

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

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## Task Force Finding and Rationale Statement

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## **Task Force Finding and Rationale Statement**

### **Intervention Definition**

Smoke-free policies are public-sector regulations and private-sector rules that prohibit smoking in indoor spaces and designated public areas. State and local ordinances establish smoke-free standards for all, or for designated, indoor workplaces, indoor spaces, and outdoor public places. Private-sector smoke-free policies may ban all tobacco use on private property or restrict smoking to designated outdoor locations.

### **Task Force Finding (November 2012)**

The Community Preventive Services Task Force recommends smoke-free policies to reduce secondhand smoke exposure and tobacco use on the basis of strong evidence of effectiveness. Evidence is considered strong based on results from studies that showed effectiveness of smoke-free policies in:

- Reducing exposure to secondhand smoke
- Reducing the prevalence of tobacco use
- Increasing the number of tobacco users who quit
- Reducing the initiation of tobacco use among young people
- Reducing tobacco-related morbidity and mortality, including acute cardiovascular events

Economic evidence indicates that smoke-free policies can reduce healthcare costs substantially. In addition, the evidence shows smoke-free policies do not have an adverse economic impact on businesses, including bars and restaurants.

## **Rationale**

### **Basis of Finding**

The Task Force finding is based on evidence from a systematic review of legislative smoke-free policies published in 2010 (Callinan et al., 50 studies, search period through July 2009) and a more recent Community Guide systematic review (82 studies, search period January 2000-December 2011). Evidence identified in The Community Guide review was used to update the published review and to examine additional outcomes. This evaluation updates and replaces two previous reviews conducted for The Community Guide (Hopkins et al., 2001; Hopkins et al., 2010).

Examined outcomes, summary effect measurements and estimates, study counts, and comparisons of review findings are provided in the table below. The Task Force recommendation is based on evidence that shows smoke-free policies are effective for the following important outcomes:

- Reduced exposure to secondhand smoke
- Reduced prevalence of tobacco use
- Reduced tobacco consumption and increased quit rates among tobacco users
- Reduced initiation of tobacco use among young people
- Reduced tobacco-related morbidity and mortality, including acute cardiovascular events

**Summary Comparison of Review Findings on the Effects of Smoke-Free Policies**

<b>Outcome and Summary Estimate</b>	<b>Results from Review by Callinan et al., 2010 (Search through July 2009)</b>	<b>Results from Community Guide Update (Search period July 2009-December 2011)</b>
<p>Exposure to Secondhand Smoke</p> <p>Median relative percent change by measurement</p>	<p>61% reduction in proportion of people exposed in workplaces (IQI: -81% to -44%; 14 studies)</p> <p>69% reduction in SHS biomarkers (IQI: -87% to -43%; 18 studies)</p> <p>88% reduction in indoor air pollution (IQI: -97% to -26%; 8 studies*)</p>	<p>50% reduction in proportion of people exposed in various settings(IQI: -60% to -43%;6 studies)</p> <p>50% reduction in SHS biomarkers (IQI: -79% to -12%; 5 studies)</p> <p>88% reduction in indoor air pollution(IQI: -95% to -81%; 11 studies)</p>
<p>Prevalence of Tobacco Use</p> <p>Median absolute percent change</p>	<p>3 percentage point reduction (IQI: -5 to -0.8 pct pts; 10 studies)</p> <p>One additional study used different measurements and reported favorable findings</p>	<p>2.7 percentage point reduction (IQI: -4.7 to -1.5 pct pts; 11 studies)</p> <p>Ten additional studies used different measurements, eight of which reported favorable findings</p>
<p>Prevalence of Tobacco Use among Youth</p> <p>Median OR for Current Use</p>	<p>Outcome not examined</p>	<p>Odds Ratio 0.85 (IQI: 0.68 to 0.93; 6 studies identified in search period January 2000-December 2011)</p> <p>Eight additional studies used different measurements. In general, these studies also found reductions in tobacco use</p>
<p>Cessation of Tobacco Use</p> <p>Median absolute percent change</p>	<p>0 percentage points (Range: -2 to 4 pct pts; 3 studies)</p> <p>Two additional studies provided different measurements and reported favorable findings.</p>	<p>3.8 percentage point increase (Range: 2 to 17.4 pct pts; 4 studies)</p> <p>Six additional studies used different measurements. In general, these studies reported increases in quitting activity</p>

<b>Outcome and Summary Estimate</b>	<b>Results from Review by Callinan et al., 2010 (Search through July 2009)</b>	<b>Results from Community Guide Update (Search period July 2009-December 2011)</b>
Consumption of tobacco  Median number of cigarettes smoked per day	-2 cigs/day (IQI: -3 to -0.4 cigs/day; 8 studies)	-1.2 cigs/day (Range: -3.6 to 0 cigs/day; 5 studies)  Four additional studies used different measurements. In general, these studies found reductions in tobacco use
Cardiovascular Disease (events)  Median relative change in hospital admissions	13.5% reduction in hospital admissions (Range: -26% to 1%; 5 studies)  Five additional studies also found reductions in cardiovascular events	5.1% reduction in hospital admissions (IQI: -11.6% to -2.2%; 9 studies)  Two of four additional studies also reported reductions in acute cardiac events  Three studies reported on changes in cardiovascular mortality, two of which reported favorable reductions
Asthma Morbidity  Median relative change in hospital admissions	Narrative summary indicating favorable effects in two of three included studies	20.1% reduction in hospital admissions (Range: -22.0% to -1.3%; 4 studies)  One additional study reported on asthma related hospital admissions and found a reduction  Two studies reported on self-reported prevalence of asthma symptoms; one of which reported favorable findings

IQI=Interquartile Interval

OR=Odds Ratio

pct pts = Percentage points

% = Relative change

\*Subset of identified studies

Evidence from both reviews indicates that smoke-free policies substantially reduce exposure to secondhand smoke, and contribute to meaningful differences in tobacco use in the population. Six studies published since 2000 also found that communities with stronger smoke-free policies experienced meaningful differences in the prevalence of tobacco use among young people. Although subset analyses in four of these studies compared differences in rates of initiation and

found mixed results, prevalence measurements in surveys of young people primarily capture changes in the uptake of tobacco use.

Evidence shows that smoke-free policies are also associated with reductions in tobacco-related morbidity, including hospitalizations due to acute cardiovascular episodes. Twenty-five studies were considered across both the Callinan et al. review (10 studies) and the updated Community Guide review (15 studies). Although included studies reported different outcome measurements, most observed meaningful reductions in hospital admissions between 1 to 5 years following implementation of smoke-free policies. Three studies from the updated search period examined mortality from cardiovascular events; two showed small decreases and one found a non-significant increase (Table 1).

Seven studies examined the impact of public or worksite smoke-free policies on asthma outcomes. Five studies found reductions in asthma-related hospital admissions, though one finding was not statistically significant. The remaining two studies used population-based surveys to compare differences in the self-reported prevalence of asthma. One reported favorable but not statistically significant associations between smoke-free policies and current asthma, frequency of asthma attacks, and emergency room visits. The other study found a favorable, significant relationship between workplace smoke-free policies and asthma.

### **Applicability and Generalizability Issues**

In this review, most of the included studies evaluated smoke-free policies in the United States. Studies also evaluated policies from Canada, England, Scotland, Wales, Australia, New Zealand, and several countries in Europe. Smoke-free policies were shown to be effective for one or more outcomes in all countries studied. Additionally, favorable results were found for studies that considered smoke-free policies implemented at national, state, and local levels.

Most studies evaluated tobacco use outcomes using large, population-based surveys with representative samples of working age adults or young people. Although few studies compared outcomes by demographic characteristics, the Task Force considers the overall evidence of effectiveness in reducing exposure to secondhand smoke in protected settings to be applicable to the U.S. population.

Most studies in the updated search period evaluated strong or comprehensive smoke-free policies covering most indoor occupational settings. Only a few studies compared different smoke-free policies. These studies found greater reductions in exposure to secondhand smoke with comprehensive smoke-free policies as compared to weaker restrictions on smoking or policies exempting specific indoor settings, such as bars.

Four studies in the updated search period examined the impact of smoke-free policies on disparities in exposure to secondhand smoke. All four studies were conducted outside of the U.S. and evaluated national comprehensive policies in England, Scotland, Wales, and New Zealand. Three of the studies compared changes in exposure to secondhand smoke by socioeconomic status (SES), of which one study found limited evidence suggesting slightly greater improvements in indoor air quality among bars in lower SES areas. The other two studies that examined exposure changes among children showed mixed results; however, exposure changes among children following policy implementation may be more difficult to interpret than changes among adults, as children may be among the least likely to directly benefit from workplace smoke-free policies. The last study, conducted in New Zealand, found a similar reduction in exposure among a minority group (the Maori people) compared with the general population. Overall, these findings suggest that comprehensive smoke-free policies can confer a similar benefit in reducing exposure to secondhand tobacco smoke among population groups, and may reduce disparities in certain groups.

In the U.S., disparities in secondhand smoke exposure can result from differences in adoption and enforcement of smoke-free protections by jurisdiction and occupational setting (i.e., hospitality workers and venues in states and communities without comprehensive smoke-free policies). Expanding and enforcing policies to include all occupational settings could help reduce these disparities.

Overall, the Task Force considers the evidence on effectiveness to be broadly applicable to the range of public and private smoke-free policy decisions in the U.S. Strong evidence of effectiveness supports the use of comprehensive smoke-free policies protecting patrons and employees in all indoor worksites and indoor public venues. Expanding smoke-free policies to cover additional settings will reduce exposure to secondhand smoke, and may also encourage efforts by tobacco users to quit and discourage initiation of tobacco use among young people.

### **Data Quality Issues**

Studies included in the Community Guide review used different designs including cross-sectional comparisons between populations exposed and not exposed to smoke-free policies, before-after evaluations, interrupted time series, and other designs with longitudinal follow-up. Although findings from cross-sectional comparisons are subject to multiple threats to validity, in general, included studies compared multiple jurisdictions, and assessed differences in large population samples. Some studies controlled for variables associated with differences in tobacco use, including demographic characteristics and the presence of additional tobacco control interventions.

Common study limitations included incomplete descriptions of the smoke-free policy and the study population, and potential confounding due to issues such as secular trends and concurrent interventions. In general, tobacco use outcomes were based on self-reported behaviors in population-based surveys.

Because trends in cigarette smoking behavior and hospital admissions for cardiovascular events have generally been falling, and can fluctuate from year to year (especially for cardiovascular events rates at the local level), simple before-after assessments may not provide the most accurate depiction of smoke-free policy effects. Statistical models that account for seasonal variations, rates in control populations, and long-term trends in cigarette smoking behavior and cardiovascular events rates can more accurately isolate the effects of these interventions. The more-recent studies included in this review tended to account for more of these factors, which may explain why these studies generally showed smaller reductions compared to the earlier studies.

### **Other Benefits and Harms**

The implementation of smoke-free policies may reduce health and hazard insurance premiums, as well as health care, productivity, cleaning, and maintenance costs incurred by establishments or employers. In addition, there is potential for reduced fire risks, resulting in less fire-related structural damage, injury, and death.

No potential harms from smoke-free policies were identified in the included studies or broader literature. Evidence indicates that public and worksite smoke-free policies do not increase smoking in the home. Some papers suggested that public and worksite smoke-free policies have contributed to increases in the adoption of voluntary smoke-free policies in homes.

### **Economic Evidence**

Eleven studies were included in the economic review (search period January 1980-July 2012). Of these studies, two assessed cost-effectiveness, one measured cost-benefit, and eight considered benefits only. All monetary values from studies are reported in 2011 U.S. dollars. The economic impact of smoke-free policies on hospitality establishments

(restaurants, bars, hotels, tourist venues, and gaming establishments) also was considered using evidence from an existing systematic review of 158 studies (Scollo & Lal, 2008, search period 1988 – January 2008) and a more recent Community Guide systematic review (21 studies, search period January 2008-July 2012).

### **Intervention Costs**

Although many state and local governments and private establishments have implemented smoke-free policies, little documentation or analysis is available on intervention costs. Three included studies reported a range of costs from \$0 to \$25 per capita based on modeled assumptions.

### **Summary Measures**

Two cost-effectiveness studies reported cost per quality-adjusted life year (QALY) gained of \$1,138 and cost per life year gained of \$8,803, but did not include healthcare costs averted or other economic benefits to smokers. The single cost-benefit study, conducted in 1994, estimated net savings from a nationwide smoke-free policy in the United States to be \$700 to \$1,297 per person not currently covered by a smoke-free policy, based on averted healthcare expenditures and decreased mortality from reduced secondhand smoke exposure.

### **Costs Averted**

Seven of eight studies evaluating economic benefits of smoke-free policies focused on healthcare costs averted. Two studies used healthcare databases and estimated \$1.6 million in hospital charges averted per 100,000 persons and \$415,000 in hospital costs averted per 100,000 persons for 1 year. Three studies estimated healthcare costs averted using average cost per disease information from the literature. Based on these studies, the averted healthcare costs for 1 year ranged from \$148,000 to \$409,000 per 100,000 persons. The annual long-term estimates of healthcare costs averted ranged from \$0.15 million to \$4.8 million per 100,000 based on results from three studies that considered a follow-up period of five years or more. The variation in these estimates was a result of population size, events included in the analysis, number of events averted, and the way the event was valued. The final study estimated smoking-related costs averted for multi-unit housing properties in California at \$18 million over 1 year.

### **Economic Effects on Hospitality Venues**

Although studies varied considerably in their methodological quality, evaluations based on actual revenue reports or surveys of consumers consistently found that smoke-free policies did not have an adverse economic impact on the business activity of restaurants, bars, or establishments catering to tourists, with some studies finding a small positive effect of these policies. There was limited evidence available on the impact on gaming establishments.

### **Considerations for Implementation**

In the U.S., a number of government agencies, public health organizations, and advocacy groups have extensive experience with enacting smoke-free policies. As a result, substantial guidance and support is available to decision makers about coalition-building and the crafting, passage, implementation, enforcement, and evaluation of smoke-free policies at the state, local, and individual level.

Barriers to adoption and implementation of smoke-free policies are common. State legislation pre-empting local control is present in 12 states (as of December 2012; Office on Smoking and Health, 2012). Policy exemptions and loopholes in legislation at the state and local level can block efforts to protect patrons and employees from secondhand smoke exposure in hospitality venues and attached outdoor areas, casinos, hookah lounges, cigar bars, and smoke-shops. Direct political opposition to new or expanded smoke-free policies is also common, including advocacy by tobacco users, hospitality organizations and businesses, and the tobacco industry. Concerns that smoke-free policies may have an

adverse economic impact on restaurants and bars are routinely raised as a barrier to implementation of such policies. As noted above, a substantial body of evidence indicates that smoke-free policies do not have negative impact on business activity, especially for restaurants and bars, and may in some cases provide a small positive effect.

In the U.S., enforcement of state and local smoke-free policies has not required substantial time or resources from public health or law enforcement officials. Addressing sporadic non-compliance, however, requires clear enforcement powers, defined responsibilities, and adequate resources. Although the evidence indicates that community and worksite smoke-free policies do not increase smoking in the home, in general, smoke-free policies will relocate smoking from protected indoor areas to nearby outdoor areas and this may require additional assessment, regulation, and enforcement.

Implementation of a new or an expanded smoke-free policy will motivate some tobacco users to try to quit; efforts should be made to maximize this outcome. Specifically, state and local tobacco control programs and their partners should plan to provide and promote cessation services in conjunction with policy implementation, starting when the policy is adopted, well ahead of its effective date.

Current public policy activity in the U.S. includes efforts to pass comprehensive state and local smoke-free policies that protect workers and the public in all indoor worksites, remove preemption, and limit or eliminate loopholes and exemptions. In addition, some communities have implemented smoke-free policies for public multi-unit housing, or require owners to establish and disclose a smoking policy to prospective tenants in all multi-unit properties. The U.S. Department of Housing and Urban Development provides toolkits to support decisions by owners and management agents to implement smoke-free policies in public and assisted multifamily housing. Coalitions in some states and communities have worked to expand smoke-free policies to selected public outdoor locations such as parks and beaches.

### **Evidence Gaps**

More research is needed to examine the effectiveness of state and local smoke-free policies on tobacco use among young people. Comparisons over time may provide additional evidence on the impact of smoke-free policies on the initiation of tobacco use among youth, and evaluate the influence of smoke-free policies on young adults as they enter the workforce. Additional research should examine the effects of smoke-free policies on tobacco product substitution among tobacco users who do not quit (e.g., adding or switching to smokeless tobacco, including recently introduced forms such as snus and dissolvables). Future policy evaluations should include assessments of dual or multiple product use among tobacco users.

Additional evaluations of smoke-free policies could capture and quantify the broad range of health effects attributable to reductions in both secondhand smoke exposure and tobacco use in the population. Longer term studies and simulations will provide a more complete assessment of the impact of these policies on both acute and chronic tobacco-related diseases.

Additional implementation and evaluation research is needed for smoke-free policies in settings with unique issues and concerns. More studies are needed to fully evaluate the effects on residents of smoke-free policies when implemented in multi-unit housing. More studies are needed to examine the effects of smoke-free policies on patients and staff in addictions and mental health treatment facilities. Evidence remains sparse on the effects of public policies extending smoke-free protections to the public in outdoor settings such as parks and beaches.

Although state and local smoke-free legislation may spur the voluntary adoption of home smoke-free policies, additional research is needed to identify effective strategies to encourage change in tobacco use behaviors in these settings. Smoking in the home remains the primary source of exposure to secondhand smoke (and metabolites of tobacco smoke) for most members of the household, including infants and children.

Though several economic studies considered expected costs, future economic research should consider and report actual costs of implementing smoke-free policies (including efforts to disseminate information to the public and to conduct enforcement). Additional economic evaluations should also capture costs and economic outcomes from the tobacco user's perspective. Finally, research is also needed to determine the benefits and costs of implementing smoke-free policies in new settings such as multi-unit housing.

*The data presented here are preliminary and are subject to change as the systematic review goes through the scientific peer review process.*

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## Disclaimer

The findings and conclusions on this page are those of the Community Preventive Services Task Force and do not necessarily represent those of CDC. Task Force evidence-based recommendations are not mandates for compliance or spending. Instead, they provide information and options for decision makers and stakeholders to consider when determining which programs, services, and policies best meet the needs, preferences, available resources, and constraints of their constituents.

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