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Planning for Pedestrians and Bicyclists: Results From a Statewide Municipal Survey

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Abstract

Background—We surveyed North Carolina (NC) municipalities to document the presence of municipal walking- and bicycling-related projects, programs, and policies; to describe whether prevalence of these elements differed if recommended in a plan; and to characterize differences between urban and rural municipalities.

Methods—We surveyed all municipalities with 5000 persons ($n = 121$) and sampled municipalities with < 5000 persons (216/420), with a response rate of 54% (183/337). Responses were weighted to account for the sampling design.

Results—From a list provided, staff reported on their municipality's use of walking- and bicycling-related elements (8 infrastructure projects, 9 programs, and 14 policies). The most commonly reported were projects on sidewalks (53%), streetscape improvements (51%), bicycle/walking paths (40%); programs for cultural/recreational/health (25%), general promotional activities (24%), Safe Routes to School (24%), and law enforcement (24%); and policies on maintenance (64%), new facility construction (57%), and restricted automobile speed or access (45%). Nearly all projects, programs, or policies reported were more likely if included in a plan and more prevalent in urban than rural municipalities.

Conclusion—These results provide cross-sectional support that plans facilitate the implementation of walking and bicycling elements, and that rural municipalities plan and implement these elements less often than urban municipalities.

Keywords

active living; active travel; bicycle plan; environment; pedestrian plan; physical activity; policy; recreation; rural; school; urban design; walking

A growing body of literature suggests that policy and environmental changes are associated with higher population-levels of physical activity.^{1–3} In practice, there is variation between states in planning for walking and bicycling⁴ and an array of documents can guide jurisdictions in these efforts. At a broad level, there are comprehensive, general, or master plans, which are defined as adopted official statements or reports of a local governmental legislative body that explain goals, policies, and guidelines intended to direct physical,

social, or economic development that occurs within a planning area, such as a municipality or a county.⁵ Elements that pertain to walking and bicycling may be included in plans for land use, transportation, greenways or trails, and parks and recreation.

A jurisdiction also may have a document focused exclusively on walking or bicycling, called a pedestrian or bicycle plan. It is a public document that explains a community's vision specifically for future walking or bicycling, identifies actions required to realize that vision, ties actions to funding sources, and describes implementation and use.^{6,7} As the planning field evolves, there has been recent momentum toward developing and implementing these plans; yet, there are municipalities that achieved notable pedestrian and bicycling improvements in the absence of these plans. This raises questions about the contexts in which planning is viewed as a necessary precursor to decision-making.

State-based case studies indicated that the presence of pedestrian and bicycle plans increased the likelihood that pedestrian and bicycle projects were included in the transportation improvement program, which guides most state construction or reconstruction projects.⁸ However, there is relatively little documented about the impact the presence of plans actually has on local activities. It is important to understand this in an environment where the creation and implementation of these plans varies across municipalities.^{1,9} Additionally, a number of stakeholders, including policymakers, public health professionals, parks and recreation professionals, citizens, nonprofit groups, and other practitioners, may be involved in developing, implementing, or garnering support for plans. To encourage their participation in the planning process, it is important that they are aware of the relationships planning, funding, and implementing projects at their local level have to opportunities for improving population health and safety outcomes.

From the health field, recent general support includes a recommendation by the American Academy of Pediatrics that governmental groups enact and endorse laws and regulations that create new efforts or expand existing efforts to promote walking and bicycling.¹⁰ Also, the Guide to Community Preventive Services supports the use of informational outreach activities to enhance access to places for physical activity.¹¹ Furthermore, the Active Living by Design Community Action Model, designed to bridge the gap between research and practice,¹² and rooted in the theory of the socioecological framework,¹³ specifies 5 strategies to direct implementation activities, including: preparation, promotions, programs, policies, and physical projects.¹¹

In this study, we surveyed North Carolina (NC) municipalities to document the presence of municipal walking- and bicycling-related projects, programs, and policies and, among those with these elements, to describe whether the prevalence differed by whether it was recommended in a plan (eg, land use, transportation, pedestrian, bicycle, park and recreation, greenway/trail). We also explored whether the prevalence of projects, programs, and policies differed by rurality, given the geographic differences in physical activity¹⁴⁻¹⁶ and the lower prevalence of pedestrian and bicycle plans in rural NC.⁹ We hypothesized that if municipalities had specific pedestrian and bicycle projects, programs, and policies, the prevalence of such elements would be higher if included in plans than if not included in plans. We also hypothesized that rural municipalities would report projects, programs, and

policies less often than their more urban counterparts. We surveyed municipalities, rather than counties, since roads outside of municipalities are owned and maintained by the NC Department of Transportation (NC General Statutes §136–51).

Methods

Description of Survey Administration

The survey targeted the NC municipal staff member most knowledgeable about walking and bicycling issues. To our knowledge, no comprehensive list of planners or other staff exists for all NC municipalities. Therefore, to find the appropriate survey recipients, we used multiple strategies, including planning association lists, website searches, and telephone calls to the municipalities. The survey was available by mail and on a website in spring 2009. We made several attempts to contact nonrespondents. The survey asked about plans that the municipality had in place, and provided lists of relevant walking and bicycling projects, programs, and policies. For each item, respondents were asked to select whether the municipality had each project, program, and policy with the goal of increasing walking and bicycling. Response options were: no; yes, and included in at least 1 of their plans; and yes, but not included in any of their plans.

Description of Sample

Using July 2006 population estimates from the U.S. Census, we classified the 541 NC municipalities by population; we defined “urban” as municipalities with a population ≥ 5000 persons ($n = 121$) and “rural” as municipalities with a population < 5000 persons ($n = 420$). When exploring the validity of this stratification, we found that of the municipalities with a population < 5000 , 91% ($n = 381$) were classified as rural (falling outside the boundary of an urbanized area) based on the 2000 U.S. Census definition.¹⁷

For the survey, we included all municipalities with ≥ 5000 persons ($n = 121$) and randomly selected 50% of municipalities with < 5000 population (210/420). Smaller municipalities with a pedestrian or bicycle plan, based on our collection of plans in 2008,^{6, 18} were also included in the survey sample if they were not randomly selected, for a total of 216/420 selected municipalities with a population < 5000 . Survey response was 62% (75/121) from municipalities with ≥ 5000 persons and 50% (108/216) from municipalities with < 5000 persons. Among the respondents, 77% ($n = 141$) completed the online survey and 23% ($n = 42$) mailed in print copies.

Statistical Analysis

Survey responses were weighted to account for the sampling design and to reflect statewide prevalence estimates for all municipalities. For brevity, only the weighted prevalences were reported. To explore differences by municipality size, we stratified the results by population size and reduced the number of categories from 3 to 2 (either yes or no) due to sample size limitations. Differences between rural and urban municipalities were examined with a Rao-Scott chi-square test using weighted frequencies. SAS version 9.2 was used for all analyses.

Results

Plans

Municipal staff reported whether the following 5 types of plans existed in their municipalities: land use or comprehensive [76.8%, standard error (SE) 2.8]; transportation (43.3%, SE 3.1); greenway or trail (37.1%, SE 3.0); park and recreation (49.8%, SE 3.2); and pedestrian, bicycle, or combined pedestrian and bicycle (24.3%, SE 2.4). Among the first 4 plan categories, between 61.6% (land use/comprehensive) and 95.8% (greenway/trail) of respondents reported that the referenced plan made recommendations on walking or bicycling. Each type of plan was significantly more common in urban than rural municipalities ($P < .0001$, data not shown). Other plans mentioned in open-ended responses included: traffic management, subarea (eg, neighborhood, small area, shoreline access, downtown or town center, corridor), streetscape, tree, and parking plans.

Projects

Respondents were asked whether design or construction had begun for 8 different types of facility or infrastructure projects in their municipality and if so, whether the projects were included in any plans (we provided the following examples: pedestrian, bicycle, land use, comprehensive, transportation, greenway or trail, or parks and recreation) (Table 1). The most commonly reported projects from the list were sidewalks (52.6%), streetscape improvements (51.0%), bicycle and/or pedestrian paths (39.8%), trails (39.4%), and intersection and crosswalk treatments (38.1%). Of the walking and bicycling projects listed in Table 1, we calculated the ratio of planned projects relative to those not specified in plans using weighted percents. The ratio ranged from 1.8 for transit shelters to 10.0 for bicycle and/or pedestrian paths, indicating that each of the 8 facilities or infrastructure projects was present more frequently when included in a plan than when not specified in a plan. All 8 walking and bicycling projects were more likely to be in place in urban compared with rural municipalities (Table 2).

Programs

We asked respondents whether any of 9 different programs related to walking and bicycling existed in their communities, and if so, whether the programs were documented in any plans (Table 3). The most frequently reported programs included cultural, recreational, and health (25.3%), general promotional activities (24.4%), Safe Routes to School (24.0%), and law enforcement (23.5%). Of the walking and bicycling programs listed in Table 3, we calculated the ratio of planned programs relative to those not specified in plans. All but 2 ratios were above 1.0 (range 1.4 general promotional activities to 3.0 monetary incentive programs), indicating that 7 of 9 programs were present more frequently when included in a plan than when not specified in a plan. The 2 programs less likely to be included in plans were law enforcement (0.7) and commuter alternative (0.9). Walking and bicycling programs were more likely to be in place in urban than rural municipalities (Table 4).

Policies

We asked respondents whether their municipality had any of 14 different policies related to walking and bicycling and if so, whether the policies were included in any plans (Table 5). Maintaining sidewalks, trails, footpaths, and crosswalks (63.6%); building sidewalks, trails, and greenways (57.2%); restricting the speed or access of automobiles (eg, road diets, car-free streets, speed limit reductions, traffic calming) (45.2%); and enhancing pedestrian facilities in new developments (43.5%) were the most frequently reported policies. Of the walking and bicycling policies listed in Table 5, we calculated the ratio of those in plans relative to those not specified in plans. All but 2 ratios were above 1.0 (range 1.3 for enforcing or promoting safety to 7.3 for advocacy), indicating that 12 of the 14 policies were more often present when included in a plan than when not specified in a plan. One policy, charging for parking (0.4), was less likely to be implemented if specified within a plan, and there was no difference for the policy of restricted speed or access of automobiles (1.0). In open-ended responses, several respondents reported increased transit services as a policy and others described adding bicycle parking requirements to their zoning ordinance or to commercial development. All 14 walking- and bicycling-related policies were more likely to be in place in urban than rural municipalities (Table 6).

Participants reported whether their municipality used any of 6 land planning tools to promote walking or bicycling (Table 7). Zoning ordinances (63.2%), subdivision regulations (59.9%), and site design guidelines (43.7%) that could support walkers or bicyclists were reported most frequently. Few respondents reported using impact fees (5.7%) relating to amenities for walkers or bicyclists. With the exception of impact fees, all these tools were reported more often in urban than in rural municipalities (Table 8).

Discussion

This statewide survey documented the presence of municipal walking- and bicycling-related projects, programs, and policies. More than half of NC municipalities reported policies regarding maintenance of sidewalks, trails, footpaths and crosswalks (64%) and building of these amenities (57%). About half of municipalities reported having sidewalk (53%) and streetscape improvement (51%) projects. Fewer municipal staff reported programs, with about one-quarter listing cultural/recreational/health (25%), general promotional activities (24%), Safe Routes to School (24%), and law enforcement programming (24%).

Walking and bicycle projects, programs, and policies were less commonly reported among rural compared with urban municipalities. In rural municipalities, the most frequently reported projects were sidewalks (41%) and streetscape improvements (40%). Walking- and bicycling-related programming were infrequently reported, with the most common program in rural municipalities relating to law enforcement (13%) and Safe Routes to School (12%) programs. Many policies were also infrequently reported; the exceptions were that more than half of respondents reported policies to maintain sidewalks, trails, footpaths, and crosswalks (54%) and nearly half reported policies to build sidewalks, trails, or greenways (44%). The relative lack of pedestrian and bicycling elements in rural areas matched the lower prevalence of physical activity in these areas^{14–16} and the frequently reported barriers to physical activity, such as less access to exercise facilities and safety concerns.^{14, 16, 19–21}

Rural areas may benefit from the presence of walking and bicycling elements that support physical activity by reducing these barriers. A number of pedestrian and bicycle elements we ascertained addressed the barrier of safety by creating safer environments (eg, maintenance of bikeways, safer intersection crossings, Safe Routes to School program). Further incorporation of these topics in planning documents may enhance their implementation.

This study also examined whether having plans (eg, land use, transportation, pedestrian, bicycle, park and recreation, greenway/trail) that included pedestrian and bicycle elements was associated with a higher report of pedestrian and bicycle projects, programs, and policies when the element was in place. NC municipalities with pedestrian and bicycle elements in plans were more likely to report projects, programs, and policies related to walking and bicycling than municipalities with such elements not in plans. The findings demonstrate that plans may facilitate the presence of walking and bicycling elements to support active living. Other research suggests that land use plans that include improvements in alternative modes of transportation, such as transit, walking, and bicycling, are positively associated with leisure and transportation physical activity.²²

Of 6 land planning tools listed that could support walkers or bicyclists, the most often cited were zoning ordinances, subdivision regulations, and site design guidelines. It is not surprising that few respondents reported using impact fees. Local governments in NC generally lack statutory authority to impose impact fees to fund certain services, and doing so requires local legislation enacted by the General Assembly, which few places have obtained. This documented use of a variety of tools, which are defined by different documents, reflects the breadth of approaches to improve walking and bicycling. It is not any one plan, be it a pedestrian, bicycle, comprehensive, or park and recreation plan, just as it is not any single strategy (eg, project, program, or policy) that practitioners use to encourage walking and bicycling. Rather it is a variety of related documents and strategies that can be used in different municipal contexts.

Future Studies

A major section of the survey inquired whether the municipality had each project, program, and policy with the goal of increasing walking and bicycling. If these questions were used again, researchers may wish to add an option to distinguish between a negative response (eg, “no project, in plans” and “no project, not in plans). Understanding how municipal plans are implemented with respect to walking and bicycling would also be useful to help other localities improve active living through the planning process. To provide further support for local planning, studies to determine if municipal levels of walking and bicycling improve after plan completion would be helpful.

Limitations

These findings are subject to several limitations. The survey was weighted to represent all municipalities in the state of NC, but these prevalence estimates should be interpreted considering the precision of the estimates. Some prevalence estimates had wide confidence intervals, as indicated by higher standard errors, and other estimates were based on small cell sizes, particularly for the stratified analysis (Tables 2, 4, 6, 8).

Although the weighted prevalences represented the state of NC, there may be confounding factors that were unaccounted for. However, the associations with urbancity, for example, were consistent, such that it is unlikely that confounding would have affected our general interpretation of the results. This survey was cross-sectional; thus, we cannot discern whether planning for walking and bicycling occurred before, during, or after walking and bicycling projects, programs, and policies were implemented.

The respondents varied across municipalities and included, for example, planners, planning directors, public works directors, and town managers. Similar to a municipal survey conducted in Utah,¹ this reflects the diversity of job functions and positions across municipalities. In an effort to maintain consistency, the survey targeted the staff person most appropriate to report on municipal pedestrian and bicycle planning. In addition, respondents were more likely to represent municipalities > 5000 persons and to have a lower proportion of those who walked to work compared with nonrespondents. However, respondents and nonrespondents did not differ by region of NC (mountain, piedmont, coastal), urban area, bicycling to work, household income, or income below the poverty level (detail available elsewhere²³). In addition, the measurement of plans, projects, programs, and policies relied on the respondent's self-report; the accuracy of this is not known.

Conclusions

These results provide cross-sectional evidence that when walking and bicycling projects, programs, and policies are present in NC, their prevalence is usually higher when included in a plan. Our findings were consistent across various walking- and bicycling-related projects, programs, and policies and provide actionable steps that communities can take to plan for pedestrian and bicycling efforts. Our results also indicate that planning and the presence of walking- and bicycling-related projects, programs, and policies was less prevalent in rural compared with urban NC municipalities. Focused efforts, such as technical assistance, special funding opportunities, and transdisciplinary collaboration may be needed to assist rural municipalities to plan for walking and bicycling. Future research could explore the unique characteristics of rural communities that successfully implement projects, programs, and policies to support active living.

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Table 1
Prevalence of Facilities or Infrastructure Projects Related to Walking and Bicycling, and If Yes by Whether or not They Were in a Current Plan, Among North Carolina Municipalities (n = 183)

Project	Presence	n	Weighted percent	Standard error	Prevalence ratio ^d	Missing
Trails	yes, in plans	74	33.6	2.9	5.7	5
	yes, not in plans	9	5.8	1.6		
Sidewalks	no	95	60.6	3.0		
	yes, in plans	94	43.3	3.1	4.6	3
Bicycle and/or pedestrian paths	yes, not in plans	14	9.3	1.9		
	no	72	47.3	3.2		
Bicycle and/or pedestrian paths	yes, in plans	79	36.2	2.9	10.0	5
	yes, not in plans	6	3.6	1.2		
Streetscape improvements ^b	no	93	60.2	3.0		
	yes, in plans	84	39.5	3.0	3.4	3
Intersection and crosswalk treatments ^c	yes, not in plans	20	11.5	2.0		
	no	76	48.9	3.2		
Bicycle facilities ^d	yes, in plans	64	28.3	2.7	2.9	6
	yes, not in plans	17	9.8	1.9		
Wayfinding/signage	no	96	61.8	3.0		
	yes, in plans	45	19.2	2.3	4.8	5
Transit shelters	yes, not in plans	6	4.0	1.3		
	no	127	76.8	2.5		
Transit shelters	yes, in plans	46	20.7	2.4	3.8	6
	yes, not in plans	12	5.5	1.3		
Transit shelters	no	119	73.8	2.6		
	yes, in plans	16	5.8	1.2	1.8	6
Transit shelters	yes, not in plans	8	3.3	1.0		
	no	153	90.9	1.5		

Note: Percents may not add to 100% due to rounding.

^dThe prevalence ratio compared “yes, in plans” vs. “yes, not in plans.”

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^gExamples included lighting, planing, and buffering.

^cExamples included curb cuts, pedestrian crosswalk flags, traffic signals, count-down pedestrian signals, crosswalks, midblock crossings, median islands, and bulb-outs.

^dExamples included bicycle racks, shared lane markings or sharrows, and raised bicycle lanes.

Prevalence of Facilities or Infrastructure Projects Related to Walking and Bicycling Among North Carolina Municipalities by Population Size (n = 183)

Table 2

Project	Municipal population > 5000			Municipal population < 5000			P-value ^d
	n = 75		Standard error	n = 108		Standard error	
	n	Weighted percent		n	Weighted percent		
Trails	56	74.7	4.1	27	26.1	3.6	<0.0001
Sidewalks	64	86.5	3.2	44	40.5	3.9	<0.0001
Bicycle and/or pedestrian paths	57	78.1	3.9	28	26.1	3.5	<0.0001
Streetscape improvements*	61	81.3	3.7	43	39.9	3.9	<0.0001
Intersection and crosswalk treatments**	53	73.6	4.2	28	25.6	3.5	<0.0001
Bicycle facilities***	36	49.3	4.8	15	13.8	2.7	<0.0001
Wayfinding/signage	43	59.7	4.7	15	14.3	2.8	<0.0001
Transit shelters	23	31.9	4.5	1	1.0	0.8	<0.0001

^d P-values are from the Rao-Scott chi-square test on weighted data.

* Examples included lighting, planting, and buffering.

** Examples included curb cuts, pedestrian crosswalk flags, traffic signals, count-down pedestrian signals, crosswalks, midblock crossings, median islands, and bulb-outs.

*** Examples included bicycle racks, shared lane markings or sharrows, and raised bicycle lanes.

Table 3
Prevalence of Programs and Promotions Related to Walking and Bicycling, and If Yes by Whether or not They Were in a Current Plan, Among North Carolina Municipalities (n = 183)

Program	Presence	n	Weighted percent	Standard error	Prevalence ratio ^e	Missing
Safety and/or educational	yes, in plans	32	13.0	1.9	2.2	5
	yes, not in plans	12	5.8	1.4		
Driver training/driver education initiatives	no	134	81.2	2.2		
	yes, in plans	6	2.5	0.9	1.8	5
Law enforcement	yes, not in plans	4	1.4	0.6		
	no	168	96.0	1.0		
Law enforcement	yes, in plans	23	9.4	1.6	0.7	5
	yes, not in plans	29	14.1	2.1		
On-going promotional activities or programs that may encourage walking ^b	no	126	76.6	2.5		
	yes, in plans	34	14.2	2.0	1.4	6
Safe Routes to School	yes, not in plans	24	10.2	1.7		
	no	119	75.6	2.5		
Safe Routes to School	yes, in plans	35	14.7	2.0	1.6	4
	yes, not in plans	21	9.3	1.7		
Monetary incentive ^c	no	123	75.9	2.5		
	yes, in plans	3	1.1	0.5	3.0	4
Monetary incentive ^c	yes, not in plans	1	0.4	0.3		
	no	175	98.6	0.6		
Cultural, recreational, and health-related	yes, in plans	39	16.6	2.1	1.9	6
	yes, not in plans	20	8.7	1.6		
Commuter alternative	no	118	74.7	2.5		
	yes, in plans	9	3.3	0.9	0.9	8
Commuter alternative	yes, not in plans	8	3.7	1.1		
	no	158	93.0	1.4		
Special populations ^d	yes, in plans	26	10.9	1.7	2.1	6
	yes, not in plans	10	5.1	1.3		
Special populations ^d	no	141	84.0	2.1		

Note. Percents may not add to 100% due to rounding.

^aThe prevalence ratio compared “yes, in plans” vs. “yes, not in plans.”

^bExamples included Earth Day, bike on bus, health promotion challenges, and Walk to School Day/Month.

^cExample included parking cash-out.

^dExamples included lower income groups, senior citizens, and persons with disabilities.

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Table 4 Prevalence of Programs and Promotions Related to Walking and Bicycling Among North Carolina Municipalities by Population Size (n = 183)

Program	Municipal population 5000			Municipal population < 5000			P-value ^d
	n	Weighted percent	Standard error	n	Weighted percent	Standard error	
Safety and/or educational	34	46.6	4.8	10	8.8	2.2	<0.0001
Driver training/driver education initiatives	9	12.3	3.1	1	1.0	0.8	0.002
Law enforcement	38	52.1	4.8	14	13.2	2.7	<0.0001
On-going promotional activities or programs that may encourage walking *	48	64.9	4.5	10	9.5	2.4	<0.0001
Safe Routes to School	43	58.1	4.7	13	11.8	2.6	<0.0001
Monetary incentive **	4	5.4	2.1	0	0.0		NA
Cultural, recreational, and health-related	47	65.3	4.6	12	11.3	2.5	<0.0001
Commuter alternative	15	21.1	4.0	2	2.0	1.1	<0.0001
Special populations ***	28	38.4	4.6	8	7.9	2.2	<0.0001

^a P-values are from the Rao-Scott chi-square test on weighted data.

* Examples included Earth Day, bike on bus, health promotion challenges, and Walk to School Day/Month.

** Example included parking cash-out.

*** Examples included lower income groups, senior citizens, and persons with disabilities.

Note. NA = did not calculate a P-value due to small cell sizes.

Table 5
Prevalence of Policies Related to Walking and Bicycling, and If Yes by Whether or not They Were in a Current Plan, Among North Carolina Municipalities (n = 183)

Program	Presence	n	Weighted percent	Standard error	Prevalence ratio ^d	Missing
Enforce or promote pedestrian or bicyclist safety ^b	yes, in plans	27	12.0	1.9	1.3	7
	yes, not in plans	18	9.5	1.8		
Restrict the speed or access of automobiles ^c	no	131	78.5	2.5		
	yes, in plans	47	22.6	2.5	1.0	3
Change for parking	yes, not in plans	43	22.6	2.6		
	no	90	54.9	3.1		
Maintain sidewalks, trails, footpaths, and crosswalks	yes, in plans	5	1.8	0.7	0.4	5
	yes, not in plans	11	4.4	1.1		
Retrofit or upgrade existing pedestrian facilities ^d	no	162	93.8	1.3		
	yes, in plans	80	38.9	3.0	1.6	6
Build sidewalks, trails, or greenways	yes, not in plans	43	24.7	2.8		
	no	54	36.4	3.1		
Enhance pedestrian facilities in new development ^e	yes, in plans	51	24.1	2.6	1.7	6
	yes, not in plans	27	14.2	2.2		
Encourage workites to enhance access to pedestrian and bicycling facilities (e.g., showers, bicycle racks)	no	99	61.7	3.0		
	yes, in plans	91	42.0	3.1	2.8	5
Address the needs of special populations ^f	yes, not in plans	25	15.2	2.3		
	no	62	42.8	3.2		
Encourage workites to enhance access to pedestrian and bicycling facilities (e.g., showers, bicycle racks)	yes, in plans	74	35.8	3.0	4.6	8
	yes, not in plans	14	7.7	1.7		
Address the needs of special populations ^f	no	87	56.5	3.1		
	yes, in plans	27	11.1	1.7	5.0	8
Address the needs of special populations ^f	yes, not in plans	3	2.2	1.0		
	no	145	86.7	2.0		
Address the needs of special populations ^f	yes, in plans	31	13.9	2.0	2.2	6
	yes, not in plans	13	6.2	1.4		
Address the needs of special populations ^f	no	133	79.9	2.4		

Program	Presence	n	Weighted percent	Standard error	Prevalence ratio ^a	Missing
Facilitate walking/bicycling to/from School	yes, in plans	42	18.7	2.3	2.0	7
	yes, not in plans	20	9.6	1.8		
Promote the use of transit (e.g., shelters, marked stops, kiosks, landscaping)	no	114	71.7	2.7		
	yes, in plans	26	10.9	1.7	3.0	6
	yes, not in plans	9	3.6	1.0		
	no	142	85.4	2.0		
Encourage walking, bicycling, or transit in redevelopments	yes, in plans	47	21.2	2.4	4.5	7
	yes, not in plans	10	4.8	1.3		
	no	119	74.0	2.6		
	yes, in plans	22	11.0	1.9	5.0	7
Encourage construction sites to provide pedestrian/bicycle access	yes, not in plans	5	2.2	0.8		
	no	149	86.8	2.0		
Advocacy related to policies	yes, in plans	24	10.9	1.8	7.3	12
	yes, not in plans	4	1.5	0.6		
	no	143	87.6	1.9		

Note. Percents may not add to 100% due to rounding.

^aThe prevalence ratio compared “yes, in plans” vs. “yes, not in plans.”

^bExamples included enforcement of jaywalking and yield to pedestrian signs.

^cExamples included road diets, car-free streets, speed limit reductions, and traffic calming.

^dExamples included surface improvements and removal of barriers/obstructions.

^eExamples included enhancing on-site pedestrian access from developments to curbside and enhancing off-site access to connect to existing sidewalks.

^fExamples included improving access to pedestrian facilities in lower-income neighborhoods and policies to support pedestrian activity among senior citizens or persons with disabilities.

Table 6 Prevalence of Policies Related to Walking and Bicycling Among North Carolina Municipalities by Population Size (n = 183)

Policy	Municipal population ≥ 5000			Municipal population < 5000			P-value ^d
	n = 75			n = 108			
	n	Weighted percent	Standard error	n	Weighted percent	Standard error	
Enforce or promote pedestrian or bicyclist safety*	30	42.3	4.8	15	14.3	2.8	<0.0001
Restrict the speed or access of automobiles**	52	70.3	4.3	38	36.1	3.8	<0.0001
Charge for parking	15	20.3	3.8	1	1.0	0.8	<0.0001
Maintain sidewalks, trails, footpaths, and crosswalks	66	91.7	2.7	57	53.7	4.0	<0.0001
Retrofit or upgrade existing pedestrian facilities***	48	65.8	4.5	30	28.4	3.6	<0.0001
Build sidewalks, trails, or greenways	69	94.5	2.2	47	43.8	4.0	<0.0001
Enhance pedestrian facilities in new development****	56	76.7	4.0	32	31.3	3.8	<0.0001
Encourage workites to enhance access to pedestrian and bicycling facilities (e.g., showers, bicycle racks)	23	31.9	4.5	7	6.5	2.0	<0.0001
Address the needs of special populations*****	33	44.6	4.7	11	11.0	2.6	<0.0001
Facilitate walking/bicycling to/from school	45	61.6	4.6	17	16.1	3.0	<0.0001
Promote the use of transit (e.g., shelters, marked stops, kiosks, landscaping)	30	41.1	4.7	5	5.0	1.8	<0.0001
Encourage walking, bicycling, or transit in redevelopments	41	56.9	4.8	16	14.9	2.9	<0.0001
Encourage construction sites to provide pedestrian/bicycle access	17	23.6	4.1	10	9.5	2.4	0.01
Advocacy related to policies	22	31.9	4.6	6	5.6	1.8	<0.0001

^d P-values are from the Rao-Scott chi-square test on weighted data.

* Examples included enforcement of jaywalking and yield to pedestrian signs.

** Examples included road diets, car-free streets, speed limit reductions, and traffic calming.

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Examples included surface improvements and removal of barriers/obstructions.

Examples included enhancing on-site pedestrian access from developments to curbside and enhancing off-site access to connect to existing sidewalks.

Examples included improving access to pedestrian facilities in lower-income neighborhoods and policies to support pedestrian activity among senior citizens or persons with disabilities.

Table 7

Prevalence of Implementation Tools Currently Being Used to Promote Walking or Bicycling Among North Carolina Municipalities (n = 183)

Implementation tool	n	Weighted percent	Standard error	Missing
Zoning ordinances	119	63.2	3.2	8
Subdivision regulations	115	59.9	3.2	9
Capital improvements program	76	37.0	3.0	12
Impact fees related to amenities for walkers or bicyclists	11	5.7	1.4	12
Conservation easements that could result in trails or greenways	60	30.9	2.9	12
Site design guidelines that could support walkers or bicyclists	85	43.7	3.2	13

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Table 8
Prevalence of Implementation Tools Currently Being Used to Promote Walking or Bicycling Among North Carolina Municipalities by Population Size (n = 183)

Implementation tools	Municipal population ≥ 5000			Municipal population < 5000			P-value ^a
	n	Weighted percent	Standard error	n	Weighted percent	Standard error	
Zoning ordinances	63	85.1	3.4	56	54.9	4.1	<0.0001
Subdivision regulations	65	87.8	3.1	50	49.2	4.1	<0.0001
Capital improvements program	52	71.2	4.3	24	23.8	3.5	<0.0001
Impact fees related to amenities for walkers or bicyclists	7	9.6	2.8	4	4.2	1.7	0.17
Conservation easements that could result in trails or greenways	38	52.1	4.8	22	22.8	3.5	<0.0001
Site design guidelines that could support walkers or bicyclists	53	73.6	4.2	32	32.3	3.9	<0.0001

^a P-values are from the Rao-Scott chi-square test.