



Assessing E-cigarette and Other Nicotine-related Regulations and Exposures from 2012-2018

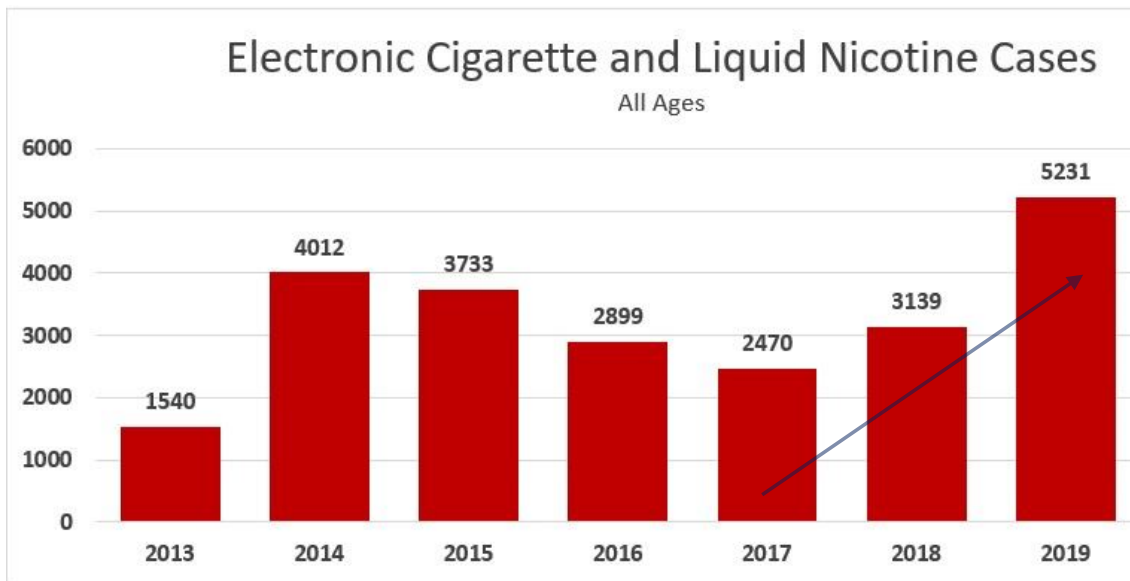
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Research Preceptor: Dorie Apollonio, PhD MPP



Introduction

The problem

Increasing rates of poison control center calls regarding e-cigarettes and liquid nicotine

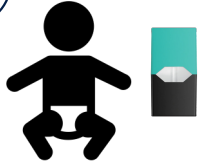


Source: American Association of Poison Control Centers

Health effects

Acute nicotine poisoning is biphasic and can be fatal

1



Nicotine exposure

2

First phase

- Tachycardia
- Nausea/vomiting
- Hypertension
- Salivation
- Tremors
- Ataxia
- Seizures

3

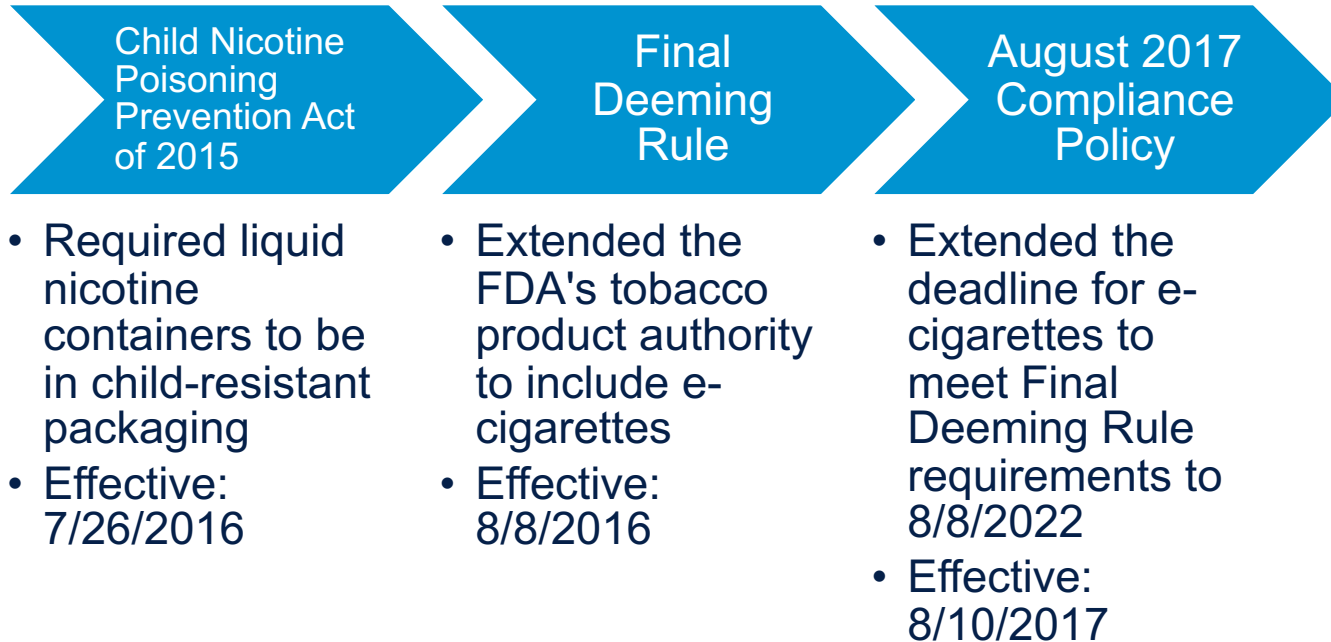
Second phase

- Bradycardia
- Respiratory depression
- Hypotension
- Weakness
- Muscle paralysis
- Coma
- Death (rare)



Timeline

Regulations surrounding e-cigarettes



Objective

To examine the impact of the 2015 Child Nicotine Poisoning Prevention Act and the August 2017 Compliance Policy on e-cigarette exposures

Study Aims:

1. Identify if the impacts of the August 2017 Compliance Policy exceeded those due to the Child Nicotine Poisoning Prevention Act of 2015
2. Identify characteristics of e-cigarette exposures and provide guidance for regulatory changes that could reduce them





Methods

Methods

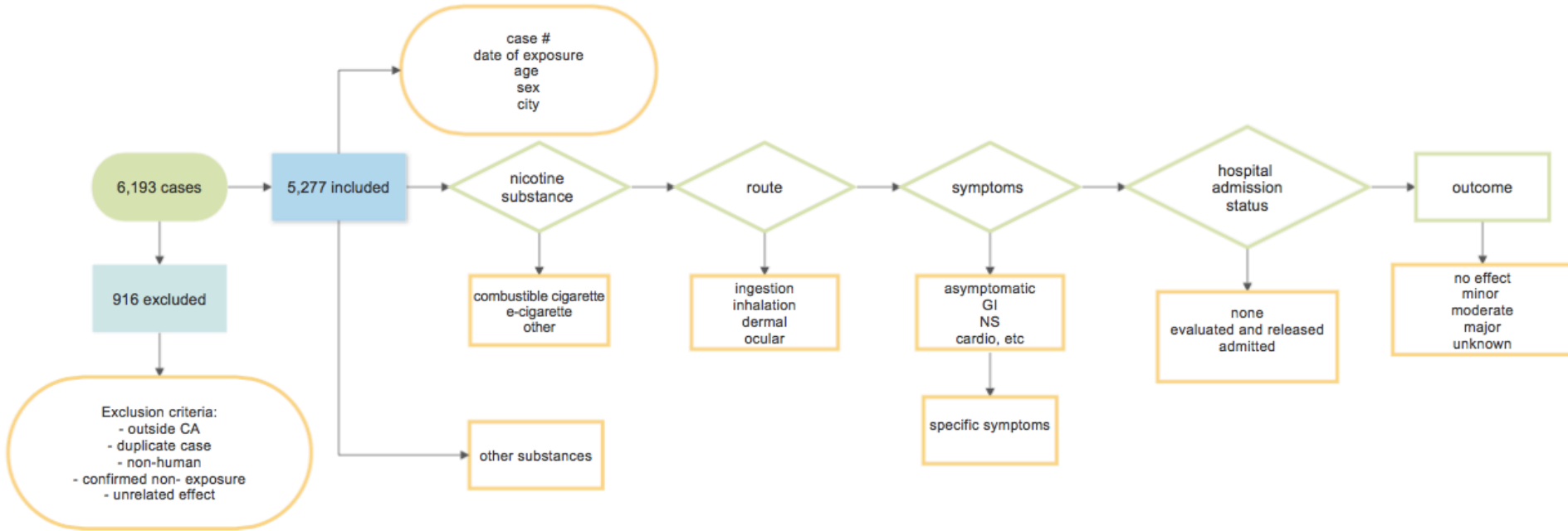


Retrospective review of all suspected nicotine toxicity cases reported to the California Poison Control System (CPCS) from Sept. 2012 – Dec. 2018



We recoded cases using REDCap and used Stata to run interrupted time series analyses

REDCap coding process

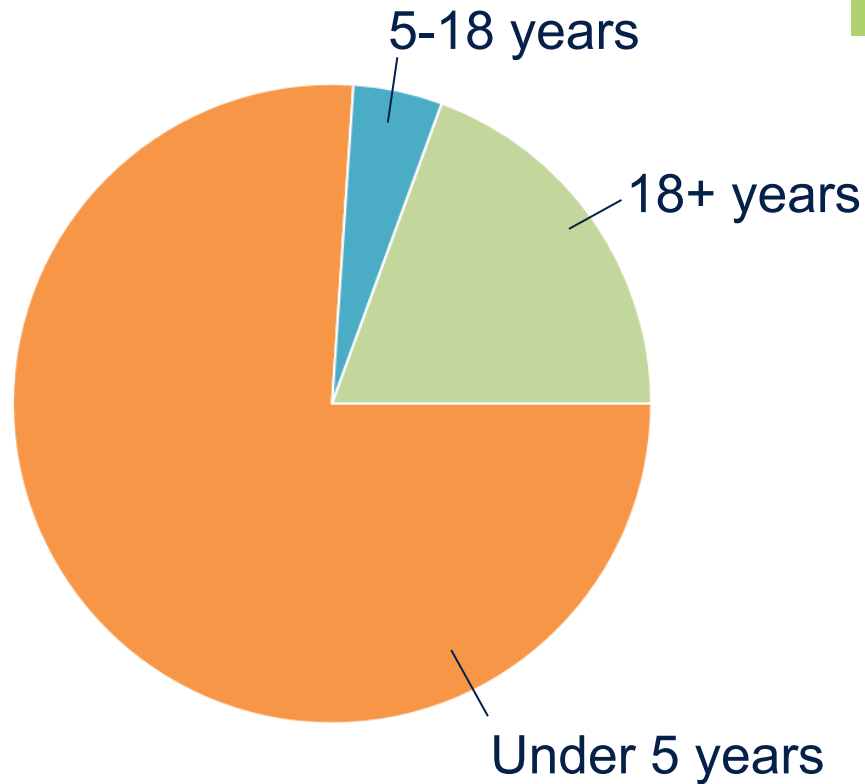




Results


Results

**Over three-quarters
(76.1%) of exposures were
children under 5 years old**



Results

	Before Child Nicotine Poisoning Prevention Act		After Child Nicotine Poisoning Prevention Act	
	Total exposures	Average number of monthly exposures	Total exposures	Average number of monthly exposures
Combustible cigarettes	1672	40.8	1364	39.0
E-cigarettes	745	18.2	741	21.2
Other	433	10.6	377	10.8



No significant changes were found before or after the Child Nicotine Poisoning Prevention Act

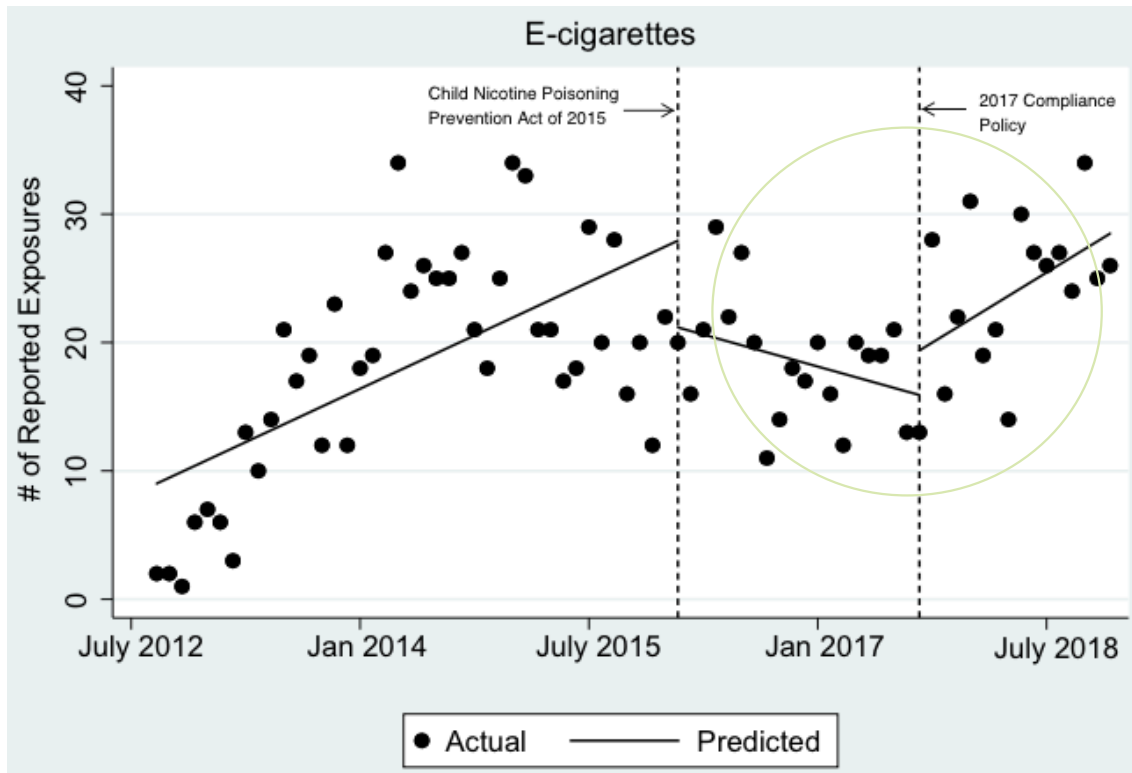
Results



	Before FDA's 2017 Compliance Policy		After FDA's 2017 Compliance Policy	
	Total exposures	Average number of monthly exposures	Total exposures	Average number of monthly exposures
Combustible cigarettes	2489	41.5	547	34.2
E-cigarettes	1103	18.4	383	24.0
Other	639	10.7	171	10.7

Note: A black arrow points from the 18.4 value to the 24.0 value, and both are circled in orange.

Results



E-cigarette exposures increased significantly* following the FDA's August 2017 Compliance Policy

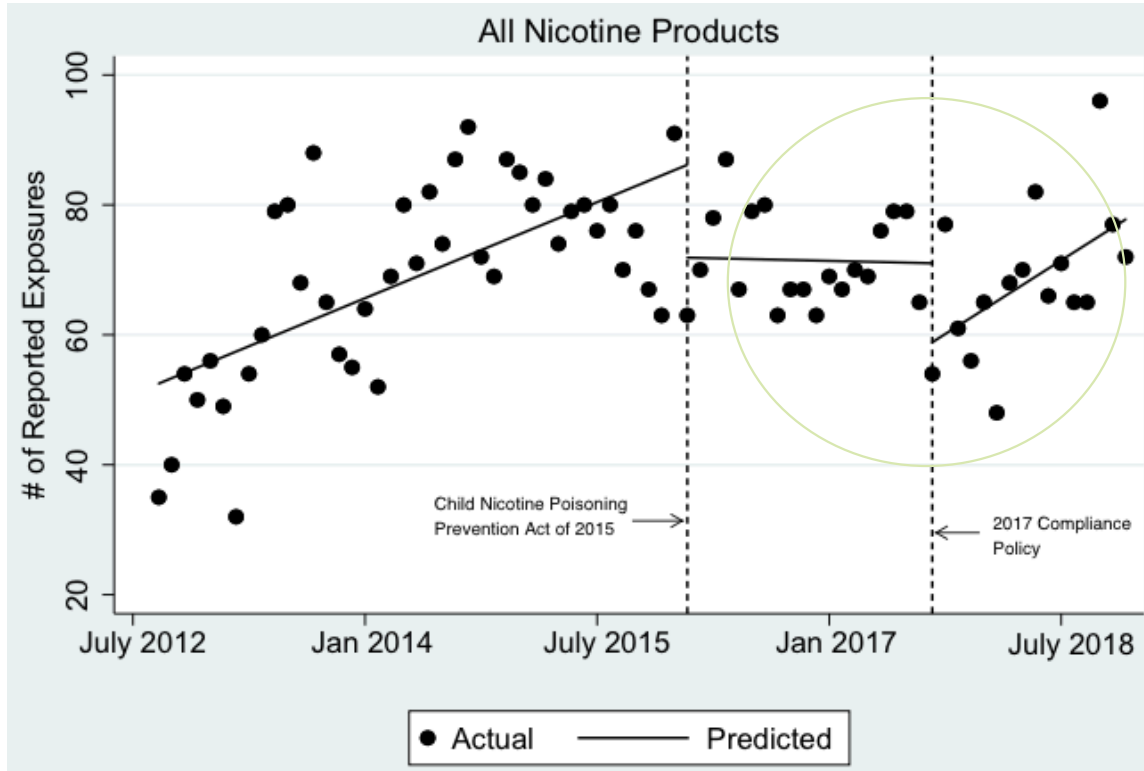
*P<0.01

Results



Combustible cigarette exposures & other nicotine-containing product exposures did not change significantly in response to the August 2017 Compliance Act

Results



These effects were substantial enough to cause nicotine exposures for all products to increase significantly*

*P<0.05



Results

Examples of nicotine exposures in young children



Ingestion and
dermal exposure to
e-cigarette cartridges
and refill containers

Appealing flavors of
liquid nicotine
leading children to
mistake it for candy

Results

Examples of nicotine exposures in adults

Ingestion of liquid
nicotine when
inhaling

Splashes of liquid
nicotine when
refilling e-cigarettes

Exploding e-
cigarettes

Broken e-cigarettes,
cartridges, and refill
vials stored in the
user's pocket



Results

Examples of labeling-related situations resulting in unintentional liquid nicotine exposures

Liquid nicotine
mistaken for
other products



Antibiotic
eye drops



Liquid
nicotine



CBD oil



Liquid
nicotine

Sources: Keeler, VaporDNA, Try The CBD, Vape Wholesale Supply

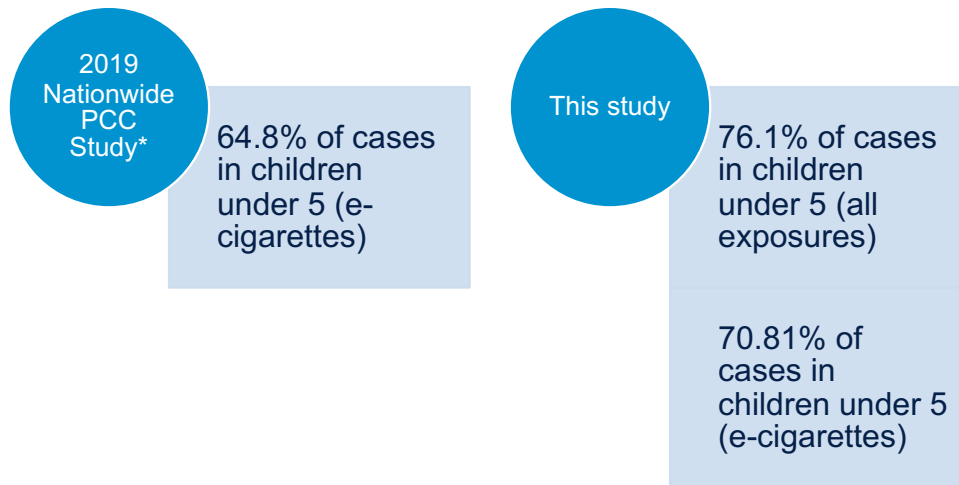




Discussion

Discussion

- Our study identified a higher proportion of nicotine exposures seen in children under 5 years of age than that in other studies

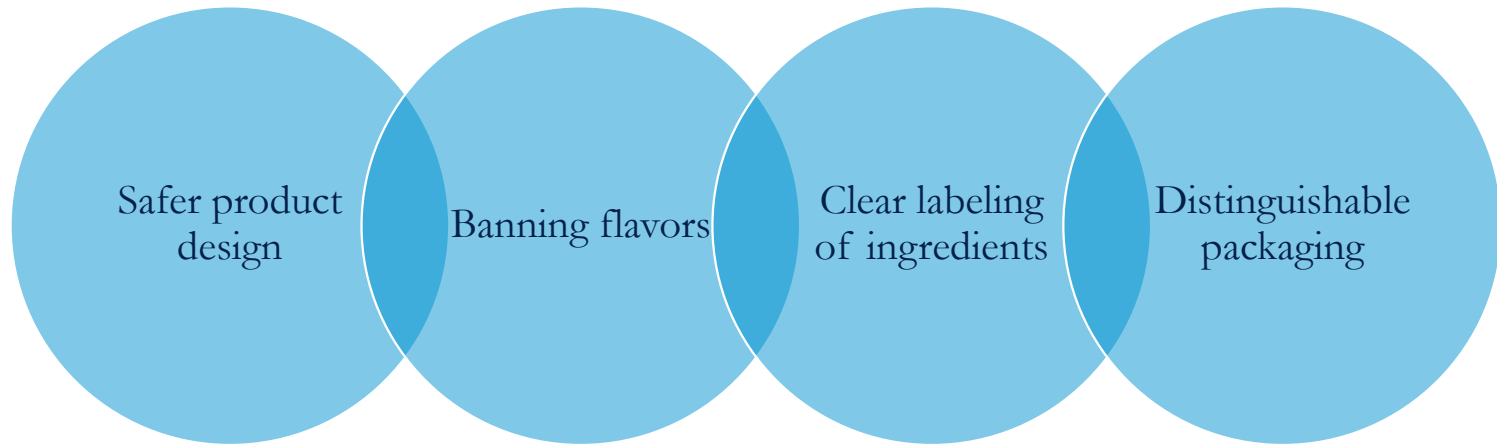


*Wang, Baoguang, et al. “Poisoning Exposure Cases Involving e-Cigarettes and e-Liquid in the United States, 2010–2018.”

Discussion



Strategies for future e-cigarette regulation may include:



Study Limitations

- Retrospective design leading to incomplete clinical data documentation
- Case reports reliant on caller's knowledge and willingness to contact the CPCS
- Complete reliance on case information from the caller



Conclusion



Conclusions

FDA's efforts to reduce nicotine exposures have been relatively unsuccessful

Even if the Compliance Policy did not cause the increase in e-cigarette exposures, the increase suggests the need for regulatory action

Our ideas for potential regulations include e-cigarette cartridge reservoir safety locks, labeling guidelines, and flavor bans on disposable e-cigarettes (e.g. Puff Bar)



Acknowledgements



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Thank You!

Any questions?

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