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Coastal climate change, vulnerability and age friendly communities: Linking planning for climate change to the age friendly communities agenda

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ABSTRACT

In light of the global, unprecedented and enduring phenomenon of population ageing, cities and communities across the world have committed themselves to establishing and implementing age friendly community designs, programs, services and practices. In Canada, there has been a particular interest in promoting 'age friendliness' in rural and remote communities where there is often a concentration of older residents and limited access to services and supports. Our study examines the connection between social and place vulnerability and the development of 'age friendly' communities in one Canadian province, Nova Scotia—a province that is at the forefront of the aging trend. Specifically, we look at how infrastructure and assets important to vulnerable seniors in rural communities may be affected by coastal climate change and consider how communities can better plan for such eventualities. This work highlights the importance of linking age friendly community initiatives to proactive planning practices. Substantively, we demonstrate the lack of attention to place vulnerability within the age-friendly communities framework.

1. Introduction

The global, unprecedented and enduring phenomenon of population ageing is pushing societies to adapt. As part of adaptation, communities are adopting a range of policies to help seniors stay healthy and active into old age. The age friendly communities agenda is one such policy response—it has garnered global interest. The World Health Organisation (WHO) has been a key champion of this approach; the organisation launched the *Global Age Friendly Cities* project in 2000, and in 2005 they engaged older persons and related stakeholders in a global consultation process to develop guidelines on how to promote active ageing (WHO, 2007). This work is linked to the organisation's active aging policy framework (WHO, 2002). From the onset, Canada has shown a strong interest in supporting active ageing and age friendly communities. In 2007, a Federal-Provincial-Territorial group drew on this work to develop specific guidelines for Canadian cities and rural communities in concert with a wide range of partners (Public Health Agency of Canada, 2007). Every Canadian province has subsequently promoted the development of age friendly communities, with some attaching funding to help communities develop plans, infrastructure, programs and services. The task has now fallen to communities to implement the age friendliness concept in everything from awareness campaigns to community design.

Age friendly community initiatives take action on something that the field of environmental gerontology has long forwarded—that 'place' matters (Alley et al., 2007; Rowles and Bernard, 2013; Scheidt and Schwarz, 2013). Where one lives, along with the structure of physical and social supports, profoundly influences health and other outcomes for older adults (Moore, 2014, p. 183). While a great deal of research in this area has focussed on institutional and home environments, there is an "astonishing paucity" of research on the macro environment—including rural locales (Menec et al., 2011, p. 480). It is on this front that our research contributes. Our work examines 'age friendliness' from the perspective of place and social vulnerability in lieu of climate change and its impacts, and contributes to the literature on aging in rural places (Burholt and Dobbs, 2012; Keating et al., 2013).

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In rural Nova Scotia these two trends—aging and coastal climate change—are coming to a head (Rapaport et al., 2015). The province's coastal communities are at the forefront of climate change impacts, such as sea level rise (Government of Nova Scotia 2009; Vasseur and Cato, 2008). Further, seniors are the fastest growing segment of the province's citizenry (Statistics Canada, 2015), with many residing in rural areas along the coast. Securing the health and well-being of an aging population is challenging on many levels, but it becomes even more challenging when considered in lieu of changing environmental conditions resulting from climate change. In examining these converging trends we ask: i) how will the effects of coastal climate change (e.g., sea level rise and coastal flooding) affect assets and infrastructure important to rural seniors and; ii) how are communities presently planning and adapting to such scenarios in lieu of the age friendly communities agenda? Our study combines census area cohort population model projections with community asset mapping and coastal sea rise scenarios to the year 2025–2026, along with a municipal policy review. We examine the coastal flooding vulnerability of key community, residential and infrastructure assets that are important to seniors as well as community planning capacity and adaptation, paying special attention to how this issue is treated within the 'age friendly communities' agenda. Our work grounded in human ecological theory and draws on Susan Cutter's 'hazard of place' framework (1997).

The paper proceeds by discussing ageing in place and age friendly community policy and practices along with background context on the tandem trends of coastal climate change and population aging in Nova Scotia. We follow with an elaboration of our theoretical framework and research methods, and results and discussion. Finally, we offer conclusions and recommendations on the interaction between population aging and climate change vulnerability. In doing so we forward a framework for understanding both social and place vulnerability *in tandem* within the age friendly communities framework.

2. Planning for age friendly communities—linking social and place vulnerability

The age friendly communities agenda arose out of a human ecological and environmental gerontology lens that forwards that there should be a fit between an older person and their environment and that the environmental context impacts their wellbeing. The World Health Organization defines an age-friendly community as one that "encourages active ageing by optimizing opportunities for health, participation and security in order to enhance quality of life as people age, [and] adapts its structures and services to be accessible *to* and inclusive *of* older people with varying needs and capacities" (WHO, 2002, p. 1). Age-friendly approaches focus on attitudinal, social and environmental barriers and challenges that hinder ageing in place. It is on this last point—*environmental barriers*—that we focus.

The age friendly communities agenda is linked to 'ageing-in-place'—a concept that suggests that older people can live out their lives for as long as possible in the place of their choice, "safely, independently, comfortably, regardless of age, income, or ability level" (Centre for Disease Control and Prevention, 2013). In order to 'age-in-place,' individuals may eventually need to rely on other social supports (e.g., family, friends, and neighbours) and a series of community supports (e.g., home care, housing, and instrumental activities of daily living) (Carstairs and Keon, 2007; Institute for Life Course and Aging, 2007). Aging in place and age friendly communities are being introduced in Canada through provincial and local government initiatives; for example, the Province of Manitoba's work on 'aging in place' in rural communities (Edmonton Seniors Coordinating Council, 2011; Government of Manitoba, 2011). Accessing local services is important for all age groups, but is especially important for elderly seniors; transportation is a lifeline for older people's independence, particularly for rural communities that can be more isolated and often have greater distances between services.

Canada's provincial and federal guidelines and supports for rural and remote communities have propelled the age friendly communities agenda forward at the local level. Both the WHO and Canada's national guidelines identify eight critical areas for action: i) outdoor spaces and buildings, ii) transportation, iii) housing, iv) social participation, v) respect and social inclusion, vi) civic participation and employment, vii) communication and information, viii) community support and health services (WHO, 2007; Public Health Agency of Canada, 2007). Cities and communities across Canada have drawn on these guidelines to create strategies outlining how they will create age friendly communities through programs, supports or physical design elements and infrastructure. But, as Menec et al. ask: are these the right domains or, are important dimensions being missed (2011, p. 482)? Our study suggests that some domains *are* missed—in particular, linkages to place and social vulnerability. These issues are not presently linked to land use and zoning bylaws in our case study areas; they do not consider how hazards (such as those linked to climate change including rising sea levels and more frequent and extreme weather events such as coastal flooding and heat stress) may impact vulnerable populations.

These issues are of crucial importance in Nova Scotia. This province is experiencing a parallel phenomenon of rural coastal community population change and environmental change—the latter can have significant consequences for the health and security of the former. In 2011, seniors accounted for more than 25 percent of the population in a number of the province's towns, and exceeded 30 percent of the population in four communities: Lunenburg (31.1 percent), Mahone Bay (32.2 percent), Lockeport (33.2 percent) and Annapolis Royal (37.4 percent) (Statistics Canada, 2006). These demographic structural changes are related to lower birth rates, the out-migration of young and middle aged people, the in-migration of retirees, and longer life spans (Statistics Canada, 2010). In Nova Scotia, seniors are the fastest growing segment of its citizenry. Rural regions in particular are dominated by late middle-aged people ages 50 years and older. These trends are similar across the other Atlantic provinces of Prince Edward Island, Newfoundland and Labrador and New Brunswick which—after Nova Scotia—have the largest proportion of seniors respectively.

Over the next 85 years (to 2100), climate projections suggest that Nova Scotia will become wetter, warmer, and stormier and that sea levels will rise to flood low-lying coastal areas (Richards and Daigle, 2011). While there is some variability in these projections, even the most conservative analyses show an increase in global sea level in the range of 0.26 to 0.82 m by 2100 (Intergovernmental Panel on Climate Change, 2013; Rahmstorf, 2007). The world is already experiencing these impacts and Nova Scotia is no exception. The most recent provincial reports suggest a total sea level change of 1.05 to 1.10 m in Nova Scotia to the year 2100 (higher than 1980-99 norms, incorporating local geologic factors and melting glaciers) (Richards and Daigle, 2011). Even short term (10–15 year) projection scenarios for the province show a great enough change in sea level (0.15 m) to have an impact on the lowest lying areas with storm surge floods moving further inland (Richards and Daigle, 2011). Sea level rise in itself may have minimal impacts on communities due to inundation. But Nova Scotia's location on the eastern seaboard also makes is a target for the wrath of hurricanes and nor'easters which leads to flooding and wind damage. With expected sea level rise, the extent of flooding is projected to