



Review

Explaining Mechanisms That Influence Smoke-Free Implementation at the Local Level: A Realist Review of Smoking Bans

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Abstract

Introduction: While studies have been undertaken to understand the adoption of outdoor and indoor smoking bans, not much is known about why implementation of smoke-free (SF) environments differs at local levels. As most European countries remain at the level of indoor bans, we aim to translate existing evidence into practical recommendations on how to improve SF (outdoor) implementation within European municipalities.

Methods: We applied six methodological steps of a realist review consistent with the RAMESES publication standards for realist syntheses. Literature search was conducted in PubMed/MEDLINE and Web of Science. In total, 3829 references were screened, of which 43 were synthesized. Studies dating from 2004 to 2015 with rigor evidence of SF implementation at the local level were selected. Implementation outcomes were SF enforcement, monitoring, nonsmoking compliance, and public support in cities.

Results: The explanatory realist framework links four innovation stages with three context-mechanism-outcome (CMO) configurations. We identified “triggering trust,” “increasing priorities,” and “limiting opposing interests” as underlying mechanisms, when (1) establishing, (2) developing, (3) contesting, and (4) implementing local smoking bans. The CMO propositions (CMOs) support practical recommendations, such as (1) providing authorities with local data when establishing and developing bans, (2) developing long-term strategies and implementing state-funded SF programs to prioritize sustained enforcement, and (3) limiting opposing interests through the use of the child protection frame.

Conclusions: This is the first realist review on the implementation of SF environments at the local level. The process-oriented theory explains how and why CMOs determine SF development in cities and municipalities from planning until implementation.

Implications: In 2015, only 16% of the world’s population lived under the jurisdiction of comprehensive SF laws. The findings of this realist review are useful to implement WHO goals of the Framework Convention on Tobacco Control (FCTC) and specifically SF environments at more local levels and to adjust them to specific contextual circumstances. This paper unpacks three

mechanisms that could be triggered by SF strategies developed at local levels and that can result in improved policy implementation. Such evidence is needed to enhance SF strategies at the level of cities and municipalities and to achieve WHO “Healthy Cities Network” objectives.

Introduction

Six tobacco control policies (TCPs) have been recommended by the World Health Organization (WHO) to decrease smoking and second-hand smoke (SHS) exposure.¹ These TCPs are an integral part of the WHO Framework Convention on Tobacco Control (FCTC), which aims to spread tobacco control to national and local levels.² One of the most visible intervention strategies is that of realizing smoke-free (SF) environments, which is consistent with the WHO FCTC Article 8 guidelines to protect people from exposure to SHS and WHO “European Healthy Cities Network” objectives.^{3,4} Implementing this strategy may include banning smoking not only in private and public worksites, hospitals, bars, and restaurants but also in outdoor areas such as parks, recreation facilities, college campuses, beaches, sports arenas, and playgrounds.⁵⁻⁹ Since California’s introduction of the “Smoke-Free Workplace Act” (1995), there has been worldwide adoption and implementation of SF environments at both national and local levels. In the past two decades, smoking bans have been passed in almost all industrialized countries.

The growing number of studies on the effectiveness of SF policies indicates an apparent difference between partial and comprehensive designs.¹⁰⁻¹³ Comprehensive SF environments can be defined as strict smoking bans without any exceptional rules, whereas partial designs allow separated smoking areas at bars, restaurants, hospitals, workplaces, or airports. Only 16% of the world’s population lives under the jurisdiction of comprehensive SF laws, found mostly in high- or middle-income countries.¹⁴ However, even in comparable Western societies and within the European Union (EU), both the speed of uptake and the goals for implementation of TCPs differ considerably among countries depending on policy opportunities, governmental will, and national circumstances.¹⁵⁻¹⁷ The European Commission encourages EU member states to adopt and implement SF environments,¹⁸ but in reference to FCTC guidelines, many countries are still “trailing behind.”¹⁹ In 2012, only 17% of European countries had implemented comprehensive SF legislation.¹⁹

Research has demonstrated that top-down implementation of TCPs at the (supra-)national level is effective in terms of improving public health (particularly in terms of reducing cardiovascular diseases) and contributing to smoking cessation.²⁰⁻²² Other authors argue that bottom-up support at the local level is most needed to achieve long-term denormalization of smoking.²³⁻²⁵ Whereas SF legislation is mostly adopted at the (sub-)national level, implementation is often enforced in cities and municipalities. According to this view, TCPs can have the greatest impact in real-world settings when they meet local needs and are suited to local opportunities,²⁵ such as capacities of a city administration. Thus, it is essential to pay attention to the local context of SF implementation processes because “adoption is a crucial first step, but implementation through effective communication and enforcement of the policy is necessary for the desired outcomes.”²⁶

As the adoption of SF policies by local authorities might be more common in pluralist and grassroots-oriented Anglo-Saxon countries,¹⁴ lessons for the local level can mostly be drawn from these contexts. Such an approach may appear to be an inadequate, “one-size-fits-all solution” for rather corporatist EU municipalities because

of their affiliation to a different “family of nations”²⁷ and because of the distinctive public policy-making processes in English-speaking, continental, Scandinavian, and peripheral contexts. Nevertheless, the experience of Anglo-Saxon countries should serve as a relevant point of orientation for policy improvements that can help create comprehensively SF EU cities.

Aims

In this paper, we aim to learn from documented SF experiences. For this purpose, we will develop an evidence-based theoretical framework based on existing theories explaining how interventions or strategies at local levels influence successful development and implementation of smoking bans. More specifically, as most EU and European countries still remain at the level of indoor bans,²⁸ the identified results will be translated into practical recommendations on how to implement SF (outdoor) policies within European municipalities. We will outline the mechanisms that could be triggered by strategies developed at local levels and that can result in improved policy implementation. In our study, the term “local” refers to spatial units below the national level, such as cities, towns, municipalities, and counties that are legal bodies of sub-national units.

Realist Study Design

“Critical realism”²⁹ is an increasingly influential field in the social sciences and offers an alternative to positivism or postmodernism, as it aims to unravel the inner workings of social reality by understanding generative mechanisms that produce outcomes. So far, research based on a realist philosophy in the field of tobacco control interventions has been limited.³⁰⁻³² As a result, there is insufficient understanding of why the implementation of SF environments does not proceed uniformly at local levels.

In this paper, we will adopt a realist methodology for three reasons: First, there is a need to understand how SF implementation could be enhanced within different local contexts and circumstances because the majority of the world’s population still lives under conditions that are not covered by comprehensive SF public places. Second, such understanding could come from a careful assessment of conditions and processes that have influenced outcomes of SF implementation in the past. Realist reviews are particularly aimed at performing an assessment that incorporates evidence obtained from different observational designs. Third, it is important to be able to translate such understanding into recommendations on how to promote SF policies within different contexts. Realist reviews provide the basis for such recommendations by identifying mechanisms that influence the development and implementation of intervention strategies within different local contexts.

Methods

The realist review methodology was applied to evaluate the inner workings of complex and dynamic policy interventions and strategies.³³⁻³⁵ The research questions guiding realist syntheses are often summarized as “what works for whom under what circumstances, how and why?”^{35,36} In accordance with critical realism,²⁹ a realist

review has more of an explanatory than judgmental character and seeks to unravel generative (causal) mechanisms.^{33,37} The realist approach investigates the “mechanisms” (M) of *how* and *why* program activities work in real-world “contexts” (C) and produce multiple “outcomes” (O). A certain program activity (PA) introduced by decision makers alters resources and constraints in a given context and environment, “which then triggers mechanism(s), which produce both intended and unintended outcomes. Intervention X may work well in one context but poorly or not at all in another context.”³⁶ Hence, the goal is to render “CMO configurations”³⁸ visible, acknowledging that mediating mechanisms (eg, preferences) are hidden.³⁵⁻³⁷

In line with recommendations by Pawson,^{33,39} our realist review includes six stages: (1) identifying the review question, (2) formulating an initial theory, (3) searching and selecting primary studies, (4) extracting evidence, (5) appraising study quality, and (6) synthesizing relevant and contradictory data.^{33,39,40} The initial theory will thus be tested, substantiated and refined by empirical data, resulting in an evidence-based framework. Our “realist-informed systematic review”³⁷ is consistent with the RAMESES publication standards (Supplementary File 1) for realist syntheses.³⁶

Stage 1: Identifying the Review Question

Our aim is to identify context-mechanism-outcome (CMO) configurations that influence the implementation of SF environments in cities and municipalities. The question is *how* PAs aimed at adopting and implementing policies to ban smoking in public places (eg, workplaces, restaurants, bars, and parks) work within different local contexts (C) and *why* specific mechanisms (M) determine (un-)intended implementation outcomes (O).

Stage 2: Formulating an Initial Theory

We combined two existing theories, the advocacy coalition framework^{41,42} (ACF) and actor-network theory⁴³ (ANT), in order to capture the level of normative-discursive (ACF) and process-related (ANT) dimensions of SF implementation.

Taking into account the variety of different policy actors with diverging interests and preferences, we assumed in line with the study of Weishaar et al.²⁰ on tobacco control advocacy in the EU that the adoption and implementation of SF policies at the local level mostly depend on the influence of “advocacy coalitions.”^{41,42} The ACF highlights that long-term policy making takes place in the policy subsystem which is comprised of at least two opposing coalitions (eg, coalition A vs. coalition B) bound together by their specific beliefs, resources, and strategies.^{41,42} According to Sabatier, coalitions are commonly comprised of “people from a variety of positions (elected and agency officials, interest group leaders, researchers) who share a particular belief system—i.e. a set of basic values, causal assumptions, and problem perceptions—and who show a non-trivial degree of coordinated activity over time.”⁴¹ ACF assumes that such allies hold strong (core) beliefs and are motivated to translate those beliefs into action and policies.^{41,42} One can distinguish a “three-tiered hierarchical structure”⁴² of beliefs. First, “core beliefs” refer to general normative (eg, liberty, equality) and ontological assumptions.^{41,42} Second, “policy core beliefs” span an entire policy subsystem,^{41,42} like a split into protobacco or antitobacco coalitions and their hegemonic views on the hazards or economic benefits of smoking.⁴⁴ Finally, secondary beliefs which are narrower in scope point out mostly to instrumental decisions like administrative rules, budgetary allocations, and evaluation of programs.^{41,42} Tobacco control coalitions

are composed of people who share similar beliefs about the causes and solutions of tobacco-attributable problems and have common core values.^{20,44} The policy subsystem consists for instance of all people and organizations that are involved in tobacco control and the implementation of SF policies at national and local levels.⁴⁴ Tobacco industry-oriented third-party actors (eg, hospitality sector) oppose beliefs of tobacco control advocates.^{45,46} Both competing coalitions are affected by macro level factors, such as relative stable system parameters (eg, constitutional rules) or external events such as policy changes because of shifts in public opinion or new governmental policies.^{41,42} Coalition opportunity structures—such as the degree of consensus needed or openness of political system—can serve as a mediator between relatively stable system parameters within a given context and the policy subsystem of tobacco-related networks.⁴² Policy making in modern societies requires that advocates specialize and offer well-founded knowledge in discourses (importance of intersubjective arguments) if they are to have any impact on policy outcomes.⁴¹ The risk of exposure to SHS, pollution caused by cigarette butts, and the long-term risks to children from seeing smoking in public are such reasonable arguments for SF environments.⁷

Similar to the ACF, the ANT offers a comprehensive sociological process-related model and initial theory for SF policy innovation.⁴³ ANT explicates four stages of SF policy innovation: (1) establishing the issue by offering knowledge about the problem, (2) developing solutions, (3) contesting solutions, and (4) implementing and refining the preferred solutions. The basic assumption of ANT is alike the ACF that actors have to build coalitions to enhance SF policies because these new interventions will be contested by other stakeholders. To understand the full innovation process, ANT maps policies from emergence to implementation.⁴³

In our initial theory, we refined key premises of the ACF and ANT’s four stages of innovation using realist-informed CMO configurations. In so doing, we accounted for the fact that the TCP subsystem is split into two opposing stakeholder coalitions, which are, on the one hand, public health or tobacco control organizations (supporting comprehensive SF policies without exemptions) and, on the other hand, tobacco industry-oriented third-party actors who oppose smoking bans because of potential economic damage or violation of commercial freedom.⁴⁵⁻⁴⁷ This sharp division and the complexities of consensus seeking are well documented in the literature.^{20,47,48}

Realist CMO configurations are presented in a format such as “if there is change in context C, this put in place mechanism M, which will then lead to outcome O.”³³ Our initial theory (Figure 1) assumes that during all four ANT policy innovation stages, SF PAs are established, developed, contested, and implemented at the local level (C), which will trigger opposing stakeholders to expand their shared policy core beliefs and objectives (M), such as health prevention (“minimizing smoking-related risks”) or libertarianism (“against the nanny state”). Such expansion may result in different outcomes, including new levels of enforcement, monitoring, compliance, or public support (O).

Stage 3: Searching for and Selecting Primary Studies

We searched from January until March 2016 based on a search query (see Supplementary File 2) for empirical evidence dating from 2004 until 2015 to refine our initial theoretical framework. This publication period was chosen because we were particularly interested in the European experience, and smoking bans became part of the legislation in many EU member states in 2004.^{10,12,49} By

using electronic databases—*Social Sciences Citation Index (Web of Science)* and *PubMed/MEDLINE*—we identified primary studies relevant to the study scope and research question. We conducted telephone interviews with two national-level tobacco control experts to define our search strategy and relevant search terms. Their expert knowledge provided us with precise information on conditions and processes that might be relevant for implementing smoking bans at the local level.

We used search terms pertaining to SF environments and smoking bans in all topics and fields of the above-mentioned electronic databases, including the following: *smoking ban* OR *smoke-free* OR *tobacco-free*. Because of our interest in the implementation of SF environments at the local level, we combined these three search terms with the following terms: *implementation*, *adoption*, *local*, *city*, *cities*, *municipality*, *municipalities*, *tobacco control*, *enforcement*, and *compliance* (see search query in [Supplementary File 2](#)). The last search was performed in summer 2016.

In total, 7282 potentially relevant articles were found and imported into our electronic literature database ([Figure 2](#)). After excluding articles that did not match our research period and deleting duplicates, we retained 3829 publications. Two researchers (MM and LH) screened the 3829 titles and abstracts of all references independently and checked them for relevance to our study scope and against the exclusion criteria in [Table 1](#). Non-English articles were not included because the large majority of the screened international evidence was published in peer-reviewed English-speaking journals.

Based on these criteria, we excluded 3746 studies that did not fit the inclusion criteria because they addressed SF indoor and outdoor settings at national or school levels, SF homes (private sphere), or tobacco display bans in shops.

The selection included 83 articles for full-text screening, of which two articles were found by reference checking ([Figure 2](#)). In the full-text screening, we selected articles based on the “realist review’s focus on relevance and rigor.”³⁶ This requires appraising the “study quality”^{37,40} of the empirical evidence (see stage 5) presented in these studies. In a realist synthesis, relevance assesses whether an article is able to contribute to CMO theory building, whereas rigor affects

the validity and trustworthiness of evidence.^{32,36} Screened empirical evidence should be useful for testing, substantiating, and refining the CMO configurations regarding the implementation of public SF policies at the local level. The evidence could relate to implementation and policy outcomes, such as the levels of enforcement, monitoring, compliance (PM 2.5 level), and public support ([Table 1](#) and [Figure 2](#)).

Stage 4: Extracting Evidence

In total, we found 43 articles that contained empirical evidence of sufficient rigor and relevance, and we included these articles in the extracting and synthesizing process ([Figure 2](#)). Studies on Anglo-Saxon ($n = 27$) cities and municipalities were dominant. For each article, we used a standard extraction template (see data syntheses in [Supplementary File 2](#)) in which eight categories were used to document CMO configurations.⁴⁰ We involved two researchers (MM and LH) in the data extraction, one male, and one female, to ensure interevaluator, four-eye principle, and gender-sensitive objectivity. Furthermore, we assessed whether theoretical frameworks were applied ([Table 2](#)) in order to potentially integrate these perspectives into our initial theory and final framework.

Stage 5: Appraising Study Quality

Quantitative approaches ($n = 21$) were used in the majority of the selected articles, followed by qualitative ($n = 14$), mixed methods—designs ($n = 5$), and reviews ($n = 3$). The relevance of the selected papers was assessed by the “thick/thin continuum,”³⁷ which refers to an article’s richness of evidence regarding CMO propositions (CMOs) that are relevant to the objectives of the review. *Thick* articles contained detailed and rich descriptions of relevant CMOs, whereas *thin* ones had only sparse data on CMOs.^{37,40} *Thin* articles predominantly measured just one relevant aspect of our framework, such as associations between program input and outcomes, without revealing much about mechanisms that could have mediated any observed effect or about the enabling or disabling role of the wider context. The relevance of the extracted

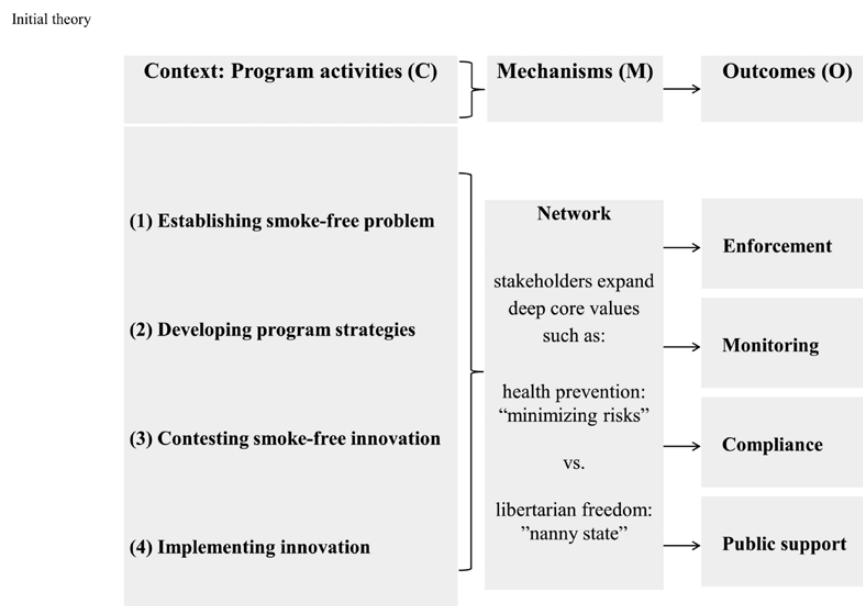


Figure 1. Initial theory.

Search process

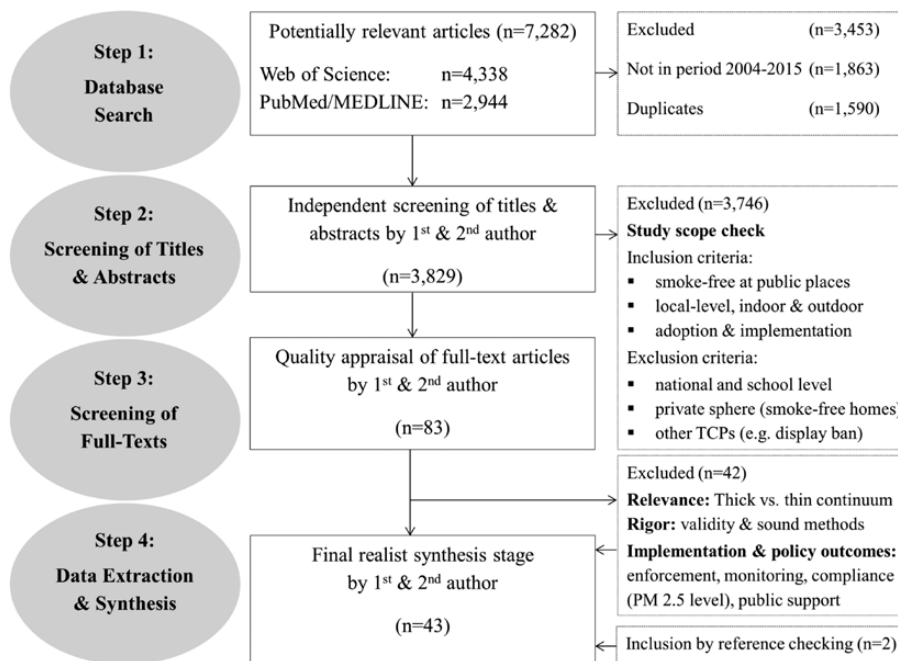


Figure 2. Search process.

Table 1. Screening of Study Scope: Inclusion and Exclusion Criteria

	Inclusion/exclusion criteria
Study focus	Includes smoke-free at public places indoor and outdoor local level (cities, municipalities) any country Excludes school-level or national-level TCPs (eg, school curricula, taxation) private sphere: smoke-free homes other TCPs (eg, advertisement bans, point-of-sale display ban)
Study design	Includes any empirical design (including qualitative, quantitative, reviews) only English articles Excludes no (primary) empirical evidence editorials, opinion pieces, letters and commentaries
Implementation: policy outcomes	Includes smoke-free enforcement (eg, fines) smoke-free monitoring (eg, evaluations) smoke-free compliance (eg, PM 2.5, air nicotine concentration) support after smoke-free implementation (eg, denormalization) Excludes no information on smoke-free policy outcomes

TCP = tobacco control policies.

papers was assessed by categorizing them (see [Supplementary File 2](#)) as thick, moderate, or thin contributions by taking into account the rigor and richness of the evidence.^{37,40} Qualitative and mixed methods studies tended to offer thicker evidence than quantitative papers, whose content was predominantly moderate or thin regarding relevant CMO implementations details ([Table 2](#) and [Supplementary File 2](#)).

Stage 6: Synthesizing Relevant and Contradictory Data With Propositions

We processed the empirical evidence for the final synthesizing step in four steps. First, based on the extraction of CMOs, we formulated CMOs in a middle-range theory sense. These propositions do not necessarily reflect all mechanisms, but they are “close enough

Table 2. Characteristics of Empirical Evidence

Study design	Thick evidence	Moderate evidence	Thin evidence
Quantitative	Hill et al. ⁵¹ ; Marsh et al. ⁸¹ ; Mark et al. ⁵⁴ ; Thrasher et al. ⁶⁵	Bhat N et al. ⁸⁶ ; Blanco-Marquizo et al. ⁶⁶ ; CDC ⁸⁸ ; Dove et al. ⁹¹ ; Fong et al. ⁷⁸ ; Giraldi et al. ⁷² ; Hamilton et al. ⁸⁴ ; Luo et al. ⁷³ ; Ma et al. ⁷⁵ ; Nykiforuk et al. ⁷⁴ ; Rhoades et al. ⁶⁸ ; Semple et al. ⁸² ; Ye et al. ⁸³	Biener et al. ⁸⁹ ; Johnson and Beal ⁹⁰ ; Lee et al. ⁹² ; Liu et al. ⁷⁹
Qualitative	Baron-Epel et al. ⁶² ; Crosbie et al. ⁶⁴ ; Douglas et al. ⁵⁵ ; Kennedy et al. ⁷¹ ; Montini and Bero ⁶¹ ; O'Dougherty et al. ⁵⁸ ; Satterlund et al. ⁶⁰ ; Satterlund et al. ⁵⁹ ; Satterlund et al. ⁶⁹	Blanchard et al. ⁵⁷ ; Kashiwabara et al. ⁶⁷ ; Klein et al. ⁵³ ; Ritchie et al. ⁸⁷ ; Sebrie et al. ⁶³	None
Mixed Methods Review	Arnott et al. ⁵² ; Douglas et al. ⁵⁶ None	Fallin et al. 2014 ²⁶ ; Klein et al. ⁸⁰ ; Stillman et al. ⁷⁰ Stillman et al. ⁷⁰ ; Thomson et al. ⁸⁵ ; Ueda et al. ⁷⁶	None None
Theory	ACF, community-building, policy process, norm change	Behavioral ecological model, socioecological model	Institutional analysis and development framework
Frameworks and theories	Arnott et al. ⁵² ; Blanchard et al. ⁵⁷ ; Douglas et al. ⁵⁵ ; Douglas et al. ⁵⁶ ; Hamilton et al. ⁸⁴ ; Klein et al. ⁸⁰ ; Montini and Bero ⁶¹ ; Rhoades et al. ⁶⁸ ; Satterlund et al. ⁵⁹ ; Satterlund et al. ⁶⁹	Baron-Epel et al. ⁶² ; Ritchie et al. ⁸⁷	Fallin et al. 2014 ²⁶

to observed data to be incorporated in propositions that permit empirical testing.⁵⁰ Second, in accordance with realist synthesis, MM and LH identified patterns in the mechanisms, also known as “demi-regularities,”⁴⁰ which are “semi-predictable patterns or pathways of program functioning.”³⁸ Demi-regularities were formulated into continuously revised and refined realist CMOs, such as “if program activity (PA) x^{n+1} in context (C) x^{n+1} , this puts in place mechanism (M) x^{n+1} , which will then lead to outcome (O) x^{n+1} .”³³ Third, these formulated CMOs were again checked by re-reading the papers; they were also juxtaposed with primary evidence and tested against contradictory evidence throughout the synthesis process.^{37,40}

Finally, all members of the research team checked whether the evidence was used properly in the interpretative synthesis, and after discussions, the first and second authors (MM and LH) agreed upon potential misreadings and ambiguities.^{32,40} The CMOs presented in this paper are based upon predominantly thick or moderate evidence with sufficient rigor, to which we gave more weight than we did to thin evidence.^{32,37}

Results

During our review, three types of mechanisms turned out to be dominant:

- triggering trust,
- increasing priorities,
- and limiting opposing interests.

These mechanisms act within multiple CMO configurations, which are reflected in the following (sub-)propositions. (1) Trust, (2) priorities, and (3) interests are triggered by SF PAs within different contexts; they lead to multiple outcomes of SF environments and make them work differently under certain circumstances at the local level. The identified CMOs will be used to refine our initial theory on SF implementation at the local level. SF PAs may or may not trigger mechanisms (M) dependent on specific contextual circumstances (C) that subsequently lead to intended or unintended outcomes (O) at

stages of establishing (1), developing (2), contesting (3), and implementing (4) SF innovations.

Triggering Trust

Proposition 1

If (C) heterogeneous alliances are able to establish (1) coalitions between SF stakeholders and local authorities (PA), trust is triggered among these actors (M), which will stimulate policy makers to develop (2) sustainable SF strategies (O).

Evidence from quantitative, mixed methods, and qualitative data highlights that local advocacy of SF grassroots movements in Anglo-Saxon countries succeeded in building up trustful relationships with municipal authorities.⁵¹⁻⁵⁴ Qualitative studies from Oklahoma and Minneapolis-St. Paul reported that trust is a crucial element of collaboration and partnership for SF alliances, and two of these studies found that this modified efficient communication with—and workload reduction for—decision makers.⁵⁵⁻⁵⁸ On the contrary, studies from California on SF workplaces and recreational spaces illustrated that local authorities can become opponents during the development stage if they are not fully convinced how the policy could be properly enforced.^{59,60}

Some local authorities and enforcers are not motivated by basic philosophical principles of SF policies.^{61,62} A study on the implementation of SF bars in Tel-Aviv reported that court judges do not support or enforce the law because of mistrust of SF advocates.⁶² However, not only in high-income regions⁵⁵ but also in middle-income countries such as Argentina,⁶³ local alliances are able to lobby more effectively, as tobacco-industry third parties have less influence on local policy makers than at the national level. Even in other non-protellant, upper middle or lower middle income countries, such as Mexico,^{64,65} Uruguay,⁶⁶ and India,⁶⁷ coalitions contributed to the effective development of SF laws in cities. A relevant number of studies highlighted the importance of heterogeneous local alliances with multiple actors when developing SF policies, as various stakeholders are involved in the process of establishing consensus and development awareness.^{55,57,67,68} Such partnerships can be established between

parent-teacher associations and sport clubs⁵⁵ or between civil society organizations and city officials,⁶⁷ which can result in developing sustainable SF strategies.

Proposition 1.1. If (C) SF advocates are able to establish (1) a strategic and coordinated program (PA), trust is stabilized through active collaboration (M), which will develop (2) and transfer SF knowledge into real-world practice (O).

Research from California,^{59,69} Oklahoma,⁵⁶ and three Chinese cities⁷⁰ indicated the need for a coordinated plan as an important contextual factor (PA) when implementing SF outdoor and workplace areas. Benefits of strategic SF programs that preempt cities and sub-national regions from enacting their own smoking restrictions have been reported in Oklahoma,⁵⁷ Ontario,⁷¹ the Italian municipality of Lazio,⁷² and 17 Chinese⁷³ cities. Anglo-Saxon and Latin American studies described local “champions” as charismatic leaders who promote strategic SF programs.^{59-61,63,69,74}

In contrast, a lack of leadership^{75,76} and inconsistent terminology⁷⁷⁻⁷⁹ produced unintended outcomes in terms of inconsistent enforcement^{60,61,76,79} and visible smoking practice.⁷⁵⁻⁷⁸ Research from Oklahoma indicates that SF knowledge can be transferred into real-world practice by stabilizing local coalitions through trust and active collaboration.⁵⁵⁻⁵⁷ Trust established through strategic face-to-face communication between city officials, and local NGOs generated strong commitments to SF activities during the development stage in Chandigarh and Chennai (India),⁶⁷ Ontario,⁷¹ and Minneapolis-St. Paul.⁵⁸ Strategic and coordinated programs trigger positive outcomes for real-world SF practice by reducing smoking rates,⁷⁰ achieving shared policy core beliefs among local stakeholders,⁵⁵ and generating public support.^{64,69}

Proposition 1.2. If (C) SF advocates are able to provide (1) local data on public support, smoking prevalence, and economic effects of smoking bans (PA), trust in SF agendas increases (M), which will persuade policy makers to develop (2) SF strategies (O).

A quantitative telephone survey from Ohio⁵¹ and a review of the smoking ban in Santa Fe/Argentina⁶³ offered strong data showing that opinion polls on public support provide policy makers with crucial information on potential outcomes when introducing SF environments.^{51,63} Findings from a study of Minneapolis-St. Paul showed that local data on smoking prevalence, knowledge on economic effects of smoking bans, and public opinion polls on support enhance trustful relationships more than pressuring officials with confrontational tactics by email or phone.⁵⁸ In California, local data served as a “persuasive tool”^{59,69} and documented evidence-based community support for decision makers. In Santa Fe and Montevideo as well, public opinion polls increased the likelihood of SF development by helping to generate consistent support.^{63,66}

Increasing Priorities

Proposition 2

If (C) financial opportunities, staff structure, and time resources are developed (2) adequately by policy makers (PA), priorities for SF implementation will increase (M), which will result in long-term enforcement (4) and program monitoring (O).

Several US states and counties prioritize comprehensive tobacco control programs and provide adequate funding for local SF

advocacy. They also structure their staff to enhance implementation.^{56,59,68,69} However, there is counter evidence that SF implementation is not necessarily expensive for municipalities. A qualitative telephone survey conducted for the SF Ontario act found that no additional staff or significant fiscal resources were needed for adequate enforcement.⁷¹ In sharp contrast, a California study found that “extra funding ‘made all the difference in the world’.”⁶⁰ Monetary funds from national and transnational organizations provided activists in India and Mexico with resources for supportive mass media campaigns.^{64,67} Quantitative and qualitative studies from Anglo-Saxon regions showed that the level of SF priorities depends heavily on staff^{54,60,61,80,81} and time,^{54,61,74,81} both of which affect the long-term monitoring of SF environments. Research from these same contexts identified limited time resources as a crucial barrier to sustainable implementation.^{54,56,59,60,71,81}

Proposition 2.1. If (C) financial opportunities, staff structure, and time resources allow frequent inspections and develop (2) effective deterrence policies (PA), priorities for the monitoring of SF compliance will increase (M), which will reinforce (4) SF laws (O).

A quantitative pre- and post-ban study of Scottish pubs in Aberdeen and Edinburgh cited frequent inspections as a PA and reported high nonsmoking compliance and remarkable reductions in air nicotine concentrations after the ban.⁸² Data suggest that (in-) frequent inspections are associated with higher⁶⁷ (and respectively, lower) levels^{51,62,72} of compliance. A quantitative pre- and post-ban study of the Chinese city of Guangzhou and its partial smoking ban found that low fines were associated with high smoking rates and low quit ratios.⁸³ In California,^{60,61} Israel,⁶² and Italy,⁷² the minimal deterrence effects of sanctions resulted in a lack of effective reinforcement and implementation.

Denormalization of smoking is impeded if authorities do not prioritize the reinforcement of SF environments, as seen in China,^{60,70,75} California,⁶⁰ and at international airports.⁷⁷ However, thanks to effective advocacy, a lack of public health priorities and inadequate resources did not prevent 67 New Zealand councils from reinforcing SF outdoor areas.⁸¹

Proposition 2.2. If (C) SF public places provide (2) visible, reasonable, and multilingual signboards (PA), municipal priorities for and awareness of nonsmoking norms both increase (M), which will lead to consolidated enforcement (4) of SF norms (O).

Studies from Minnesota and 17 Chinese cities identified low public awareness of SF policies as an expression of low priorities on the part of authorities.^{73,80} A cross-sectional survey of Massachusetts found that the more strongly smoking bans are designed, the more perceived SF norms will be consolidated.⁸⁴ There is persuasive evidence from Anglo-Saxon^{54,71,84,85} communities and Indian^{67,86} cities that understandable and visible signage consolidate public nonsmoking role modeling. Appropriately displayed no-smoking signs in Scottish pubs were associated with a high level of compliance.^{82,87} Multilingual signboards⁷⁶ maximize people’s awareness during times of globalization and migration.

In contrast, insufficient and small signage minimizes awareness,⁸⁰ even though the costs of appropriate signboards are minimal.⁸¹ Furthermore, a review of 34 international airports found that a lack of visible information and inconsistent terminology lead

to discrepancies between local SF legislation and airport practices in these cities.⁷⁷ Signboards should explain the intervention using reasonable descriptions and frame SF as a beneficial measure for reducing SHS exposure, setting a positive example for children, and reducing litter.^{76,80,85}

Limiting Opposing Interests

Proposition 3

If (C) SF advocates anticipate the resistance (3) of both the tobacco industry and third parties using intersubjective reasonable arguments (PA), the industry's economic interests would be limited in their influence on policy makers (M), leading to more consistent development (2) of SF policy implementation (O).

Research on Japanese,⁷⁶ Indian,⁶⁷ and Mexican⁶⁴ cities shows that the tobacco industry tries to influence SF innovations and succeeds at facilitating close relationships with national and local authorities. A review found that the tobacco industry influenced design and promotion at international airport premises.⁷⁷ Legal inconsistency is one major outcome of the tobacco industry's influence on local officials.^{64,67,77}

Quantitative and qualitative studies reported that by co-opting the hospitality sector and supporting smokers' rights unions, the tobacco industry aimed to block SF environments in Latin American cities.⁶³⁻⁶⁵ A quantitative telephone survey from Ohio suggests that coalitions must be prepared to combat opposition to SF environments and that one major counterargument claims that smoking bans are "bad for business."⁵¹ SF advocates in middle-income countries were able to anticipate opposition from the tobacco industry and third parties by using effective media campaigns.^{64,67}

It is true that bar owners around the world fear that smoking bans could threaten their sales and revenues.^{61,62,88} However, a multilinear regression analysis focused on El Paso (Texas) found that no decline in total restaurant or bar revenues occurred after implementation.⁸⁸ A longitudinal analysis on SF bars in Boston found that even smokers do not decrease their patronage.⁸⁹ In Oklahoma, concerns about costs were addressed by establishing positive contacts with local officials.⁵⁵

Evidence-based argumentation about smoking-related costs serves as a winning intersubjective tool. There is convincing evidence that comprehensive SF laws support reductions in exposure to SHS and in the incidence of fatal heart attacks at the local level.^{66,82,90,91} Public attitudes about SF environments change significantly if children and the unborn^{64,80,85} are framed as part of the intervention strategy (the "child-effect") or if children become local champions.⁶³

Proposition 4

If (C) SF advocates are able to limit resistance (3) among smokers in some indoor and outdoor areas (PA), smoking interests and the ignorance of smokers might be curtailed (M), leading first to smoking in alternative locations but, in the long run, leading to real-world development (2) of reduced smoking visibility in SF places (O).

There is a huge gap between legal and legitimate norms in terms of smoking because of complaints about "discrimination against smokers."⁶³ Smokers feel limited in their smoking opportunities and react by targeting issues of individual freedom⁶³ and fairness.⁶⁵ Smokers oppose SF innovations by citing controversies regarding the harms of SHS exposure,^{65,72,80} and have, depending on

their current or former smoking status, lower rates of support than nonsmokers.^{51,78,86}

A pre- and post-ban survey of three Chinese cities (Beijing, Shanghai, and Guangdong) found that 40% of Chinese smokers working in SF workplaces reported smoking sometimes.⁷⁰ In six other Chinese counties, one-third of nonsmokers reported being exposed to SHS at their workplaces.⁷⁵ Following a voluntary smoking ban in Beijing, smoking still occurred in almost half of the nominal nonsmoking venues.⁷⁹ Individual smokers' resistance leads to smoking in alternative indoor places such as restrooms,⁷² bathrooms,⁷⁰ stairwells,⁷⁰ own offices,⁷⁰ or outdoor SF areas.^{70,82,87} Two California studies reported that customers were allowed by bar owners to smoke in hospitality venues at their own risk during later hours.^{60,61} This means that support for SF environments is—as assumed in our initial theory—generally contentious and fragile because it is seen as a nonlibertarian interference into the private sphere.^{63,65}

However, a quantitative survey from Minnesota⁸⁰ and a review of SF outdoor areas in Anglo-Saxon municipalities⁸⁵ found that the vast majority of people support SF outdoor areas such as parks. Evidence indicates that a relevant number of smokers support smoking bans in at least some indoor places, such as restaurants or workplaces.^{51,66,78,92} Support among smokers even varies according to the type of outdoor location; this is observed in the "child effect," where SF places are accepted if they are frequented by minors.^{72,80,85}

Refined Theory: Three Mechanisms at Four Innovation Stages

Our refined framework (Figure 3) links realist CMO configurations with the ACF and ANT. In comparison to the initial theory, it differentiates among three CMO configurations and specifies which PAs or mechanisms work at four stages of SF innovations. As assumed in our initial theory, implementation of smoking bans is contested and fragile, but networks or shared policy core beliefs of the ACF^{20,41,42} and policy stages of ANT⁴³ should be specified with CMOs. Trust between SF advocates and policy makers was also found in previous studies^{20,93} as crucial element of the ACF⁴² and is an essential mechanism during the following initial stages of ANT: (1) establishing the problem and (2) developing solutions. Priorities raise awareness and consolidate SF norms during the development (2) and final stage, when solutions are (4) implemented and enforced. Economic and individual interests are mechanisms of the third stage, where solutions are (3) contested, but if one succeeds in limiting them and persuading smokers using intersubjective arguments, this should be considered when developing (2) SF implementation.

Discussion

We present findings from the first realist review of the implementation of SF environments at the local level. Based on the evidence, we integrated initial theoretical considerations of ANT's four SF policy innovation stages with realist-informed CMO configurations. Our theory (Figure 3) depicted the context (C) of applied PAs, which implement mechanisms of trust, priorities, and interests (M) when (1) establishing, (2) developing, (3) contesting, and (4) implementing smoking bans, which will lead or not lead to sustained development, including knowledge transfer, long-term enforcement

Framework – 4 stages and 3 mechanisms

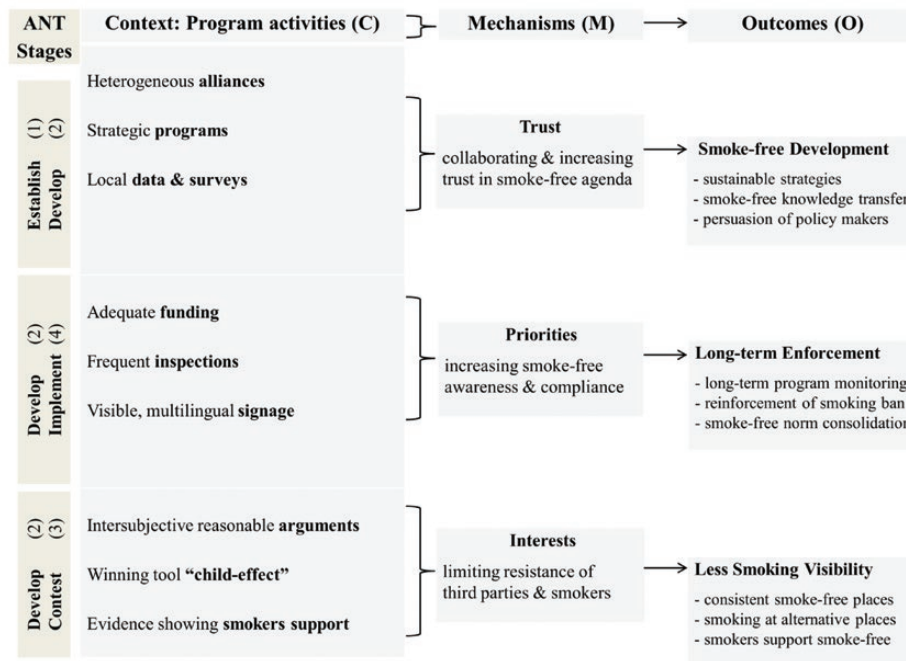


Figure 3. Framework—four stages and three mechanisms.

containing monitoring, and denormalization of smoking (O) at the local level.

Key Findings and Interpretation

We found, first, that trust between local decision makers and SF stakeholders is triggered (M) through establishing heterogeneous alliances (PA), developing strategic and coordinated SF programs (PA), and providing evidence-based local opinion surveys (PA), which will transfer knowledge and persuade local authorities to establish and develop sustained SF policies (O). Second, SF priorities and awareness can increase (M) if financial, human, and time resources are adequately provided (PA) for inspections (PA) and SF infrastructure such as signage (PA), which will ensure efficient long-term monitoring of compliance, reinforce SF laws, and consolidate norms (O). Third, the resistance of tobacco industry third parties and smokers can be successfully limited (M) if reasonable, intersubjective winning tools such as the child-effect (PA) are applied, which will lead to more consistent development of SF places (O). Lastly, if SF advocates are able to gain support among smokers at least for some indoor and outdoor areas (PA), the opposing interests of smokers might be limited (M), which will lead to less smoking visibility at SF places, even if smoking at alternative places continues (O).

Our theory is consistent with international literature on SF implementation and tobacco-free policies at local,^{8,25} national,⁹³ and supranational²⁰ (EU) levels, as funding, coordination, leadership, and "broad-based advocacy"⁹³ were found to be essential factors for implementation^{8,20,25,93} but were not systematized as CMO elements. The study of Weishaar et al.²⁰ found also in line with main premises of the ACF^{41,42} that trust and united collaboration enhance even among heterogeneous alliances fighting for a common goal, such as establishing and developing SF policies.²⁰ Trust as a CMO element might not be applicable to nonprotestant contexts and societies with deep mistrust of political elites.^{28,65} The data document a worldwide

split between high- and low-trust societies depending on religious heritage, national wealth, and ethnic homogeneity.⁹⁴ Citizens with low levels of trust are significantly more likely to accept the breaking of (SF) norms.⁹⁵

Furthermore, the role of (economic) resistance and the importance of support are evident,^{46,93} but comprehensive indoor bans are supported once they are in place.¹¹ Recent studies on outdoor regulations in the United States and Canada found high support rates for child-related SF places, even among smokers and in less affluent neighborhoods.^{96,97} Third-party harms (SHS) served as reasonable intersubjective arguments for SF parks, beaches, playgrounds, and advocacy increased trust by providing strong evidence-based data,^{7,97} which indicates that SF implementation must—as described in the ACF^{41,42} and ANT⁴³—negotiate the interests of resisters.

Limitations

Our paper has five limitations. First, related to the realist design, we were dependent on the existing scientific evidence, which is fragmentary in terms of CMOs. Therefore, linking CMOs with ANT's innovation stages required a high level of abstraction. Second, we did not consider duration and stage of SF policy implementation. Research shows that support for SF areas increases over time and might influence implementation success.^{11,84,85,96} Anglo-Saxon countries introduced SF laws 20 years ago and recently broadened their smoking bans to include outdoor areas, whereas many EU countries still remain at the level of indoor bans.^{28,71} Third, we did not elaborate on macro factors such as taxation, socioeconomic, mass media discourses, or on the sociodemographic factors of a municipality that can influence SF implementation, such as degree of urbanization, median income, and proportion of disadvantaged areas.^{74,87} A wealthy region such as California is a "trailblazer"⁶⁰ in tobacco control, while the state has also access to tobacco taxes to be used for tobacco control initiatives which is probably as important as its

level of wealth.^{59,98,99} However, even within the United States, there are significant differences in attitudes toward and design of SF policies across states, subpopulations, and by venue type like restaurants or casinos.^{92,96,100} The fourth limitation is the Anglo-Saxon dominance ($n = 27$) of our synthesized evidence, which could be a result of using only English-speaking databases. Finally, including a larger number of NGO reports or local gray literature documents would have resulted in a more refined program theory. The dominance of peer-reviewed studies in our research literature raises some concerns. Reports on local SF policies are less likely to be published in peer-reviewed journals, because of, for example, journal perceptions of local studies as replications of other communities. However, we believe that the bias is limited because at least one-fifth ($n = 9$) of the included peer-reviewed studies are reporting results based on document analysis of gray literature. Moreover, we did not only extract CMOs from the Results section of the selected studies but we also extracted gray literature findings that were mentioned in the Discussion or Introduction part.

Recommendations

The findings support three recommendations: First, (1) SF advocacy should collaborate in a trustful manner with local officials and provide key community stakeholders with evidence-based local data and reports when establishing and developing SF environments. Second, (2) authorities should develop long-term strategies and implement state-funded SF programs to prioritize the sustained enforcement of SF environments. Third, (3) reduced smoking visibility at SF places and denormalization of smoking will be developed by encountering opposing economic interests and gaining support among smokers through the use of intersubjective reasonable arguments (eg, child protection frame).

Conclusions

This realist review developed a process-oriented and evidence-based theory explaining how and why CMO configurations determine successful SF development at the local level from planning until implementation. Three underlying mechanisms—trust, priorities, and interests—influence the implementation of SF environments at four innovation stages when establishing, developing, contesting, and enforcing smoking bans at the local level. Our results indicate that adequate PAs will lead to sustained development including knowledge transfer, long-term enforcement containing monitoring, and denormalization of smoking. Further research needs to address the interplay of stakeholders and policy makers at the level of EU cities and municipalities to adjust TCPs to local contexts. Qualitative and quantitative data should be compared with the Anglo-Saxon experience and used to develop fine-grained evidence for cost-effective and local-sensitive implementation in continental Europe.

Supplementary data

Supplementary data are available at *Nicotine and Tobacco Research* online

Funding

This realist review is part of the SILNE-R project (Enhancing the Effectiveness of Programs and Strategies to Prevent Smoking by Adolescents: A Realist Evaluation Comparing Seven European Countries), which is supported by the European Union's Horizon 2020 research and innovation programme, under grant agreement 635056. Official website: <http://silne-r.ensp.org/>. The

international coordinator of the study is AK, Academisch Medisch Centrum (AMC), University of Amsterdam (Netherlands).

Declaration of Interest

The authors have no conflicts of interest to declare.

Acknowledgments

MM designed the initial theory, executed the search, managed the whole review process, drafted, and refined the framework and whole manuscript. LH was involved in designing the initial theory, search process, selection, appraisal of articles, and synthesis of evidence. MS and IM were involved in refining the initial theory, framework, and design of the paper. AEK, MCW, and MR were involved in the design of the paper and refinement of the framework theory. All authors contributed to the writing of the final version manuscript and approved the final manuscript. The authors thank Paulien Nuyts for organizing the inspiring workshop on the realist methodology, held in Utrecht (Netherlands) in January 2016.

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