

Review

Smoke-Free Policies in U.S. Prisons and Jails: A Review of the Literature

Sara M. Kennedy MPH, CHES¹, Shane P. Davis PhD², Stacy L. Thorne PhD, MPH, MCHES²

¹Biostatistics and Epidemiology, RTI International, Atlanta, GA; ²Epidemiology Branch, Office on Smoking and Health, Centers for Disease Control and Prevention, Atlanta, GA

Corresponding Author: Sara M. Kennedy, MPH, CHES, RTI International, 2951 Flowers Road South, Suite 119, Atlanta, GA 30341-5533, USA. Telephone: 770-488-5049; E-mail: vnd2@cdc.gov

Abstract

Introduction: Despite progress in limiting exposure to secondhand smoke (SHS) in the United States, little is known about the impact of smoke-free policies in prisons and jails. SHS exposure in this setting may be great, as smoking prevalence among inmates is more than three times higher than among non-incarcerated adults. To inform the implementation of smoke-free policies, this article reviews the literature on the extent, nature, and impact of smoke-free policies in U.S. prisons and jails.

Methods: We systematically searched PubMed, Embase, EconLit, and Social Services Abstracts databases. We examined studies published prior to January 2014 that described policies prohibiting smoking tobacco in adult U.S. correctional facilities.

Results: Twenty-seven studies met inclusion criteria. Smoke-free policies in prisons were rare in the 1980s but, by 2007, 87% prohibited smoking indoors. Policies reduced SHS exposure and a small body of evidence suggests they are associated with health benefits. We did not identify any studies documenting economic outcomes. Non-compliance with policies was documented in a small number of prisons and jails, with 20%–76% of inmates reporting smoking in violation of a policy. Despite barriers, policies were implemented successfully when access to contraband tobacco was limited and penalties were enforced.

Conclusion: Smoke-free policies have become increasingly common in prisons and jails, but evidence suggests they are not consistently implemented. Future studies should examine the health and economic outcomes of smoke-free policies in prisons and jails. By implementing smoke-free policies, prisons and jails have an opportunity to improve the health of staff and inmates.

Introduction

The United States has the highest adult imprisonment rate of any country in the world with 2.2 million inmates, or 712 adults per 100,000 incarcerated in 2013. The imprisonment rate in the United States is nearly five times the world wide imprisonment rate.¹ In 2012, 68% of inmates in the United States, or 1.57 million adults, were incarcerated in state or federal prisons and the remaining 744,500 inmates were held in local jails.^{2,3} According to the most recent reports from the Bureau of Justice Statistics,

there were 3,271 local jails and 1,821 state and federal prisons operating in the United States in 2006 and 2005, respectively.^{4,5} States spent an estimated \$53.3 billion on corrections in 2012, with approximately 10% allotted to inmate healthcare.^{6,7} The prevalence of *smoking* among U.S. adult state and federal inmates was estimated to be 50% in 2004, compared to an estimated 20% among non-institutionalized U.S. adults that year.^{8,9} Smoking disproportionately impacts the poor, the less educated, and the mentally ill, all of whom are overrepresented in U.S. prisons and jails.^{10,11}

Inmates are disproportionately burdened with chronic illness. The prevalence of tobacco related illnesses such as cardiovascular disease, cancer, and respiratory conditions are as much as 50% higher than in the general population.^{8,12} It is well established that tobacco smoking causes adverse health effects, accounting for an estimated 443,000 preventable premature deaths each year in the United States, including 49,400 deaths attributable to secondhand smoke (SHS) exposure.¹³ Since smoke-free policies have been shown to improve health, the implementation of smoke-free policies may have the potential to reduce the burden of tobacco-related diseases and associated healthcare costs among inmates and staff.¹³

Dramatic shifts toward establishing smoke-free policies in U.S. prisons and jails have occurred in recent decades. Until the mid-1980s, tobacco use, predominately cigarettes, was common in correctional facilities where it served as a form of currency, a reward for good behavior, and was distributed to inmates as personal rations.^{14,15} During the early 1990s, as more smoke-free policies were adopted in this setting across the United States,¹⁶ inmates brought smoking related lawsuits against prisons and jails.¹⁷ Lower courts consistently ruled that inmates did not have a right to smoke but were divided regarding an inmate's right to a smoke-free environment.¹⁷ In 1993, however, the U.S. Supreme Court ruled that prison officials "deliberate indifference" to unreasonably high levels of SHS exposure represented a violation of inmates' eighth amendment rights not to be subjected to cruel and unusual punishment.¹⁸ This ruling was followed by a surge in the number of jail and prison systems adopting smoke-free policies that either restricted or completely prohibited smoking.¹⁹ While the number of prisons and jails with smoke-free policies has increased, these policies are not universal. In 2007, the Institute of Medicine formally called for the American Correctional Association to require all prisons and jails to adopt complete indoor smoke-free policies; to date, the organization recommends, but does not mandate, smoke-free policies.²⁰

The Centers for Disease Control and Prevention (CDC), the American Nonsmokers' Rights Foundation (ANRF) and the Public Health Law Center track and report smoke-free policies in U.S. prisons and jails for different purposes and therefore use different criteria to classify the policies. The CDC's STATE System tracks state preemption laws prohibiting indoor smoking, and reports indoor smoke-free policies created by legislation, but not those created by prison systems.²¹ ANRF and the Public Health Law Center classify policies according to how they apply to both inmates and staff, reporting the least restrictive policies.^{20,22}

Little is known about health and economic outcomes of smoke-free policies adopted by prisons and jails in the United States. Evidence from New Zealand indicates that complete indoor/outdoor smoke-free policies improve indoor air quality and reduce the threat of tobacco related health effects.²³ Reports from Quebec, Canada suggest that adopting an indoor smoke-free policy alone does not reduce SHS exposure, as 93% of inmates who smoked continued to smoke indoors following the adoption of the policy.²⁴ A comprehensive review of the evidence is needed to provide direction for future research and inform the implementation of smoke-free policies in U.S. prisons and jails. We aimed to review the literature on the extent, nature, and impact of smoke-free policy implementation in U.S. prisons and jails.

Methods

Literature Search

We conducted a systematic search utilizing electronic search engines to identify published studies addressing smoke-free policies in local,

state, or federally run correctional facilities (i.e., jails or prisons). We searched PubMed, Embase, EconLit, and Social Services Abstracts databases using combinations of the following search terms: correctional facility, prison, jail, incarcerated, tobacco policy, secondhand smoke, smoke-free, smoking, smoking prevalence, smoking cessation, tobacco cessation, smoking restrictions, smoking cessation intervention, tobacco use, tobacco ban, cost benefit analysis, budget, financial, cost, substance use, and health status. These searches were not limited by date of publication. PubMed includes references published since 1800, while EconLit, Social Services Abstracts, and Embase include references published since 1969, 1979, and 1988, respectively. Once we determined that a study met eligibility, we manually reviewed the reference list to identify additional studies that were not retrieved from the electronic search engines. We considered both qualitative and quantitative studies published prior to January 2014. After we removed duplicates, the titles and abstracts of each article were reviewed. A peer- or non-peer-reviewed study was included if it addressed smoke-free policies in adult U.S. correctional facilities by: (a) reporting the number or type of smoke-free policies; (b) measuring SHS exposure; (c) describing health and economic outcomes; (d) investigating the process or outcomes of smoke-free policy implementation; or (e) reporting the impact on inmate smoking behaviors or other relevant findings. A study was excluded if it: (a) included only juvenile detention centers or correctional facilities outside the United States or; (b) involved study participants who were not incarcerated in a jail or prison at the time of the study; (c) was published as a commentary, abstract, legal case review; or (d) described inmate smoking behaviors and cessation interventions without addressing smoke-free policies.

Definition of Terms

In this review, the following terms are used to describe study settings: (a) "prison" is a state or federally run facility that typically holds adults with a sentence greater than one year; (b) "jail" is a locally run (e.g., city, county) facility that typically holds adults either awaiting trial, sentencing, or sentenced to less than one year; (c) "correctional facility" may refer to either a jail or a prison; and (d) "prison system" encompasses all state or federal prisons run by a state department of correction or the Federal Bureau of Prisons (FBOP).

To distinguish between types of smoke-free policies, this review defines (a) "partial indoor smoke-free policy" as any policy that allows smoking in designated indoor areas but prohibits smoking in other indoor areas; (b) "complete indoor smoke-free policy" as any policy that prohibits smoking in all indoor areas; and (c) "complete indoor/outdoor smoke-free policy" as any policy that prohibits smoking indoors and throughout the grounds of prisons and jails. Many prisons and jails have implemented policies that prohibit the use of all tobacco products, including smokeless tobacco products. This review focuses specifically on smoke-free policies and SHS-related outcomes.

Results

Study Selection and Description of Reviewed Studies

Figure 1 displays the process for identifying and selecting studies for this review. The literature search identified 273 unique articles. Nineteen studies met inclusion criteria and seven additional studies were identified from reference lists.^{14,15,25-29} A total of 26 studies met final inclusion for this review. Three studies were based on the same sample of inmates but reported different findings.³⁰⁻³² A brief

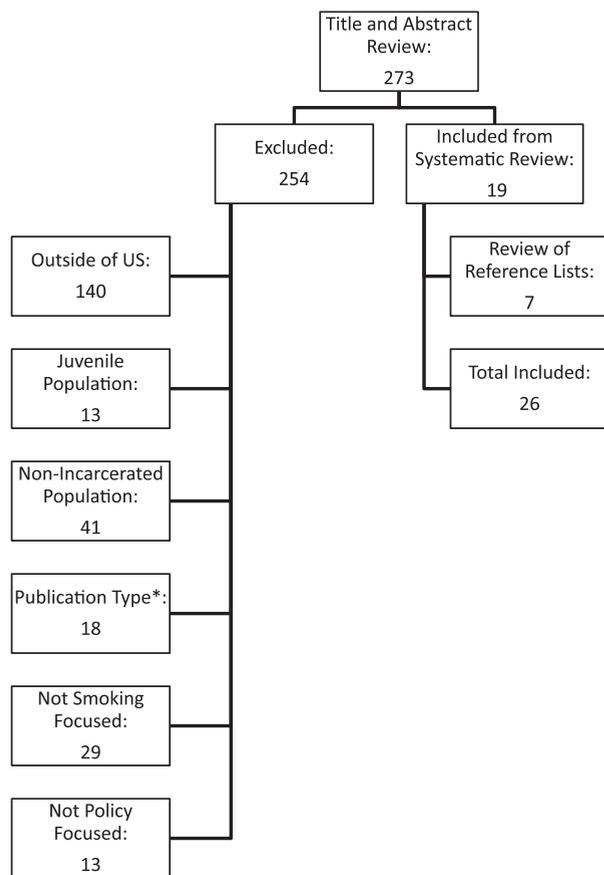


Figure 1. Flowchart identifying study selection process. * Includes studies published as commentaries (10), abstracts (4), and reviews (4).

summary of the 26 selected studies is provided in [Supplementary Table 1](#) that includes author, publication year, sample description, study location, methods and a brief summary of key findings.

Prevalence and Type of Smoke-Free Policies in Correctional Facilities

Seven studies reported the prevalence of smoke-free policies including four that sampled prisons, two that sampled jails, and one that sampled both prisons and jails. These cross-sectional studies, published between 1988 and 2007, show that smoke-free policies were rare in the mid-1980s and became increasingly common in the mid-1990s and 2000s.^{14,15,25,27,28,33,34}

Prisons

The earliest of four studies documenting changes to smoke-free policies in prisons, conducted in 1986, reported that none of the 18 state prison systems surveyed or FBOP had a complete indoor smoke-free policy.¹⁴ A subsequent study, conducted in 1993 among 50 state prison systems, found that the majority of prison systems (90%) had a partial indoor smoke-free policy. Most prohibited smoking in their hospital units, classrooms, and/or chapels, but no prison system had a complete indoor smoke-free policy.¹⁵ A study conducted four years later, which included the FBOP, 50 state prison systems, and the District of Columbia, found that 70% of prisons made their indoor smoke-free policies more restrictive between 1992 and 1996. By 1996, 14% of prison systems had adopted complete indoor/outdoor

smoke-free policies.²⁸ The most recently published study (2007) identified in the literature found that 60% of prison systems had a policy prohibiting all smoking among inmates, 27% had a complete indoor smoke-free policy, and 13% had a partial indoor policy.³⁴

Jails

Two studies conducted in jails in the 1990s found more restrictive policies in place than in prisons.^{27,33} First, a 1991 survey of 64 jails in Wisconsin found 33% had a complete indoor/outdoor smoke-free policy for inmates, 23% had a partial or complete indoor policy, and 44% had no policy restricting smoking. Notably, 30% of jails that did not yet have a complete indoor/outdoor smoke-free policy planned to implement one in 1992.³³ Secondly, Falkin, Strauss, and Lankenau²⁷ surveyed 925 of the nation's 3,627 jails in 1998 and found that more than half (55%) had a complete indoor/outdoor smoke-free policy for staff and inmates, with the majority of these policies adopted since 1995.

Smoke-Free Policies for Staff and Inmates

Two studies reviewed differences in smoke-free policies as they apply to inmates and staff and found that systems often had more lenient policies for staff. Among the 45% of jails that permitted some smoking in 1998, 32% allowed staff, but not inmates, to smoke.²⁷ Among the 77% of self-described "tobacco-free" prisons and jails surveyed in 2001, 79% allowed staff, but not inmates, to use tobacco.²⁵

Smoke-Free Policies and Cessation Assistance Availability

Five of the 23 included studies assessed the availability of cessation programs in prisons and jails; these studies found that despite intentions to provide cessation support most prisons and jails with complete indoor/outdoor smoke-free policies did not provide this service.^{14,15,25,34} In 1986, three of 19 prison systems had cessation interventions available for inmates.¹⁴ In 1993, 74% of 50 prison systems claimed that if a smoke-free policy was adopted, then cessation assistance should be provided and 26% reported nicotine replacement treatment (NRT) should be provided as well.¹⁵ However, in 1998, among jails with a complete indoor/outdoor policy, less than a quarter (20%) provided cessation education materials, 17% provided cessation counseling or support groups, and only 4% provided free nicotine replacement treatments.²⁷

In 2003, fewer than 20% of prisons and jails surveyed reported offering any form of cessation program.²⁵ In 2007, 53% of prison systems offered cessation programs to inmates, but only 39% of those with a complete indoor/outdoor smoke-free policy offered cessation programs compared to 86% of systems with a complete indoor policy.³⁴ Even when NRT is sold in prisons and jails, the cost may be prohibitive for inmates; one study found that a pack of nicotine patches cost 15.5 times more than a pack of cigarettes.³⁵

Motivations for Smoke-Free Policy Implementation

Four studies examined motivations of prisons and jails for implementing smoke-free policies; these studies found that reasons differed depending on the type of policy adopted.^{25,27,28,34} Reducing healthcare costs was the most common reason cited for implementing a smoke-free policy in prisons and jails, particularly among those with a complete indoor/outdoor smoke-free policy.^{27,34} Prison systems with a partial indoor policy were more likely than those with complete indoor/outdoor policies to reference reducing building and maintenance costs as smoke-free policies are generally associated

with reduced fire risk as well as reduced tar and nicotine build up on walls.²⁸

Impact of Policies on SHS Exposure and Inmate Health

Two studies examined the impact of smoke-free policies in prisons on levels of SHS exposure by measuring environmental markers of SHS; the studies found that smoke-free policies dramatically reduced SHS levels, but that implementation was inconsistent.^{36,37} Hammond and Emmons³⁶ measured the concentration of nicotine in several areas of two Vermont prisons before and after the implementation of an indoor/outdoor smoke-free policy. There is no safe level of SHS exposure; therefore, nicotine levels, a marker of SHS, should be below the limit of detection, which is 0.021 $\mu\text{g}/\text{m}^3$.^{38,39} Prior to the adoption of the smoke-free policy, prisons averaged nicotine concentrations of 1.3–5.3 $\mu\text{g}/\text{m}^3$ in living quarters, 3.4–7.6 $\mu\text{g}/\text{m}^3$ in common rooms and main building areas, and 25 $\mu\text{g}/\text{m}^3$ in a gym used as a living space due to overcrowding. Following the adoption of the smoke-free policy, the prisons experienced a reduction in nicotine concentration of 50%–80%, with greater decreases in areas that had the highest pre-policy nicotine concentrations.³⁶ A later study measured respirable suspended particulate matter ($\text{PM}_{2.5}$) before and after the adoption of a state mandated indoor smoke-free policy in six North Carolina prisons. Though $\text{PM}_{2.5}$ is not unique to tobacco smoke, the study found average $\text{PM}_{2.5}$ concentrations decreased by 77%–91% across facilities following policy implementation. One facility did not comply with the indoor smoke-free policy; study staff directly witnessed inmates smoking and $\text{PM}_{2.5}$ concentrations increased slightly following the adoption of the policy.³⁷

Two studies assessed inmate health outcomes associated with smoke-free policies; both studies suggest smoke-free policies have the potential to positively impact inmate health through reducing both active smoking and SHS exposure. Connell²⁶ conducted a retrospective survival analysis measuring the impact of a complete indoor/outdoor smoke-free policy versus a complete indoor smoke-free policy on acute myocardial infarctions (AMIs) at six Kentucky prisons. After controlling for confounders, the risk of experiencing an AMI was 2.87 times higher in prisons that had only a complete indoor smoke-free policy compared with prisons with a complete indoor/outdoor policy.²⁶ Heng and colleagues⁴⁰ found a complete indoor/outdoor smoke-free policy in a women's federal prison eliminated differences in complications following dental extractions between smokers and nonsmokers.⁴⁰

Economic Impacts

No published studies related to healthcare costs or other economic impacts, such as reduced maintenance costs associated with smoke-free policies in prisons or jails, were identified in our literature search.

Compliance With Smoke-Free Policies

Seven studies conducted in 10 state prisons across the United States found inmates continued to smoke despite smoke-free policies with 20%–76% of inmates reporting smoking in violation of a smoke-free policy.^{35,37,41–45} Self-reported daily smoking among inmates in a complete indoor/outdoor smoke-free North Carolina prison remained high (42%), but was less than the smoking prevalence in another North Carolina prison with a complete indoor, but not outdoor, smoke-free policy (64%).³⁷

Smoke-Free Policy Implementation Experience

Eight studies described challenges faced by prisons and jails implementing smoke-free policies; limited staff support, competing priorities, and challenges posed by the development of tobacco black markets were consistently reported as barriers to implementation.^{15,25,28,35,43,45–47} The type of policy (e.g., indoor or indoor/outdoor), the security level of the facility, and the consistency and strength of penalties for policy violations were associated with the success of smoke-free policies.^{43,45}

Staff Support

Staff support of smoke-free policies was associated with staff smoking status; further, staff support of policies influenced the success of policy implementation.^{46,47} A survey of Vermont state prison staff, conducted in the late 1990s, found that 50% of never and former smokers supported a complete indoor/outdoor smoke-free policy for inmates while only 15% of current smokers supported such a policy.⁴⁶ Lankenau⁴³ found that most staff viewed tobacco contraband as a less serious problem than illicit drug contraband because many were current or former smokers and it is legal for adults to smoke outside of prison. Some staff reported that a complete indoor/outdoor smoke-free policy made their jobs more difficult because they were no longer able to give inmates cigarettes as a reward for good behavior; though this practice had been common, it was not officially permitted.⁴³

Staff Expectations of Smoke-Free Policy Implementation

Vaughn and del Carmen's¹⁵ survey of prison systems, found that more than half (52%) of prison administrators felt implementing a smoke-free policy would place a greater burden on prison staff and resources. A 2003 study sampling medical doctors in 100 correctional facilities found they did not consider reducing smoking and SHS exposure a health priority in comparison to other health-related priorities such as illicit drug addiction, mental illness, and infectious diseases. Further, 44% were pessimistic about their ability to reduce tobacco use among staff and inmates, reporting that they did not believe any cessation program or educational resource would be helpful in reducing tobacco use among staff or inmates.²⁵

Violence and Tobacco Black Markets

Prior to the wide spread adoption of complete indoor/outdoor smoke-free policies, eighty percent (80%) of administrators believed that prohibiting smoking would likely increase tensions, lead to violence, and draw staff away from other duties.¹⁵ However, later studies have found little or no evidence of increased violence related to the adoption of smoke-free policies.^{15,28,34} Studies did, however, consistently document the development of tobacco black markets (illegal trade of contraband tobacco) after the implementation of complete indoor/outdoor smoke-free policies.^{27,28,34,43,45,47}

Key informant interviews at a prison with a complete indoor/outdoor smoke-free policy suggested cigarettes were often available in quantities that indicated staff were likely complicit in bringing cigarettes into the prison for inmates. Further, staff noted that it was difficult to identify the individual inmates smoking when they were in large groups, making enforcement of penalties difficult.⁴⁷ However, Thibodeau and colleagues found that in a jail with a complete indoor/outdoor policy, the risk of being caught and penalized along with the high cost, low quality, and inconsistent supply of contraband cigarettes made smoking too great a "hassle" for most inmates.⁴⁵ Black

market trade tended to be less active in facilities with higher security levels (i.e., maximum vs. minimum), or when smoke-free policies were consistently implemented with clear penalties.^{43,45,47}

Inmate Post-Release Smoking

Six articles described post-release smoking and found that, without a smoking cessation intervention, inmates released from complete indoor/outdoor smoke-free prisons or jails were very likely to smoke following release.^{29–32,44,48} Intention to quit smoking before release was associated with smoking abstinence following release.^{30,31,44} Among inmates who received no cessation support, one small study found that 27 of 44 of inmates (61%) released from a complete indoor/outdoor smoke-free prison remained smoke-free at one month post-release,⁴⁴ whereas two larger studies found that 60% of inmates smoked within one day of release.^{31,48} Inmates who received a cessation intervention were six and a half times more likely to be cotinine confirmed non-smokers at three weeks post-release compared to inmates who were randomized not to receive the intervention.³¹

Discussion

Our review found that the number of U.S. prisons and jails with smoke-free policies has increased substantially since the 1980s. In addition to the published literature included in this review, the ANRF provides more recent, comprehensive estimates of smoke-free policies in U.S. prisons. In July of 2013, ANRF reported that 21 states had complete indoor and outdoor smoke-free policies and 27 states and the FBOP had complete indoor smoke-free policies. However, the extent to which these policies differ for staff and inmates is not known. Since previous research indicates that prisons tend to have less restrictive smoke-free policies for staff, the tracking and reporting of smoke-free policies could be strengthened by reporting how policies apply to both staff and inmates.

Implementation of smoke-free policies was not consistent between individual prisons and jails but, when enforced, policies dramatically reduced SHS levels.^{35,36} Though we found limited research specific to U.S. prisons and jails, the evidence indicates that smoke-free policies positively impact inmate and staff health.^{26,40} Yet, even without studies specific to U.S. prisons and jails, it is well known that reduced exposure to SHS benefits health.¹³

While many studies have assessed the healthcare savings associated with smoke-free policies in public places,⁴⁹ no economic analysis specific to prisons or jails was identified in this review. The paucity of evidence around the economic impacts is surprising given the fact that healthcare costs for inmates represent a large and growing proportion of government budgets.⁷ Through preventing and reducing the severity of smoking-related illnesses in prisons and jails, smoke-free policies could potentially reduce healthcare costs. A longitudinal study investigating the health effects of the complete indoor/outdoor smoke-free policy in the FBOP is underway. This study, which will follow 250 inmates over several years, will provide valuable insight into the health impacts of smoke-free policies in this setting.⁵⁰ Though evidence from other settings suggests the potential healthcare savings are substantial, an in depth cost-benefit analysis documenting the impact of smoke-free policies in this setting may provide greater incentive for jail and prison systems to adopt and implement comprehensive smoke-free policies.

Our review suggests that while smoke-free policies are rarely associated with increased violence, the success of implementation

varies between prisons and jails with some inmates continuing to smoke in violation of policies. Limited staff support, competing priorities, and tobacco black markets are important barriers to implementing smoke-free policies. As physicians who smoke are less likely to advise patients to quit smoking,⁵¹ staff who smoke may be less likely to enforce penalties for violating smoke-free policies. Promoting smoking cessation assistance to staff and providing education on the benefits of smoke-free policies may improve policy implementation.

As inmates who are considering quitting smoking are less likely to violate a smoke-free policy, promoting tailored smoking cessation interventions to inmates may also be an effective strategy for implementing smoke-free policies.^{41,44,52} Inmates make quit attempts at the same rate as adult smokers in the general population and tailored cessation interventions have achieved quit rates comparable to those conducted in the community.^{10,31,53} Unfortunately, we found most prison systems with complete indoor/outdoor smoke-free policies did not provide cessation programming to inmates.^{25,34} When cessation assistance is available, many state prison systems reported only providing educational materials or offering some unspecified assistance program other than classes or counseling.²² Therefore, it is unlikely that many cessation assistance programs offered in this setting meet the recommendations from the U.S. Public Health Service Clinical Practice Guidelines.⁵⁴ Recommended treatments include individual, group, or telephone counseling as well as nicotine replacement treatments, bupropion, and varenicline.

Prison and jail administrators may not think investing in smoking cessation programs, particularly when tobacco is already contraband, is a worthy use of limited resources.²² However, not investing in smoking cessation programs represents a missed opportunity to reduce spending. The American Lung Association found that for every dollar a state spends on smoking cessation, it will save an average of \$1.26.^{22,55} As jails and prisons are constitutionally obligated to provide reasonable levels of healthcare to inmates,⁷ the direct return on investment for prisons and jails may be even greater. While research indicates that forced smoking abstinence does not translate to sustained smoking cessation,^{48,56} providing cessation interventions to inmates increases their ability to remain smoke-free.³¹

Inmates are a vulnerable, high-risk population with greater prevalence of both smoking and mental illness than the general population. The Bureau of Justice Statistics estimates that 56% of state prisoners and 64% of jail inmates have either a diagnosis or symptoms of a mental health problem.¹¹ During 2009–2011, 36% of non-institutionalized adults with a mental illness were current smokers compared to 21% among adults with no mental illness.⁵⁷ This represents a public health opportunity to provide smoking cessation interventions to an underserved population that has not, as of yet, been reached by traditional tobacco control efforts.

While this review was limited to studies conducted within the United States, research describing the implementation and outcomes of smoke-free policies in other countries provides insight. A series of studies conducted in prisons in Australia led the authors to conclude that a systems approach incorporating smoking cessation with mental health care services may increase cessation success.⁵⁸ A review of smoke-free policies in the United States, Australia, and Europe concluded that comprehensive policies that restrict where inmates can smoke, provide smoking cessation support to inmates and staff, and offer specialized training for health staff are needed to address smoking in prisons.⁵⁹ New Zealand was the first to adopt a national complete indoor/outdoor smoke-free policy nationwide for staff and

inmates. One year after policy adoption, a review of media coverage, government reports, and scientific literature concluded that policy implementation was, generally, successful. Critical factors to successfully implementing the policy were careful preparation, availability of cessation services, and choosing to implement a complete indoor/outdoor smoke-free policy as opposed to a complete indoor smoke-free policy.⁶⁰

This review is subject to, at least, the following limitations. Study selection was limited to studies that specifically assessed smoke-free policies in U.S. prisons and jails and does not capture research conducted outside of the United States or studies specific to smoking cessation among incarcerated populations. All research regarding smoke-free policies in U.S. prisons and jails, especially analyses conducted by prison and jail administrators for internal purposes, may not be published in the literature, potentially biasing this review. Studies included in this review report several different types of outcomes. Results are reported for major themes selected by the authors and do not represent an exhaustive review of all findings reported in the included studies. Among the studies in this review, 11 were conducted at only one prison or jail. The findings of reviewed studies, which mostly sampled a small number of prisons and jails, are not necessarily generalizable to other prisons or jails.

Implementing smoke-free policies has the potential to provide health benefits by reducing active smoking and SHS exposure. Complete indoor/outdoor smoke-free policies for inmates have become common in U.S. prisons and jails yet there are significant barriers to their implementation. Despite limited staff support, competing priorities, and tobacco black markets, evidence suggests consistently enforcing penalties for violating policies and promoting smoking cessation can lead to successful implementation. There is a dearth of evidence describing the health and economic impacts of these policies. Future studies should document the impact of smoke-free policies on smoking related illnesses among staff and inmates as well as economic outcomes. Successfully implementing smoke-free policies and providing inmates with the skills to remain smoke-free is an important opportunity not only to reduce corrections costs but also to improve the health of a vulnerable, high-risk population.

Funding

This research was supported in part by an appointment to the Research Participation Program at the Centers for Disease Control and Prevention administered by the Oak Ridge Institute for Science and Education through an interagency agreement between the U.S. Department of Energy and CDC. The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

Declaration of Interests

None declared.

Acknowledgments

L. England, Office on Smoking and Health, Centers for Disease Control and Prevention; D. Mallett, CDC Public Health Library and Information, Center Centers for Disease Control and Prevention; L. Williams, American Nonsmokers' Rights Foundation; G. Falkin, National Development and Research Institutes, Inc.

References

1. Walmsley R. *World prison population list*. 10th ed. London: King's College London, International Centre for Prison Studies; 2013:1–6. http://www.prisonstudies.org/sites/prisonstudies.org/files/resources/downloads/wppl_10.pdf. Accessed November 10, 2014.
2. Carson EA, Golinelli D. *Prisoners in 2012—advance counts*. Washington, DC: U.S. Department of Justice, Office of Justice Programs, Bureau of Justice Statistics; 2013.
3. Minton TD. *Jail inmates at midyear 2011: statistical tables*. Washington, DC: U.S. Department of Justice, Office of Justice Programs, Bureau of Justice Statistics; 2012.
4. Stephan JJ. *Census of state and federal correctional facilities, 2005*. Washington, DC: U.S. Department of Justice, Office of Justice Programs, Bureau of Justice Statistics; 2008. <http://www.bjs.gov/index.cfm?ty=pbdetail&cid=530>. Accessed November 10, 2014.
5. Stephan JJ, Walsh GW. *Census of Jail Facilities, 2006*. Washington, DC: U.S. Department of Justice, Office of Justice Programs, Bureau of Justice Statistics; 2011. <http://www.bjs.gov/index.cfm?ty=pbdetail&cid=2205>. Accessed November 10, 2014.
6. National Association of State Budget Offices. *State expenditure report: examining fiscal 2010–2012 state spending*. Washington, DC: National Association of State Budget Officers; 2012. <http://www.nasbo.org/sites/default/files/State%20Expenditure%20Report%20%28Fiscal%202010-2012%29.pdf>. Accessed November 10, 2014.
7. Kinsella C. Corrections health care costs. 2004. <http://www.csg.org/knowledgecenter/docs/TA0401CorrHealth.pdf>. Accessed November 10, 2014.
8. Binswanger IA, Krueger PM, Steiner JF. Prevalence of chronic medical conditions among jail and prison inmates in the USA compared with the general population. *J Epidemiol Community Health*. 2009;63:912–919.
9. Centers for Disease Control and Prevention. Current cigarette smoking among adults aged ≥18 years—United States, 2005. *MMWR Morb Mortal Wkly Rep*. 2005;54:1121–1124.
10. Centers for Disease Control and Prevention. Quitting smoking among adults—United States, 2001–2010. *MMWR Morb Mortal Wkly Rep*. 2011;60:1513–1519.
11. James DJ, Glaze LE. *Mental health problems of prison and jail inmates*. Washington, DC: U.S. Department of Justice, Office of Justice Programs, Bureau of Justice Statistics; 2006.
12. Wilper AP, Woolhandler S, Boyd JW, et al. The health and health care of US prisoners: results of a nationwide survey. *Am J Public Health*. 2009;99:666–672.
13. US Department of Health and Human Services. *The health consequences of involuntary exposure to tobacco smoke: a report of the surgeon general*. Atlanta, GA: Centers for Disease Control and Prevention, Coordinating Center for Health Promotion, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health; 2006.
14. Romero CA, Connell FA. A survey of prison policies regarding smoking and tobacco. *Journal of Prison and Jail Health*. 1988;7:27–36.
15. Vaughn MS, del Carmen RV. Research note: smoking in prisons—a national survey of correctional administrators in the United States. *Crime Delinquency*. 1993;39:225.
16. Eriksen MP, Cerak RL. The diffusion and impact of clean indoor air laws. *Annu Rev Public Health*. 2008;29:171–185.
17. Vaughn MS, Del Carmen RV. Smoke-free prisons: policy dilemmas and constitutional issues. *J Crim Just*. 1993;21:151–171.
18. *Helling v. McKinney*, No. 91-1958, 959 F.2d 853 (Supreme Court of The United States 1993).
19. Sweda EL Jr. Litigation on behalf of victims of exposure to environmental tobacco smoke. The experience from the USA. *Eur J Public Health*. 2001;11:201.
20. American Nonsmokers' Rights Foundation. 100% smokefree correctional facilities. 2012. <http://www.no-smoke.org/pdf/100smokefreeprisons.pdf>. Accessed July 6, 2012.

21. Centers for Disease Control and Prevention. State Tobacco Activities Tracking and Evaluation (STATE) System. 2013. <http://www.cdc.gov/tobacco/statesystem>. Accessed November 10, 2014.
22. Cork K. Tobacco behind bars: policy options for adult correctional populations. 2012. <http://publichealthlawcenter.org/sites/default/files/resources/phlc-policybrief-tobaccobehindbars-adultcorrections-2012.pdf>. Accessed November 10, 2014.
23. Thornley ST, Dirks KM, Edwards R, Woodward A, Marshall R. Indoor air pollution levels were halved as a result of a national tobacco ban in a New Zealand prison. *Nicotine Tob Res.* 2013;15:343.
24. Lasnier B, Cantinotti M, Guyon L, Royer A, Brochu S, Chayer L. Implementing an indoor smoking ban in prison: enforcement issues and effects on tobacco use, exposure to second-hand smoke and health of inmates. *Can J Public Health.* 2011;102:249.
25. Chavez RS, Oto-Kent DS, Porter J, Brown K, Quirk L, Lewis S. *Tobacco policy, cessation, and education in correctional facilities: National Commission on Correctional Health Care and National Network on Tobacco Prevention and Poverty*. West Sacramento, CA: National Network on Tobacco Prevention and Poverty Health Education Council; 2004.
26. Connell AR. Tobacco-free prison policies and health outcomes among inmates. (Doctoral Dissertations). Lexington, KY: The Graduate School at UKnowledge, University of Kentucky; 2010. http://uknowledge.uky.edu/gradschool_diss/22. Accessed November 10, 2014.
27. Falkin GP, Strauss SM, Lankenau SE. Cigarette smoking policies in American jails. *American Jails.* 1998;8:9–14.
28. Patrick S, Marsh R. Current tobacco policies in US adult male prisons. *Soc Sci J.* 2001;38:27–37.
29. Pezzino G, Remington PL, Anderson H, Lantz PM, Peterson DE. Impact of a smoke-free policy on prisoners in Wisconsin, United States. *Tob Control.* 1992;1:180.
30. Bock B, Lopes CE, van den Berg JJ, et al. Social support and smoking abstinence among incarcerated adults in the United States: a longitudinal study. *BMC Public Health.* 2013;13:859–867.
31. Clarke JG, Stein LAR, Martin RA, et al. Forced smoking abstinence: not enough for smoking cessation. *JAMA Intern Med.* 2013;173:789–794.
32. van den Berg JJ, Bock B, Roberts MB, et al. Cigarette smoking as an expression of independence and freedom among inmates in a tobacco-free prison in the United States. *Nicotine Tob Res.* 2014;16:238–242.
33. Centers for Disease Control and Prevention. Cigarette smoking bans in county jails—Wisconsin, 1991. *MMWR Morb Mortal Wkly Rep.* 1992;41:101–103.
34. Kauffman RM, Ferketich AK, Wewers ME. Tobacco policy in American prisons, 2007. *Tob Control.* 2008;17:357.
35. Kauffman RM, Ferketich AK, Murray DM, Bellair PE, Wewers ME. Tobacco use by male prisoners under an indoor smoking ban. *Nicotine Tob Res.* 2011;13:449.
36. Hammond SK, Emmons KM. Inmate exposure to secondhand smoke in correctional facilities and the impact of smoking restrictions. *J Expo Anal Environ Epidemiol.* 2005;15:205–211.
37. Proescholdbell SK, Foley KL, Johnson J, Malek SH. Indoor air quality in prisons before and after implementation of a smoking ban law. *Tob Control.* 2008;17:123.
38. Apelberg BJ, Hepp LM, Avila-Tang E, et al. Environmental monitoring of secondhand smoke exposure. *Tob Control.* 2013;22:147–155.
39. Kraev TA, Adamkiewicz G, Hammond SK, Spengler JD. Indoor concentrations of nicotine in low-income, multi-unit housing: associations with smoking behaviours and housing characteristics. *Tob Control.* 2009;19:438–444.
40. Heng CK, Badner VM, Clemens DL, Mercer LT, Mercer DW. The relationship of cigarette smoking to postoperative complications from dental extractions among female inmates. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 2007;104:757–762.
41. Cropsey KL, Kristeller JL. The effects of a prison smoking ban on smoking behavior and withdrawal symptoms. *Addict Behav.* 2005;30:589–594.
42. Khavjou OA, Clarke J, Hofeldt RM, et al. A captive audience: bringing the WISEWOMAN program to South Dakota prisoners. *Women Health Iss.* 2007;17:193–201.
43. Lankenau SE. Smoke 'em if you got 'em: cigarette black markets in U.S. prisons and jails. *Prison J.* 2001;81:142.
44. Thibodeau L, Jorenby DE, Seal DW, Kim SY, Sosman JM. Prerelease intent predicts smoking behavior postrelease following a prison smoking ban. *Nicotine Tob Res.* 2010;12:152.
45. Thibodeau L, Seal DW, Jorenby DE, Corcoran K, Sosman JM. Perceptions and influences of a state prison smoking ban. *J Correct Health Care.* 2012;18:293–301. doi:10.1177/1078345812456019.
46. Carpenter MJ, Hughes JR, Solomon LJ, Powell TA. Smoking in correctional facilities: a survey of employees. *Tob Control.* 2001;10:38–42.
47. Foley KL, Proescholdbell S, Herndon Malek S, Johnson J. Implementation and enforcement of tobacco bans in two prisons in North Carolina: a qualitative inquiry. *J Correct Health Care.* 2010;16:98.
48. Lincoln T, Tuthill RW, Roberts CA, et al. Resumption of smoking after release from a tobacco-free correctional facility. *J Correct Health Care.* 2009;15:190–196. doi:10.1177/1078345809333388.
49. Hahn EJ. Smokefree legislation: a review of health and economic outcomes research. *Am J Prev Med.* 2010;39(suppl 1):S66–S76.
50. Martin SA, Celli BR, DiFranza JR, et al. Health effects of the Federal Bureau of Prisons tobacco ban. *BMC Pulm Med.* 2012;12:64.
51. Pipe A, Sorensen M, Reid R. Physician smoking status, attitudes toward smoking, and cessation advice to patients: an international survey. *Patient Educ Couns.* 2009;74:118–123.
52. Voglewede JP. Predictors of current need to smoke in inmates of a smoke-free jail. *Addict Behav.* 2004;29:343–348.
53. Cropsey KL, Kristeller JL. Motivational factors related to quitting smoking among prisoners during a smoking ban. *Addict Behav.* 2003;28:1081–1093.
54. Fiore MC, Jaén CR, Baker TB, et al. *Treating tobacco use and dependence: 2008 update. Clinical practice guideline*. Rockville, MD: U.S. Department of Health and Human Services. Public Health Service; 2008. http://www.ahrq.gov/professionals/clinicians-providers/guidelines-recommendations/tobacco/clinicians/update/treating_tobacco_use08.pdf. Accessed November 10, 2014.
55. American Lung Association. Helping smokers quit: tobacco cessation coverage 2011. 2011. <http://www.lung.org/assets/documents/publications/smoking-cessation/helping-smokers-quit-2011.pdf>. Accessed July 26, 2013.
56. Voglewede JP Jr, Noel NE. Predictors of current need to smoke in inmates of a smoke-free jail. *Addict Behav.* 2004;29:343–348. doi:10.1016/j.addbeh.2003.08.048
57. Centers for Disease Control and Prevention. Vital signs: current cigarette smoking among adults aged ≥18 years with mental illness—United States, 2009–2011. *MMWR Morb Mortal Wkly Rep.* 2013;62:81–87.
58. Richmond R, Indig D, Butler T, Wilhelm K, Archer V, Wodak A. A randomized controlled trial of a smoking cessation intervention conducted among prisoners. *Addiction.* 2012;108:966–974.
59. Ritter C, Stöver H, Levy M, Etter J, Elger B. Smoking in prisons: the need for effective and acceptable interventions. *J Public Health Policy.* 2011;32:32–45.
60. Collinson L, Wilson N, Edwards R, Thomson G, Thornley S. New Zealand's smokefree prison policy appears to be working well: one year on. *N Z Med J.* 2012;125:164–168.