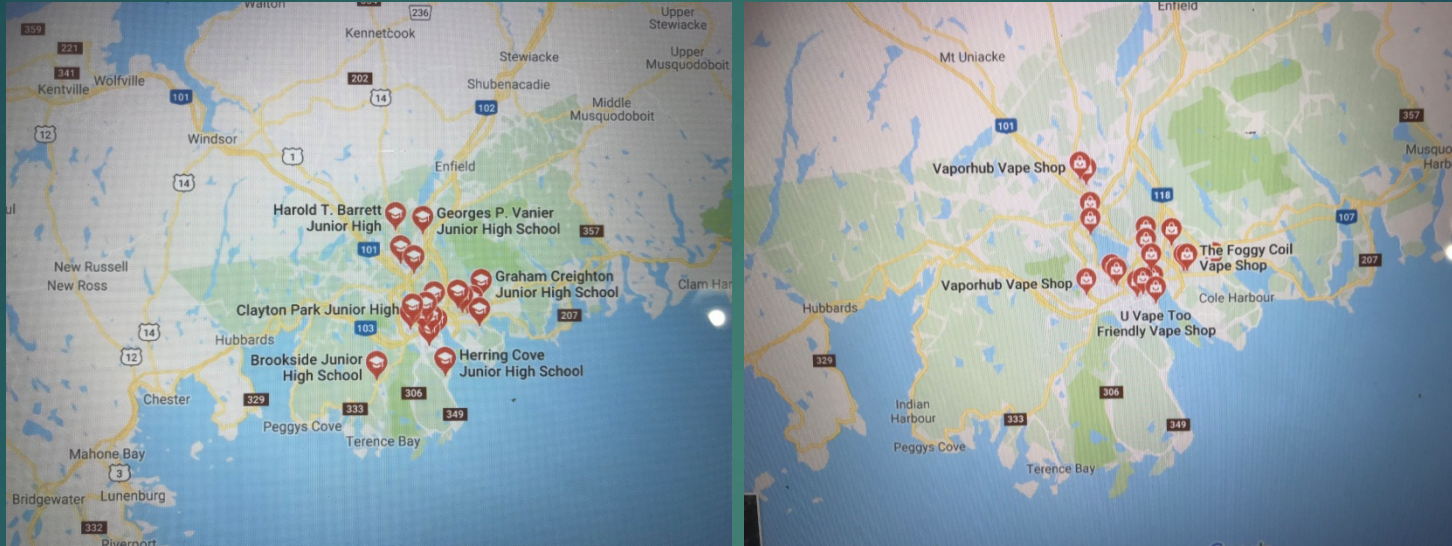
- ▶ Mimic the personal/public experience of smoking
- ▶ Cloudy matter

Fairchild, A. L., Bayer, R., & Colgrove, J. (2014). The renormalization of smoking? E-cigarettes and the tobacco "endgame". *New England Journal of Medicine*, 370(4), 293-295.



# Schools and vape shops

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# How to improve the issue?

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- ▶ Taxation
- ▶ Advertisement restrictions
- ▶ Regulating content
- ▶ Increasing the minimum age to 21



# What about research?

- ▶ Study
  - ▶ Predictors
  - ▶ Mechanisms
  - ▶ Clusters
  - ▶ Trajectory for use
  - ▶ Trajectory of tobacco co-use
- ▶ Until then
  - ▶ Restrictive/ stringent policies



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B R E A T H E  
the lung association

  
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Health and Wellness