

**tobacconomics**

Economic Research Informing Tobacco Control Policy

# E-Cigarette Taxation: Potential Impact & Options

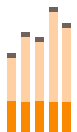
Frank J. Chaloupka, University of Illinois at Chicago

Society for Research on Nicotine and Tobacco

Chicago, Illinois, March 5, 2016

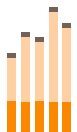
# Overview

- Demand for E-Cigarettes
  - Effects of prices on e-cigarette demand
  - Cross-price, other effects
- ENDS Taxation – Options
  - Potential e-cigarette tax revenues



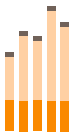
# Disclosures

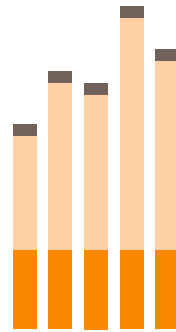
- National Cancer Institute, State and Community Tobacco Control Initiative, 5UO1-CA154248
- Centers for Disease Control and Prevention, Office on Smoking and Health
- American Cancer Society, Cancer Action Network



# Collaborators

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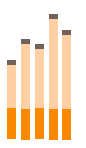
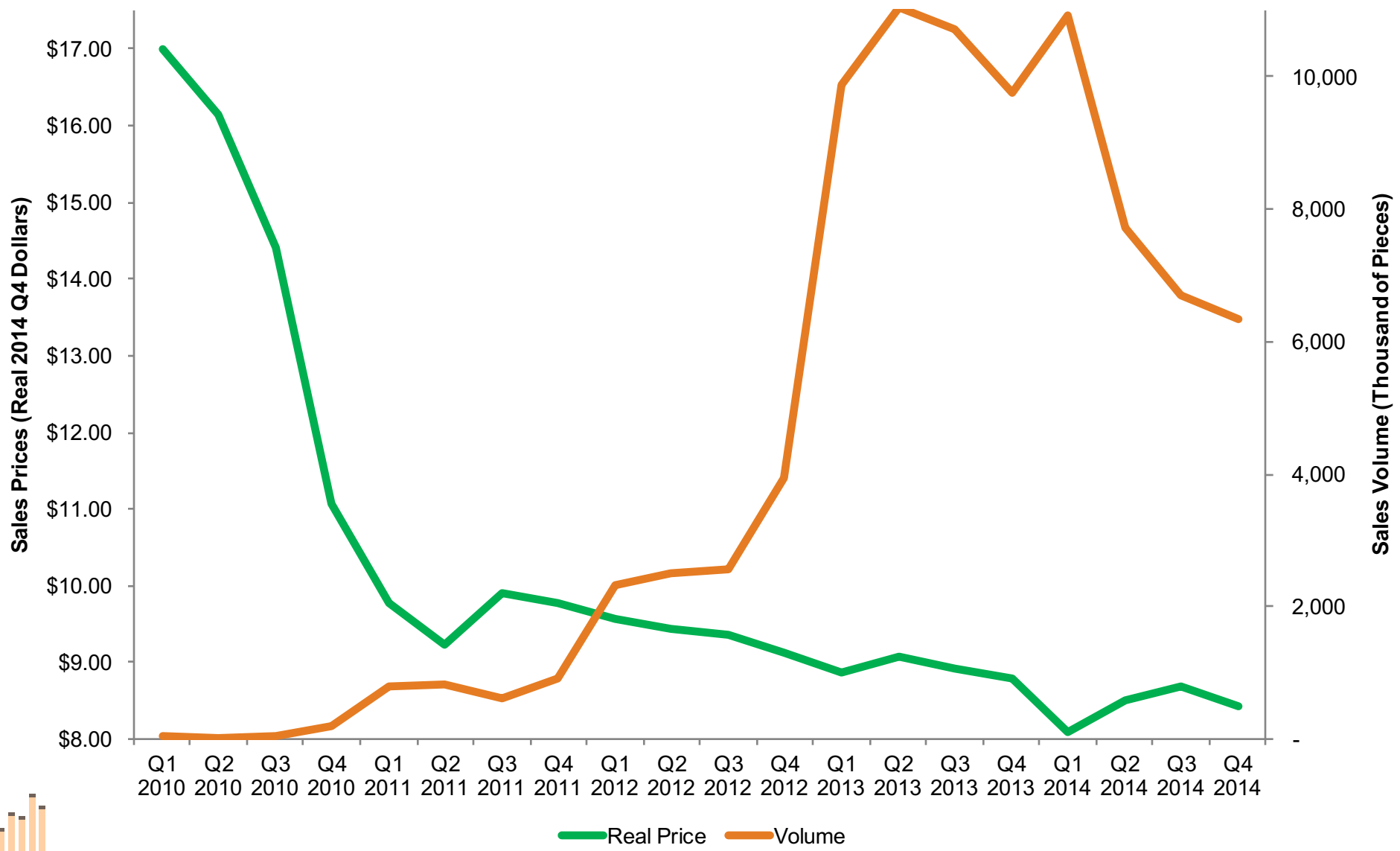


# E-Cigarette Demand



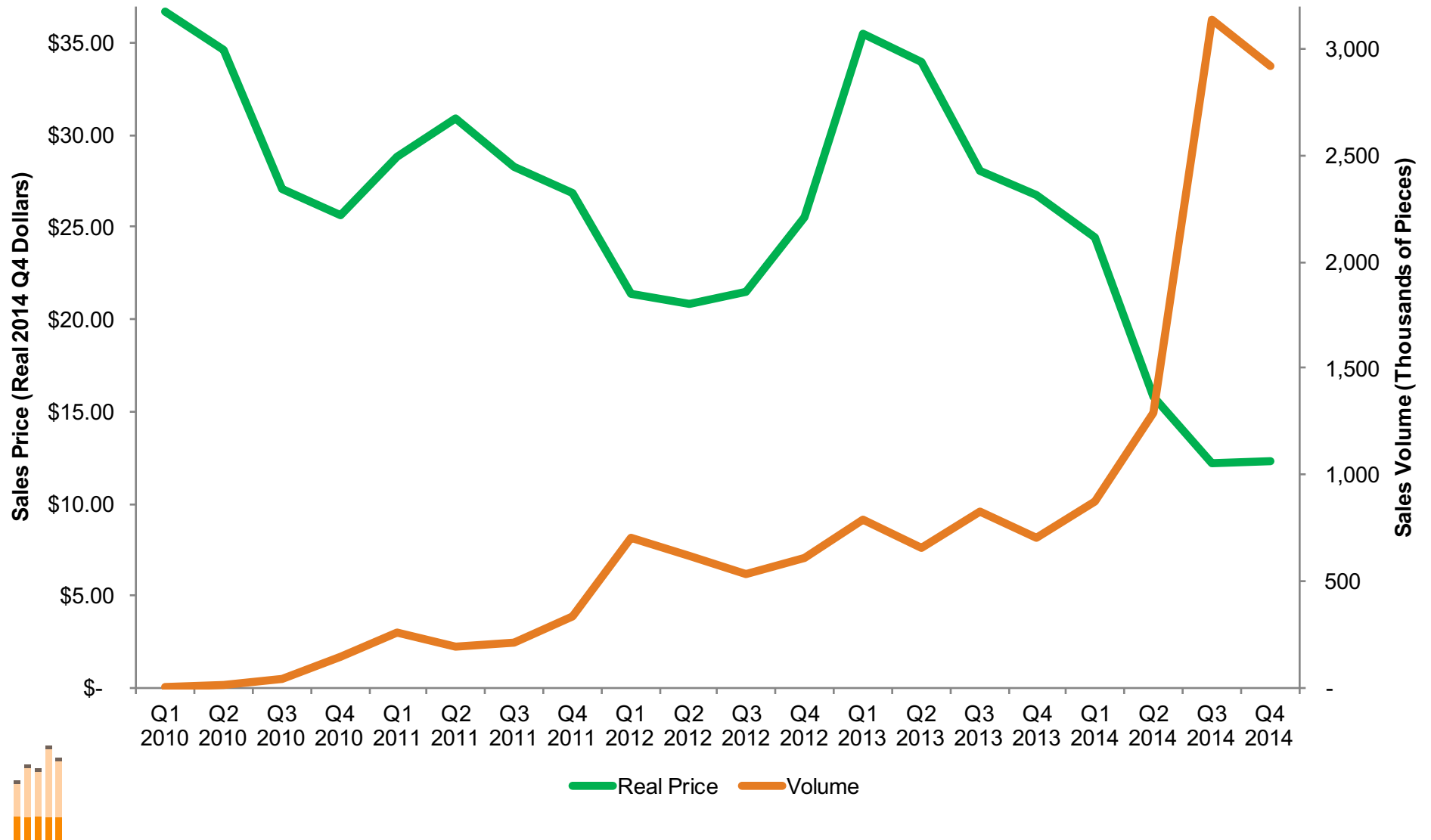
# Disposable ENDS

## Sales Volume and Price, US 2010 - 2014



# Reusable ENDS

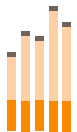
## Sale Volume and Price, US 2010 - 2014





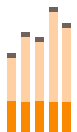
# E-Cigarette Prices & Sales

- Huang, et al., *Tobacco Control*, 2014
  - 2010-2012, quarterly e-cigarette sales data
  - Overall sales of e-cigarettes are sensitive to price changes
  - A 10% increase in price reduces sales of disposable e-cigarettes by approximately 12%, and by about 19% for reusable e-cigarettes.
  - Sales of disposable e-cigarettes were higher in markets with stronger SFA policies.
  - No consistent statistical significant relationship between cigarette prices and e-cigarette sales.
  - Increasing reusable e-cigarette price will lead to an increase in disposable e-cigarette sales.

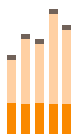
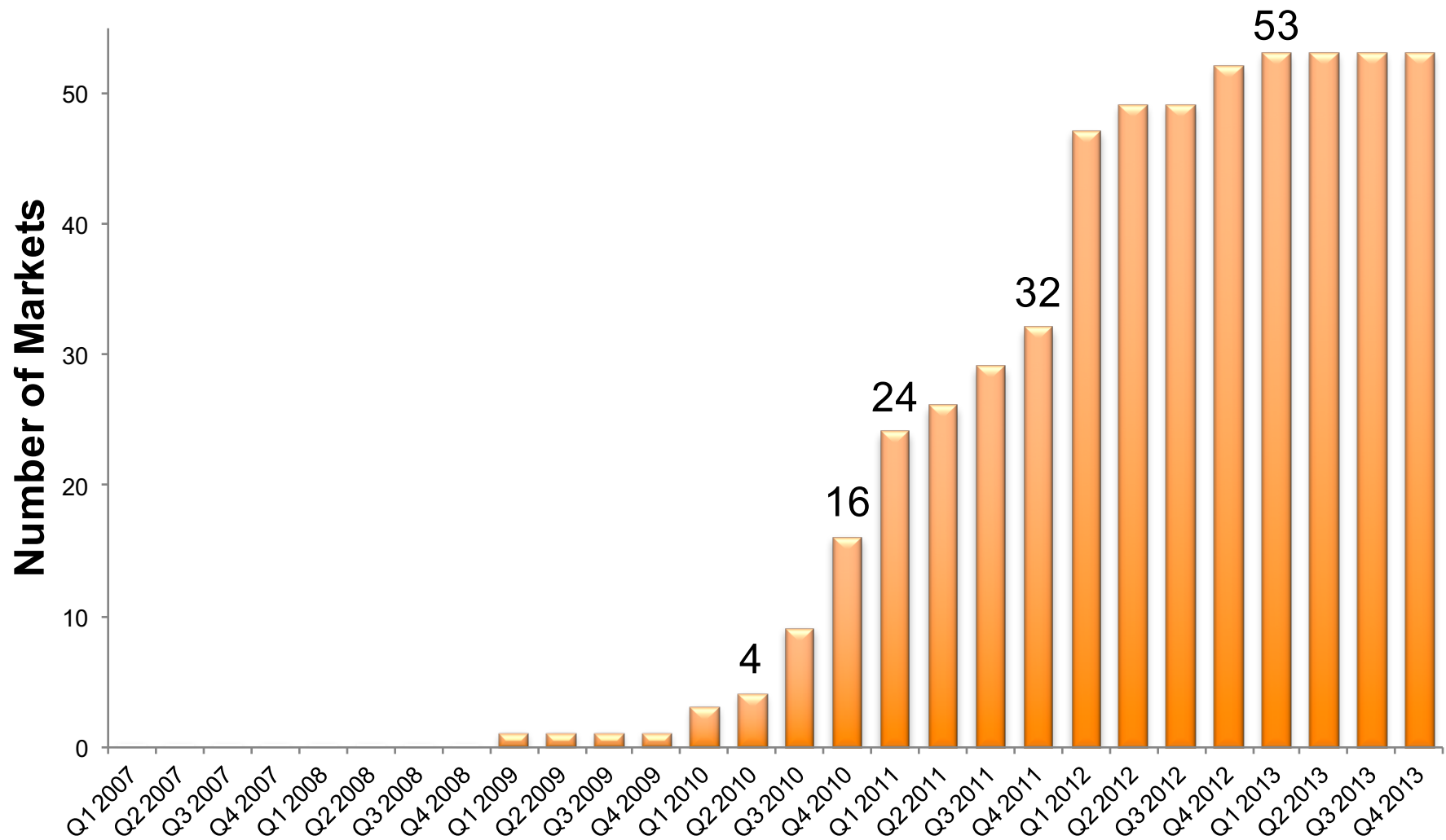


# E-Cigarette Prices & Sales

- Gwarnicki, et al. (under review)
  - 2010-2014, quarterly e-cigarette and other nicotine product sales data
  - Overall sales of e-cigarettes are sensitive to price changes
  - 10% increase in price reduces sales of disposable e-cigarettes by between 9% and 16%.
  - 10% increase in price of rechargeable e-cigarettes reduces sales by between 14% and 24%
  - Generally positive associations between cigarette prices and e-cigarette sales, implying substitution from cigarettes to e-cigarettes in response to increases in the relative price of cigarettes

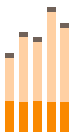


# Number of Nielsen Markets with E-cigarette Sales



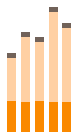
# E-Cigarettes and NRT Sales

- Diaz, et al. (in progress)
  - 2009-2014, quarterly e-cigarette and nicotine replacement product sales data
  - Assess the entry of e-cigarettes into Nielsen markets, e-cigarette prices, and e-cigarette sales on sales of NRT products
  - Preliminary findings include:
    - E-cigarette entry associated with reduced sales of NRT patches and gum
    - Greater e-cigarette sales volume generally associated with reduced NRT sales
    - Evidence of substitution based on positive cross-price effects



# E-Cigarette Prices & Sales

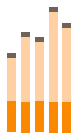
- Stoklosa, Drope & Chaloupka (under review)
  - 2011-2014 monthly data on e-cigarette sales in six EU countries (Estonia, Ireland, Latvia, Lithuania, Sweden, and UK)
  - Own price elasticities range from -0.83 to -0.87
  - E-cigarette sales generally positively associated with cigarette prices, but mostly not statistically significant



# Impact of Price on E-cigarette Use

## Methods:

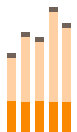
- Nationally representative 2013 online survey
  - 7,522 U.S. adults from GfK's Online Knowledge Panel.
- Survey data were linked with Nielsen e-cigarette retail prices
  - separately for disposable and reusable e-cigarette
- Weighted survey logistic regression analysis
  - ever use and current use
  - Control for cigarette price, demographics, and socioeconomics



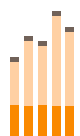
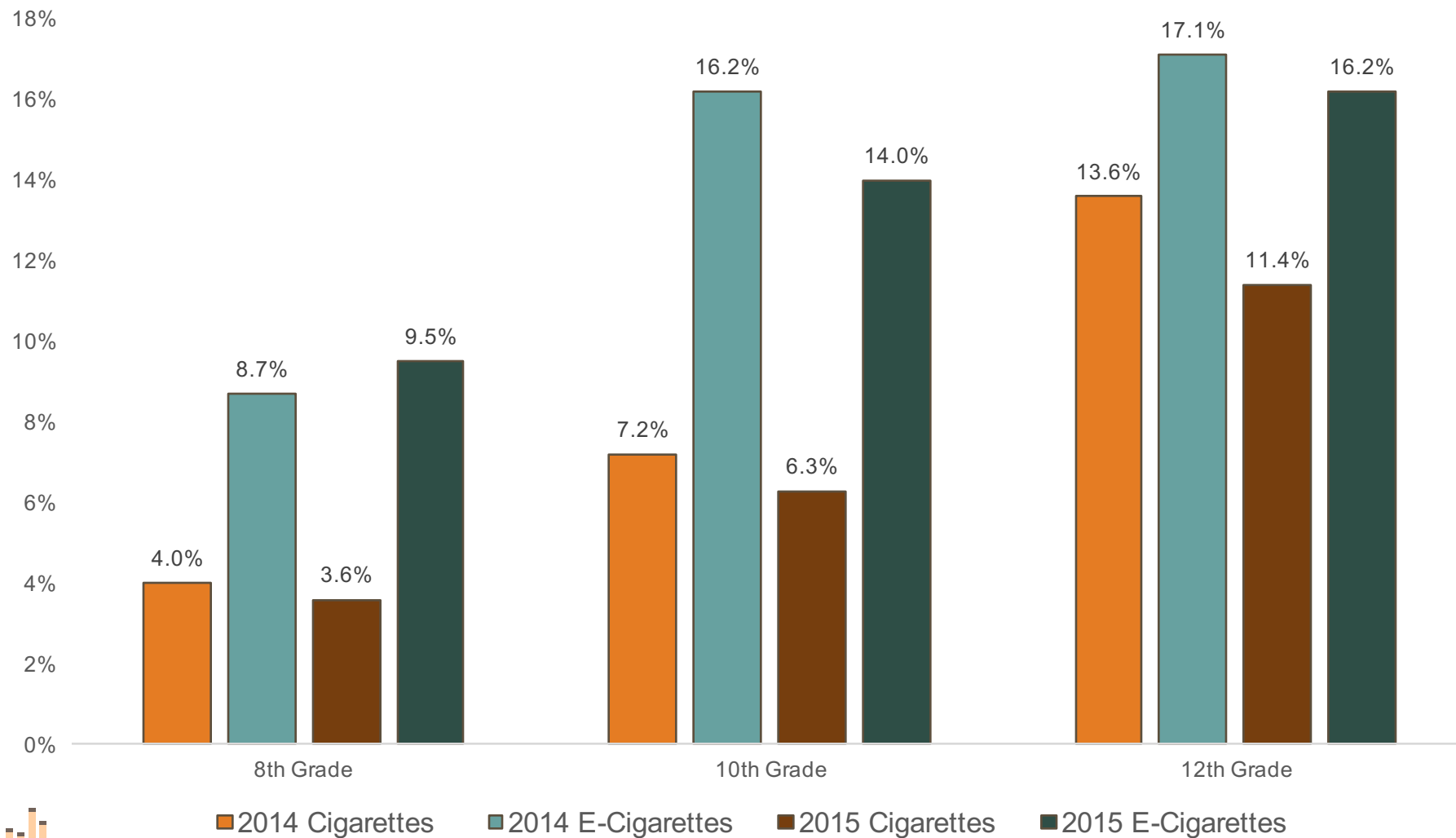
# Impact of Price on E-cigarette Use

## Summary:

- 15% of respondents reported ever using e-cigarettes
- 5.1% reported current use
- young adults and cigarette smokers had the highest odds of both ever use and current use.
- Higher disposable e-cigarette prices correlated with lower odds of ever use
  - estimated own price elasticity ranges from -0.81 to -0.98
- Neither rechargeable e-cigarette price nor combustible cigarette price was found associated with e-cigarette ever use
- No significant interactions were discovered between e-cigarette or cigarette price and e-cigarette current use.



# Youth E-Cigarette and Cigarette Use Middle & High School Students, Use in past 30 days, 2014-2015



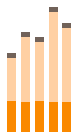
■ 2014 Cigarettes   ■ 2014 E-Cigarettes   ■ 2015 Cigarettes   ■ 2015 E-Cigarettes



# Impact of Price on E-cigarette Use

Pesko, et al. (in progress):

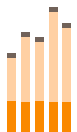
- 2014 Monitoring the Future data on youth use of e-cigarettes
- Nielsen scanner price data
- Preliminary estimates suggest very large effects of price on youth
- Next steps: add 2015 data

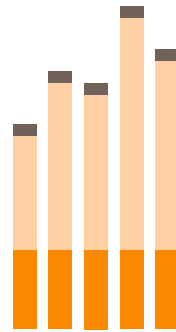


# Impact of Price on E-cigarette Use

## Research Needs:

- Better measures of e-cigarette costs, which distinguish initial fixed costs on devices and recurring costs on e-juices, are needed
- Better measures of e-cigarette use (frequency, intensity, device type) are needed

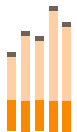




# ENDS Taxation

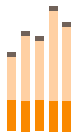
# Rationale for ENDS Taxation

- Improve Public Health
  - Encourage switching from combusted to potentially 'less harmful' products
  - Prevent youth initiation
- Raise Revenue
  - Revenue replacement



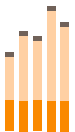
# Mechanics of ENDS Taxes

- How to tax?
  - Specific vs. *ad valorem*?
- What to tax?
  - All products/components vs. e-juice?
  - Only products that contain nicotine?
  - All nicotine vs. nicotine derived from tobacco?
- Where to collect tax?
  - Distributor vs. retailer?
  - Need for licensing



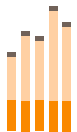
# ENDS Taxation

- Minnesota, North Carolina, Louisiana and DC currently tax ENDS
  - 95% of wholesale price in MN; 67% in DC
  - 5 cents per ml in NC, LA
- Kansas tax goes into effect July 2016
  - 20 cents per ml
- Local ENDS taxes:
  - Petersburg AK (45% of wholesale price)
  - Mat Su Borough, AK (55% of wholesale price)
  - Chicago (80 cents per unit, plus 55 cents per ML)
- Many others have proposed or are considering



# ENDS Taxation

- Low tax relative to cigarette, OTP taxes
  - Little impact in reducing use, uptake
  - Encourages dual use
  - Maximize incentives to switch from combustibles to ENDS
  - Minimal new revenue
- ENDS tax equivalent to cigarette tax
  - Significant impact on use, uptake
  - Little incentive to switch from combustibles to ENDS
  - Modest new revenue



# Optimizing ENDS Taxation

- Significant tax on ENDS coupled with increased taxes on cigarettes and other combustible tobacco products
  - Maintain or increase relative price of combustibles
  - Maximize switching while discouraging initiation and dual use
  - Generates significant new revenues



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PERSPECTIVE

**Differential Taxes for Differential Risks — Toward Reduced Harm from Nicotine-Yielding Products**

Frank J. Chaloupka, Ph.D., David Sweanor, J.D., and Kenneth E. Warner, Ph.D.  
N Engl J Med 2015; 373:594-597 | August 13, 2015 | DOI: 10.1056/NEJMp1505710



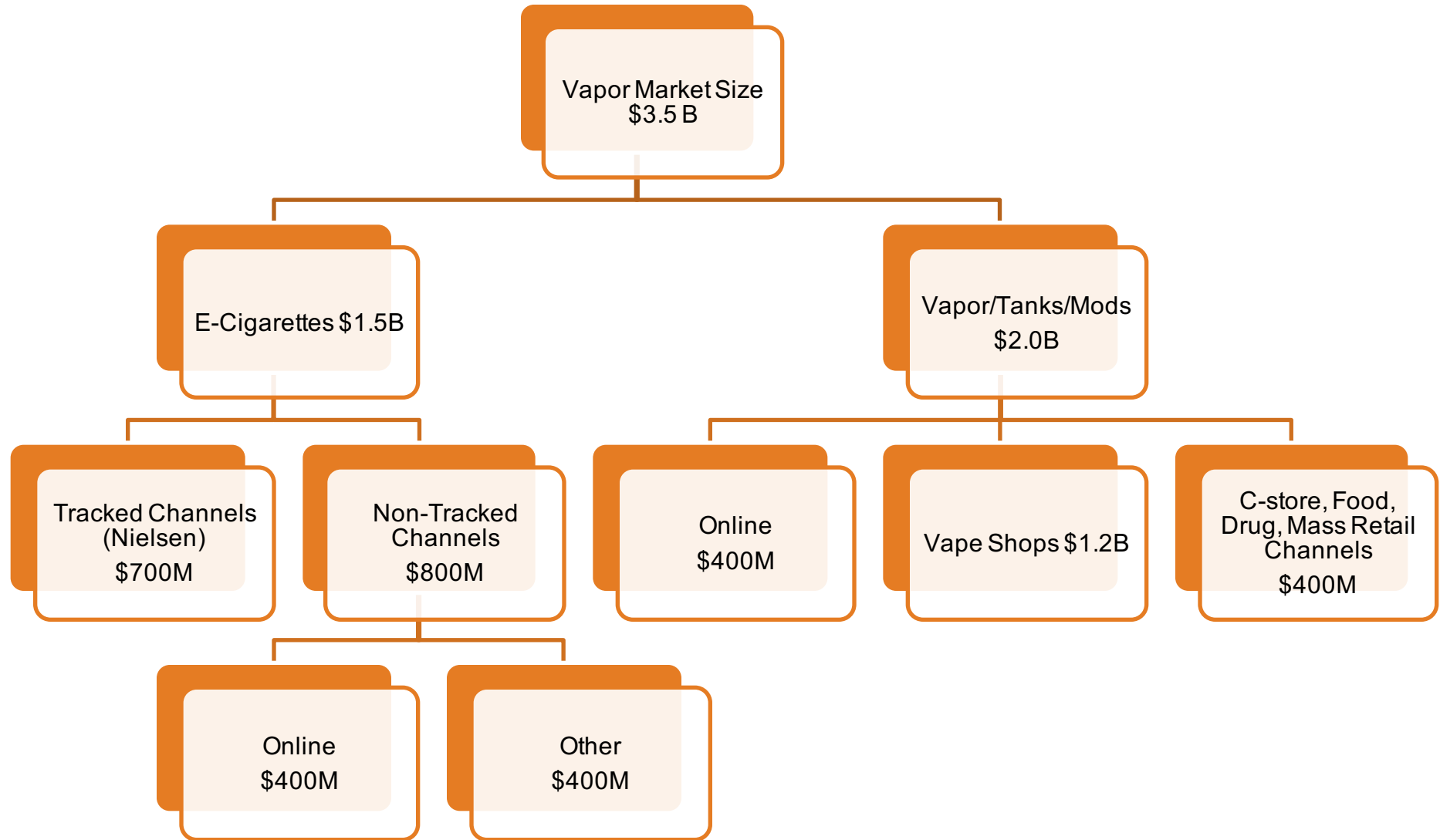
**Circulation**  
JOURNAL OF THE AMERICAN HEART ASSOCIATION

**Electronic Cigarettes: A Policy Statement From the American Heart Association**  
Aruni Bhatnagar, Laurie P. Whitsel, Kurt M. Ribisl, Chris Bullen, Frank Chaloupka, Mariann R. Piano, Rose Marie Robertson, Timothy McAuley, David Goff and Neal Benowitz  
on behalf of the American Heart Association Advocacy Coordinating Committee, Council on Cardiovascular and Stroke Nursing, Council on Clinical Cardiology, and Council on Quality of Care and Outcomes Research

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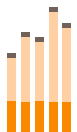


# Estimated Size of the Vapor Market



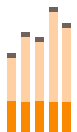
Source: Presentation: Development of Premium E-Flavors and Market Analysis

Note: Other Non-Tracked channels include tobacco-only outlets and other e-cig retail locations



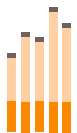
# Potential ENDS Tax Revenues

- Assume own-price elasticity of -1.5 based on published Nielsen data analysis
- Assume same elasticity in other market segments
- Calculate new sales and tax revenues
  - CA:
    - 20% tax – revenues around \$18.7 million
    - 40% tax – revenues around \$21.4 million
    - \$1.00 cigarette tax increase (almost 20% price increase) generates nearly \$550 million in new revenue



# Summary

- Taxes on disposable and rechargeable e-cigarettes will reduce sales
- Taxes on disposable e-cigarettes likely to reduce e-cigarette ever use (trial use and experimentation)
- Cigarettes and e-cigarettes increasingly appear to be substitutes for one another
- E-cigarettes appear to be substitutes for nicotine replacement products
- ENDS taxes will generate new revenues, but relatively modest (at least in the short term)
- Differential taxes on cigarettes and ENDS have potential to significantly improve public health



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