A Social Ecological Approach to

Exploring the Relationship between the Built Environment and Social Isolation

and Loneliness: Implications for Public Policy

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Executive Summary

Introduction

- Social isolation and loneliness is a significant predictor of adverse physical and mental health outcomes
- Though our knowledge of the contextual factors contributing to social isolation and loneliness in Western culture is increasing, one area found to be lacking in knowledge, policy, and action is the effects of the built environment

Methods

- Through the application of a social ecological lens as well as several practice tools developed for Canadian public health professionals, a semi-systematic review of the literature was conducted to answer the research question '*What is the association between the built environment and loneliness and social isolation?'*
- Utilizing a synthesis matrix, 71 articles were reviewed and organized by built environment theme and was identified as falling within one or more social ecological category

Results

- The predominant built environment themes found include the home, supported housing, the workplace, greater rural and urban communities, and built community services
- Within these built environments, a variety of populations and sub-populations were found within the research including older and working-class adults, those with mental and physical disabilities, and youth and adolescents
- In consideration of the intersection between the built environment and population explored, the findings of this review reveal that research within each environment has a propensity to focus on a predominant social ecological level

Discussion

- It is not our built environment that results in social isolation and loneliness, but rather it is the unintended inequities created within our environments that result from how the environment is built
- Without consideration of the challenges faced by populations to adapt or control their environment, the fight to reduce social isolation and loneliness, and its association health consequences, will continue to endure.
- The results of this review also highlight a number of gaps in our understanding of the effect of the built environment on social isolation and loneliness including a lack of evidence-based strategies to reduce or mitigate risk and of specific populations including the disenfranchised (e.g. those affected by homelessness and/or addiction) and of specific cultural and ethnic backgrounds (e.g. Aboriginal and First Nations groups).

Conclusion

- The association between the built environment and social isolation and loneliness requires more than an understanding of the contributory contextual factors
- To improve social connectedness, we must work to not only ensure that our environment is as equitable and accessible as possible to those within it, but we must also make concerted efforts to develop strategies to improve social connectedness through the built environment

Introduction

The intersection between health and the environment is well-established. From the late 19th century, as part of the social welfare movement stemming primarily from the burden of infectious disease, the collaborative efforts of health and design professionals have been instrumental in the provision of healthier living environments within modern society (1,2). To date, research on the association between the built environment and health reveals how the environment continues to influence health status. From housing to air quality (3), the walkability of neighbourhoods and obesity rates (4), to environmental determinants of food consumption (5), we must work to not only ensure that health is safeguarded through reactionary measures to control immediate risks, but also to support and protect those from environmental factors which do not promote health (6).

One health promotion area which has gained notoriety in the public discourse as of late is that of the health effects of social isolation and loneliness (7-8). Implicated as being as unhealthy as smoking 15 cigarettes per day as a risk factor for premature mortality (9), the adverse physical (10-11) and mental (12-13) health effects of social isolation and loneliness are purported as having reached epidemic proportions (7-8,14). Current efforts to understand contextual factors which contribute to social isolation and loneliness reveal a host of influences including individual, social, community-based, and societal factors (15). However, one area particularly lacking in knowledge, policy, and action, is the association between the built environment and social isolation and loneliness (8,15). Therefore, using the social-ecological model as a framework to guide an exploration of the primary and secondary literature, the aim of this semi-systematic review is to contribute to the existing knowledge of predictors of social

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isolation and loneliness by examining the effects and influences of the built environment so that policy and research recommendations may be proposed.

The Case for a Social Ecological Approach

Not only is human behaviour influenced by the environment we live in, but so do we adapt the environment around us for the betterment of human welfare (16). To improve human health, it is argued, policy and health promotion interventions must consider multiple elements of influence (17). Though many frameworks and models may be used to help guide our understanding of the influences of the complex nature of human health (18), one model, the social-ecological model, lends itself well to our understanding of health within broader social and societal contexts (19). Here, the social-ecological model considers the *interactions* of health determinants within a variety of contexts including individual, social, community-based, and broader societal aspects including environmental factors such as the built environment (20) (see Appendix A).

Methods

Using a social ecological lens to understand the relationship between the built environment and social isolation and loneliness, a semi-systematic search of electronic databases was completed with the aim of locating primary and secondary academic literature. Through the utilization of several practice tools developed for Canadian public health professionals (21) (as outlined in Appendices B and C), the following is an overview of the search strategy, review method, and organizational approach used to conduct this review.

The electronic databases used to locate scholarly published literature included Medline (OVID), CINAHL (Cumulative Index to Nursing and Allied Health Literature), and PsycINFO. Databases were searched using a combination of keywords and MeSH headings where available

(see Appendix B for search strategy details). After screening titles and abstracts for relevance to the research question and applying *a priori* inclusion and exclusion criteria, full articles were then obtained to further assess their relevancy (see Appendix C for full search result details). Once the final list of articles was identified, a total of 71 articles, a synthesis matrix was used to organize relevant research findings of each article (see Appendix D). To assist with the application of a social ecological lens, each source was identified as falling within one or more social ecological categories.

Results

Within a diverse range of built environment settings including the home, supportive housing, work environments, rural and urban neighbourhood communities, built community service environments, and others, the results of this review revealed a number of populations at the forefront of this research including seniors, working-class adults, those with mental and physical disabilities, youth and adolescents. These findings originate from a variety of countries from all over the globe including North America, Europe, Australia, New Zealand, and Asia. The following is an overview of these findings. To aid in structuring the results of this review, an exploration will take place within the context of the built environment explored. Where significant overlap between environments was identified, research findings are examined within the context of the predominant research theme.

The Home

One setting which received a great deal of attention was the home (any permanent non-institutional, or agency controlled, residence). Here multiple social ecological levels of influence were found to impact and contribute to one's ability to engage socially with others and the broader community. At the individual level, factors such as elevated body mass index,

poorer health, and lower income increased a person's likelihood to becoming homebound (22).

Poor physical health resulting from chronic health conditions such as Multiple Sclerosis (MS)

(23-24) and stroke (25), also affected a person's ability to function within their immediate home

environment which resulted in social disconnectedness and isolation. For example, one mother

diagnosed with MS reported being confined to upper level of the house as she was not able to use

the stairs to reach the main floor. Unsurprisingly, this left her feeling disconnected from the rest

of her family and indeed the greater community (24). Conversely, the home was also found to

increase social connectedness. At the community level, take for instance a residential hotel in

San Francisco which was home to a significant number of marginalized persons with human

immunodeficiency virus (HIV). Owing largely to their actual and perceived ostracization and

judgement by the greater society, this neighbourhood community provided a very at-risk group a

sense of community and acceptance (26).

At a societal level, the importance of empowering and supporting persons to 'age-in-

place' (that is, to remain in their long-term home rather than transitioning to an alternative living

arrangement) was observed throughout several studies (27-30). Indeed, the ability to age-in-

place was associated with many positive outcomes including the social continuity of existing

relationships (27). It is cautioned however that a one-size-fits-all approach not be undertaken to

promote ageing-in-place as many older adults, especially those with a lack of social support and

those who live alone (31-32), do better within institutionalized settings (30).

Supported Housing

Supported housing, environments in which persons receive physical and/or mental

supports, include institutional housing such as assisted living facilities, care and group homes, as

well as community-based support housing such as subsidized housing with integrated support

services. Research within this context is found to focus primarily around social and community ecological levels with special attention paid to the demographic variations of persons residing within the same lived environment as this has the potential to positively or negatively impact a person's feelings of loneliness and isolation (33-35). For instance, one article outlining the lived-experience of a 53-year old with Parkinson's disease described the challenges of engaging with others in the care home who were 20-30 years older with markedly increased functional limitations (33). Persons living with mental illness in subsidized housing also revealed that engaging with other's in this environment was a challenge owing largely to the reclusive nature of neighbourhood residents, and fear of being stigmatized and unsupported (34). Type of supported housing environment also impact a person's sense of loneliness and isolation. For example, in Ireland, persons with intellectual disabilities reported a greater sense of social inclusion within supported living environments compared to those within small group and residential homes, and campus-style housing (36).

The Workplace

The effects of the workplace environment on the psychosocial needs of workers was also a prevalent theme throughout the literature. Two predominant types of workers examined within the context of the physical working environment included persons whose occupations required them to work in isolated communities (37-44) and teleworkers (45-49).

Professional isolates. Professional isolates, a name given to those individual's who work in geographically remote and socially isolated communities (37) such as research stations within the Antarctica (37-42) and mining towns (43), composed a large portion of the literature findings. Here research centered largely around how the individual characteristics acted as a protective factor to working in this environment. For instance, persons who work in such

environments are likely to possess intelligent, stable, slightly introverted (37), and self-sufficient characteristics (38). Although changes in adaptation were found to occur in several stages (39), significant differences between various cultures (40) and occupations were observed (41). The use of the physical environment of Antarctic research stations to engage in social activities revealed that dining rooms, pubs, and lounges lent themselves especially well to this purpose (42).

Teleworkers. As technological advances have allowed us to communicate with one another at great distances, the popularity of teleworking environments (work that is conducted outside of traditional workspaces) has increased in recent years. Indeed, within the United States, approximately 20% of its workforce are teleworkers (45). Though many benefits to telework have been identified including increased work efficiency, flexibility in scheduling especially in the context of self-management of physical impact of disability, and communication with coworkers (46), a negative drawback found throughout all research studies was feelings of isolation owing largely to limited engagement with fellow coworkers (46-47).

Rural and Urban Communities

Within the built environment of both rural and urban communities, a number of factors within each social ecological context were found to influence social isolation and loneliness with the largest attention paid to individual factors, community characteristics, and the broader built environment.

Individual factors. Like the home environment, individual factors such as mental debility (50), chronic health conditions (23-24, 51-52), financial constraints (51-54), and culture (55-56) were found to impact, or be impacted by, the community at large. One example is that of Latino immigrant women in rural communities who often rely on their husbands for

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transportation as women from this group do not posses a drivers licence. Owing to lack of public transportation, this group was found to be especially vulnerable to social isolation due to an inability to move throughout and engage with the broader community (55-56).

Living and working conditions. Naturally occurring retirement communities, or NORCs, are communities which are formed through natural migratory patterns which result in large proportions of older adults (57). As NORCs occur through a variety of individual and social pressures instead of by design, ensuring that NORC residents are well supported within their community, including enabling and facilitating social connectedness and supportive living, is often a challenge (57).

Broader societal considerations. A significant focus of community-level factors to social barriers and disengagement was that of physical barriers (52, 58). Weather, for instance, was a prominent theme (58). Indeed, one study on the effects of weather on wheelchair bound adults revealed that unfortunately many made little effort to venture outdoors when snow and ice were present as such conditions created substantial challenges in navigating the city (58). Neighbourhood access was another often cited challenge (23-24,52-53,55-56,58-60). Barriers to access included the deterioration of the physical environment such as streets and buildings (24,51), lack of access to parking spaces (23-24) and the absence of, or difficulty using, public transportation (55-56,60).

Built Community Services

Community services within the built environment highlighted a number of promising areas to promote social connectedness (61-65). For instance, local neighbourhood café's offer a space where persons of all ages and circumstances can come to spend time together (61). A particularly novel feature of dementia care within the United Kingdom are Alzheimer or

dementia cafés. Here, both persons with Alzheimer or dementia, and their carers, come together to share experiences and spend time with persons undergoing similar life changes and circumstances (62). Community-based services such as collective kitchens (63) and recreational facilities for sports and leisure activities (64-65), also worked to promote social connectedness. However, the level of engagement in, and the effects of programming on, social isolation and loneliness did vary between population and sub-population groups. For instance, children without disabilities were more likely to become accepting of their disabled peers through a shared experience in a community aquatics program (64) while children of lower socioeconomic status were less likely to engage in organized community-based sport (65-66).

Discussion

The primary finding of this semi-systematic review reveals that it is not our built environment per se which leads to social isolation and loneliness, but rather it is the unintended inequities created within our environments that result from how the environment is built. Specifically, without consideration of the challenges faced by at-risk populations to adapt or control their environment, the fight to reduce social isolation and loneliness, and its association health consequences, will continue to endure. Hence, to improve social connectedness within this context, we must work to not only ensure that our environment is as equitable and accessible as possible to those within it, but we must also make concerted efforts to develop strategies to improve social connectedness through the built environment.

Research Gaps

The findings of this review also highlight a number of gaps in our understanding of this impact on at-risk populations. Very few studies for example, focus on the disenfranchised such as the homeless and those affected by substance abuse. Cultural and ethnic backgrounds are also an area of research particularly lacking in this regard. For instance, this review was unable to

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locate research on the built environment of Aboriginal and indigenous groups such as those on reserve.

Evidenced-based strategies to identify, control, and mitigate the environmental circumstances of those at risk was also identified as a substantial research need as the focus of this research centered largely on understanding the contextual circumstances of this issue. Very few articles (62-63,67-69) outlined a tangible and pragmatic approach to reducing environmental factors which contribute to inequities and social barriers.

Implications for Research and Public Policy

Within each social ecological dimension, the findings of this review reveal a host of areas for targeted policy, research, and health intervention strategies. To summarize these implications at each social ecological level, a conceptual model is proposed (see Appendix E). Here, research and public policy form a sub-context to which recommendations within each area are made.

Strengths and Limitations

An inherent strength of this review was a broadly defined search strategy as this allowed for the capture of a breadth of environment-person/population interfaces. However, given the previously discussed gap of identified evidenced-based interventions, the utilization of grey literature would likely have augmented knowledge on this topic, at least anecdotally. An additional limitation includes the generalizability of these findings especially given, at times, the conflicting differences within various cultures, countries, community environments, and population characteristics.

Conclusion

The association between the built environment and social isolation and loneliness requires more than an understanding of the contributory contextual factors. Indeed, this is only a

necessary first step to breaking down barriers which hinder our ability to create an equitable

society in which everyone may become socially engaged, no matter their culture, age, physical or

mental limitations, income, or status within society. This review demonstrates that we are only in

the initial phase of this endeavour. Much work is needed to move this foundational knowledge

to practice in the form of policy development and research.

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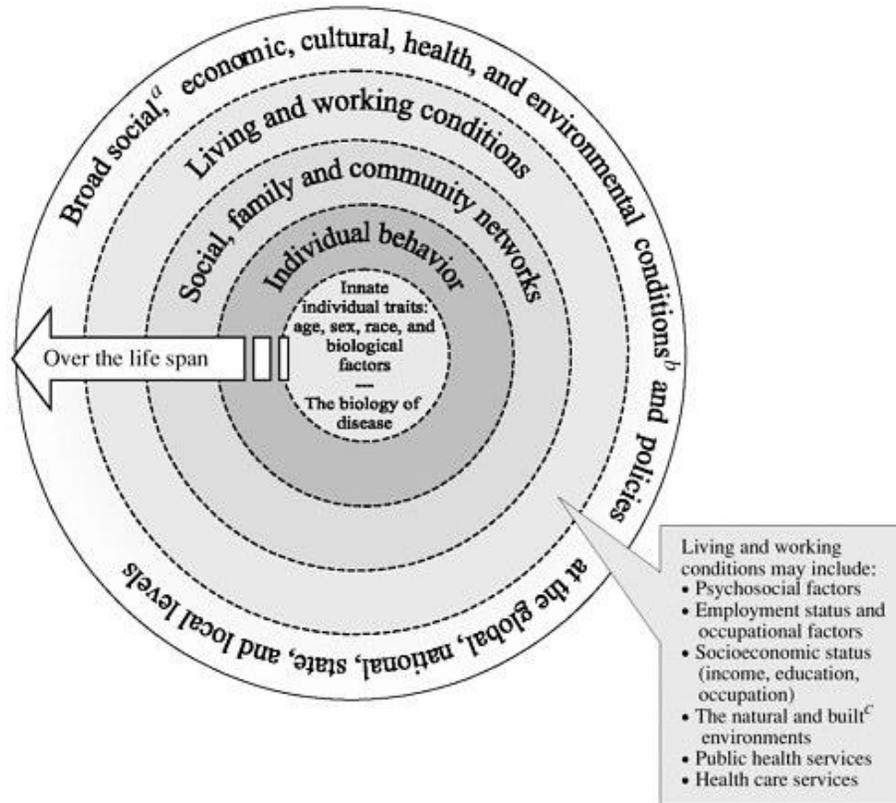
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NOTES: Adapted from Dahlgren and Whitehead, 1991. The dotted lines between levels of the model denote interaction effects between and among the various levels of health determinants (Worthman, 1999).

[a]Social conditions include, but are not limited to: economic inequality, urbanization, mobility, cultural values, attitudes and policies related to discrimination and intolerance on the basis of race, gender, and other differences.
[b]Other conditions at the national level might include major sociopolitical shifts, such as recession, war, and governmental collapse.
[c]The built environment includes transportation, water and sanitation, housing, and other dimensions of urban planning.

Research Question:

What is the association between the built environment and loneliness and social isolation?

Databases Utilized:

Medline (OVID), PsycINFO, and CINAHL (Cumulative Index to Nursing and Allied Health Literature) Plus with Full Text

Search Strategy:

	Population	**I**ntervention *or* **E**xposure	**O**utcomes
Synonyms or other key words or phrases ****Medline, PsycINFO, and CINAHL Plus**	General Population n/a – will not use a descriptor here to keep search as broad as possible to include any sub-populations	Environment Built Environment Environment Design	Social Isolation Loneliness Isolation Lonesome* Social Exclusion
	Based on the above parameters, the keyword search utilized was: ("Environment" OR "Built Environment" OR "Environment Design") AND ("Social Isolation" OR "Loneliness" OR "Isolation" OR "Lonesome*" OR "Social Exclusion")		
MeSH headings ****Medline Only**	n/a – will not use a descriptor here to keep search as broad as possible to include any sub-populations	Environment Design	Social Isolation Loneliness

With acknowledgements to Health Evidence™ and Peel Health, adapted from: Health Evidence™ (2009, November 25). *Developing an Efficient Search Strategy*. Retrieved February 7, 2018 from https://healthevidence.org/practice-tools.aspx#PT2

Inclusion Criteria:

- Studies and articles which examined the effects of the built environment and human interface which created conditions for, or resulted in, social isolation and loneliness
- Primary research – Studies and reviews outside of primary research were included only if they added greatly to the review

Exclusion Criteria:

- Articles published in a language other than English

Appendix C – Literature Review Search Results

Total Identified Articles (n=939)

Medline (Ovid)
Keyword Search = 9
Medline (Ovid)
MeSH Search = 14
PsycINFO = 408
CINAHL Plus =
508

Removal of Duplicates

n=22

Primary Relevance Assessment

Non-Relevant (based on title and abstract screening) (n=733)

Potentially Relevant Articles (n = 184)

Relevance Assessment of Full Document Versions

Non-Relevant Articles (n=109)

Total Relevant Articles (n=71)
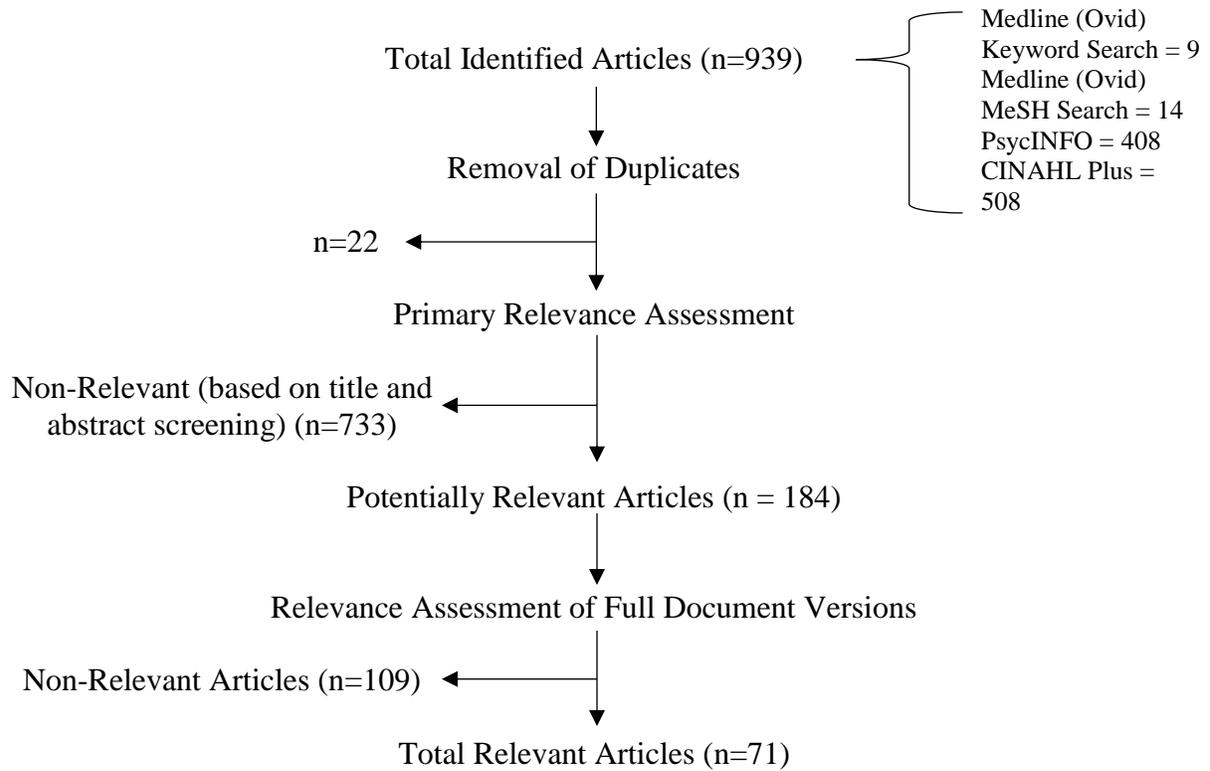
Health Evidence™ (2009, November 25). Keeping Track of Search Results: A Flowchart. Retrieved February 7, 2018 from https://healthevidence.org/practice-tools.aspx#PT5

Appendix D – Literature Review Summary Findings within the Context of the Social-Ecological Model

The Home

Source	Environment Investigated	Participants	Individual	Social	Work and Living	Broad Societal	Key Research Findings within the Context of the Built Environment and Social Isolation and/or Loneliness
[22] Cohen-Mansfield J, Schmotkin D, Hazan H. Homebound older persons: Prevalence, characteristics, and longitudinal predicators. Arch Gerontol Geriatr. 2012;54:55-60.	Housebound	Older adults – 75 years and older – Israel	●				• Factors found to be associated with being homebound include: Age, female sex, elevated or underweight BMI, lower functional status, poorer health, lower income, and be depressed Homebound persons were also more likely to have stairs and no elevators
Wannebo W, Wichstrom L. Are high school students living in lodgings at an increased risk for internalizing problems? J Adolesc. 2010;33:439-447.	School lodgings (residence)	Adolescent youth (age 15-19 years) – Norway	●				• Female students who leave home to attend school who live in lodgings (student residence) experience loneliness at greater proportions than their peers who can remain with their parents • This effect was not experienced by males • The effect was temporary
[26] Carr G. Ethnography of an HIV hotel. J Assoc Nurses AIDS Care. 1996;7(2):35-42.	A Residential Hotel in San Francisco	Marginalized persons with HIV and AIDS at various clinical stages – a diverse group in terms of sexual orientation, ethnicity, frequency and type of substance abuse		●	●	●	• Within San Francisco, a district known as the "Tenderloin" is known to consist of older, run-down apartment style housing where "the poor and homeless from refuge" (pp. 35) • A hotel within this district (single-room occupancy) is known for individuals with HIV and AIDS to congregate • Due to the increased population of individuals housed here, community health services are offered to assist this population • An ethnographic study found that the residents felt the hotel offered them a place of community that they would not be able to find elsewhere. • In addition to the hotel providing them basic needs such as shelter, it also allowed them to develop companionship where "people know each other, speak to each other, and help each other out" (pp. 39) and also was a place where they did not feel judged as they did elsewhere in society
[27] Barrett P, Hale B, Gauld R. Social inclusion through ageing-in-place with care? Ageing Soc. 2012;32:361-78	Ageing-in-Place in a long-term family home	Elderly individuals				●	• While home care affords the opportunity for older individuals to remain in their homes, and therefore provides social continuity with their families and friends, the authors of this review suggest that owing largely to the physical capabilities of the aged, that changes to home care policies provides an opportunity could improve social connectedness

Citation	Theme	Population					Key Findings
[28] Granbom M, Himmelsbach I, Haak M, Lofqvist C, Oswald F, Iwarsson S. Residential normalcy and environmental experiences of very old people: changes in residential reasoning over time. J Aging Stud. 2014;29:9-19.	The Home	Very old persons aged 80-89 years			•		• The relationship with the aged individual and their physical and social environments were the main focus of this research – particularly how changes to 'residential reasoning' changes over time. • The findings of this research revealed attachment of the home for many persons grew stronger with time. If a move is required, it was important for participants to bring their belongings with them • For some, a move enabled them to engage socially with others (e.g. through the use of senior centres)
[29] Curtin A, Martins DC, Gillsjo C, Schwartz-Barcott D. Ageing out of place: the meaning of home among hispanic older persons living in the United States. Int J Older People Nurs. 2017;12:1-8.	Home Environment	Hispanic adults age 65 to 83 – United States		•	•	•	• For Hispanic immigrants within the USA, home is defined as their family and not a physical space • When Hispanic immigrants transition to living environments external to their own home and community, they seek and desire environments more akin to their experiences in their country of origin
[25] Zhang L, Yan T, You L, Li K, Gao Y. Social isolation and physical barriers in the houses of stroke survivors in rural China. Arch Phys Med Rehabil. 2016;97:2054-60.	The Home	Stroke Survivors with Residual Physical Impairments			•		• Approximately one third participants were found to be socially isolated with 31% of participants almost never leaving their home (59% of participants shared they often went out of the home) • The main source of activity for survivors was walking with more than half of participants sharing that they did not participate in leisure activities • The home barriers that were associated with social isolation include inaccessible light switches, unsuitable seating, and a distant toilet • Researchers conclude that the modification of home barriers may help to increase social connectedness
[31] Ng CF, Northcott HC. Living arrangements and loneliness of South Asian immigrant seniors in Edmonton, Canada. Ageing Soc. 2015;35(3):552-75.	Various Home Environments	South Asian Immigrants 60 years and older	•				• Those who lived alone, reported lower family relationship scores • South Asian immigrant seniors often live with other family members, including extended family • However, living in larger households resulted in more time spent alone
[32] Nyqvist F, Cattan M, Andersson L, Forsman AK, Gustafson Y. Social capital and loneliness among the very old living at home and in institutional settings: a comparative study. J Aging Health. 2013;25(6):1013-35.	Home vs. Institutional Settings	Persons 85 years and older – Sweden and Finland	•				• Differences in perceived loneliness were observed between the two settings with approximately 55% of individuals within institutions vs. 45% of individuals living at home reported being lonely • Persons living in their own home were more likely to report being lonely if living alone
Brown C. A comparison of living situation and loneliness for people with mental illness. Psychiatr Rehabil J. 1996;20(2):59-63.	Alone vs. having a roommate vs. living with family vs. living in a group home	Persons living with severe mental illness	•				• Living situation (alone, roommate, family, group home) did not impact perception of loneliness of those afflicted by severe mental illness

Citation	Location	Population					Findings
Stahl ST, Beach SR, Musa D, Schulz R. Living alone and depression: the modifying role of the perceived neighborhood environment. Aging & ment health. 2017 Oct 3;21(10):1065-71.	The Home – Pittsburgh, PA	Older adults who live alone vs. with another family member			●	●	• Perception of social neighbourhood quality was an important moderator of depressive symptoms • When the perceived social quality of the neighbourhood was low, persons who lived alone were more likely to be depressed than their counterparts who lived with a family member • In contrast, those who lived either alone or with a family member and perceived the social quality of their neighbourhood as being good, their risk of depressive symptoms (even if they lived alone) were lower than the previously discussed cohort (persons who live alone, or with family, who perceive their neighbourhood social quality as low).
[30] Henning-Smith C. Quality of life and psychological distress among older adults: the role of living arrangements. J Appl Gerontol. 2016;35(1):39-61.	Various living arrangements	Adults 65 years and older	●				• The findings of this research support the notion that one-size-fits-all approach should not be taken to improve the quality of life of this cohort through housing support strategies and community services • Though a majority of older adults prefer to 'age-in-place,' many who do (even those who lie with others) were found to be especially vulnerable to a lack of social support • Surprisingly, older adults who live in multigenerational households were found to be particularly at risk for a poor quality of life

Supportive Housing

Citation	Location	Population					Findings
[33] Bayne M. A room with a grim view: the 'ambient despair' that marks life in assisted living. Health Aff. 2012;31(7):1633-1635.	Assisted living facility	53-year old with young-onset Parkinson's disease	●	●			• A lived-experience piece written by a then 53-year old with young-onset Parkinson's who lived in an assisted living facility. This person speaks greatly to the loneliness and social isolation experienced in this facility – in larger part due to the age difference between this individual and the majority senior population
[36] McConkey R. Variations in the social inclusion of people with intellectual disabilities in supported living schemes ad residential settings. J Intellect Disabil Res. 2007;51(3):207-217.	Variety of Supportive Housing Environments	Individuals with an intellectual disability - Ireland			●	●	• Home environments include community-based housing vs. Supported-living with groups accommodations (apartments/housing) on one site vs. group homes vs. residential housing vs. campus settings • Overall, the type of living environment for individuals with intellectual disabilities has an impact on their sense of social inclusion • People within supported living environments reported greater levels of social inclusion than those within small group homes, residential homes, or campus-style housing

Citation	Setting	Population					Findings
[34] Walker R, Seasons M. Supported housing for people with serious mental illness: resident perspectives on housing. Can J Commun Ment Health. 2002;21(1):137-51.	Supported Housing	Persons with Mental Illness			●		To understand the housing experience of persons with mental illness in supportive housing (affordable integrated housing paired with mental health support services), researchers conducted a qualitative study which examined four dimensions of housing (physical and social environments, affordability, and residential history). The results of this study, in part revealed: • Loneliness and social isolation were themes expressed by participants as a result of living in housing where they didn't know anyone else (though some residents expressed that they preferred their privacy and did not want to engage with others) • The friendliness of neighbours was another theme which emerged – some participants expressed that their neighbours kept to themselves and therefore contributed to feelings of perceived social isolation and loneliness, while others engaged enough socially with their neighbours that their needs for social engagement were satisfied • In general, participants expressed a desire to have more interaction with their neighbours • Participants also expressed a need to be accepted and understood by the community they engaged with (e.g. landlords, other persons in the building) • Owing to the housing being subsidized, the majority of tenants within the building were also low-income earners. Participants shared that a desire to move away into normal housing in part due to the stigma they believe existed from living in subsidized housing. In general, participants did not feel like they fit in with the other tenants.

Morgan-Brown M, Ormerod M, Newton R, Manley D. An exploration of occupation in nursing home residents with dementia. Br J Occup Ther. 2011;74(5):217-225	Nursing Homes in Ireland	Nursing home residents			●	●	• The main sitting rooms were physically configured in a way which discouraged socialization (though the researchers identify observer-bias as perhaps changing the social dynamic):
							  o There were no smaller sitting areas where people could sit together
							  o There were no tables that people could sit at
							  o Instead, seating was established throughout the edges of the room in a circle
							  o The sitting rooms lacked items that residents and visitors could engage with (games, books, etc.)
							• Residents with dementia spent approximately 70% of their time during the day in the main sitting area

[67] Brownie S, Neeleman P, Noakes-Meyer C. Exemplar: Establishing the Eden Alternative in Australia and New Zealand. Contemp Nurse. 2011 Feb;37(2):222-4.	The Eden Alternative aged care residence	Elderly persons				●	• Created by Dr. William Thomas, the Eden Alternative is an approached to the development of care facilities that reduces hopelessness, boredom, and loneliness through environmental changes • Within the US, more than 200 facilities have adopted this approach. The purpose of this article was to describe the establishment of an Eden Alternative facility in New Zealand • Unfortunately, this article does not describe the logistics of adoption (and instead provides a high-level overview)

Reference	Setting	Population					Findings
[35] Riazi A, Bradshaw SA, Playford ED. Quality of life in the care home: a qualitative study of the perspectives of residents with multiple sclerosis. Disabil Rehabil. 2012;34(24):2095-102.	Care Home	Persons with Multiple Sclerosis (ages 43-80)	●	●		●	• Through the findings of this research, a conceptual model outlining the relationship between the self, environment, and relationships within the context of what the care home meant to residents with Multiple Sclerosis was developed • Some residents reported that moving to the care home improved their relationships with them family members owing to a sense of relief as no longer being a burden on their family • The home also allowed the residents the opportunity to form new relationships with one another, however, the demographics of the home were a point of frustration. For instance, having social instances where the residents only had opportunities to engage with persons with severe mental and physical disabilities.
Brownie S, Horstmanshof L. Creating the conditions for self-fulfilment for aged care residents. Nurs Ethics. 2012;19(6):777-86.	Aged Care Facilities	Older Persons			●		• Though the overarching descriptive review focused on self-fulfilment, several environmental protective factors of feelings of loneliness and social isolation include: ○ Residents described the importance of engaging in meaningful daily and community factors to prevent boredom and isolation. Care facilities should be developed in such a way as to facilitate this ○ The use of plants, and animals within the environment • Guided through 10 principles, one approach to ensuring self-fulfillment of aged care residents is through the Eden Alternative
[68] Cook G, Clarke C. A framework to support social interaction in care homes. Nurs Older People. 2010 Apr;22(3)	General Care Homes	Staff caring for care home residents			●	●	The INTERACT framework recommends eight themes for encouraging social interaction in the home care environment • Individualise quality and type of social interaction • Notice quiet and withdrawn residents • Talk with clients • Consider environmental conditions such as lighting, noise, space, furnishings, and adapt the environment to make it more conducive to social engagement • Assist clients to maintain relationships with others • Individualize care to residents • Promote a community within the care environment • Use technology to promote social interactions

The Workplace

Reference	Setting	Population					Findings
[37] Taylor AJW. Professional isolates in New Zealand's Antarctic research programme. Int Rev App Psychol. 1969;18(2):135-137.	Geographically isolated area - New Zealand's Antarctic Research Programme Base	"Professional isolates"	●				• Men who winter for long periods in isolated regions are stable, intelligent, and slightly introverted
[38] Taylor AJW, Shurley JT. Some Antarctic troglodytes. Nt Rev App Psychol. 1971;20(2):143-148.	Geographically isolated area - Antarctic Research Programme	Men who spent 8.5 months in social isolation together	●				• Men who spend time wintering in remote socially isolated programmes in the Antarctic are likely to be well-balanced, resourceful, and self-sufficient • Overtime, personalities may become taciturn

[47] Bentley TA, Teo STT, McLeod L, Tan F, Bosua R, Gloet M. The role of organisational support in teleworker wellbeing: A sociotechnical systems approach. Appl Ergon. 2016;52:207-215	Mobile work environments (telework or telecommuting)	Teleworking employees – New Zealand			●		• Organizational support in the form social support reduced social isolation of teleworking employees though workers who engaged in high-intensity telework (i.e. those who worked remotely for longer periods of time) were the least likely to benefit from this support • Social isolation within the workplace was found to be associated with decreased job satisfaction and increased job strain. • Social isolation within this context is hypothesized to be the result of a person-environment mismatch. • A limitation of this article is that a clear concept of what organizational social support looked like was not offered.
[45] Robertson M, Vink P. Examining new ways of office work between the Netherlands and the USA. Work. 2012 Jan;41(Supplement 1):5086-90.	Office Work Environments	Office workers in the Netherlands and the USA			●		• Within the Netherlands, working remotely resulted in better concentration, increased productivity, and reduced travel to work time. Meetings through communication technology were found to be more efficient. However, one challenge identified was that employees felt socially isolated owing to a lack of connectivity with the organization • In the USA, nearly 20% of the population are employed within telework environments which are believed to be associated with both positive and negative outcomes. Examples of positive outcomes include reduced stress, increased work-life balance, accommodation of the disabled, decreased sick time, and increased productivity. On the contrary, potential negative outcomes include social isolation, increased perceived work levels, and family conflict.
[46] McNaughton D, Rackensperger T, Dorn D, Wilson N. " Home is at work and work is at home": Telework and individuals who use augmentative and alternative communication. Work. 2014 Jan;48(1):117-26.	Telework Environments	Working-Class Adults with Disabilities (those with augmentative and alternative communication)			●		Four themes were revealed: 1. Benefits of telework: Increased work efficiency, flexibility in scheduling especially in the context of self-management of physical impact of disability, and communication with coworkers 2. Negative impacts of telework: Increased feelings of social isolation due to decreased opportunity to develop relationships, cost and need of equipment and problems with technology, difficulty in separating work and home environments 3. Strategies for addressing negative impacts: Participant suggestions for improving the isolating effects of working alone included the development of a work 'network' or informal gatherings (e.g. Christmas party) and business trips. The utilization of a variety of communication techniques outside of just email (e.g. conference calls, instant messaging, and chat rooms) and increasing the quality of communication 4. Recommendations for improving outcomes for this working group: Increased employment opportunities including transitioning programs.

Reference	Setting	Population					Findings
[40] Palinkas LA, Johnson JC, Boster JS, Rakusa-Suszczewski S, Klopov VP, Fu XQ, et al. Cross-cultural differences in psychosocial adaptation to isolated and confined environments. Aviat Space Environ Med. 2004 Nov;75(11):973-80.	Research Stations in the Antarctic	Scientists and Support Personnel	●				• Mood scores were compared between different subjects at five different research stations in the Antarctic. Finding revealed significant cultural differences in the ability to adapt to the confined environment: o Russians reported lower levels of fatigue, energy, and depression and higher levels of anxiety. Russians were also more likely than Americans to seek out advice and interact with crew members o Polish workers reported increased levels of feelings of anger during the first half of the winter, but lower levels of fatigue compared to other groups throughout the entire winter duration. In addition, compared to other groups, Polish workers were less likely to interact and seek advice from their peers. o Chinese personnel reported higher confusion and lower energy and fatigue throughout the entire winter, but also experienced increased depressive symptoms in the last half of the winter o The Indians at Maitri station experienced high rates of peer engagement behaviours throughout the entire winter duration • Overall, workers within these environments differed in their ability to adapt to their environments with general adaptive characteristics believed to be related to cultural backgrounds. Hence, researchers propose the integration of cultural differences into the establishment and training of teams in similar environments such as space missions.
[41] Seymour GE, Gunderson EK. Attitudes as predictors of adjustment in extremely isolated groups. J Clin Psychol. 1971 Jul;27(3):333-8.	Antarctic Stations	Three distinct occupational groups (Navy personnel, civilian scientists, and technicians)	●				• Differences in the predictability of adjustment to the confined isolated environments of research stations in the Antarctic were different between occupational groups • Navy personnel were the most predicable occupation within this setting.
[42] Carrere S, Evans GW. Life in an isolated and confined environment: a qualitative study of the role of the designed environment. Environ Behav. 1994 Nov;26(6):707-41.	Research station in the Antarctica	Station workers				●	• Overall, the use of different areas of the research station remained constant (e.g. Approximately 37% in the dining room and pub/lounge) with the exception of sleeping which participants reduced by approximately over 2 hours through the winter • Participants socialized in large group settings (three or more people) in the pub/lounge and large group settings • When participants spent waking time in their bedrooms, the activities were predominately solitary and focused mainly on personal projects
[39] Palinkas LA, Houseal M. Stages of change in mood and behavior during a winter in Antarctica. Environ Behav. 2000 Jan;32(1):128-41.	Research stations in the Antarctica	Male and female station workers	●				• Men and women who spend winters in an isolated community in Antarctica experience mental adaptation over 2-3 stages
[43] Syme GJ, Illingworth DJ, Eaton E, Kantola SJ. Identification of early leavers from a remote mining community. Popul Environ. 1981;4(3):147-55.	Remote mining regions	Mining workers – Australia	●				• Persons who move to isolated communities for work are more likely to leave these environments if their personality is one which enjoys travel and exploration, possess a variety of interests, and enjoy variety in their physical environments

Reference	Setting	Population	C1	C2	C3	C4	Key Findings
[48] Marshall GW, Michaels CE, Mulki JP. Workplace isolation: Exploring the construct and its measurement. Psychol Mark. 2007 Mar;24(3):195-223.	Virtual Working Environments	Working Class Adults			●		• The aim of this study was to develop a workplace isolation scale to measure employee social and organization isolation
[49] Baker P, Moon NW, Ward AC. Virtual exclusion and telework: Barriers and opportunities of technocentric workplace accommodation policy. Work. 2006 Jan;27(4):421-30.	Work environment	Persons with disabilities			●		• To test the idea that 'physical inclusion and social inclusion' are linked, this paper sought to understand the impact of a virtual work environment on persons with disabilities when the use interactive technology was incorporated into the work day
[44] Nicolas M, Suedfeld P, Weiss K, Gaudino M. Affective, social, and cognitive outcomes during a 1-year wintering in Concordia. Environ Behav. 2016 Oct;48(8):1073-91.	Concordia Polar Station	Working crew (21-58 years of age)		●			• Levels of perceived social stress grew throughout the wintering period and was indeed the most significant finding of the study • This was validated from studies by other researchers who found that isolating environments increased the likelihood of interpersonal issues such as social tensions

Rural and Urban Communities

Reference	Setting	Population	C1	C2	C3	C4	Key Findings
[52] Rantakokko M, Iwarsson S, Vahaluoto S, Portegijs E, Viljanen A, Rantanen T. Perceived environmental barriers to outdoor mobility and feelings of loneliness among community-dwelling older people. J Gerontol A Biol Sci Med Sci. 2014;69(12):1562-1568.	General community – Finland	Seniors 75-90 years of age		●			• 28% of the study population experienced loneliness • Factors associated with increased loneliness included age, decreased autonomy in outdoor participation, living alone, female sex, chronic health condition, lower income, and walking difficulties • Persons who were lonely were found to experience greater environmental barriers to mobilizing outdoors than those who weren't lonely • Having an environmental barrier approximately doubled the likelihood of reporting loneliness • After adjusting for age ad sex, approximately half of the environmental barriers increased the odds of loneliness • Environmental barriers included: Ice and snow in winter, dangerous crossroads, noisy traffic, high curbs, lack of resting places, and long distant travel

Reference	Setting	Population					Findings
[51] Portacolone E, Perissinotto C, Christine J, Greysen SR. "I feel trapped": The tension between personal and structural factors of social isolation and the desire for social integration among older residents of a high-crime neighborhood. Gerontologist. 2018;58(1):79-88.	High crime neighbourhood	Individuals 58-95 years of age – Richmond California	●	●	●	●	Social isolation was manifested in several different ways: • Personal factors: Chronic health conditions, disabilities, and poverty constrained the ability to physically and financially engage with the neighbourhood and other residents within the neighbourhood (for instance, it cost $20 to pay for transportation to attend church, so individuals stopped going) • Social factors: Crime was an especially prevalent issue which preventing participants from engaging with their environment. Fear of encountering violence, drug dealers, prostitutes and the homeless made participants not want to leave their home. • Physical environment factors: Participants felt isolated and/or isolated themselves secondary to physical environmental factors such as "decay of building and streets, safe and accessible benches and community rooms, and the paucity of health care and social services available" (pp. 84) or places they could congregate

[57] Ivery JM, Akstein-Kahan D, Murphy KC. NORC supportive services model implementation and community capacity. J Gerontol Soc Work. 2010;53:21-42.	Naturally Occurring Retirement Community (NORC) Model	"Older adults"			●	●	• NORC's are naturally formed communities which consist of "a large concentration of older adults within a geographically defied area" (pp. 22) and occur as a result of migration patterns (they are typically defined as a NORD if >50% of residents are ≤ 60 years of age)
							• Migratory patterns of the aged and young adults influence the NORC demographics.
							  ○ Persons who move to a community typically have greater economic resources
							  ○ NORC communities which arise from young adults migrating elsewhere are typically composed of individuals with less economic resources because they themselves cannot migrate, and therefore are considered to *age in place*
							• It is argued that when demographics change, the "relationships between individuals and their environments must be considered" (pp. 22
							• It is a challenge to provide support to NORC communities because they develop through migration processes instead of design (to combat this and promote individuals aging in their homes, supportive living programs may be implemented)
							• Such programs can help seniors in a myriad of way including reducing social isolation

[53] Scharf T, de Jong Gierveld J. Loneliness in urban neighbourhoods: An Anglo-Dutch comparison. Eur J Ageing. 2008;5:103-115.	Urban neighbourhoods	Netherlands vs. England – 60 years and older	●		●		Netherlands: • The typology of neighbourhoods was found to be most significantly related to loneliness. • Older persons in less urban environments report feeling less lonely; loneliness increased as urbanization increased • Lower income was associated with higher loneliness scores England: • Those residing in deprived neighbourhoods were more likely to report being lonely though differences were also found to exist between deprived neighbourhoods suggesting influences from the local context
Kropf NP. Increasing community capacity for older residents and their families. J Gerontol Soc Work. 2012;55(4):301-303.	NORCs and long-term care facilities	Geriatric population – general			●	●	Editorial Piece – Social Worker Perspective • NORCs and villages are promising environments for promoting social engagement • Older persons residing in environments with substandard housing, crime, and violence are less likely to be happy or free of depression

Citation	Environment	Population					Findings
Bergland A, Narum I. Quality of life demands comprehension and further exploration. J Aging Health. 2007 Feb;19(1):39-61.	Local communities within Oslo, Norway	Women 75-90 years		●	●		Quality of life indictors for women participating in this study included: • The ability to engage socially • The ability to participate within the larger community • A sense of belonging to the social environment
Newcomer R. Environmental influences on the older person. Geriatrics. 1973;28(7):120	General Environment	'Older persons'	●		●	●	Though this article is over 40 years old, this discussion provides an excellent foundation for the interaction of contextual factors which explain how 'older persons' both influence and are influenced by their environments. Here Newcomer discusses a number of environmental factors including: • The types of services brought into a physical environment have the potential to greatly impact our psychological experiences including how we might socially interact with others • How the environment influences are sense of territoriality, privacy, and personal space. For instance, how seating is arranged influences how we engage with one another (i.e. benches which discourage social interaction vs. round tables which encourage it).
[59] White DK, Jette AM, Felson DT, Lavalley MP, Lewis C, Torner JC. et at. Are features of the neighborhood environment associated with disability in older adults? Disabil Rehabil. 2010; 32(8):639-645.	Local Neighbourhoods	Older adults (65 years and over) with functional limitations	●		●		• Older adults (age 65 and older) who did not have access to walking areas or parks within their local neighbourhood, engaged less frequently in social activities and exercise
[58] Ripat J, Colatruglio A. Exploring winter community participation among wheelchair users: An online focus group. Occup Ther Health Care. 2016;30(1):95-106.	Cold weather climate barriers	Wheelchair users in Manitoba	●	●	●	●	Barriers fell into three categories: 1) Weather: Snow was the most frequently cited weather barrier when not cleared from curbs, sidewalks, parking lots, and bus stops 2) Policies: Policies on accessible transportation created barriers when inflexible booking rules were difficult 3) Attitudes: Including pedestrians who were not accommodating to wheelchair users on sidewalks and city inspectors and snow-clearing staff who did not consider the snow to be a barrier Additional findings include: • Safety concerns were an issue arising from these barriers include hypothermia, frost-bite, and getting stuck for prolonged periods outdoors • As a result of these barriers, participants reported staying at home as much as possible during the winter • Social participation and community engagement increased in warmer weather

Reference	Environmental level	Population					Key findings
[23] Dyck I. Hidden geographies: The changing lifeworlds of women with multiple sclerosis. Soc Sci Med. 1995;40(3):307-302.	Local neighbourhood	Unemployed women with Multiple Sclerosis (21 to 57 years of age) – British Columbia	•	•	•	•	**Residential relocation:** • The majority of women moved, or were planning a move, to a housing environment which increased accessibility in order to maintain independence, and where possible, to fulfill their role within their family • A move might also be the result of a marital separation or divorce arising from stressors from reduced income • Multilevel housing (when women would be confined to a floor of the house) decreased a women's ability to engage in familial and mothering roles • Remaining within their existing neighbourhood was important to many women – however women at times were unable to remain in their neighbourhood especially due to housing cost **Modifications of Physical Space:** • To increase utilization and maneuverability of their physical space, adaptations were made such as installing an accessibility ramp, moving furniture, widening of door frames, grab bars and bath lifts in the bathroom, • Modifications were only largely possible in homes which were owned and not rented • Modifications assisted women with maintaining their ability to fulfill roles within the household • Private or government donations made such modifications possible **Neighbourhood Access:** • Access to the neighbourhood community afforded women the opportunity to engage with others in a social setting • Concerns regarding the safety of moving through the physical environment, in part, restricted their engagement in the community • Lack of access to shopping areas, uneven sidewalks, and lack of parking spaces were all physical barriers

[24] Prodinger B, Weise AP, Shaw L, Stamm TA. A Delphi study on environmental factors that impact work and social life participation of individuals with multiple sclerosis in Austria and Switzerland. Disabil Rehabil. 2010;32(3):183-95.	General community characteristics	Person's with Multiple Sclerosis in Austria and Switzerland			•	•	• The purpose of this study was to learn about factors in the environment which impair social and work participation for persons with Multiple Sclerosis in Austria and Switzerland
							• Environmental factors impairing social and work engagement include:
							  ○ Inaccessible physical structures both indoors and outdoors
							  ○ Policy factors such as open space planning, architecture and construction services

Citation	Environment	Population					Findings
van den Berg P, Kemperman A, de Kleijn B, Borgers A. Ageing and loneliness: The role of mobility and the built environment. Travel Behav Soc. 2016;5:48-55.	Community neighbourhood of varying urban densities (very low < 500 addresses per km^2 to very high > 2500 addresses per km^2)	All persons within the community of Noord-Limburg Netherlands	•	•	•	•	Four logit models were developed to estimate the extent that residents within the Noord-Limburg communities of the Netherlands felt socially isolated or lonely. • Using only age as an explanatory variable, the first model demonstrated that "age explains only a small proportion of variance in loneliness" (pp. 53) • Households within the age category of 35-64 were less lonely than persons in households younger than 35 and older than 64. • Younger people living in apartments reported being more lonely • Older individuals who age-in-place (being long-time residents of their neighbourhood) were found to be less lonely • Urban density was not associated with feelings of social isolation or loneliness • The use of varying transportation methods (public transit, car, and cycling) were found to significantly reduce loneliness (and explained the effects of age away) as transportation provides access to social relations • Public transportation itself provides an opportunity for social interaction
Wen M, Hawkley LC, Cacioppo JT. Objective and perceived neighborhood environment, individual SES and psychosocial factors, and self-rated health: An analysis of older adults in Cook County, Illinois. Soc Sci Med. 2006;63:2575-2590.	Local neighbourhood environment	Middle-aged and older adults – Cook County Illinois			•		• Individual psychosocial factors including loneliness, hostility, depression, and stress work to partially explain the effects of the perceived environment of the local neighbourhood on health.

Kearns A, Whitley E, Tannahil C, Ellaway A. 'Lonesome town'? Is loneliness associated with the residential environment, including housing and neighbourhood factors? J Community Psychol. 2015;43(7):849-867.	Fifteen 'deprived' areas of Glasgow (measured by income deprivation based on out-of-work benefit provisions)	All residents residing within these areas	•	•	•	•	The authors examined three domains of the environment:
							1) Housing factors:
							  • Loneliness was reported higher in persons who lived in flats or lived in their homes for a shorter length of time
							  • After controlling for sociodemographic characteristics, there were no marked differences found
							2) Neighborhood physical and service environment:
							  • Residents who felt their neighborhoods were of lower quality were more likely to report being lonely
							  • Those who used the least local amenities were more likely to report being lonely
							3) Community factors (neighborhood social environment):
							  • Those who did not feel connected to their community were more likely to report feelings of loneliness
							  • Social connectedness was a protective factor against loneliness
							  • People who believed that other members of their community were antisocial, were more likely to report loneliness.
							Confounding variables which were adjusted for included sex, age, household type, employment status, and migrant status.

Reference	Environment	Population					Findings
Kim M, Clarke P. Urban social and built environments and trajectories of decline in social engagement in vulnerable elders: findings from Detroit's Medicaid home and community-based waiver population. Res Aging. 2015;37(4):413-35.	Urban disadvantaged neighbourhoods	Physically and economically disadvantaged older adults	●		●		• Of the social and built environments factors studied, the presence of security groups within the neighbourhood, such as Neighbourhood Watch, were associated with increased social isolation and withdrawal of community members
Cohen-Mansfield J, Hazan H, Lerman Y, Shalom V. Correlates and predictors of loneliness in older-adults: a review of quantitative results informed by qualitative insights. Int Psychogeriatr. 2016;28(4):557-76.	Low income neighbourhoods in Tel-Aviv	Older adults (ages 60 to 85 years)			●		• Barriers to social engagement for participants include changes in local demographics (cultural shifts in the population), fear of crime, and inaccessible housing
[54] de Jong Gierveld J, Keating N, Fast JE. Determinants of loneliness among older adults in Canada. Can J Aging. 2015;34(2):125-36.	General Environment	Canadian adults 65 years and older	●				• Researchers looked at the 'person-environment fit' through an examination of personal characteristics, living conditions, and social engagement • An important precursor to loneliness are recent changes to living conditions and deprived living conditions (though this is likely a proxy for other factors such as low education and income)
[50] Mapes N. It's a walk in the park: exploring the benefits of green exercise and open spaces for people living with dementia. Work Older People. 2010 Dec;14(4):25-31.	Green space or parks	Persons living with dementia	●			●	• This review highlights the need for research into the benefits of green space and parks for persons with dementia to exercise • Hypothesized benefits include increased social inclusion, a cost-effective sustainable modality, and improved sleep patterns
Keating N, Swindle J, Fletcher S. Aging in rural Canada: A retrospective and review. Can J Aging. 2011 Sep;30(3):323-38.	Rural Communities	Senior Citizens – Canada	●	●			• Rural Canadian communities rely on senior community engagement in the form of volunteering • Rural residents are likely to visit friends and family more often than rural settings providing evidence that rural seniors exist within large social networks • Geographic distances however promote social disengagement
[60] Biggs S, Carr A. Age-and child-friendly cities and the promise of intergenerational space. J Soc Work Pract. 2015;29(1):99-112.	Urban Environments	Senior and Youth				●	• Urban environments present physical barriers to social inclusion to both older adults and children (e.g. traffic congestion, barriers to transportation) – therefore it is suggested that urban areas be developed by establishing them as age-friendly
[55] Evenson KR, Sarmiento OL, Macon ML, Tawney KW, Ammerman AS. Environmental, policy, and cultural factors related to physical activity among Latina immigrants. Women Health. 2002 Oct;36(2):43-56.	Rural North Carolina	Latina Immigrants	●			●	• Latina immigrants often relied on their family (husbands) for transportation and also had difficulty mobilizing within the community due to lack of a bus service • The local environments lacked parks and sidewalks however, when sidewalks and parks were available, the women and their families were afraid to use them • The above contributed to decreased social participation

Citation	Setting	Population					Key findings
[56] Stacciarini JM, Smith R, Garvan CW, Wiens B, Cottler LB. Rural Latinos' mental wellbeing: A mixed-methods pilot study of family, environment and social isolation factors. Community Ment Health J. 2015 May;51(4):404-13	Rural Communities in Florida	Latino Immigrants			•	•	• Aspects of rural and social environments in Florida were found to either protect or impair mental wellbeing • Factors within the built and community environment specifically which acted as barriers to mental wellbeing (including social isolation) included demographic differences, a lost sense of community, and a lack of geographic mobility (which were found to impact both adults and children) • Protective factors were not found within the built environment and instead were found within the family context alone.
[66] Schneider BH, Richard JF, Younger AJ, Freeman P. A longitudinal exploration of the continuity of children's social participation and social withdrawal across socioeconomic status levels and social settings. Eur J Soc Psychol. 2000 Jul;30(4):497-519.	Urban Environments – Canada	Children (followed from age 5 to 7)		•	•		• Children of lower-socioeconomic status (SES) participated less in large-group activities within the community (e.g. sport and art activities) • Additionally, marked differences of 'social competence' among parents were found between low and high SES groups • Children from lower SES backgrounds were found to be more likely to engage in solitary play than their more affluent peers
Scharlach A. Creating aging-friendly communities. Generations. 2009 Sep;33(2):5-11.	American Communities	Aged Adults				•	In recent years, there has been a push to create aging-friendly communities based on a number of principles including: • The person-environment fit through consideration of the 'actual and perceived demands imposed by physical and social environments" (pp. 7) • How 'behaviour settings' shape person-environment interactions • Empowering individuals to be 'cocreators' of their own lives but actively responding to (and changing) their environments • The environment is considered not only in terms of individual demands, but also as a modality to growth • As the physical, social, and cultural contexts shape the environment, these must also be considered • Macro-level forces including politics and economics
Rémillard-Boilard S, Buffel T, Phillipson C. Involving Older Residents in Age-Friendly Developments: From Information to Coproduction Mechanisms. J Hous Elderly. 2017 Apr;31(2):146-59.	Urban Neighbourhoods	Older residents				•	Three possible mechanisms for the developing of age-friendly cities include: 1. Aging in urban environments: 2. Creating inclusion and connectiveness 3. Empowerment of older people in community development through information sharing, consultation, public engagement, collaboration, and coproduction

Citation	Setting	Population					Findings
Buffel T, Phillipson C, Scharf T. Experiences of neighbourhood exclusion and inclusion among older people living in deprived inner-city areas in Belgium and England. Ageing Soc. 2013 Jan;33(1):89-109.	Inner city areas – Belgium vs. England	Older people	●	●	●		Four themes within the context of the how neighbourhoods contribute to social inclusion and exclusion in later life were found: 1. Experiences in community change: How neighbourhoods changed over time contributed to inclusion or exclusion of the community (e.g. shifting demographics including population turnover and differences in demographics to long-term residents, and changes to how people interact with one another. 2. Safety and security: The perception of an unsafe environment contributed to community disengagement 3. Urban space management: Communities of persons of similar ages and cultures, if they utilized the community together, felt safer and connected 4. Control strategies including avoiding perceived dangerous situations, the use of medical alert devices, and security alarms in the home

Built Community Services

Citation	Setting	Population					Findings
[64] Oriel KN, Marchese VG, Shirk A, Wagner L, Young E. The psychosocial benefits of an inclusive community-based aquatics program. Pediatr Phys Ther. 2012;24:361-367.	Community-based aquatics program	Children with and without disabilities			●		• Aquatics programs for children with and without disabilities may lead to children without disabilities becoming more accepting of their peers with disabilities
[62] Capus J. The Kingston dementia café: The barriers of establishing an Alzheimer café for carers and people with dementia. Dementia (London). 2005;4(4):588-591	A dementia café in the UK	Individuals with dementia and their caregivers		●	●		• Alzheimer and dementia cafes can be found throughout the UK as part of the dementia care landscape • Dementia cafes reduced social isolation of caregivers of those with dementia
[61] Warner J, Talbot D, Bennison G. The cafe as affective community space: reconceptualizing care and emotional labour in everyday life. Crit Soc Policy. 2013;33(2):305-24.	Neighbourhood Café	Individuals of all Ages			●		• Here researchers sought to understand café's as a space to promote social connectedness. Research findings revealed four themes: 1. The owner of the café did so largely in part to her relationships with her customers 2. Community members meet at frequent intervals within the café for varying reasons. Researchers described the café as being "enmeshed in the social, spatial, and economic environment around it" (pp. 317) 3. Customers expressed that the café acts as an extended family providing relief from social isolation and is an "antidote to everyday loneliness" (pp. 318) 4. The café is for everyone
[63] Engler-Stringer R, Berenbaum S. Exploring social support through collective kitchen participation in three Canadian cities. Can J Commun Ment Health. 2007;26(2):91-105.	Collective kitchens	Participants within Saskatoon, Toronto, and Montreal		●	●		• It is estimated that there are approximately 2500 community kitchen groups in Canada • Though the purpose of community kitchens vary, one goal is to support social participation • While the food aspects were often an initial reason for joining, every participant spoke to the social aspect of engaging in such a program • Themes which gave rise from the research included 'breaking social isolation,' 'social support,' and 'building friendships'

Citation	Setting	Population					Findings
Wasfi R, Steinmetz-Wood M, Levinson D. Measuring the transportation needs of people with developmental disabilities: a means to social inclusion. Disabil Health J. 2017;10:356-60.		Those with developmental disabilities					• Walking, community services, and public transportation were found to be the most commonly utilized form of transportation • Those with developmental disabilities encounter great difficulty with utilizing public transportation, even in communities where ample opportunity is available.
[65] Collins M. Sport, physical activity and social exclusion. J Sports Sc. 2004 Aug;22(8):727-40.	General community	All ages	●	●			• Those affected by poverty, ethnic minorities, the disabled, and delinquents are less likely to engage in sport and physical activity thereby reducing social inclusiveness

Other

Citation	Setting	Population					Findings
Poon KT, Chow JT, Chen Z. Desiring to connect to nature: The effect of ostracism on ecological behavior. J Environ Psychol. 2015;42:116-122.	Natural environments	Undergraduate students (experiments 1 and 2); Men mean age 32.38 – United States	●				• Ostracized individuals reported higher inclinations to connect with natural environments and behave ecologically
[69] O'Connor MF, Arizmendi BJ, Kasziak AW. Virtually supportive: A feasibility pilot study of an online support group for dementia caregivers in a 3D virtual environment. J Aging Stud. 2014;30:87-93.	Virtual	Caregivers of those with dementia		●			• This study sought to examine the use of virtual support groups for caregivers of persons with dementia. • Their findings revealed lower stress, depression, and loneliness (though stress was the only variable which approached significance) • As this was a pilot program, the authors felt that more rigorous evaluations are warranted
Carcedo RJ, Lopez F, Begona Orgaz M, Toth K, Fernandez-Rouco N. Men and women in the same prison: interpersonal needs and psychological health of prison inmates. Int J Offender Ther Comp Criminol. 2008 Dec;52(6):641-57	Correctional Facility in Spain	Male and Female Inmates	●			●	• Of the interpersonal variables examined within the context of psychological health, only social isolation and sexual satisfaction were found to be statistically significant • Given the high stress nature of correctional facilities, the authors suggest that allowing contact between male and female inmates may help to fulfil some of their interpersonal needs mitigating the effects, in part, on social isolation
McKeever P, O'Neill S, Miller KL. Managing space and marking time: mothering severely ill infants in hospital isolation. Qual Health Res. 2002 Oct;12(8):1020-32.	Hospital Isolation Room	Mother's of Infants Hospitalized for severe Immunodeficiencies		●		●	• Though mothers recognized the hospital isolation room as necessary for the care of their infant, each mother developed individual strategies to cope with the situation: • Mothers often remark on the challenges of becoming socially isolated. To this end, the researchers suggest that the use of technologies to assist the mothers in maintaining their social networks be explored

Citation	Setting	Population					Findings
Sharabi A, Margalit M. The mediating role of internet connection, virtual friends, and mood in predicting loneliness among students with and without learning disabilities in different educational environments. J Learn Diffic. 2011 May;44(3):215-27.	Virtual Environment	Students with and without learning disabilities		●			• Virtual environments as a tool to strengthen interpersonal relationships resulted in less intense loneliness • Virtual friendships through virtual environments resulted in greater feelings of loneliness.

Page RM. High school size as a factor in adolescent loneliness. High Sch J. 1990;73(3):150-152.	High School	Adolescent Youth	●			●	• Students within medium-sized high schools were more likely to report being lonely than those within small and large-sized high schools (except for males in large schools)
							• Several hypotheses for this included:
							  o Students in smaller schools may be more likely to engage in school activities (and therefore have greater opportunity for socialization) and are more likely to know one another
							  o Females are more adept at establishing social relations in larger schools than males which could be due to there being less opportunity for males to join sports teams
							• The authors discuss that these findings were established in a sample of students within a rural western area of the United States (thereby suggesting the possibility of selection bias) and therefore recommend further research in this area

Appendix E – Implications for Policy and Beyond

Research:
 - The effectiveness of evidenced-based strategies within the greater societal context

Policy:
 - Ongoing surveillance and identification of populations at-risk for, or experiencing, social isolation and loneliness
 - Immigration policy which considers the community environment to which populations are relocated
 - The provision of built community services within high risk areas

Research:
 - The effectiveness of evidenced-based strategies on reducing barriers to social engagement within working and living environments (e.g. The Eden Alternate)

Policy:
 - Work policies to promote social engagement
 - The creation of supportive living environments to promote social connectedness
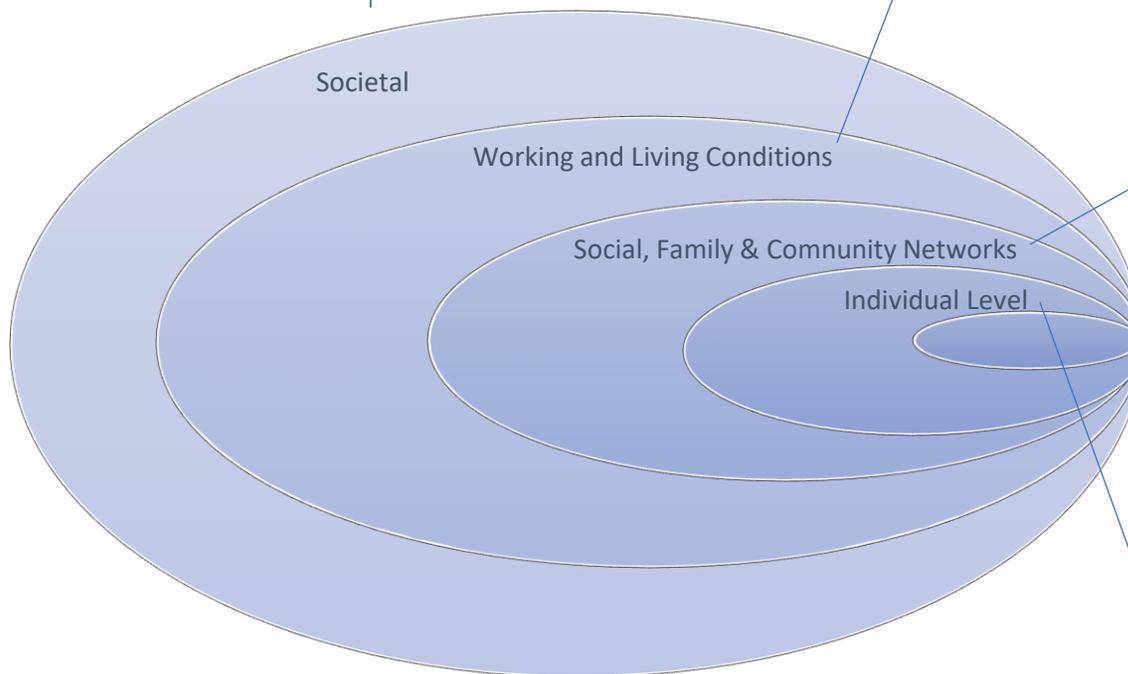
Research:
 - How family and social community facilitate or impede social connectedness in the built environment

Policy:
 - Establishment of formal community support networks

Research:
 - Risk assessment tools for primary care practitioners
 - Factors affected various cultures, ethnicities, and marginalized groups

Policy:
 - Training of those with developmental disabilities to utilize public transportation

Societal

Working and Living Conditions

Social, Family & Comnunity Networks

Individual Level