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Article

Changes in visitor profiles and activity patterns following dog supportive modifications to parks: A natural experiment on the health impact of an urban policy

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ABSTRACT

Urban parks are important settings for physical activity, but few natural experiments have investigated the influences of park modifications on activity patterns and visitor profiles.We assessed the impact of implementing a municipal policy on off-leash dogs in city parks in Calgary (Alberta, Canada). Systematic observation undertaken in 2011 and 2012 within four parks captured patterns of use, activities, and visitors' characteristics. After baseline data collection, off-leash areas were created in two parks only. We compared changes in the sociodemographic and activity profiles in all parks between 2011 and 2012. Visitors *with* dogs participated in less intense activity relative to visitors *without* dogs. In both modified parks, the intensity of children's activities decreased, while the intensity of adults' activities remained stable. Adjusting for visitor characteristics, the likelihood of dog-related visits, relative to other activities, significantly decreased in one of the two modified parks (odds ratio 0.55, $p < .05$). Accommodating off-leash dogs in parks has the potential to modify activities undertaken inside parks as well as the profile of visitors, but may not increase park visits among dog-walkers in the short term. Recreation, park, and urban planners and policy-makers need to consider the needs and preferences of the broader community in the design and redesign of public parks.

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Introduction

Exposure to greenspace and natural environments can provide mental and emotional health benefits (Bowler, Buyung-Ali, Knight & Pullin, 2010; Lee & Maheswaran, 2010; Francis, Wood, Knuiman & Giles-Corti, 2012). Urban parks, in particular, provide opportunities for physical activity, play, social interaction, and relaxation for different segments of the population (Lee and Maheswaran, 2010; Francis et al., 2012; Kazmierczak, 2013; Peters, Elands & Buijs, 2010). As a public good, parks are accessible to large proportions of urban populations, and can support a diverse range of activities. Thus, urban parks are important settings for improving population health (Bedimo-Rung, Mowen & Cohen, 2005).

To improve park planning and design, more evidence on how park environments influence usage patterns is needed. Evidence from natural experiments investigating the relations between the built environment and physical activity is beginning to emerge (McCormack & Shiell, 2012; Koohsari et al., 2015) yet few examine changes in park use and activity following park modifications. For instance, the installation of new play and outdoor fitness equipment in parks, in addition to ground surfacing and landscaping improvements, led to an increase in visitors and the amount of energy expended by park visitors (Cohen et al., 2015). Elsewhere, the installation of outdoor fitness equipment in parks led to increased energy expenditure among visitors, mainly due to increases in moderate and vigorous-intensity activity resulting from the use of the installed equipment and changes in the demographic profile of visitors following the modifications (Cohen, Marsh, Williamson, Golinelli & McKenzie, 2012). Likewise, improvement to ground surfaces, new fencing, lighting, landscaping, and addition of

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benches to two parks in a US low-income neighbourhood resulted in increases in park and playfield use, changes in the demographic profile of visitors, but also increases in the proportion of sedentary activity (Tester & Baker, 2009). Indeed, not all studies report improvements in park physical activity or visits following park modifications. For example, Cohen et al. (2009) found no improvements in observed or self-reported physical activity following modifications to several parks, such as the development or refurbishment of gymnasia, landscaping, picnic areas, paths, and ground surfaces surrounding play equipment. Concurrent changes in park programming (organized sports, operating hours etc.) alongside park modifications however, may contribute to changes in park use and activity (Tester & Baker, 2009; Cohen et al., 2009).

Parks serve as destinations for dog-walkers, and dog-walking routines support physical activity (Cutt, Giles-Corti, Knuiman & Burke, 2007; Christian et al., 2013). Dogs may provide motivation for people to remain active, when built environment (e.g., low walkability) and weather conditions might otherwise discourage physical activity (Temple, Rhodes & Wharf Higgins, 2011; McCormack, Shiell, Doyle-Baker, Friedenreich & Sandalack, 2014). Furthermore, neighbourhood built environment characteristics appear to be important for encouraging dog-walking (Westgarth, Christley & Christian, 2014; Richards, McDonough, Edwards, Lyle & Troped, 2013). A recent study found that dog-owners who walk their dogs were more likely to report more frequent dog-walking if they lived near an off-leash area, but other dog-owners nearby were less likely to walk their dogs at all (McCormack, Rock, Sandalack & Uribe, 2011). Another Canadian study found frequent dog-walking in parks, some of which allowed off-leash dogs (Temple et al., 2011). Within US cities, park spaces where dogs can be exercised support physical activity via dog-walking (Cohen et al., 2010; Lee, Shepley & Huang, 2009). Whereas, dog-owners in Australia residing within 1-mile of parks, which contained dog-supportive features, were more likely than other owners to regularly walk their dogs (Christian, Giles-Corti & Knuiman, 2010). Improvements to an Australian neighbourhood park, which included the installation of a 'fenced' off-leash area along with a playground, walking track, perimeter fencing, and a barbeque area, led to an increase in park visitors and in walking and vigorous physical activity (Veitch, Ball, Crawford, Abbott & Salmon, 2012). However, changes in the visitor profiles and dog-walkers visiting the park were not fully explored (Veitch et al., 2012).

Proximity of off-leash areas appear to be important for supporting dog-walking but the extent to which park modifications impact park activities and visitor profiles have not been investigated. This natural experiment examined the potential for creating off-leash areas to result in changes in: 1) demographic characteristics of park visitors, and; 2) patterns of park-based activity.

Methods

Study and sample design

Using purposive sampling, we selected four city parks in Calgary (Alberta, Canada). Taradale park (21.9 ha) had recently been designated as off-leash but had yet to undergo any environmental modifications (Parks Foundation Calgary, 2011). Martindale (2.48 ha), West Hillhurst (1.11 ha), and Meadowlark (1.39 ha) were publicly proposed as potential sites for new "off-leash" areas (City of Calgary, 2011), although only Martindale became designated during the study. West Hillhurst and Meadowlark parks remained in the study, serving as "comparison" sites. Using a pre-post study design, we collected quantitative systematic direct observation data from May to July in 2011 and 2012. The University of Calgary Research Ethics Board approved this study.

Park modifications

The physical characteristics of the four parks at baseline are fully described elsewhere (McCormack, Rock, Swanson, Burton & Massolo, 2014). No planned physical environmental changes occurred in the two parks that retained "on-leash" designations during the study (West Hillhurst and Meadowlark). West Hillhurst park is located at the neighbourhood periphery and separated from an adjacent major arterial road by a chain-linked fence. A bridge for pedestrians and cyclists joins the park with the river pathway located on the opposite side of the arterial road. The park includes an open area with trees, a playground, benches and garbage bins. Meadowlark park includes multiple open green areas and pedestrian and cycling paths that link the surrounding communities with a local major mall. The park is located on the neighbourhood periphery and a 10-foot tall concrete wall separates the park from an adjacent major arterial road. The park includes benches, garbage cans, public art, lighting, and landscaped gardens.

For Taradale and Martindale parks, the creation of off-leash areas resulted in modifications. At baseline, Taradale park was a 'natural' open field bisected by two paved pathways, and bordered by fences that separated the unmaintained green space from a baseball diamond, a major roadway, and residential neighbourhoods. One of the pathways connected the park with residential neighbourhoods, while the other formed part of a linear park system that was under development in land set aside as a transportation and utility corridor. Discreet signage pointed to an off-leash area but the boundaries were unclear. Prior to follow-up, a large section of the Taradale park, immediately adjacent to a residential neighbourhood, was fenced and gated as an off-leash area (4.13 ha). The fenced area was divided into two gated sections: one signed for larger dogs that included a pond, and the other signed for smaller dogs. The City's standard signs for off-leash areas were prominently installed within the fenced area. Gravel pathways, benches, and waste garbage bins were added within the fenced areas. A gravel parking lot was also installed near one of three gateways to the fenced off-leash area. The other gateways were located near the paved pathways in the larger park.

Martindale park included a natural but unkempt wooded area and a large open grassy area which contained a storm water drainage basin. The large park (2.48 ha) included a dual-use path and a garbage can placed by the path adjacent to street parking. The park featured a brass monument (a women pushing a girl on a swing set and an off-leash dog jumping) but neither a playground, dedicated lighting, nor seating (e.g., benches). Prior to follow-up in Martindale park, the City's standard signs for off-leash areas were prominently installed at the periphery of the main greenspace. An additional garbage bin for waste-disposal was also provided. Improvements to landscaping assisted with the drainage of storm water, although this modification was unrelated to the City's off-leash policy.

Data collection

Direct observation: quantitative data

The selected observation points within each of the four parks allowed most of the park area to be seen. Standing at the observation points, research assistants collected data in each park during the morning (830–1230 h) and an afternoon (1430–1830 h) on a Saturday, Sunday, and one weekday (Tuesday or Thursday). To begin the quantitative systematic observation, the research assistants selected the first park visitor within their field of vision and recorded their demographic characteristics and type of activity. The research assistants scanned the park in counter-clockwise direction and selected the next park visitor in their field of vision

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