Electronic cigarettes (e-cigs) have only been around since 2006, yet their potential to dramatically reduce the damaging health impacts of traditional cigarettes has garnered significant attention and credibility. Numerous scientific studies show that e-cigs not only reduce the harm from smoking, but can also be a part of the successful path to smoking cessation.

The term “e-cig” is misleading because there is no tobacco in an e-cig, unlike a traditional, combustible cigarette. The e-cig uses a battery-powered vaporizer to deliver nicotine via a propylene-glycol solution—which is why “smoking” an e-cig is called “vaping.” The vapor is inhaled like a smoke from a cigarette, but does not contain the carcinogens found in tobacco smoke.

Unlike traditional nicotine replacement therapy (NRT), such as gum or patches, e-cigs mimic the physical routine of smoking a cigarette. As such, e-cigs fulfill both the chemical need for nicotine and physical stimuli of smoking. This powerful combination has led to the increasing demand for e-cigs—8.2% use among nondaily smokers and 6.2% use among daily smokers in 2011.1

The game-changing potential for dramatic harm reduction by current smokers using e-cigs will flow directly into lower healthcare costs dealing with the morbidity and mortality stemming from smoking combustible cigarettes. These benefits will particularly impact the Medicaid system where the prevalence of cigarette smoking is twice that of the general public (51% versus 21%, respectively).

Based on the findings of a rigorous and comprehensive study on the impact of cigarette smoking on Medicaid spending, the potential savings of e-cig adoption, and the resulting tobacco smoking cessation and harm reduction, could have been up to $48 billion in Fiscal Year (FY) 2012.2 This savings is 87% higher than all state cigarette tax collections and tobacco settlement collections ($24.4 billion) collected in that same year.

Unfortunately, the tantalizing benefits stemming from e-cigs may not come to fruition if artificial barriers slow their adoption among current smokers. These threats range from the Food and Drug Administration regulating e-cigs as a pharmaceutical to states extending their cigarette tax to e-cigs. To be sure, e-cigs are still a new product and should be closely monitored for long-term health effects. However, given the long-term fiscal challenges facing Medicaid, the prospect of large e-cigs cost savings is worth a non-interventionist approach until hard evidence proves otherwise.
Prevalence of Smoking in the Medicaid Population

According to the Centers for Disease Control and Prevention, in 2011, 21.2% of Americans smoked combustible cigarettes. However, as shown in Table 1, the smoking rate varies considerably across states with the top three states being Kentucky (29%), West Virginia (28.6%), and Arkansas (27%) and the three lowest states being Utah (11.8%), California (13.7%), and New Jersey (16.8%).

Additionally, the smoking rate varies dramatically by income level. Nearly 28% of people living below the poverty line smoke while 17% of people living at or above the poverty line smoke.

As a consequence, the level of smoking prevalence among Medicaid recipients is more than twice that of the general public, 51% versus 21%, respectively. However, this too varies considerably across states with the top three states being New Hampshire (80%), Montana (70%), and Pennsylvania (70%) and the three lowest states being Mississippi (35%), New Jersey (36%), and South Carolina (41%).

In absolute terms, the U.S. Medicaid system includes 36 million smokers out of a total Medicaid enrollment of over 68 million. As such, this places much of the health burden and related financial cost of smoking on the Medicaid system which strains the system and takes away scarce resources from the truly needy.

Economic Benefit of Smoking Cessation and Harm Reduction

Smoking creates large negative externalities due to adverse health impacts. Table 2 shows the results of a comprehensive study that quantified the two major costs of smoking in 2009—lost productivity and healthcare costs.

Lost productivity occurs when a person dies prematurely due to smoking or misses time from work due to smoking. This cost the economy $185 billion in lost output in 2009.
Smokers incur higher healthcare costs when those individuals require medical services such as ambulatory care, hospital care, prescriptions, and neonatal care for conditions caused by smoking. This cost the economy $116 billion in extra medical treatments.

Overall, in 2009 alone, the negative externalities of smoking cost the U.S. economy $301 billion in lost productivity and higher healthcare costs. Not surprisingly, these costs were centered in high population states such as California ($26.9 billion), New York ($20.6 billion), and Texas ($20.4 billion).

**Literature Review On E-cig Impact On Harm Reduction Through Reduced Toxic Exposure and Smoking Cessation**

E-cigs have only been around since 2006, yet their potential to dramatically reduce the damaging health impacts of traditional combustible cigarettes has garnered significant attention and credibility. Numerous scientific studies are showing that e-cigs not only reduce the harm from smoking, but is also a successful path to smoking cessation.

In perhaps the most comprehensive e-cig literature review to date, Neil Benowitz et al. (2014) identified eighty-one studies with original data and evidence from which to judge e-cig effectiveness for harm reduction. They concluded:

“Allowing EC (electronic cigarettes) to compete with cigarettes in the market-place might decrease smoking-related morbidity and mortality. Regulating EC as strictly as cigarettes, or even more strictly as some regulators propose, is not warranted on current evidence. Health professionals may consider advising smokers unable or unwilling to quit through other routes to switch to EC as a safer alternative to smoking and a possible pathway to complete cessation of nicotine use.”

There are two ways that e-cigs benefit current smokers. First, there is harm reduction for the smoker by removing exposure to the toxicity...
associated with the thousands of compounds, many carcinogenic, found in the burning of tobacco and the resulting smoke. Second, smoking cessation efforts by the smoker are enhanced by simultaneously fulfilling both the chemical need for nicotine and physical stimuli of smoking.

In the last few years the academic literature has exploded with articles on these two topics. The following is a selection of some of the most recent studies and their conclusions.

**Reduced Toxic Exposure**

Igor Burstyn (2014) concludes, “Current state of knowledge about chemistry of liquids and aerosols associated with electronic cigarettes indicates that there is no evidence that vaping produces inhalable exposures to contaminants of the aerosol that would warrant health concerns by the standards that are used to ensure safety of workplaces . . . Exposures of bystanders are likely to be orders of magnitude less, and thus pose no apparent concern.”

Neal Benowitz, et al. (2013) concludes, “The vapour generated from e-cigarettes contains potentially toxic compounds. However, the levels of potentially toxic compounds in e-cigarette vapour are 9—450-fold lower than those in the smoke from conventional cigarettes, and in many cases comparable with the trace amounts present in pharmaceutical preparation. Our findings support the idea that substituting tobacco cigarettes with electronic cigarettes may substantially reduce exposure to tobacco-specific toxicants. The use of e-cigarettes as a harm reduction strategy among cigarette smokers who are unable to quit, warrants further study.”

Kostantinos E Farsalinos et al. (2014) concludes, “Although acute smoking inhalation caused a delay in LV (Left Ventricular) myocardial relaxation in smokers, electronic cigarette use was found to have no such immediate effects in daily users of the device. This short-term beneficial profile of electronic cigarettes compared to smoking, although not conclusive about its overall health-effects as a tobacco harm reduc-

**Smoking Cessation**

Emma Beard et al. (2014) concludes, “Among smokers who have attempted to stop without professional support, those who use e-cigarettes are more likely to report continued abstinence than those who used a licensed NRT [Nicotine Replacement Therapy] product bought over-the-counter or no aid to cessation. This difference persists after adjusting for a range of smoker characteristics such as nicotine dependence.”

Christopher Bullen et al. (2013) concludes, “E-cigarettes, with or without nicotine, were modestly effective at helping smokers to quit, with similar achievement of abstinence as with nicotine patches, and few adverse events . . . Furthermore, because they have far greater reach and higher acceptability among smokers than NRT [Nicotine Replacement Therapy], and seem to have no greater risk of adverse effects, e-cigarettes also have potential for improving population health.”

Pasquale Caponnetto et al. (2013) concludes, “The results of this study demonstrate that e-cigarettes hold promise in serving as a means for reducing the number of cigarettes smoked, and can lead to enduring tobacco abstinence as has also been shown with the use of FDA-approved smoking cessation medication. In view of the fact that subjects in this study had no immediate intention of quitting, the reported overall abstinence rate of 8.7% at 52-weeks was remarkable.”

Konstantinos E. Farsalinos et al. (2013) concludes, “Participants in this study used liquids with high levels of nicotine in order to achieve complete smoking abstinence. They reported few side effects, which were mostly temporary; no subject reported any sustained adverse health implications or needed medical treatment. Several of the side effects may not be attributed to nicotine. In addition, almost every vaper reported significant benefits from switching to the EC [e-cigarette]. These observations are consistent with findings of Internet surveys and are supported by studies showing
that nicotine is not cytotoxic, is not classified as a carcinogen, and has minimal effects on the initiation or propagation of atherosclerosis . . . Public health authorities should consider this and other studies that ECs are used as long-term substitutes to smoking by motivated exsmokers and should adjust their regulatory decisions in a way that would not restrict the availability of nicotine-containing liquids for this population.”

Potential E-cig Medicaid Cost Savings

To date, the academic literature strongly suggests that e-cigs hold the promise of dramatic harm reduction for smokers simply by switching from combustible tobacco cigarettes to e-cigs. This harm reduction is due to both its positive potential to reduce exposure to toxic compounds in cigarette smoke. As a result, we can expect the healthcare costs of smoking to decline over time as the adoption of e-cigs by smokers continues to grow. Additionally, we can expect greater rates of adoption as e-cigs continue to evolve and improve based on market feedback—a dynamic that has never existed with other nicotine replacement therapies.

As discussed earlier, the potential savings to the economy are very large. In terms of healthcare alone, most of that cost is currently borne by the Medicaid system where the prevalence of cigarette smoking is twice that of the general public, 51% versus 21%, respectively. So what are the potential healthcare savings to Medicaid?

Brian S. Armour et al. (2009) created an impressive economic model to estimate how much smoking costs Medicaid based on data from the Medical Expenditure Panel Survey and the Behavioral Risk Factor Surveillance System.15

Overall, their model “. . . included 16,201 adults with weighting variables that allowed us to generate state representative estimates of the

<table>
<thead>
<tr>
<th>State</th>
<th>Medicaid Spending (Millions of Dollars)</th>
<th>Smoking Costs as Percent of Medicaid Spending</th>
<th>Smoking Costs on Medicaid (Millions of Dollars)</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>415,154</td>
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<tr>
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</tr>
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<td>744</td>
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</tr>
<tr>
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<td>4,848</td>
<td>11%</td>
<td>533</td>
</tr>
<tr>
<td>South Dakota</td>
<td>749</td>
<td>16%</td>
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</tr>
<tr>
<td>Tennessee</td>
<td>8,798</td>
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</tr>
<tr>
<td>Texas</td>
<td>28,286</td>
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</tr>
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<td>1,903</td>
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<td>Vermont</td>
<td>1,353</td>
<td>15%</td>
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</tr>
<tr>
<td>Virginia</td>
<td>6,906</td>
<td>11%</td>
<td>760</td>
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<tr>
<td>Washington</td>
<td>7,560</td>
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<td>7,096</td>
<td>13%</td>
<td>923</td>
</tr>
<tr>
<td>Wyoming</td>
<td>528</td>
<td>16%</td>
<td>85</td>
</tr>
</tbody>
</table>

Note: States do not sum to Total due to rounding.
Source: See Endnote 15 and State Budget Solutions
adult, noninstitutionalized Medicaid population.”

The study concluded that 11% of all Medicaid expenditures can be attributed to smoking. Additionally, among the states these costs ranged from a high of 18% (Arizona and Washington) to a low of 6% (New Jersey).

This study uses their percentage of Medicaid spending due to smoking and applies it to the latest year of available state-by-state Medicaid spending. As shown in Table 3, in FY 2012, smoking cost the Medicaid system $45.7 billion. Of course, the largest states bear the brunt of these costs such as New York ($5.9 billion), California ($5.5 billion), and Texas ($3.1 billion).

To put this potential savings to Medicaid into perspective, in FY 2012, state governments and the District of Columbia combined collected $24.4 billion in cigarette excise taxes and tobacco settlement payments. As shown in Table 4, the potential Medicaid savings exceeds cigarette excise tax collections and tobacco settlement payments by 87%.

However, this varies greatly by state with high ratios in the South Carolina (435%), Missouri (409%), and New Mexico (260%), Arizona (238%), and California (238%) and low ratios in New Jersey (-39%), New Hampshire (-31%), Rhode Island (-17%), Connecticut (-13%), and Hawaii (-4%). Overall, 45 states and D.C. stand to gain more from potential Medicaid savings than through lost cigarette tax collections and tobacco settlement payments.

Note that many of the five states with negative ratios are distorted because excise tax collections are based on where the initial sale occurred and not where the cigarettes were ultimately consumed. This can vary greatly because of cigarette smuggling and cross-border shopping created by state-level differentials in cigarette excise taxes.16

For instance, New Hampshire has long been a source for out-of-state cigarette purchase from shoppers living in Massachusetts, Maine, and Vermont because of its lower cigarette excise

---

### Table 4

<table>
<thead>
<tr>
<th>State</th>
<th>State Cigarette Tax Collections (a)</th>
<th>Tobacco Settlement Payments (b)</th>
<th>Smoking Costs on Medicaid as a Percent of State Cigarette Tax Collections and Tobacco Settlement Payments</th>
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<td>United States</td>
<td>17,226</td>
<td>7,190</td>
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</tr>
<tr>
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<td>126</td>
<td>94</td>
<td>106%</td>
</tr>
<tr>
<td>Alaska</td>
<td>67</td>
<td>30</td>
<td>108%</td>
</tr>
<tr>
<td>Arizona</td>
<td>319</td>
<td>101</td>
<td>238%</td>
</tr>
<tr>
<td>Arkansas</td>
<td>247</td>
<td>51</td>
<td>54%</td>
</tr>
<tr>
<td>California</td>
<td>896</td>
<td>736</td>
<td>238%</td>
</tr>
<tr>
<td>Colorado</td>
<td>203</td>
<td>91</td>
<td>173%</td>
</tr>
<tr>
<td>Connecticut</td>
<td>418</td>
<td>124</td>
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</tr>
<tr>
<td>Delaware</td>
<td>121</td>
<td>27</td>
<td>1%</td>
</tr>
<tr>
<td>District of Columbia</td>
<td>36</td>
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</tr>
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<td>Georgia</td>
<td>227</td>
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</tr>
<tr>
<td>Hawaii</td>
<td>122</td>
<td>49</td>
<td>-4%</td>
</tr>
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</tr>
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<tr>
<td>Wyoming</td>
<td>26</td>
<td>19</td>
<td>90%</td>
</tr>
</tbody>
</table>

(a) Includes all forms of tobacco taxes.
(b) Includes Master Settlement Agreement and individual state payments.
Source: Department of Commerce: Census Bureau, Internal Revenue Service, and State Budget Solutions.
tax. As such, the ratio is too high for Massachusetts, Maine, and Vermont and too low for New Hampshire. The same applies to New Jersey and Connecticut vis-à-vis New York and, more specifically, New York City, which levies its own cigarette tax on top of the state tax.

Hawaii is an exception due to its physical isolation which creates monopoly rents. Rhode Island levies a very high cigarette excise tax, but not relatively high enough compared to neighboring Connecticut and Massachusetts to drive a lot of cross-border shopping.

**Other Potential E-cig Cost Savings**

Another area of cost savings from greater e-cig adoption is the reduction in smoke and fire dangers in subsidized and public housing. According to a recent study, smoking imposes three major costs:

1. Increased healthcare costs from exposure to second hand smoke within and between housing units.
2. Increased renovation costs of smoking-permitted housing units.
3. Fires attributed to cigarettes.

As shown in Table 5, the study estimates that smoking imposes a nationwide cost of nearly $500 million.\(^{17}\) The top three states facing the greatest expenses are New York (\$125 million), California (\$72 million), and Texas (\$24 million) while the top three states with the lowest expenses are Wyoming (\$0.6 million), Idaho (\$0.8 million), and Montana (\$1 million).

### Table 5

<table>
<thead>
<tr>
<th>State</th>
<th>Smoking Costs (Millions of Dollars)</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>496.8</td>
</tr>
<tr>
<td>New York</td>
<td>124.7</td>
</tr>
<tr>
<td>California</td>
<td>72.4</td>
</tr>
<tr>
<td>Texas</td>
<td>28.3</td>
</tr>
<tr>
<td>Massachusetts</td>
<td>24.0</td>
</tr>
<tr>
<td>Florida</td>
<td>23.2</td>
</tr>
<tr>
<td>Ohio</td>
<td>21.7</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>17.7</td>
</tr>
<tr>
<td>New Jersey</td>
<td>15.8</td>
</tr>
<tr>
<td>Louisiana</td>
<td>14.4</td>
</tr>
<tr>
<td>North Carolina</td>
<td>13.9</td>
</tr>
<tr>
<td>Illinois</td>
<td>13.3</td>
</tr>
<tr>
<td>Tennessee</td>
<td>12.9</td>
</tr>
<tr>
<td>Michigan</td>
<td>12.8</td>
</tr>
<tr>
<td>Alabama</td>
<td>12.4</td>
</tr>
<tr>
<td>Georgia</td>
<td>11.6</td>
</tr>
<tr>
<td>Connecticut</td>
<td>10.7</td>
</tr>
<tr>
<td>Missouri</td>
<td>9.4</td>
</tr>
<tr>
<td>Indiana</td>
<td>8.3</td>
</tr>
<tr>
<td>Virginia</td>
<td>7.8</td>
</tr>
<tr>
<td>Mississippi</td>
<td>7.2</td>
</tr>
<tr>
<td>Kentucky</td>
<td>7.1</td>
</tr>
<tr>
<td>Minnesota</td>
<td>7.1</td>
</tr>
<tr>
<td>South Carolina</td>
<td>7.0</td>
</tr>
<tr>
<td>Maryland</td>
<td>7.0</td>
</tr>
<tr>
<td>Arkansas</td>
<td>6.8</td>
</tr>
<tr>
<td>Oklahoma</td>
<td>6.8</td>
</tr>
<tr>
<td>Wisconsin</td>
<td>6.5</td>
</tr>
<tr>
<td>Washington</td>
<td>5.0</td>
</tr>
<tr>
<td>Arizona</td>
<td>4.9</td>
</tr>
<tr>
<td>Colorado</td>
<td>4.5</td>
</tr>
<tr>
<td>West Virginia</td>
<td>4.3</td>
</tr>
<tr>
<td>Oregon</td>
<td>4.3</td>
</tr>
<tr>
<td>Maine</td>
<td>4.2</td>
</tr>
<tr>
<td>Rhode Island</td>
<td>4.0</td>
</tr>
<tr>
<td>Hawaii</td>
<td>3.8</td>
</tr>
<tr>
<td>Iowa</td>
<td>3.8</td>
</tr>
<tr>
<td>New Mexico</td>
<td>3.0</td>
</tr>
<tr>
<td>Kansas</td>
<td>2.9</td>
</tr>
<tr>
<td>Nebraska</td>
<td>2.1</td>
</tr>
<tr>
<td>Nevada</td>
<td>1.9</td>
</tr>
<tr>
<td>Vermont</td>
<td>1.9</td>
</tr>
<tr>
<td>New Hampshire</td>
<td>1.9</td>
</tr>
<tr>
<td>Utah</td>
<td>1.4</td>
</tr>
<tr>
<td>Delaware</td>
<td>1.3</td>
</tr>
<tr>
<td>North Dakota</td>
<td>1.2</td>
</tr>
<tr>
<td>South Dakota</td>
<td>1.1</td>
</tr>
<tr>
<td>Montana</td>
<td>1.0</td>
</tr>
<tr>
<td>Idaho</td>
<td>0.8</td>
</tr>
<tr>
<td>Wyoming</td>
<td>0.6</td>
</tr>
<tr>
<td>Alaska</td>
<td>N.A.</td>
</tr>
<tr>
<td>District of Columbia</td>
<td>N.A.</td>
</tr>
</tbody>
</table>

Source: See Endnote 17 and State Budget Solutions

### Applying Cigarette Taxes to E-cigs?

Many policymakers around the country have suggested applying the existing cigarette tax, wholly or in part, to e-cigs. This is bad public policy and is based on a fundamental misunderstanding of the cigarette tax.

The cigarette tax is what economists call a “Pigovian Tax” which is designed to mitigate...
negative externalities of certain actions. Cigarette smoking creates many negative externalities such as harmful health consequences to the user or to those in near proximity (second-hand smoke).

As detailed in this study, the negative externalities associated with traditional smoking are all but eliminated by e-cigs. Without evidence of actual negative externalities, applying the existing cigarette tax to e-cigs is simply bad public policy.

**Conclusion**

Policymakers have long sought to reduce the economic damage due to the negative health impact of smoking. They have used tactics ranging from cigarette excise taxes to subsidizing nicotine replacement therapies. To be sure, smoking prevalence has fallen over time, but there is more that can be done, especially given the fact that so much of the healthcare burden of smoking falls on the already strained Medicaid system.

As with any innovation, no one could have predicted the sudden arrival into the marketplace of the e-cig in 2006. Since e-cigs fulfill both the chemical need for nicotine and physical stimuli of smoking the demand for e-cigs has grown dramatically. The promise of a relatively safe way to smoke has the potential to yield enormous healthcare savings. The most current academic research verifies the harm reduction potential of e-cigs.

As shown in this study, the potential savings to Medicaid significantly exceeds the state revenue raised from the cigarette excise tax and tobacco settlement payments by 87%. As such, the rational policy decision is to adopt a non-interventionist stance toward the evolution and adoption of the e-cig until hard evidence proves otherwise. While cigarette tax collections will fall as a result, Medicaid spending will fall even faster. This is a win-win for policymakers and taxpayers.
Notes and Sources


5. See Endnote 2 for data source.


15. See Endnote 2 for reference.


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State Budget Solutions

J. Scott Moody is the Chief Executive Officer and Chief Economist at State Budget Solutions. He may be reached at [jsmoody@statebudgetsolutions.org](mailto:jsmoody@statebudgetsolutions.org)

Scott has over 17 years as a public policy economist. He is the author, co-author and editor of over 170 studies and books. He has testified twice before the House Ways and Means Committee of the U.S. Congress as well as various state legislatures. His work has appeared in Bloomberg, Forbes, CNN Money, State Tax Notes, The New York Post, Portland Press Herald, Bangor Daily News and others.

His professional experience includes positions as CEO of The Maine Heritage Policy Center, Senior Economist at The Tax Foundation and Senior Economist at The Heritage Foundation. Scott received his Bachelor of Arts in Economics from Wingate University (Wingate, N.C.). He received his Master of Arts in Economics from George Mason University (Fairfax, VA).

State Budget Solutions (SBS) is a non-partisan, non-profit, national public policy organization with the mission to change the way state and local governments do business.

SBS produces studies, articles, reports and compelling narratives about the critical issues that affect state and local budgets, including pension reform, healthcare and education. SBS engages state leaders, journalists and others on positive reforms aimed at improving the functionality of government.

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