

# Reducing Tobacco Use and Secondhand Smoke Exposure: Smoke-Free Policies

## Summary Evidence Table - Economic Evidence

Author, Year	Study Location					
Study Design	Sample Size	Intervention Description	Effect size	Intervention Costs (2011 US\$)	Intervention Benefits (2011 US\$)	Economic summary measure (2011 US\$)
Economic Method	Population Characteristics					
	Time horizon					
<b>American Cancer Society (ACS) 2011</b>  Model  Healthcare costs averted	United States  27 states without current state-wide SF policies  No characteristics given  5 years	Implementing state-wide comprehensive SF policies in states with no current policy. Policy would: cover all work places; make venues 100% SF with no exceptions; limit state-wide laws from preempting local authorities from enacting stronger SF laws	Decreases in the lung cancer, heart attacks, stroke, smoking related diseases in Medicaid population, and smoking-related pregnancies from literature; effect and sources not reported	N/A	<b>Total healthcare costs averted: \$1.36 billion</b> (States' Medicaid savings: \$44.1 million)	N/A
<b>Hauri 2010</b>  Model  Healthcare costs averted	Switzerland  Not reported (estimated population of Switzerland: 7.7 million*)  21% of population were exposed to ETS in public places for >7 hours/week  For hospital days: 1 year; For YLL: lifetime	Hypothetical smoking ban in public places (restaurants, cafes, bars, events, workplaces, schools and universities)	Smoking ban reduced hospital admissions for ischemic heart disease by 0.84 (95% CI: 0.80, 0.88)	N/A	Hospital days from ischemic heart disease averted: 40,954 (30,528 – 50,882)  YLL from ischemic heart disease averted: 15,409 (11,144 – 19,738)  <b>Total costs averted (healthcare + YLL): \$65 million</b>	N/A

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<b>Herman 2011</b>  Hospital database analysis  Healthcare costs averted	Arizona  Counties with no ban prior to May 1, 2007 (~17% of AZ's population)  No characteristics given  1 year	Arizona's state- wide smoking ban implemented on May 1, 2007	Changes in number of AMI, unstable angina, acute stroke, acute asthma hospital discharges in no ban counties	N/A	Number of cases reduced: Acute MI: 159 Unstable Angina: 63 Acute Stroke: 198 Acute Asthma: 249  <b>Estimated savings (hospital charges):</b> Acute MI: \$7.5 million Unstable Angina: \$0.9 million Acute Stroke: \$5.1 million Acute asthma: \$4.0 million <b>Total: \$17.6 million</b> (Savings to Medicaid: \$2.4 million)	N/A

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<b>Hojgaard 2011</b>  Model  Cost- effective	Denmark  Not reported (estimated population of Denmark: 5.5 million*)  No characteristics given  Steady state	Ban on smoking in enclosed public places	Primary aim of ban is to reduce passive smoking (assumed half of the exposure to ETS occurred at home and half in public)  Base case scenario and worst and best case scenarios were conducted. Worst case scenario suggests changes were from social norms and ban had no impact.  <u>Effect on Smoking:</u> <i>Initiation Rate:</i> No effect in base case; reduction of 20% in 11-16 yr olds in best case <i>Quit Rate:</i> No effect in base case; 8.2% in best case  <u>Effect on Health Outcomes:</u> Reduced risk of dying due to reduced passive smoking: 250 deaths/yr fewer first 10 years, 375 deaths/yr fewer thereafter	Campaign costs and law enforcement costs of SF policies are both assumed to be very modest and to be \$0.  <b>Total intervention costs: \$0</b>	All results are presented: undiscounted; 3.5% discount  LYG: Base case: 0.33; 0.026 Best case: 0.37; 0.031  Healthcare costs averted: Base case: \$0 Best case: \$300; \$66 Non-healthcare costs averted: Base case: Increase of \$4,820;\$387 Best case: Increase of \$5,492; \$471 Productivity costs averted: Base case: \$1,583; \$169 Best case: \$2,007; \$241 <b>Total costs averted:</b> <b>Base case: Increase of \$3,238; \$219</b> <b>Best case: Increase of \$3,815; \$164</b>	<b>Base case: \$8,803; \$7,473 per LYG</b> <b>Best case: \$6890; \$4,241</b>

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<b>Juster 2007</b>  Hospital database analysis/ Logistic regression  Healthcare costs averted	New York State  Not reported (estimated population of NY: 19 million*)  No characteristics given  1 year	New York’s state-wide comprehensive smoking ban that prohibited smoking in all workplaces including restaurants and bar enacted on July 24, 2003	Changes in number of AMI hospital discharges	N/A	Number of AMI averted: 3,813  <b>Total healthcare costs averted: \$77.7 million</b>	N/A

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<b>Mudarri 1994</b>  Model  Cost-benefit	United States  1990 US Population not covered by SF Policies (n = 84.7 million)  No characteristics given  1 year	Legislation that would require all non-residential buildings regularly entered by 10 or more persons in the course of a week adopt a policy that bans smoking inside the building or restricts it to separately ventilated and exhausted smoking rooms	3-6% of current smoker quit and 5-10% reduction in initiation ( <i>Note: The analysis does not account for the benefit or losses to smokers, only the savings in reduced smoker absenteeism</i> )  Decrease in lung cancer and heart disease deaths, tonsillitis and adenoids and tympanostomy operations, ear infections, asthma, physician visits for cough, and lower respiratory tract infections (all primarily among children) from ETS exposure at home and non-home  90% reduction of smoking-related fires in the non-residential sector with bans and 50% in those with smoking lounges  15% reduction in house-keeping	All results are discounted 3%  Enactment costs which include: initial costs (develop the policy, assign responsibilities, print and distribute information, print and post signs, remove ashtrays and cigarette vending machines, provide outdoor receptacles, develop compliance procedures, and one time increase in smoking cessation programs); annual policy maintenance (based on managerial, administrative, and maintenance personnel time): \$186.7 million - \$450.8 million Enforcement costs which are based on costs for sting operations comparable for selling cigarettes to minors: \$116.9 million - \$584.4 million Construction and maintenance of smoking lounges in 10% - 20% of establishments; Construction of outdoor shelter for smokers at 10% of establishments (high estimate only): \$409.8 million - \$1,147.5 million <b>Total annual costs: \$0.7 – \$2.2 billion</b>	All results are discounted 3%  Benefits from Reduced ETS (Premature death averted, improved health [in children]): \$52.9 - \$98.7 Savings in operating and maintenance costs (housekeeping and maintenance): \$6.1 - \$11.7 Savings in reduced smoker absenteeism: \$0.3 - \$0.5 Savings in smoking related fires (deaths + property damage):\$0.7 - \$1.1  <b>Total Costs Averted: \$60.0 - \$112.0</b>	<b>Net Savings: \$59.2 - \$109.8 billion</b>

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<b>Ong 2012</b>  Survey  Costs Averted (MUH)	California  343 MUH property owners answered the survey; results projected to the 104,237 MUH properties in CA  Average number of units per property: 38.8 (SD: 93.8); 27.1% experienced smoking-related costs; 33.5% completely SF, 20.3% partially SF, 46.2% no policy  1 year	Implementing a state-wide MUH SF policy (no smoking anywhere on the property)	If all MUH properties had complete SF policies, 8,339 properties would not incur smoking-related costs and 19,909 properties would save \$348 in smoking-related costs.	N/A	<b>Total smoking-related costs averted: \$18 million</b>	N/A

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<b>Ong 2005</b>  Model  Cost-Utility/ Cost- Effective	Minnesota  MN indoor works not currently covered by SF policies (n = 565,000)  Smoking prevalence: 22.2%; Smokers ready to attempt smoking cessation: 64%; Moderate to heavy smokers: 54.9%  1 year	State-wide SF indoor work environments	-3.7% absolute smoking prevalence; -16.7% in smokers (including quitters who quit without regard to SF policy); -14.2% (only SF policy); Compliance with SF policies: 90%; Smoking relapse: 35%  Each sustained quitter generates 1.58 QALY	Includes the costs of enactment and enforcement - enactment costs based on FL campaign costs per capita; enforcement costs based on CA media campaign costs.  Enactment costs: \$2.2 million Enforcement costs: \$8.2 million <b>Total Costs: \$10.4 million</b>	10,400 quitters; 16,400 QALYs gained	<b>\$1,801 per quit</b>  <b>\$1,138 per QALY</b>

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<p><b>Ong 2004</b></p> <p>Model</p> <p>Healthcare costs averted</p>	<p>United States</p> <p>US Indoor workers not currently covered by SF Policies (n = 33.2 million)</p> <p>No characteristics given</p> <p>1 year (initial year); 7 years (steady state results)</p>	<p>National SF workplace policy</p>	<p>-29% in total cigarette consumption (-3.8% in absolute smoking prevalence; 14.7% of smokers quit because of SF policies); -1.3 cigarette per day in daily consumption among continuing smokers</p> <p>Transition Probabilities (RR):</p> <table border="1" data-bbox="709 646 1199 1442"> <thead> <tr> <th></th> <th colspan="2">AMI</th> <th>Stroke</th> </tr> <tr> <th></th> <th>Male</th> <th>Female</th> <th></th> </tr> </thead> <tbody> <tr> <td colspan="4"><b>Smoker</b></td> </tr> <tr> <td>Current</td> <td>2.88 (1.54; 5.39)</td> <td>3.85 (1.53; 9.67)</td> <td>2.80 (1.86; 4.23)</td> </tr> <tr> <td>Steady State for quitters</td> <td>1.17 (0.91; 1.51)</td> <td>1.40 (0.93; 2.11)</td> <td>1.42 (1.54; 2.02)</td> </tr> <tr> <td colspan="4"><b>Passive Smoker</b></td> </tr> <tr> <td>Current</td> <td colspan="2">1.25 (1.17, 1.32)</td> <td></td> </tr> <tr> <td>Steady State</td> <td colspan="2">1.11 (0.70; 1.74)</td> <td></td> </tr> <tr> <td colspan="4"><b>Never Smoker</b></td> </tr> <tr> <td>Events /1,000 PY</td> <td>3.11</td> <td>0.89</td> <td>1.37</td> </tr> <tr> <td colspan="4"><b>Annual Survival Probability</b></td> </tr> <tr> <td>Immediate Mortality Rate</td> <td>0.115</td> <td>0.167</td> <td>0.043</td> </tr> <tr> <td>Persons at risk 1<sup>st</sup> yr after event</td> <td>0.992</td> <td>0.995</td> <td>0.993</td> </tr> <tr> <td>Subsequent yrs</td> <td>0.812</td> <td>0.765</td> <td>0.663</td> </tr> <tr> <td></td> <td>0.994</td> <td>0.933</td> <td>0.961</td> </tr> </tbody> </table>		AMI		Stroke		Male	Female		<b>Smoker</b>				Current	2.88 (1.54; 5.39)	3.85 (1.53; 9.67)	2.80 (1.86; 4.23)	Steady State for quitters	1.17 (0.91; 1.51)	1.40 (0.93; 2.11)	1.42 (1.54; 2.02)	<b>Passive Smoker</b>				Current	1.25 (1.17, 1.32)			Steady State	1.11 (0.70; 1.74)			<b>Never Smoker</b>				Events /1,000 PY	3.11	0.89	1.37	<b>Annual Survival Probability</b>				Immediate Mortality Rate	0.115	0.167	0.043	Persons at risk 1 <sup>st</sup> yr after event	0.992	0.995	0.993	Subsequent yrs	0.812	0.765	0.663		0.994	0.933	0.961	<p>N/A</p>	<p>Number of events averted:</p> <p><i>Initial Year:</i> Stroke: 360 AMI: 1,540</p> <p><i>Steady State:</i> Stroke: 1,270 AMI: 6,250</p> <p><b>Total healthcare costs averted:</b> <i>Initial Year: \$78.9 million</i> <i>Steady State: \$364.9 million annually</i></p>	<p>N/A</p>
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<p><b>Ong 2003</b></p> <p>Model</p> <p>Healthcare costs averted</p>	<p>Florida</p> <p>FL Indoor works not currently covered by SF policies (n = 1.9 million)</p> <p>Smoking prevalence: 20.7%; Mean number of cigarettes smoked: 18.6 per day</p> <p>1 year; steady state</p>	<p>Statewide SF workplace policy</p>	<p>-20.7% in smoking prevalence (81,400 quitters); -13% in cigarette consumption by smokers</p> <p>Transition Probabilities (RR):</p> <table border="1" data-bbox="709 553 1199 1044"> <thead> <tr> <th></th> <th colspan="2">AMI</th> <th>Stroke</th> </tr> <tr> <th></th> <th>Male</th> <th>Female</th> <th></th> </tr> </thead> <tbody> <tr> <td><b>Smoker</b></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Current</td> <td>2.88</td> <td>3.85</td> <td>2.80</td> </tr> <tr> <td>1 yr after quit</td> <td>2.08</td> <td>2.71</td> <td>2.16</td> </tr> <tr> <td>Steady State</td> <td>1.17</td> <td>1.40</td> <td>1.42</td> </tr> <tr> <td><b>Passive Smoker</b></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Current</td> <td></td> <td>1.30</td> <td></td> </tr> <tr> <td>1 yr after quit</td> <td></td> <td>1.21</td> <td></td> </tr> <tr> <td>Steady State</td> <td></td> <td>1.11</td> <td></td> </tr> <tr> <td><b>Never Smoker</b></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Events/1,000 PY</td> <td>3.11</td> <td>0.89</td> <td>1.37</td> </tr> <tr> <td><b>Survival Probability</b></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Short Term Mortality Rate</td> <td>0.115</td> <td>0.167</td> <td>0.043</td> </tr> <tr> <td>1<sup>st</sup> yr after event</td> <td>0.812</td> <td>0.765</td> <td>0.663</td> </tr> </tbody> </table> <p><u>Low birth weight:</u> Incidence: 0.0741 RR: Smokers: 2.0; Passive: 1.2</p> <p><u>Respiratory Illness Among Children &lt;5 years:</u> RR reduction from 2.0 to 1.0</p> <p><u>SIDS:</u> Pooled OR for maternal smoking: 2.98</p>		AMI		Stroke		Male	Female		<b>Smoker</b>				Current	2.88	3.85	2.80	1 yr after quit	2.08	2.71	2.16	Steady State	1.17	1.40	1.42	<b>Passive Smoker</b>				Current		1.30		1 yr after quit		1.21		Steady State		1.11		<b>Never Smoker</b>				Events/1,000 PY	3.11	0.89	1.37	<b>Survival Probability</b>				Short Term Mortality Rate	0.115	0.167	0.043	1 <sup>st</sup> yr after event	0.812	0.765	0.663	<p>N/A</p>	<p>Initial year: Number of events averted: AMI: 120 Stroke: 20 Low birth-weight births: 300 Asthma: 80</p> <p><b>Total healthcare costs averted: \$8.9 million</b></p> <p>Steady state: <b>Total healthcare costs averted: \$288.4 million annually</b></p>	<p>N/A</p>
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<b>Roberts 2012</b>	Rhode Island	RI's Smoke Free Public Places and Workplaces Act—a comprehensive state-wide ban on smoking in all enclosed public places of business (restaurants and bars, healthcare facilities, shopping areas, and offices)	Changes in hospital discharge data	N/A	Number of events averted (2009 compared to 2003) AMI: 977 Asthma: Increase of 225  <b>Total healthcare costs averted (2009 compared to 2003): \$4.2 million</b>	N/A
Hospital database analysis	Not reported (estimated population of RI: 1 million*)					
Healthcare costs averted	No characteristics given					
	1 year					

\*Estimate not reported in publication; obtained from other sources based on information reported

AMI = acute myocardial infarction; ETS = environmental tobacco smoke; LYG: Life-Year Gained; MUH = multi-unit housing; RR: Relative Risk; SF = smoke-free policies; YLL: Years Life Loss