

Smoke-free spaces over time: a policy diffusion study of bylaw development in Alberta and Ontario, Canada

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Abstract

Policy diffusion is a process whereby political bodies 'learn' policy solutions to public health problems by imitating policy from similar jurisdictions. This suggests that diffusion is a critical element in the policy development process, and that its role must be recognised in any examination of policy development. Yet, to date, no systematic work on the diffusion of smoke-free spaces bylaws has been reported. We examined the diffusion of municipal smoke-free bylaws over a 30-year period in the provinces of Alberta and Ontario, Canada, to begin to address this gap and to determine whether spatial patterns could be identified to help explain the nature of policy development. Bylaw adoption and change were analysed within local, regional, and provincial contexts. Geographical models of hierarchical and expansion diffusion in conjunction with the diffusion of innovations framework conceptually guided the analyses. Study findings contribute to a broader understanding of how and why health policies diffuse across time and place. Policy development can be a powerful mechanism for creating environments that support healthy decisions; hence, an understanding of policy diffusion is critical for those interested in policy interventions aimed at improving population health in any jurisdiction.

Keywords: diffusion of innovations, municipalities, policy, second-hand smoke, smoke-free bylaws, spatial behaviour

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Introduction

Policy diffusion literature suggests that political bodies search for policy solutions to public problems by learning from the experiences of similar jurisdictions; therefore, the potential influence of policy diffusion should be recognised in any analysis of policy development. Municipal bylaws that regulate smoking in public places are one example of a population-health policy becoming increasingly prevalent worldwide. While there is a growing body of knowledge on several facets associated with bylaw adoption, to date there has been no systematic work reported on the diffusion of municipal smoke-free bylaws.

This study, conducted in 2004, examined the role of policy diffusion in municipal smoke-free spaces bylaw development over a 30-year period in two Canadian

provinces: Alberta and Ontario. Bylaw outcomes were examined within the context of local, provincial, and national environments, specifically in association with the timing of initial bylaw adoption and subsequent bylaw changes. Rogers' diffusion of innovations framework (2003) and classic geographical diffusion models were used as theoretical foundations from which to explore patterns of bylaw adoption and change.

Municipal smoke-free spaces bylaws as population health interventions

The effects of second-hand smoke (SHS) have been linked to a wide variety of health problems in smokers and non-smokers. Exposure to SHS, a class A carcinogen, has been strongly associated with increased risk of

lung cancer, cardiovascular and cerebrovascular disease in adults and increased risk of sudden infant death syndrome, respiratory tract illness, and illness-related school absences in children (US Environmental Protection Agency 1993, Brownson *et al.* 1997, National Institutes of Health 1999, Mannino *et al.* 2001, Gehrman & Hovell 2003, Jaakkola *et al.* 2003, Hill *et al.* 2004, California Air Resources Board 2005). SHS exposure occurs primarily in the workplace and home (Hammond *et al.* 1995, Anderson *et al.* 2001, Sorenson *et al.* 2004). The regulation of smoking in public places and workplaces through municipal bylaws is an increasingly common policy response to this public health problem. Well-crafted policy is a powerful intervention that shapes environments in which health behaviour occurs, impacting place and behaviour simultaneously (Spasoff 1999, Green *et al.* 2001).

In Canada, formal policies like bylaws or legislation are enacted at three government levels. Federal legislation pertains to all provinces and territories, and each province and territory also has the jurisdiction to pass legislation pertaining to its constituent municipalities. Provinces grant municipal governments authority to pass bylaws pertaining to their communities. Historically, the majority of smoke-free spaces policies in Canada were municipal-level, and despite recent advances in provincial legislation of smoke-free spaces, municipalities continue to be an important policy arena. For example, for provinces with legislation, that law sets a minimum standard of protection that municipalities must comply with, but municipalities can also pass bylaws that extend the provincial law and offer a greater level of protection from SHS. Thus, municipal smoking bans can protect health by limiting exposure to SHS and can foster changes in social climate that are increasingly unfavourable to tobacco use. This helps to denormalise smoking, an important message for youth, and creates supportive environments for smoking prevention and cessation activities (Farkas *et al.* 2000, Trotter *et al.* 2002, Tang *et al.* 2003, Weber *et al.* 2003, Siegel *et al.* 2004, Gilpin *et al.* 2004, Sargent *et al.* 2004).

In addition to Canada's federal *Tobacco Act* (SC 1997 ch. 13), *Non-Smoker's Health Act* (RSC ch. N-23.6), and various provincial regulations, Health Canada (2003) estimated that, as of May 2003, over 300 municipalities in Canada had implemented a smoke-free bylaw, and that the number and degree of restrictions were increasing with time. Recent evidence shows that municipal bylaws have contributed to reduced occupational exposure to SHS in bars and restaurants (Hahn *et al.* 2006, Repace *et al.* 2006, Semple *et al.* 2007), reduced acute myocardial infarction hospitalisations (Sargent *et al.* 2004, Barone-Adesi *et al.* 2006, Bartecchi *et al.* 2006), increased cessation and quit attempts among smokers (Stephens

et al. 1997, Moskowitz *et al.* 2000, Longo *et al.* 2001, Bartosch & Pope 2002, Trotter *et al.* 2002, Hammond *et al.* 2004, Bauer *et al.* 2005, Albers *et al.* 2007), and prevention of youth smoking (Siegel *et al.* 2005). While it is clear that municipal bylaws can be an effective mechanism for addressing SHS exposure, there remains distinct variation in the level of protection offered by bylaws in different communities (Skeer & Siegel 2003, Skeer *et al.* 2004, Tocque *et al.* 2005). This disparity in protection leads to differential impacts on community health outcomes and the health system warranting systematic investigation into the factors that contribute to bylaw variation.

In recent literature on 'new' public health geographies, place and context have emerged as critical factors in considerations of risk management and health promotion interventions (Mohan 1998, Brown & Duncan 2000, 2002, MacIntyre & Ellaway 2000, Kearns & Moon 2002). For example, Poland's (2000) discussion of interactions between smokers and non-smokers in public spaces suggested that smoker self-regulation (in the guise of consideration) is central to social control and the reshaping of social norms, i.e. through smoke-free spaces policy. Similarly, power and control are often implicitly expressed in spatially referent language in policy development and discourse (e.g. Kearns & Joseph 2000, Moon & Brown 2000). In the shift from curative to preventive public health social control, regulation and governance have become mechanisms for shaping social norms to reflect health promotion ideologies. The new public health emphasis on the use of community-related, place-based identities is clearly evident in health promotion initiatives intended to make 'unhealthy spaces healthy' (Brown & Duncan 2002, p. 366). This warrants the addition of a spatial dimension to examinations of policy, and underscores the need to examine variation in the articulation of policy across place, particularly in the case of smoke-free spaces where social and environmental changes are primary intentions. While there is a growing body of work examining the respective influence of compositional (e.g. socio-demographic) and contextual (e.g. the policy process) factors associated with municipal bylaw variation (Asbridge *et al.* 1997, Gibbins *et al.* 1999, Lachetti & Abernathy 2001, Skeer *et al.* 2004, Asbridge 2004, Nykiforuk *et al.* 2007), what remains missing is a purposeful consideration of the role of policy diffusion in bylaw uptake.

Policy diffusion and geographical diffusion

Policy diffusion is a key element in policy development and suggests that political jurisdictions, at any government level, learn policy solutions to public problems by imitating policy from other jurisdictions, usually in the

same country (Berry & Berry 1999, Studlar 2002, Jensen 2003, Rogers 2003, Tews *et al.* 2003, Boehmke & Witmer 2004). Innovative policies may diffuse rapidly through time and space; it is more efficient for a jurisdiction to model themselves after others rather than to undertake the policy development cycle for each specific issue. This fits closely with the diffusion of innovations model, where diffusion is the process by which an innovation (*policy*) is communicated through certain channels over time among the members of a social system (*policy network*) (Mintrom & Vegari 1998, Berwick 2003, Rogers 2003). Relatively earlier and later adopters are identified by examining the rate of adoption over time, which is typically represented by a logistic, S-shaped, diffusion curve (Rogers 2003). Adopters are categorised based on their location in that curve.

The diffusion network is a critical component of Rogers' framework; it is the vehicle through which the adoption of an innovation occurs. Communication between key players and opinion leaders within a network drives the diffusion process and influences the rate of adoption. Diffusion, however, also implies movement outward from a place of origin within a system or network, thus suggesting that geographical diffusion models may be of analytic use in conjunction with Rogers' model.

Geographical diffusion appears in several subdisciplines of geography including, for example, recent studies of political party support (Perdomo 2004), emergence of skyscrapers in the urban form (McNeill 2005), use of Internet in retail shopping (Frag *et al.* 2006), technology diffusion (Perkins & Neumayer 2005), and the spread of disease (Meade & Earickson 2000, Ciccarone & Bourgois 2003). Geographical diffusion is patterned by the configuration of networks where factors such as distance, location or population size influence the level and direction of diffusion. Specifically, expansion diffusion models suggest distance is a critical factor, where adoption occurs later in places further away from the point of initiation. Hierarchical diffusion moves beyond distance to consider the spatial arrangement of adopters. Here, innovation spreads among urban areas according to relative size, where initiation typically occurs at the largest city and cascades down the urban hierarchy to smaller municipalities. For this study of municipal bylaw adoption, expansion and hierarchical diffusion models were used as explanatory frameworks in conjunction with Rogers' diffusion of innovations model.

Method

Data sources

Secondary data collected in October 2001 were used in this study. The initial data set consisted of all bylaws in

Alberta ($n = 78$) and Ontario ($n = 245$) municipalities with a population of 5000 or more. Communities with populations of less than 5000 often did not have jurisdictional authority to pass bylaws and were excluded (as such, this data set represented 21% of all municipalities in Alberta and 55% in Ontario). The data set was updated to be current as of October 2004 using bylaw information compiled by provincial tobacco control advocacy groups: the Ontario Campaign for Action on Tobacco and Action on Smoking and Health (Alberta). The operational definition of 'bylaw' included municipal bylaws regulating smoking in public places and workplaces and less restrictive Council resolutions or policies concerning smoking in municipality-owned buildings. (Resolutions and policies are similar in intention to bylaws – they do not specify provisions for enforcement, but typically precede bylaw development.)

Data analysis

The primary outcome of interest was bylaw adoption, a binomial variable denoting the presence/absence of a municipal smoke-free spaces bylaw. A secondary outcome of interest, applicable for the subset of municipalities with a bylaw, was change in bylaw restrictiveness over time. Bylaw restrictiveness was rated using a validated tool (Campbell *et al.* 2002, Nykiforuk *et al.* 2007) to capture change through bylaw amendments. SPSS version 11.0 software was used for all statistical analyses.

Bylaw adoption and change were carefully considered within local, regional, and provincial contexts. Municipalities were plotted by location (health region and province) and year of bylaw adoption to reveal spatial patterns. Timing of adoption was examined in conjunction with (i) provincial and national timelines of tobacco control activities; (ii) bylaw development in neighbouring municipalities; and (iii) jurisdictional changes – health region structure in both provinces, and in Ontario, municipal amalgamation and changes in municipal tier-status. This facilitated description of initial adoption patterns.

Municipalities with a bylaw were assigned to one of five different policy adopter groups adapted from Rogers' innovator categories, including: innovators, early adopters, early majority, late majority, and laggards. Designation to adopter categories was empirically fitted using the classical approach described by Rogers (2003). The mean and standard deviation of the number of municipalities with a bylaw were calculated and used to divide a normal curve into the five categories: innovators (2.5%), early adopters (13.5%), early majority (34.0%), late majority (34.0%) and laggards (16.0%). Municipalities with no bylaw comprised a distinct group of non-adopters.

Table 1 Geographical patterns of 'first municipal bylaw adopted in health region' by time period

Status in urban hierarchy of 'initiator municipality'	Total health regions with pattern (<i>N</i> = 37)	Level of first bylaw	Time period
Regional municipality – single bylaw for all of health region's constituent municipalities	8	Regional	1987–2001
City-level municipality first to adopt bylaw in health region	16	Municipal	1978–2001
Town-level municipality first to adopt bylaw in health region	7	Municipal	1983–1994
Township-level municipality first to adopt bylaw in health region	5	Municipal	1989–1995
NA	1	None	NA

The time period used to define the adopter categories was from the year the first bylaw was passed (1978 in Ontario, 1987 in Alberta) through to the fall of 2004. Bylaw diffusion was examined in two ways: (i) across the province irrespective of health region structure and (ii) within health regions relative to other health regions in the province.

Results

Geographical diffusion of bylaws

Alberta

Hierarchical and expansion diffusion processes emerged as two patterns of bylaw adoption in Alberta. When examining municipalities independent of their location in a health region, diffusion followed a classic hierarchical pattern across the province. Adoption initiated with large cities, the uppermost tier of urban hierarchy, beginning in 1987 with Edmonton, the provincial capital, followed by Calgary (1993) and Lethbridge (1996), respectively the second and third most predominant cities. Bylaw adoption expanded out from these cities and down the urban hierarchy to nearby smaller cities and towns.

The examination of bylaw adoption within health regions showed that diffusion patterns varied by health region location in the province. In central and northern health regions, bylaw adoption followed the classical hierarchical pattern. In southern Alberta the pattern was reversed, and bylaw adoption typically began with a smaller community and moved up the urban hierarchy to relatively larger, more central municipality in the health region. Most municipalities had a bylaw within 10 years of one having passed in the nearest major city, regardless of diffusion pattern.

Ontario

The geographical diffusion pattern of bylaw adoption among Ontario municipalities was more complex than in Alberta, and no overall provincial pattern (independent of health region structure) emerged. Hierarchical

diffusion was occurring in health regions, yet there was inconsistency in the urban status of the first municipality to adopt a bylaw within each region. Two spatial diffusion patterns were evident across Ontario: (i) downward hierarchical diffusion from larger to smaller municipalities within health regions and (ii) upward hierarchical diffusion from smaller to larger municipalities within health regions.

Downward, or classic, hierarchical diffusion was the most common pattern of bylaw adoption within health regions. This pattern occurred in 16 health regions between 1978 and 2001, where a city was first to adopt a bylaw, followed by other cities, then towns and rural areas (townships and counties) (Table 1). An example of this is the Renfrew County and District Health Unit where Ontario's first no-smoking bylaw passed in the city of Pembroke in 1978. As the only city and the location of the health unit's head office, Pembroke was the 'central place' of this health region. Bylaw adoption diffused down the urban hierarchy from Pembroke to the town of Renfrew and then the township of Whitewater Region over the next 12 years.

This pattern occurred in several health regions, where many cities that initiated bylaw uptake were also the locale of their respective health unit head offices. Given the health units' mandate to increase the proportion of smoke-free bylaws in their regions, it is reasonable that bylaw adoption often occurred first in the head office's municipality. Our analysis revealed that this downward diffusion process recurred in the early 2000s, where in many health units, aging bylaws were amended to increase the level of protection offered in public places and workplaces. Again, cities were the first to amend their bylaws, except in cases of newly amalgamated municipalities where new bylaws were passed to replace those rendered obsolete through municipal restructuring.

A special case of downward diffusion in Ontario was that of comprehensive, region-wide bylaw adoption, where a bylaw passed by the upper-tier (regional) municipality applied to all constituent lower-tier municipalities. This first occurred in 1987

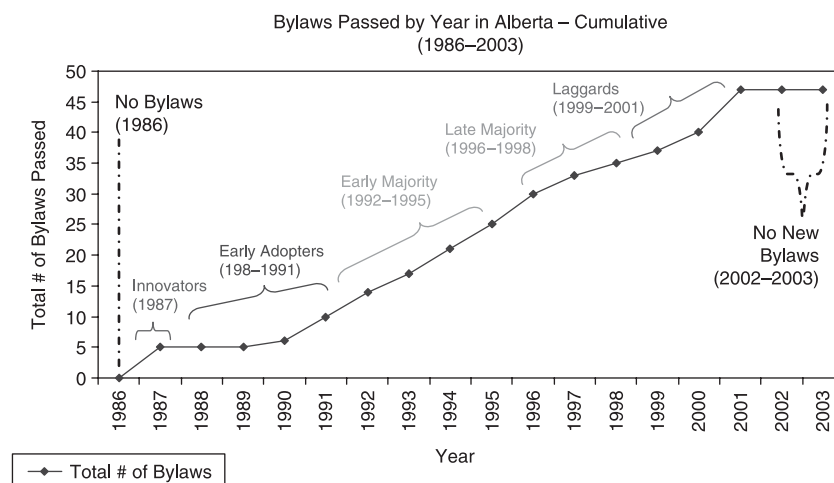


Figure 1 Bylaw adoption timeline by adopter category for the province of Alberta, Canada.

Table 2 Policy adopter categories and bylaw adoption by time period – Alberta

Adopter category	Time period	No. of bylaws – period total	Municipal bylaws – cumulative total (<i>N</i> = 78 municipalities)
Innovators	1987	5	5
Early adopters	1988–1991	5	10
Early majority	1992–1995	15	25
Late majority	1996–1998	10	35
Laggards	1999–2001	12	47
Bylaw amendment, no new bylaws	2002–2003	–	47
Non-adopters	As of 2004	31	78

and became increasingly common in the late 1990s. Typically, there were no pre-existing bylaws in any of the lower-tier municipalities when the regional municipality bylaw was passed; a notable example is the Regional Municipality of Waterloo's No-Smoking Bylaw, a 100% smoke-free public places bylaw unilaterally applicable to the seven municipalities in the region. The increasing prevalence of regional-level bylaws coincided with an intense period of municipal restructuring by the province between 1996 and 2001, which reduced the total number of municipalities by over 40%. Municipal restructuring dissolved or amalgamated a mix of pre-existing urban and rural municipalities, only some of which had smoke-free bylaws. Post-amalgamation, regional-level bylaws were often adopted in lieu of replacing the previous patchwork of local bylaws.

Upward hierarchical diffusion was the second spatial diffusion pattern in Ontario and occurred in 12 health regions where the initiator municipality was either a town (7 health regions) or township (5 health regions) (Table 1). Here bylaw adoption initiated in a small town or rural community, followed by larger towns and cities. Again, many of the first municipalities to adopt a bylaw were also the first to amend them as

new bylaw standards emerged. For example, in the North-western Health Unit, the first no-smoking policy occurred in the town of Fort Frances (1990) was followed more than a decade later by bylaws in the cities of Kenora (2001) and Dryden (2003). In 2002, Fort Frances passed a bylaw to replace its existing policy strengthening regulatory power and increasing the protection offered by the bylaw.

Adopter categories

Rogers' diffusion of innovations framework provided a theoretical foundation from which to discern explanations for the geographical diffusion patterns. Municipalities were assigned to one of five adopter groups, while non-adopters were treated separately. The resulting delineations of adopter categories for Alberta (Table 2, Figure 1) and Ontario (Table 3, Figure 2) are discussed below.

Alberta

The Alberta timeline began in 1987, when five 'innovator' municipalities passed smoke-free spaces bylaws (Table 2). Although the 'early adopter' category spanned 3 years

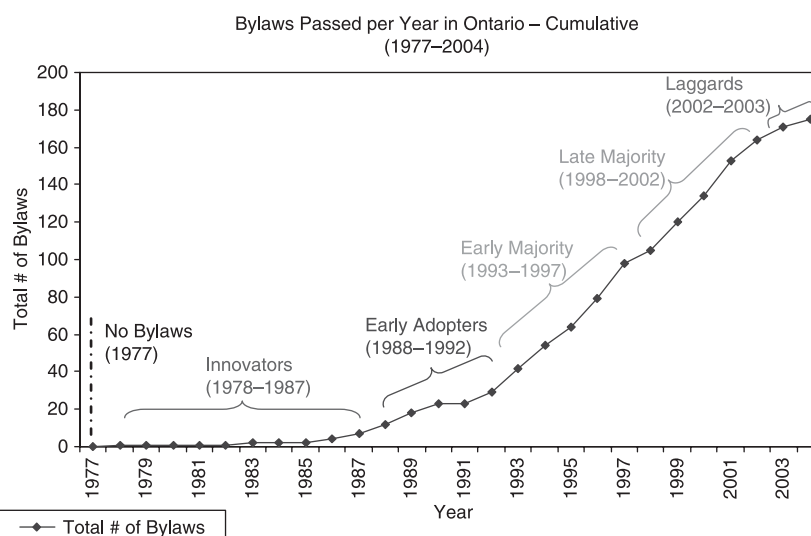


Figure 2 Bylaw adoption timeline by adopter category for the province of Ontario, Canada.

Table 3 Policy adopter categories and bylaw adoption by time period – Ontario

Adopter category	Time period	No. of bylaws – period total	Municipal bylaws – cumulative total (N = 245 municipalities)
Innovators	1978–1987	7	7
Early adopters	1988–1992	22	29
Early majority	1993–1997	69	98
Late majority	1998–2002	79	177
Laggards	2003–2004	12	189
Non-adopters	As of 2004	68	245

(1988–91), bylaws were passed only in the last year of that period (Table 2, Figure 1), setting the stage for bylaw adoption over the next decade.

The early 1990s were a particularly active time for bylaw development in Alberta. This is reflected in the 'early majority' (1992–95), in which 15 municipalities passed smoke-free bylaws, averaging four new bylaws each year. Consistent with the diffusion model, rate of adoption slowed to two new bylaws per year in the latter part of that decade. Two adopter categories coincide with this time period: 'late majority' (1996–98) and 'laggards' (1999–2001). The bylaw activity during these periods was synergistic with a marked increase in provincial tobacco control activity. In 1997, Alberta passed the *Protection from Second-Hand Smoke in Public Places Act* (Ch. P19.7), and later that year, the province began the lengthy process of creating legislation to address youth tobacco use. The *Prevention of Youth Tobacco Use Act* became formal legislation in 2003.

The new millennium saw an unusual spike of bylaw activity in the midst of what should have been a levelling-off period in the diffusion model (Figure 1). In 2001 seven new bylaws were passed, an all-time

provincial high for bylaws passed in a single year. Again, local policy activity coincided with provincial events; in this case with the 2001 Alberta Tobacco Reduction Strategy, a comprehensive provincial strategy calling for municipal smoke-free bylaws among other programme and policy initiatives.

The next 2 years saw a shift in bylaw activity from adoption to amendment of existing policies. In 2002 and 2003, when 60% of Alberta municipalities ($n = 47/78$, population ≥ 5000) had a bylaw, municipalities focused on increasing the level of protection offered by existing bylaws. Interestingly, the 10 municipalities that strengthened bylaws during this time were large towns or major cities, and had been in the 'innovator' and 'early adopter' categories for initial bylaw adoption.

Ontario

Smoke-free spaces bylaw adoption in Ontario began in 1978, a full decade earlier than Alberta. Yet unlike Alberta where the 'innovator' municipalities passed bylaws within the same year, the first seven bylaws in Ontario were passed over a 9-year period (Table 3). Each subsequent adopter category spanned a shorter

time period than its predecessor (Figure 2), which culminated in over 77% of Ontario municipalities ($n = 189/245$, population ≥ 5000) with a bylaw by mid-2004. Despite variation in yearly adoption rates, the pattern of cumulative increase over time approximates the S-shaped curve consistent with the diffusion model.

As expected in the transition from the 'innovators' to 'early adopters', bylaw adoption rates increased to an average of four bylaws per year (1988–92). This period saw ground-breaking tobacco control activity in Ontario. Several key health promotion reports were released, each calling attention to the health risks associated with smoking and exposure to SHS. In 1990 both the *Smoking in the Workplace Act* (R.S.O. 1990 ch. S13) and the *Health Protection and Promotion Act* (R.S.O. 1990 ch. H7) came into force. Within months of this legislation, the Chief Medical Officer of Health released a report on tobacco and health in Ontario in addition to a report of the Premier's Council on Health, which included a component on tobacco control. This was followed by the 1992 announcement of the Ontario Tobacco Strategy (OTS), a provincially funded comprehensive tobacco control initiative unprecedented in Canada. The face of tobacco control in Ontario was changing and tobacco control was becoming an important issue for both municipal and provincial jurisdictions.

The 'early majority' period in Ontario saw 69 municipalities pass a bylaw in 4 years (Table 3). This dynamic period coincided with the roll-out of the OTS, after which bylaw activity increased dramatically with 10 or more bylaws passed each year. This included two regional bylaws – Waterloo and Niagara – that together regulated 19 municipalities. As in Alberta, this is indicative of a broader policy diffusion cycle linking municipal and provincial activity.

In 1998 there was an unusual drop in the rate of adoption, with only seven new bylaws passed that year – a reduction of almost two-thirds from the previous year (Figure 2). The sudden decrease (rather than the gradual tapering expected in the diffusion model) may be partially explained by the province's decision to transfer 100% of funding responsibility for public health to municipalities. This decision was revised in 1999 when public health once again became a shared responsibility funded by municipalities and the province. Ontario also renewed its commitment to the OTS in 1999, following recommendations issued earlier that year by the Expert Panel on Renewal. These two provincial funding decisions likely contributed to the renewed intensity of smoke-free bylaw adoption that averaged 20 bylaws per year in the last 3 years of the 'late majority' (1998–2002). As expected, adoption rates began to level-off during the 'laggard' period (2003–04) (Table 3). Many of the bylaws adopted or amended

during this time were much more comprehensive than those from earlier periods, suggesting that bylaw restrictiveness had become the focal point for municipalities. Four regional bylaws were passed in the 'laggard' period, each strengthening pre-existing local bylaws and addressing previously unregulated municipalities.

Non-adopters

One challenge in this analysis of an ongoing policy process was addressing 'non-adopters', a category comprised of municipalities with no bylaw at the time of study. As there is no finite point in time marking the end of the bylaw adoption process, this category inherently consists of two types of non-adopters: (i) those that will *never* adopt a smoke-free spaces bylaw and (ii) those that have *not yet* adopted a bylaw. As it was not possible to distinguish between these at the time of study, the category of 'non-adopter' was tasked to suffice for both.

There were proportionately more 'non-adopters' in Alberta (39.7%, $n = 31/78$) than Ontario (22.9%, $n = 68/245$), yet the profiles were similar. In Alberta, there were only two health regions in which all municipalities had adopted a bylaw. In the remaining seven health regions, the vast majority of municipalities with no bylaw were smaller towns or rural areas. This was also true for Ontario where, with the exception of one city, all of the non-adopting municipalities were smaller towns or rural communities.

When considering geographical diffusion patterns, these small communities are further from urban centres than larger municipalities. It may be that this relatively low status in the urban hierarchy is related to delayed spread of bylaw adoption to these municipalities. But while these communities are low in the urban hierarchy, they are not isolated from events occurring at regional, provincial and national levels. Early in the diffusion process these communities may not have been aware of or interested in the innovation of a smoke-free spaces bylaw, but in 2004, this type of policy was commonplace in Canada and given broad exposure in local and national media. This suggests that lack of awareness and actions by neighbouring municipalities are not key explanatory factors for these communities; rather, it may be a question of community resources or policy fit with community values and priorities. This may be especially relevant for Ontario where municipal decision-making and resource allocation has been complicated by issues of local and health region restructuring for over 40 years, which can result in complex socio-geographical impacts including shifts in social identity, connection with community or sense of place (Joseph & Kearns 1996, Cloutier-Fisher & Skinner 2006).

Discussion

This study contributes to an enhanced understanding of the policy process concerning municipal smoke-free bylaws. Our findings imply that policy event timelines, geographical diffusion and adopter characteristics work together to help explain patterns of bylaw uptake. While geographical patterns varied, diffusion curves for both provinces were consistent with Rogers' framework. The consistency of the diffusion patterns across the two provinces suggests that bylaw adoption is a systematic process despite political and geographical differences in provincial context.

Hierarchical and expansion diffusion processes were evident in both provinces, suggesting that, with respect to key issues on the local policy agenda, communities learn policy responses from others' experiences relative to fit with local resources, values and priorities. Municipalities within each pattern also behaved consistently over time in regards to bylaw change. The 'innovator' and 'early adopter' municipalities for initial bylaw adoption were typically first to amend bylaws to reflect current standards of SHS protection. Similarly, the increase of adoption rates among the 'late majority' and 'laggards' may be a result of gold-standard bylaw dissemination activities in addition to diffusion processes. This suggests that municipal decision-makers follow familiar patterns of policy-making within a defined issue network (Berry & Berry 1999, Spasoff 1999, Berwick 2003, Rogers 2003). These policy networks may exist within an epistemic community, or trans-jurisdictional 'network of professionals with recognised expertise and competence in a particular domain and with recognised policy-relevant knowledge within that domain or issue-area' (Haas 1992, p. 3). The epistemic community contributes to a broader policy cycle that transcends municipal and provincial policy cycles, and links the two in reciprocal waves of policy diffusion around specific issues on the policy agenda resulting in multiple, overlapping diffusion cycles as the issue evolves.

Rogers' (2003) innovation adopter categories were useful for describing temporal bylaw adoption trends. While the current diffusion of innovations model may be limited for describing non-adopters, these ideas are still relevant and may be extended through further empirical testing. In this study, location in an adopter category not only marked the timing of bylaw adoption for a municipality, but was suggestive of that municipality's readiness for a bylaw relative to other communities in the same provincial context. Thus, the diffusion model could also be used to extend policy studies examining advocacy, champions, and issue networks. In the study reported here, the interregional differences in the spatial diffusion patterns, as well as the policy

activity unusual in a diffusion model, are likely to have alternate explanations that occur parallel to and interact with the natural diffusion process. Yet we would argue that these factors are filtered through local communities, making profiles such as ours of continuing and contextual relevance.

This study was limited to an analysis of bylaws that were still in effect in 2004, whether in original or amended delineation. Furthermore, there is significant heterogeneity in the type of bylaws adopted. It is not always easy therefore to demonstrate what these differences mean. One possible solution would be to consider community-wide vs. more limited-settings bylaws, but this does not necessarily coincide with strong or weak bylaws as it is possible to have strong limited-setting and weak community bylaws, and vice versa. Despite the heterogeneity, we argue that for this preliminary study, the presence/absence and timing of the bylaws are important, especially given our interest in diffusion.

Given this, the study findings revealed that there are spatial and temporal patterns in policy adoption and change; thus, future work should consider bylaw iterations in order to appropriately identify stage in the diffusion cycle. We found that this inclusion facilitated a broader understanding of adopter characteristics in response to changes in the policy environment and reflected policy maintenance irrespective of those changes. To extend the work reported here, an ideal study would include municipalities that had passed a bylaw at some point in the diffusion cycle, but had since repealed the decision. Investigations of policy change have important implications for understanding new policy trends; this is particularly relevant for municipalities in provinces developing provincial smoke-free legislation as this may lower the priority of the issue for local decision-makers.

Rogers' (2003) diffusion of innovations model is certainly applicable to the analysis of municipal bylaw diffusion, but does not always facilitate a full understanding of the complexity of the diffusion process, particularly when extending the model to municipalities. We contend that this preliminary study demonstrates that the use of geographical models enriches utilisation of Rogers' diffusion process model to explain policy diffusion. Geographical models enable us to look both up and down the hierarchy of urban status relative to the course of policy adoption, where Rogers' model on its own is limited to examining a unidirectional diffusion process.

Conclusion

This investigation of smoke-free spaces bylaw adoption over time contributes to the growing literature on new

public health geography by providing an enhanced understanding of spatial patterns in the diffusion of health policy. While the geographical and political contexts for local tobacco control vary, our study provides some useful predictive pointers as to the factors that enhance or impede such policy development. Study findings suggest that geographical diffusion and adopter characteristics work in concert with local, provincial and national tobacco control activity timelines to help explain patterns of bylaw adoption among municipalities. The consistency of diffusion patterns across the two provinces suggests that bylaw adoption is systematic irrespective of contextual differences. Thus, these findings have implications for future research on health policy including examinations of policy process and assessments of policy impact on health outcomes.

Despite the potentially complex and dynamic nature of the diffusion process, it is necessary to have a comprehension of its role in uptake of local policy to better understand how evidence, including experiential evidence of peer communities, impacts the policy-making process. Additionally, a broader knowledge of adopter categories is useful for strategising policy responses to changes in the broader policy environment. This will strengthen both research and practice efforts in the use of policy interventions in support of population health.

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