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Original Research

Implementation phase of the Tobacco-Free Parks Ordinance: a policy evaluation using photographic data

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ABSTRACT

Objective: Mecklenburg County (Charlotte, North Carolina) Board of County Commissioners took the unique step of passing a Tobacco-Free Parks Ordinance designating most county parks as tobacco-free including all smoking products, smokeless tobacco, and e-cigarettes. The objective of the baseline phase of the Ordinance evaluation sought to assess whether signage in the parks was associated with the presence of tobacco-use litter.

Study design: A qualitative study was conducted with photography as the method of observation across Mecklenburg County parks in North Carolina.

Methods: A representative sample of 42 parks was selected from the 186 county park properties. Photographs were taken at a list of specific types of locations within each park, with attention to signage and tobacco-use litter (butts, e-cigarette).

Results: Tobacco-use evidence was mostly found in parks' picnic areas (67%) and walking trails (67%), with least found in parks' athletic courts (23%). At least 80% of parks have some tobacco litter. Evidence of tobacco use was not significantly associated with signage.

Conclusion: Little research has focused on the effect of local public policies limiting tobacco use in public outdoor spaces. Findings from this evaluation have potential to inform policy implementation efforts regarding efforts to limit tobacco use in public spaces.

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Introduction

Tobacco use is a major risk factor contributing to chronic diseases and remains the number one preventable cause of death and disability in the community.^{1,2} Strategies to prevent

tobacco use include creating smoke-free and tobacco-free environments. Furthermore, the immediate social environment of tobacco users plays a role in their cessation efforts,^{3,4} which highlights the importance of tobacco-free environments. One environment which has received less attention as

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a possible tobacco-free environment is parks. Given the role of parks in promoting health through increasing physical activity of local populations,⁵ parks also may play a role in preventing tobacco use, as well as creating tobacco-free social environments that influence social norms about smoking.⁶ Creating tobacco-free and smoke-free environments, however, depends on having supportive organizational and public policies. The purpose of this study was to establish a baseline assessment of the implementation of a unique public policy to create tobacco-free parks. The study contributes to the development of policy evaluation methods and highlights the relevance of interdepartmental collaboration in local tobacco-free policy implementation.

Background

Tobacco policies and evaluation

In the United States, the rate of tobacco use has been declining, specifically smoking cigarettes,² leading to lower healthcare expenditures.⁷ A wide variety of approaches have been implemented that focus on individual behavior change of smokers, such as control of where cigarettes are sold, pricing of cigarettes, and stop-smoking campaigns.^{8,9} Another set of efforts center on tobacco-related policies aimed at changing the context or environment for tobacco use, such as changes in cigarette labeling, bans of advertising on television and radio, and restrictions on smoking in restaurants and airplanes.⁹ These laws are consistent with the substantial body of evidence that no safe level of secondhand smoke exposure exists.^{9,10} Importantly, such policies and laws can have a longer term effect of changing social norms regarding tobacco use regardless of location.

Evaluation studies of indoor smoking bans have shown that comprehensive laws improve overall air quality, reduce exposure to secondhand smoke,^{11–13} and improve health outcomes.¹⁴ The indoor smoking bans also promoted stronger quit attempts and reductions in tobacco use.^{15–18} Such studies provide evidence supportive of smoking and tobacco bans as a public health strategy that influences social norms regarding smoking and thus prevents individuals from initiating tobacco use.

Subsequent to indoor and workplace smoking bans, outdoor smoking and tobacco use bans have been implemented in the United States and have become more common.^{17,19} For example, New York City implemented Smoke-Free Air Act in 2002 and then in 2011 extended it to cover all public spaces such as parks, beaches, and plazas,²⁰ becoming one of the first municipal jurisdictions to do so. Outdoor smoking bans have received international attention as well,^{18,21–23} reflecting a trend toward broader smoking restrictions. Research into the impact of outdoor smoking bans has focused on attitudes and effects of secondhand smoke exposure^{24,25} rather than evaluating the effect of the laws and policies focused on outdoor smoking behavior. Evaluations of the policy effects on tobacco-free policies can substantiate the value of such public policies and inform future policy efforts.

Mecklenburg County and tobacco

This tobacco-free parks policy implementation study focused on Mecklenburg County, North Carolina (NC) which sits on the border with South Carolina. Mecklenburg County has a population of over 1,000,000 persons with 770,000 persons living in Charlotte.²⁶ Mecklenburg County has a slightly younger population than that of NC (median age = 34.7 years vs 38.3 years) and a more diverse, majority minority population.²⁷ As of 2013, 17% of Mecklenburg County adults reported currently smoking, a rate that has been stable over past few years,²⁸ with approximately 20% of deaths in Mecklenburg County attributable to smoking and tobacco use.²⁹ The Mecklenburg County 2013 Community Health Assessment ranked chronic disease and disability as the number one health problem for the county.²⁹ As one strategy to address the chronic disease priority, Mecklenburg County Public Health (MCPH) set a goal of reducing the percentage of adult smokers by 10% by 2020.³⁰ The development and implementation of the Tobacco-Free Parks Ordinance was an intervention intended to help reach that goal.

The policy

The Mecklenburg Board of County Commissioners adopted the Tobacco-Free Parks Ordinance, which went into effect on March 18, 2015. Under the Tobacco-Free Parks Ordinance, most Mecklenburg County parks and buildings on park property are designated as tobacco-free. An exemption was made for the 18 regional parks and golf courses owned or managed by the County. The exemption of regional parks was a compromise to garner broader political support. The tobacco-free designation prohibits the use of cigarettes, cigars, e-cigarettes, smokeless tobacco, water pipes, and hookahs. The goal of the Tobacco-Free Parks Ordinance is to reduce environmental second hand tobacco smoke and to address social norms by reducing the visual cues of tobacco-related litter and behaviors as a strategy to help denormalize tobacco use, particularly for youth. To implement the Tobacco-Free Parks Ordinance, staff from MCPH worked with Mecklenburg County Parks and Recreation Department, Mecklenburg County Human Resources, the City of Charlotte, and the surrounding six townships. The Mecklenburg County Park and Recreation Department administers and maintains 210 park properties and facilities located on more than 20,000 acres of parkland throughout Mecklenburg County. MCPH staff shared specific information on the Ordinance, identified the number and type of necessary signs, and collated resources to help current tobacco users quit. The MCPH staff also developed A-frame stands and metal rectangular signs for placing on posts or buildings within the parks. The Parks Department received and was responsible for installing 1000 permanent tobacco-free parks signs and for displaying the portable signs. MCPH sought to conduct a baseline implementation evaluation. The evaluation research questions were as follows:

- 1) What tobacco use behaviors were observed in the parks immediately after the tobacco ban Ordinance went into effect?

- 2) Did the evidence of tobacco use vary by the presence of signage about the tobacco-free Ordinance?
- 3) Did the evidence of tobacco use vary by the number of signs per park acre?

Methods

The policy evaluation used a qualitative method with photographs as the data. Approval for the evaluation of the Tobacco-Free Parks Ordinance was received from the University of North Carolina at Charlotte Institutional Review Board (IRB). In accordance with protocol approved by the IRB, no attempt was made to identify persons in the photographs, and all persons in the photographs were in public places. No verbal contact was made with persons seen in the parks.

Sampling plan

To have the most representative data possible, the sampling plan drew from all parks in Mecklenburg County. The list of active Mecklenburg County parks ($n = 186$) included the exempt and non-exempt parks. After excluding greenways, golf courses, and school properties that posed logistical challenges, the sampling frame was 154 park properties. To assure representativeness, for each park we noted the park type

(regional, community, neighborhood, or regional), location within Mecklenburg County (north, south, and central), and types of amenities at the park. Amenities were any combination of concession stand, athletic field, playground or multipurpose area, picnic shelter, trails, nighttime activity, recreation center, waterfront area, and dog park. Athletic fields, picnic shelters, playgrounds, and walking trails were the most common park amenities. From the 154 parks, a final sample of 42 parks (Fig. 1) was purposely selected based on having all of the four most common amenities, as well as having park regions and types equally represented and one exempt park included. Thus, the sample of parks reflected the locations and types of all parks in Mecklenburg County (Table 1). Of the 42 parks chosen, eight were regional parks, of which five were exempt from the Ordinance at all times (meaning that tobacco use was allowed), and the other three were not exempt, but only during special events they were exempt. Two of those three partially exempted parks were visited during a special event so that possible tobacco use behavior could be observed during the time when tobacco use would not be allowed.

Data collection

At each park, the following standardized procedure for taking and recoding photographs was followed. Using a

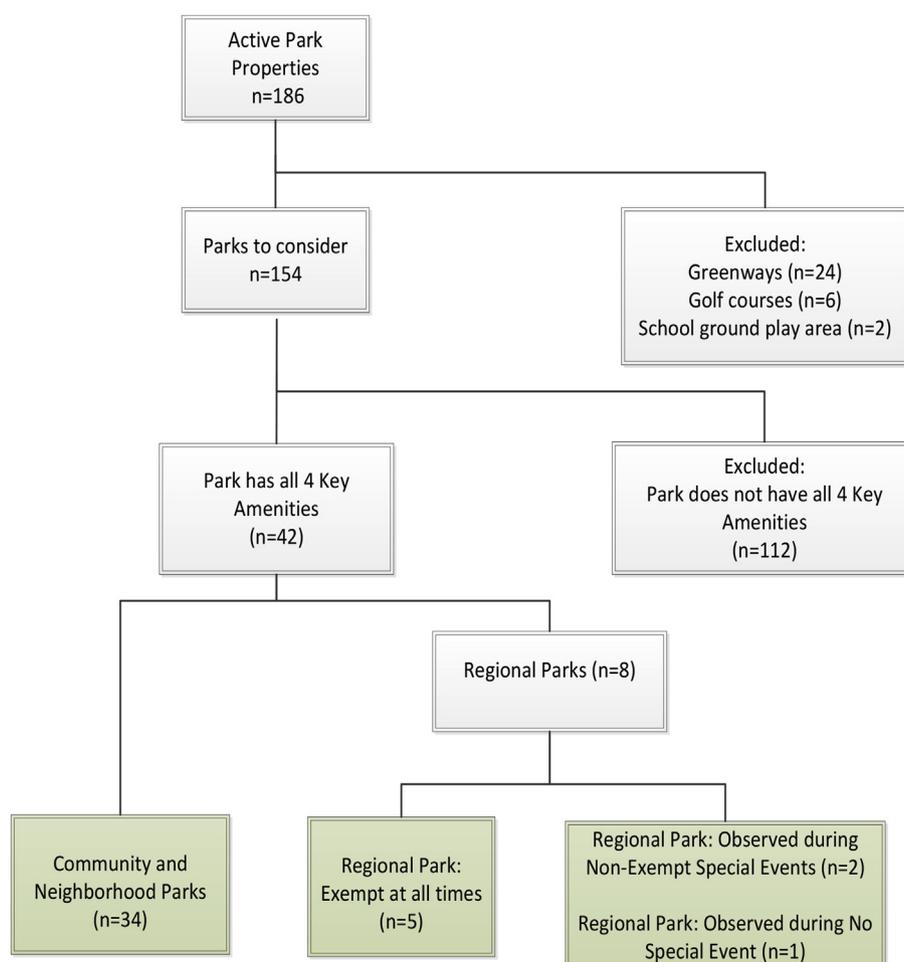


Fig. 1 – Flow diagram of sampling plan for Tobacco-Free Parks ordinance evaluation.

Table 1 – Descriptive characteristics of the sampled parks.

Park type	Sample of parks (n = 42)	Parks not in the sample (n = 112)
	n (%)	n (%)
Neighborhood	15 (35.6%)	59 (52.7%)
Community	18 (42.9%)	21 (18.8%)
Special facility	1 (2.4%)	6 (5.4%)
Other (e.g., pool, rec. center)	0 (0.0%)	16 (14.3%)
Regional:	8 (19.0%)	10 (8.9%)
Exempt	5 (11.9%)	10 (8.9%)
Non-exempt during special events (no event) ^a	1 (2.4%)	0 (0%)
Non-exempt during special events (event)	2 (4.8%)	0 (0%)
Mecklenburg region		
North	13 (31.0%)	28 (25.0%)
South	12 (28.6%)	30 (26.8%)
Central	17 (40.5%)	54 (48.2%)
Acreage		
Mean (SD)	56.9 acres (62.4)	63.9 acres (192.3)

rec., recreational; SD, standard deviation.

^a Event or no event indicates whether, at the time of the park photography, a special event was occurring. A special event at those parks meant that the park was tobacco-free during that event.

checklist of locations within each park to be photographed, at least one digital photograph was taken at each location. The number of the photograph taken at that location was noted on the checklist giving a precise location of the photograph. Additionally, a map of each park obtained from either the parks department website or Google maps further helps clarify the location of each photograph. Written notes about the photograph, unphotographed observations, or characteristics about the location were also recorded on the checklist. The photographs included tobacco litter (e.g., cigarette butts, empty packages) and the locations of the litter. In addition to photographs at the predetermined locations, photographs were taken of any type of tobacco use behavior, such as cigarettes, e-cigarettes, cigars, hookahs, and other forms of smoked tobacco regardless of the location being on the checklist. Lastly, photographs were taken of all tobacco-free parks signs designed specifically to assist in implementing the Ordinance.

A total of 972 photographs were taken in the 42 parks, with an average of 23 (range: 6–46) photographs per park. Data collection was completed in 38 h, with an average 58 (SD = 25.1) minutes per park.

Analysis

Based on the visual information in the photographs, the codes were developed for each type of smoking or tobacco-use behaviors and for each type of tobacco litter. Using the information on the checklist and park maps, we coded the location of the tobacco use behavior or evidence. Given the dichotomous data, nature of the data, ‘yes’ or ‘no’ for location, type of tobacco behavior, and presence of tobacco litter and park signage, data analysis consisted of descriptive statistics:

counts of the number of photographs at each location, counts of location and types of tobacco litter, and location and counts of types of tobacco behaviors. Analysis of observed tobacco-use behavior was dropped from the analysis because of the very small number of photos of persons actively using a tobacco product.

Excel was used to manage the data and to create cross-tabulations by location, type of tobacco behavior, type of tobacco litter, and park signage. Active tobacco use behavior by individuals was seen in only seven of the 42 parks, and thus this variable was dropped from the analysis, keeping tobacco litter as the only evidence of tobacco-use variable. Using Yate's correction to a Chi-squared test, no statistical significance was found of the cross tabulations between evidence of tobacco and signage.

Results

Evidence of tobacco in parks

An apparent difference in distribution of tobacco evidence by region in Mecklenburg County (Table 2) was seen, with the central (greater Charlotte downtown) region exhibiting highest number (n = 4) of parks with no tobacco evidence. Among the non-exempt parks (n = 34), roughly 80% of neighborhood

Table 2 – Distribution of tobacco evidence by Mecklenburg Region and type of non-exempt parks, autumn 2015.

Park characteristic	No tobacco	Tobacco evidence	Total
	n (%)	n (%)	n
Mecklenburg region			
North	1 (9%)	10 (91%)	11
Central	4 (25%)	12 (75%)	16
South	1 (14%)	6 (86%)	7
Total	6 (18%)	28 (82%)	34
Type of park			
Neighborhood	3 (20%)	12 (80%)	15
Community	3 (17%)	15 (83%)	18
Special facility	0 (0%)	1 (100%)	1
Total	6 (18%)	28 (82%)	34
Regional parks			
Regional: exempt or no event	0 (0%)	6 (100%)	6
Regional: non-exempt during special event (event) ^a	0 (0%)	2 (100%)	2
Total	0 (0%)	8 (100%)	8
Location in park			
Athletic court ^b	28 (77%)	9 (23%)	37
Play area ^b	30 (71%)	12 (29%)	42
Sports field ^b	20 (61%)	13 (39%)	33
Walking trail ^b	14 (33%)	28 (67%)	42
Picnic shelter/table ^b	14 (33%)	28 (67%)	42
Parking lot	10 (33%)	20 (67%)	30

^a Event or no event indicates whether, at the time of the park photography, a special event was occurring. A special event at the regional non-exempt parks meant that the park was tobacco-free during that event.

^b These were the amenities required to be included in the sample of parks.

and community parks had some evidence of tobacco use. In all the regional parks photographed ($n = 8$), evidence of tobacco use was noted, particularly in the form of tobacco litter. Similarly, tobacco evidence was observed at each Mecklenburg County region in which the exempt parks were located. Fresh appearing tobacco litter was found in the photographs taken during a special event, contrary to the expectation of no tobacco during the tobacco-free event. The locations at which the fewest number of parks had tobacco evidence were athletic courts (23%), followed by play areas (29%). Overall, two-thirds (67%) of the walking trails, picnic areas, and parking lots photographed had tobacco evidence.

Tobacco evidence and signage

The last set of analyses attempted to answer the question of whether signage was related to less tobacco evidence at non-exempt parks or the exempt parks visited during non-exempt special events. Among the types of parks, 87% ($n = 14$) of the community parks had tobacco-free parks signage. At the non-exempt parks (Fig. 2), signage placement was most often at park entrances (50% of parks) and walking trails (45% of parks). Out of the 22 non-exempt parks with a parking lot, 10 parks (45%) had signage posted at the parking lots. Lack of tobacco evidence was not statistically related to the presence of signage (Table 3). Among the non-exempt parks, although most of parks without tobacco evidence ($n = 5$, 15%) had signage, a similar percent of parks with tobacco evidence ($n = 25$, 73.5%) also had signage present. A post hoc evaluation question asked whether there was adequate Ordinance signage to potentially affect tobacco use behavior. In an attempt to answer this question, the number of park acres per sign was calculated. Wide variability in the acres per sign was found: two parks had over 95 acres per sign, 10 parks had 1–5 acres per sign, and nine parks had 5–10 acres per sign. No benchmark exists for interpreting this metric.

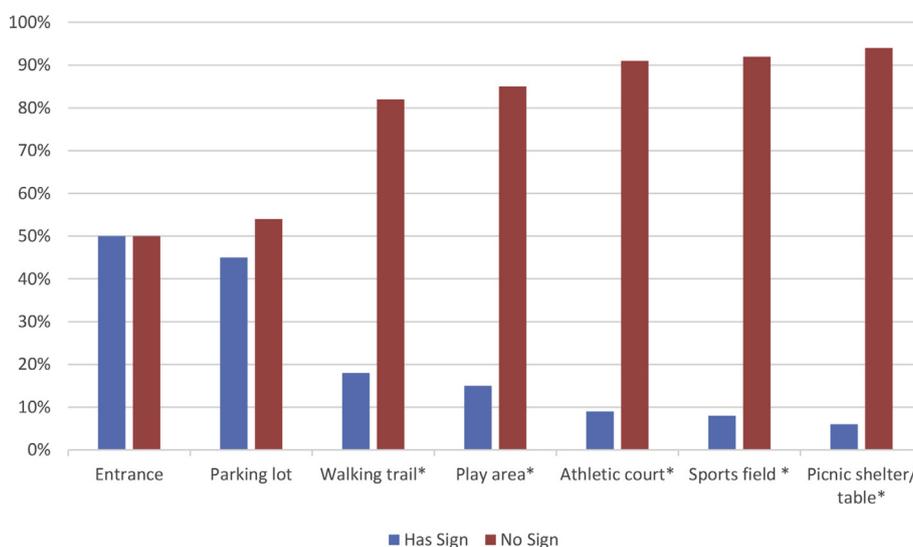


Fig. 2 – Distribution of signage location across parks amenities among non-exempt parks, autumn 2015. * Parks in the sample had to have these amenities to be included in the sample, except that a park could have either an athletic court or a sports field.

Table 3 – Distribution of tobacco evidence across all non-exempt parks, autumn 2015.

	No tobacco evidence	Tobacco evidence	Total
	<i>n</i> (%)	<i>n</i> (%)	<i>n</i>
No signs	1 (2.9%)	3 (8.8%)	4
Signs	5 (14.7%)	25 (73.5%)	30
Total	6 (17.6%)	28 (82.4%)	34

Yate's continuity correction = 0.000.

Tobacco use, signage, and acreage

A key evaluation question asked whether there was adequate tobacco-free park signage to potentially affect tobacco behavior. The simplest approach to answering this question was to calculate the number of park acres per sign. Although the average number of acres per sign was 16.95 (SD = 23.64), two parks had over 95 acres per sign. There were 10 parks with 1–5 acres per sign, and nine parks with 5–10 acres per sign. In other words, there was wide variability in the distances between signs. Given that only six parks had no evidence of tobacco, we were unable to assess for a relationship between acres per sign and tobacco use.

Discussion

The presence of tobacco use or tobacco litter indicates a violation of the Ordinance, given that 'tobacco-free' covers all types of tobacco products. Although 80% of parks had tobacco-free parks signage, 80% also had tobacco litter, strongly suggesting that signage alone is insufficient to change public tobacco-use behavior, at least in the public parks in this study. Specific characteristics of signage may have contributed to its ineffectiveness, such as being small, being placed with other park signs, and having a pale color scheme. Given that the

signs had only the words ‘tobacco-free park’, it is unlikely that literacy was an issue.

Intuitively, tobacco bans ought to influence individuals by bringing about a change in their behavior. Evidence, however, is lacking that such bans bring about significant change in tobacco-use behaviors among people in public places.^{30,31} The results of earlier studies are consistent with the findings of this evaluation study in which the Ordinance had minimal immediate effect. It is possible that the brief time between the Ordinance passage and the data collection (7 months) may have contributed to seeing tobacco use in the parks. Future evaluations may be beneficial in looking at the impact of having exemptions in the park Ordinance and that this can lead to public confusion, limiting policy success. These future evaluations may also need to consider the reality that individuals may substitute other places for parks as a place to smoke in public.³²

Photographs, as data, could be readily analyzed, making it a useful approach to document both policy implementation via placement of signage and current tobacco use behaviors. Having a set of photographs at different time points at the standardized locations based on the checklist will facilitate documenting changes over time. Furthermore, the simplicity of the method means that minimum training or supervision would be required for subsequent data collection. Finally, given the comparatively unambiguousness of tobacco litter and tobacco-use behaviors, reliability of coding the data ought to remain quite high.

The findings from the baseline Ordinance implementation evaluation were presented to the representatives from MCPH and the Parks and Recreation Department. The meeting focused attention on what could be learned from the data, such as the inadequacy of signage to change behavior. The issue of parks maintenance surfaced during the presentation of the litter photographs, with the general agreement about the difficulty of maintaining pristine parks given that the 186 represented more than 20,000 acres. The presentation also led to constructive discussion about feasible next policy steps which would strengthen the current Ordinance.

Implications for policy and practice

The baseline implementation evaluation has implications broadly applicable to jurisdictions attempting similar policy implementation. For example, the results suggest a strong need to place signage about the Ordinance at locations where most tobacco use occurs. The interdepartmental collaboration uncovered the need to have a set of agreed upon metrics to use as benchmarks. For example, given the diversity in park amenities and sizes, having indicators of sign adequacy (i.e., acres per sign) and effective placement (i.e., all parking lots and each park entrance) would be useful for ongoing monitoring of behavior change. Establishing such benchmarks for long-term policy evaluation could then inform administrators and policy-makers of the effectiveness of the Ordinance. The signage could be reinforced by both the Parks Department and MCPH by using additional approaches, such as using social media, reminder about being tobacco-free on all parks

correspondence and marketing materials (maps, flyer, brochures), use movable signage to decrease desensitization to the signs, and having a more prominent display of tobacco-free parks logo on parks materials. Other innovative approaches may be needed, such as having awards for parks with the least evidence of tobacco use and use of citizen science to document tobacco use.

Several limitations to this study exist. The age of the tobacco litter was unknown, given no data were available regarding the most recent dates that each park was cleaned. The season during which the photographs were taken (late autumn) may have influenced tobacco behavior as well as park cleaning schedule. The length of time between the implementation of the Ordinance and the data collection was roughly 7 months. No data were collected before the Ordinance went into effect, making it difficult to determine whether the baseline photographic data represented any early changes in public tobacco-use behavior. The preferred evaluation design would have collected data before signage was placed in the park and then after the signage had been in place for a period of time. Also, the parks were not randomly selected. Parks were selected based on the likelihood of having sufficient public use to capture tobacco behavior. Thus, differences based on other the park characteristics, such as landscaping, park convenience to public transportation, or proximity to tobacco outlets, are unknown.

Conclusion

The baseline evaluation of the implementation of Tobacco-Free Parks Ordinance in Mecklenburg County determined areas for further investigation and highlighted the need to incorporate additional measures other than signage to sufficiently influence public tobacco use behavior. The evaluation adds to a growing body of literature that aims to document the positive impact of comprehensive outdoor tobacco-free legislation. Introducing such comprehensive smoke-free and tobacco-free legislations should be a public health priority for legislators and public health workers to control the global tobacco epidemic.

Author statements

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Ethical approval

Approval for the evaluation of the Tobacco-Free Parks Ordinance was received from the University of North Carolina at Charlotte Institutional Review Board (IRB).

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Competing interests

None declared.

REFERENCES

1. The health consequences of smoking—50 years of progress: a report of the Surgeon General. Surgeon General Web site. <http://www.surgeongeneral.gov/library/reports/50-years-of-progress/>. Published 2014. [Accessed 15 May 2017].
2. Jamal A, King BA, Neff L, Wihitmill J, Babb SD, Graffnunder CM. Current cigarette smoking among adults – United States, 2005–2015. *Weekly* 2016;**65**(44):1205–11. <https://doi.org/10.15585/mmwr.mm6544a2>.
3. Biener L, Hamilton WL, Siegel M, Sullivan E. Individual, social-normative, and policy predictors of smoking cessation: a Multilevel longitudinal analysis. *Am J Public Health* 2010;**100**:547–54. <https://doi.org/10.2105/AJPH.2008.150078>.
4. Phuna JJ. The reference group perspective for smoking cessation: an examination of the influence of social norms and social identification with reference groups on smoking cessation self-efficacy. *Psychol Addict Behav* 2013;**27**:102–12.
5. Han B, Cohen D, McKenzie TL. Quantifying the contribution of neighborhood parks to physical activity. *Prev Med* 2013;**57**:483–7. <https://doi.org/10.1016/j.ypmed.2013.06.021>.
6. Echeverria SE, Gunderson DA, Manderski MTB, Delvevo CD. Social Norms as its correlates as a pathway to smoking among young Latino adults. *Soc Sci Med* 2015;**124**:187–95.
7. Lightwood J, Glantz SA. Smoking behavior and healthcare expenditure in the United States, 1992–2009: panel data estimates. *PLoS Med* 2016;**13**(5):e1002020. <https://doi.org/10.1371/journal.pmed.1002020>.
8. Pierce JP, White VM, Emery SL. What public health strategies are needed to reduce smoking initiation? *Tobac Contr* 2012;**21**:258–64.
9. IOM (Institute of Medicine). *Secondhand smoke exposure and cardiovascular effects: making sense of the evidence*. Washington, DC: The National Academies Press; 2010.
10. The health consequences of involuntary exposure to tobacco smoke: a report of the surgeon general. Surgeon general web site. <http://www.surgeongeneral.gov/library/reports/secondhandsmoke/fullreport.pdf>. Published 2006. [Accessed 15 May 2017].
11. Bohac DL, Hewett MJ, Kapphahn KI, Grimsrud DT, Apte MG, Gundel LA. Change in indoor particle levels after a smoking ban in Minnesota bars and restaurants. *Am J Prev Med* 2010;**39**(6):S3–9.
12. Marin HA, Diaz-Toro EC. Reduced exposure to secondhand smoke at casinos in Puerto Rico after the implementation of a workplace smoking ban in 2007: a Pre-Post design. *Puert Rico Health Sci J* 2011;**30**(4):182–7.
13. Travers MJ, Cummings KM, Hyland A, Rpace J, Babb S, Pechacik R, Caraballo R. Indoor air quality in hospitality venues before and after implementation of a clean indoor air law – western New York, 2003. *Mortality and Morbidity Weekly Report* 2004;**53**:1038–41.
14. Frazer K, Callinan JE, McHugh J, van Baarsel S, Clarke A, Doherty K, Kelleher C. Legislative smoking bans for reducing harms from secondhand smoke exposure, smoking prevalence and tobacco consumption. *Cochrane Database Syst Rev* 2016;(2), CD005992. <https://doi.org/10.1002/14651858.CD005992.pub3>.
15. Borland R, Yong H, Cummings KM, Hyland A, Anderson S, Fong GT. Determinants and consequences of smoke-free homes: findings from the international tobacco control (ITC) four country survey. *Tobac Contr* 2006;**15**(Suppl 3):iii42–50.
16. Thomson G, Russell M, Jenkin G, Patel V, Wilson N. Informing outdoor smoke free policy: methods for measuring the proportion of people smoking in outdoor public areas. *Health Place* 2013;**20**:19–24.
17. Zabolcki RW, Edland SD, Myers MG, Strong DR, Hofstetter RC, Al-Delaimy WK. Smoking ban policies and their influence on smoking behaviors among current California smokers: a population-based study. *Prev Med* 2014;**59**:73–8.
18. Kaufman P, Griffin K, Cohen J, Perkins N, Ferrence R. Smoking in urban outdoor public places: behaviour, experiences, and implications for public health. *Health Place* 2010;**16**:961–8.
19. Johns M, Coady MH, Chan CA, Farley SM, Kansagra SM. Evaluating New York city's smoke-free parks and beaches law: a critical Multiplist approach to assessing behavioral impact. *Am J Community Psychol* 2012;**51**(1–2):254–63.
20. Existing New Your City Legislation. NYC Smoke Free Web site. <http://nycsmokefree.org/existing-legislation> [Accessed 15 May 2017].
21. Darzi A, Keown OP, Chapman S. Is a smoking ban in UK parks and outdoor spaces a good idea? *BMJ* 2015;**350**:h958. <https://doi.org/10.1136/bmj.h958>.
22. Basto-Abreu AC, Christine PJ, Zepeda-Tello R, Romero-Martínez M, Duque JAI, Reynales-Shigematsu LM. Behaviours and opinions towards outdoor smoking bans and cigarette littering in Baja California, Mexico. *Health Pol Plann* 2016;**31**(3):309–13.
23. Gallus S, Rosato V, Zuccaro P, Pacifici R, Columbo R, Manzari M, et al. Attitudes towards the extension of smoking restrictions to selected outdoor areas in Italy. *Tobac Contr* 2012;**21**(1):59–62.
24. Kennedy RD, Zummach D, Filsinger S, Leatherdale ST. Reported municipal costs from outdoor smoke-free by-laws-experience from Ontario, Canada. *Tob Induc Dis* 2014;**12**(1):4. <https://doi.org/10.1186/1617-9625-12-4>.
25. Wildman J, Hollingsworth B. Public smoking bans and self-assessed health: evidence from Great Britain. *Econ Lett* 2013;**118**(1):209–12.
26. Mecklenburg County Health Department. *State of the county health report*. 2015. <http://charmeck.org/mecklenburg/county/HealthDepartment/HealthStatistics/Documents/2015%20SOTCH%20Report.pdf>.
27. American FactFinder fact sheet: Mecklenburg County, N.C. U.S. Census Bureau Web site. http://factfinder.census.gov/faces/nav/jsf/pages/community_facts.xhtml?src=bkmm. ND. [Accessed 15 May 2017].
28. 2013 BRFS survey results: North Carolina. North Carolina Centre for Health Statistics Web site. http://www.schs.state.nc.us/data/brfss/2013/nc/all/_rfsmok3.html. Uploaded 2014. [Accessed 15 May 2017].
29. 2013 Mecklenburg county community health assessment: a profile of health indicators and prevention priorities for our community. Mecklenburg county health department. Mecklenburg County Health Department Web site. <http://charmeck.org/mecklenburg/county/healthdepartment/healthstatistics/documents/2013%20mecklenburg%20cha%20feb%207.pdf>. Uploaded 2013. Retrieved May 15, 2017.
30. Tobacco-free Mecklenburg. Mecklenburg county health department. Mecklenburg county health department web site. <http://charmeck.org/mecklenburg/county/HealthDepartment/CommunityHealthServices/TobaccoUse/Pages/TobaccoFreeMeck.aspx>. Uploaded 2014. Retrieved May 15, 2017.
31. Anger S, Kvasnicka M, Siedler T. One last puff? Public smoking bans and smoking behavior. *J Health Econ* 2011;**30**(3):591–601.
32. Adda J, Cornaglia F. The effect of bans and taxes on passive smoking. *Am Econ J Appl Econ* 2010;**2**(1):1–32.