Estimated Savings to Medicaid Obtained by Substituting Electronic for Tobacco-Based Cigarettes

Society for Benefit-Cost Analysis
Annual Conference
March 17, 2017

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CHECKBOOK

Motivation

◎ Tobacco cigarettes pose substantial morbidity and mortality risks, including cancer, respiratory and heart disease

◎ E-cigarettes pose essentially none of these risks because no tobacco is combusted

◎ Most medical care costs are borne by third parties, including taxpayers via Medicare and Medicaid

◎ Smoking prevalence <u>may be</u> higher among Medicaid beneficiaries

◎ Permanent program cost savings gained for every smoker who switches

Tasks

◎ Estimate baseline smoking prevalence, accounting for interstate diversity and other factors

◎ Estimate cost savings/smoker-year

◎ Estimate undiscounted and discounted stream of cost-savings per 1% who switch

◎ Identify policy barriers to switching

Baseline Smoking Prevalence (1)

◎ Multiple surveys are available; all have information quality concerns

◎ Behavioral Risk Factor Surveillance Survey (BRFSS) is the most recent and detailed

◎ Smoking prevalence is estimated as a function of time, sex, race, age and educational attainment

Baseline Smoking Prevalence (2) Regression Models

Model	Independent Variables Included
1	Year Index (2000=0), (Year Index)^2, Sex (M=default), Age Group (45-64 = default), Black, Hispanic, Education (12th grade=default)
2	Model 1 + 52 jurisdiction dummy variables (DC=default)
3	Model 2 + 52 jurisdiction*year interactive terms (DC_2000=default)
4	Model 3 + Year Index * Sex (M_2000=default)
5	Model 4 + 52 jurisdiction * Sex interaction terms (M_DC=default)

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Baseline Smoking Prevalence (3) Results Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.690	.476	.475	6.3169
2	.814	.662	.657	5.1006
3	.816	.666	.656	5.1088
4	.816	.666	.656	5.1094
5	.816	.666	.653	5.1356

Default: Male, DC, not B or H, A_{45-64}, 12 Grade

Model 1: constant, y, y^2, F, B, H, A_{18-24}, A_{35-44}, A_{65+}, LT12, GT12

Model 2: Model 1 + jurisdiction dummies

Model 3: Model 2 + jurisdiction/year interactions

Model 4: Model 3 + (y x F)

Model 5: Model 4 + year/female interactions

Baseline Smoking Prevalence Among Medicaid Participants

◎ CDC estimates vary
- ▪ Highest observed: 37% [a] (no source disclosed)
- ▪ Lowest observed: 29.8% [b] (NHIS)
- ▪ How were these estimated derived?

◎ National Health Interview Survey (NHIS)
- ▪ Smoking prevalence included for first time
- ▪ Apparently no reliable State-level data
- ▪ Only selected data have been made public

[a] CDC. n.d. *Medicaid; Tobacco Cessation* Available: https://www.medicaid.gov/medicaid/quality-of-care/improvement-initiatives/tobacco/index.html [accessed January 21,, 2017].

[b] CDC. 2015. *Smoking Rates for Uninsured and Adults on Medicaid More Than Twice Those for Adults with Private Health Insurance*. Available: https://www.cdc.gov/media/releases/2015/p1112-smoking-rates.html [accessed February 23, 2017].

Smoking Prevalence
by Insurance Status, 2014 (NHIS)

	All current smokers	Every-day smokers	Some-day smokers	Former smokers	Non-smokers
Under 65:					
Private	14.0 (0.45)	10.2 (0.41)	3.8 (0.20)	18.3 (0.38)	67.7 (0.54)
Medicaid	**29.8 (0.99)**	**23.9 (0.94)**	**5.9 (0.52)**	**14.6 (0.81)**	**55.6 (1.10)**
Other	23.4 (1.85)	18.2 (1.70)	5.2 (0.90)	20.4 (1.54)	56.2 (2.13)
Uninsured	28.1 (0.95)	21.7 (0.86)	6.4 (0.49)	14.0 (0.72)	57.9 (1.04)
65 and over:					
Private	7.1 (0.53)	5.7 (0.47)	1.4 (0.25)	39.8 (1.08)	53.1 (1.09)
Medicare and Medicaid	12.1 (1.77)	10.4 (1.68)	1.7 (0.49)	32.1 (2.20)	55.8 (2.37)
Medicare only	8.1 (0.67)	6.6 (0.60)	1.5 (0.31)	37.3 (1.22)	54.7 (1.27)
Other	11.4 (1.61)	9.3 (1.43)	*2.1 (0.83)	48.5 (2.73)	40.1 (2.58)
Uninsured	*6.2 (2.87)	*6.2 (2.87)	~	37.7 (8.66)	56.1 (8.96)

* Estimates are considered unreliable. Data preceded by an asterisk have a relative standard error (RSE) greater than 30% and less than or equal to 50% and should be used with caution. Data not shown have an RSE greater than 50%.
~ Quantity zero.
Source: Centers for Disease Control and Prevention. 2017. *Health Behaviors of Adults -- United States, 2011–2014: Table a-12a. Age-Adjusted Percentages (with Standard Errors) of Current Cigarette Smoking Status among Adults Aged 18 and over, by Selected Characteristics: United States, 2014*. Available: https://ftp.cdc.gov/pub/Health_Statistics/NCHS/NHIS/SHS/2014_SHS_Table_A-12.pdf [accessed February 24, 2017].

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Baseline Smoking Prevalence (4) (Simplified Model)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	34.619	3.123		11.086	.000
	Year Index (2000=0)	-.806	.239	-.119	-3.375	.001
2	(Constant)	35.238	1.738		20.270	.000
	Year Index (2000=0)	-.806	.131	-.119	-6.134	.000
	LT 12th Grade	8.789	.455	.433	19.307	.000
	GT 12th Grade	-10.643	.455	-.524	-23.381	.000

a. Dependent Variable: Data Value

Unweighted State average estimates, 2014 (BRFSS):

 12th: 18.5%

 LT 12th: 27.3%

 GT 12th: 7.9%

Model estimate for 2014: 35.238% + (-0.806% x 14) = 23.954%

# 'Smoking-Attributable Mortality, Morbidity and Economic Costs ('SAMMEC')'

- ◎ Estimated by anti-tobacco establishment
- ◎ 2005-09 only
- ◎ Smoking-attributable Mortality (SAM)
  - ■ Average annual deaths/yr, by State
  - ■ Average annual SAM/yr, by State
- ◎ Smoking-attributable economic costs: $ millions/smoker-yr by State
- ◎ Apply well-known *Goose v. Gander Rule*
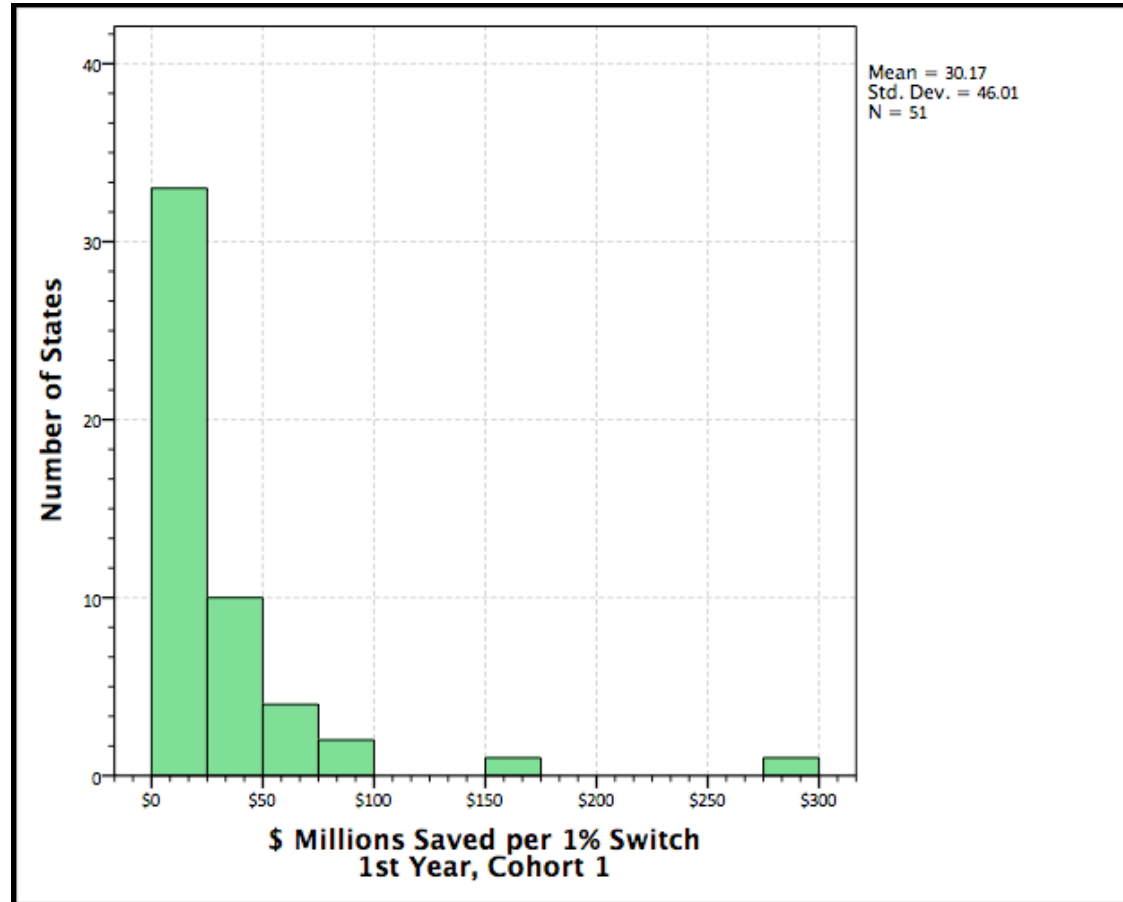
Method for Estimating State Cost Savings from Switching

◎ Estimate number of smokers [S]

◎ Calculate SAE/smoker [SAE/S]

◎ Estimate smokers in Medicaid [SAE/S_M]

◎ Calculate savings per 1% of Medicaid smokers who switch in 1st year ['Cohort 1']

◎ Calculate PV of Cohort 1 savings [3%, 20]

◎ Calculate PV of Cohorts 2-9

Cost Savings/Smoker by State per 1% Switch
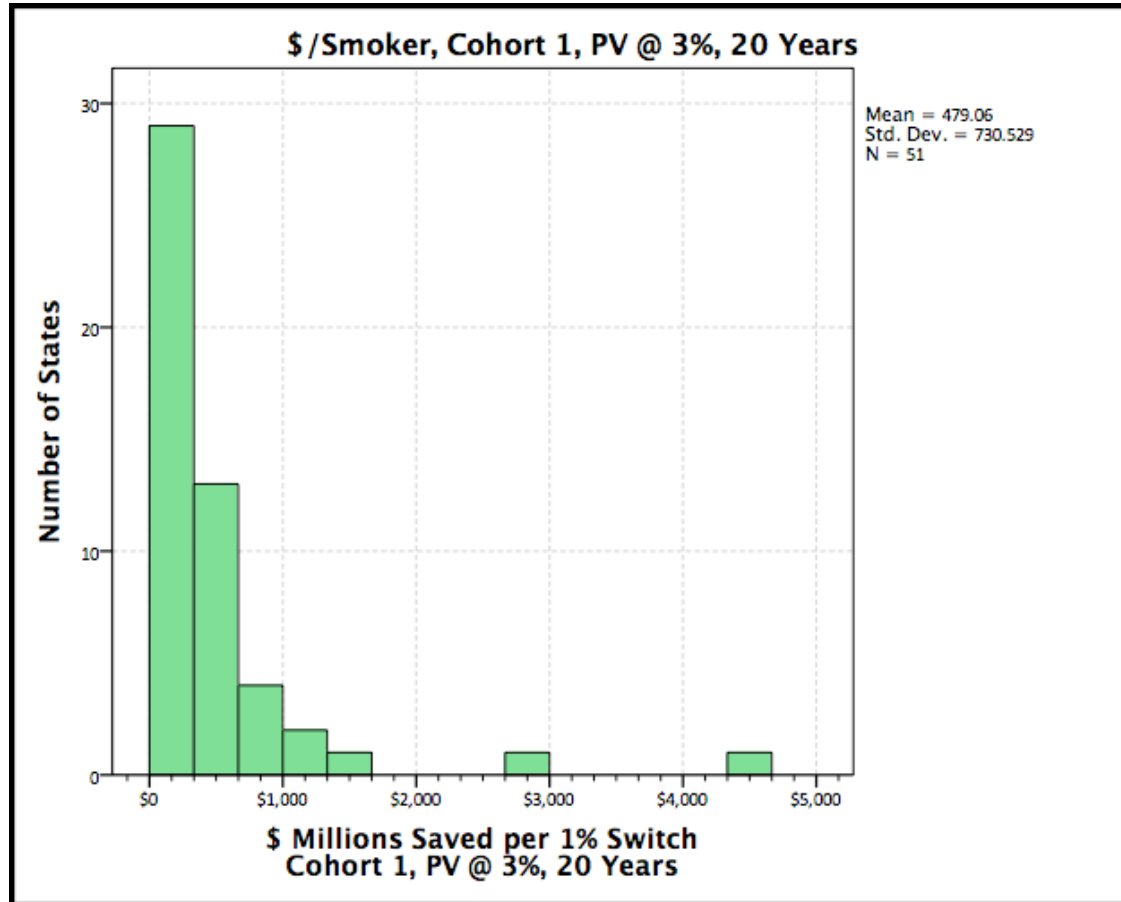(1st cohort, 1st yr after switch, no cessation lag)
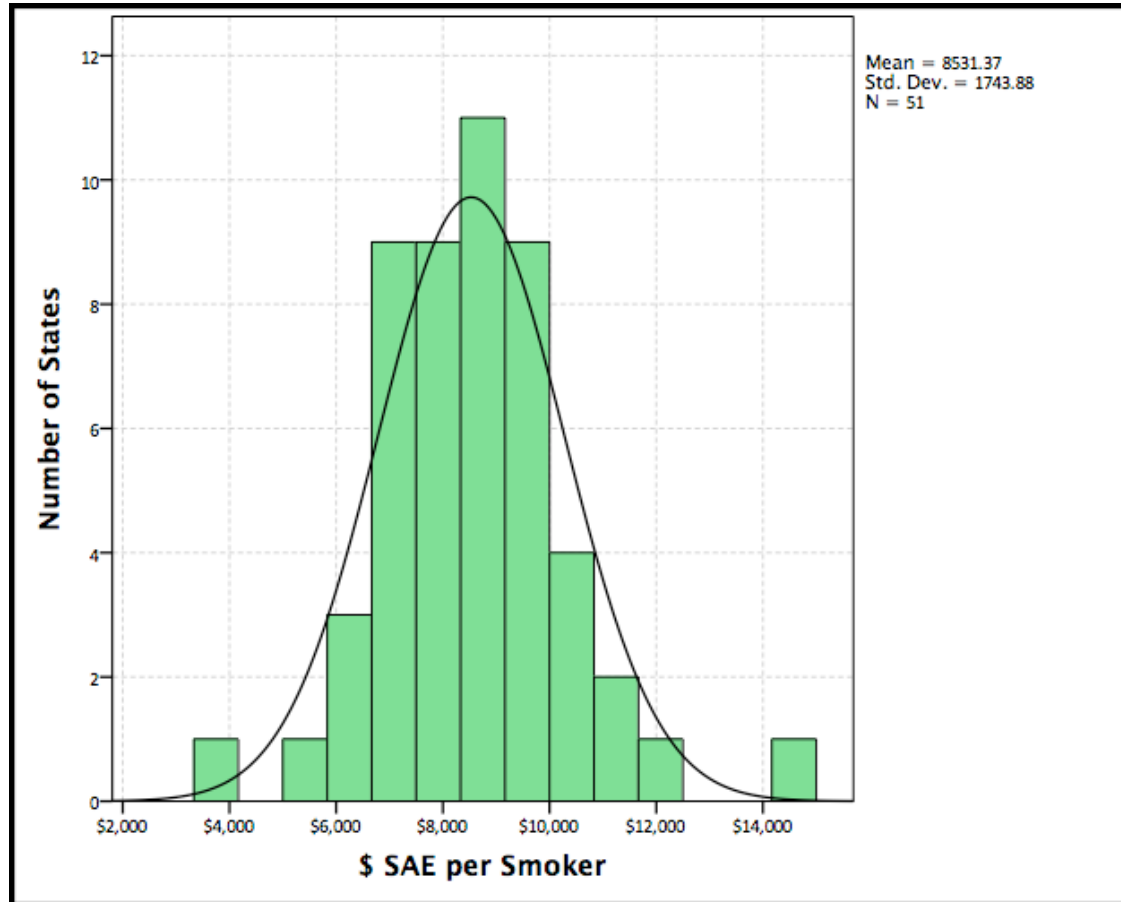
Aggregate Cost Savings by State per 1% Switch
(1st cohort, 1st year, no cessation lag)

$ Millions Saved per 1% Switch
1st Year, Cohort 1

Mean = 30.17
Std. Dev. = 46.01
N = 51

PV Cost Savings by State per 1% Switch
(1st cohort, PV@ 3%/20 years, no cessation lag)

$/Smoker, Cohort 1, PV @ 3%, 20 Years

Mean = 479.06
Std. Dev. = 730.529
N = 51

$ Millions Saved per 1% Switch
Cohort 1, PV @ 3%, 20 Years

What Are Reasonable Switch Rates?

◎ Estimated rates of sustained switching
- Bullen et al (2013): 10%
- Caponnetto et al (2013): 10-20%
- Adriaens et al (2014): 38%
- Etter & Bullen (2014): 46%

◎ Estimated rates of NRT effectiveness
- UB quit rate: <2x baseline (Cochrane Collab.)
- LB quit rate: Zero (Stanley & Massey 2016)

Modeling Future Cohorts

◎ Savings lower for delayed switch cohorts
- ■ SP is declining, reducing pool of smokers
- ■ Discounting reduces all future values

◎ Effect is small for low switch rates, and low switch rates are reasonable given barriers to e-cigarette promotion

Some Technical Caveats

◎ Medicaid data are insufficiently detailed to apply the full SP model

◎ Savings are higher if Medicaid participants have higher smoking prevalence

◎ SAMMEC may overstate smoking costs

◎ Costs to Medicaid may be lower

◎ Cessation lag is not included

◎ Potential e-cigarette risks are not included

Key Policy Caveats:
'The <u>policy</u> is settled'

◎ 'Denialist' anti-tobacco establishment unremittingly opposes e-cigarettes despite health benefits

◎ FDA regulation of e-cigarettes
- ■ 'Deemed' a form of tobacco
- ■ Not approved as NRTs

◎ Tobacco use regulations apply to vaping

◎ Vaping could be 'deemed' to be smoking

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