

***Type this form except the date and the signature.**

Please prepare your Research Report in English or Japanese within three to ten pages including this page. The contents should include:

7. Background of Research

Lack of physical activity and prolonged sitting is known to increase the risk of chronic diseases such as type 2 diabetes, cardiovascular disease, and some cancers. In spite of the recognition of health benefits of active living (more physical activity and less sitting), population-level physical activity has shown substantial and continued declines over the last few decades in Japan. Data from a national sample of Japanese adults show that the number of daily walking steps by adults has been decreasing steadily. Japanese adults also spend a high proportion of their time in sitting. An international study with data from 20 countries found that adults in Japan reported the highest amount of sitting per day. Physical inactivity is going to be an even more serious issue in Japan, where one in every three people will be aged 65 years and over by 2030. The 'Healthy Japan 21', the official plan developed by the Ministry of Health, Labour and Welfare to enhance the nation's health, recognizes the gravity of the current situation and strongly argues the need for promoting physical activity in Japan.

Given the limitations of individually-based approaches (e.g., providing incentives and support, social media campaigns) to promote active living, recent research emphasizes the importance of the neighbourhood built environment for facilitating physical activity and reducing sedentary behaviour. Such environmental approaches are likely to have a sustained impact on a larger number of community residents. A recent large-scale international study published in the Lancet journal found that those living in higher residential density areas were more active than those living in lower density areas, suggesting the potential of significantly increasing residents' physical activity through urban design initiatives.

However, research on environmental factors that can influence physical activity and sedentary behaviour has been conducted predominantly in Western countries such as the United States and Australia. Little is known about how urban design attributes are related to active living in the context of Japan. For instance, two recent academic reviews on the associations of urban design attributes with walking and sedentary behaviour have identified only two (out of 63) studies conducted in Japan. Japanese cities have different environmental attributes in comparison with Western cities: population densities in Japanese urban areas are generally higher than Western cities, and Japanese cities tend to have better access to public transport. Because of these unique characteristics, evidence on urban design attributes associated with active living obtained in previous research may not be applicable to Japan. The purpose of my project is to identify urban design attributes (i.e., land use, street layout, residential density, parks) that can be targeted in an effort to enhance walking and reduce sitting time in Japanese cities. It will generate evidence that can contribute to the promotion of active living in Japan through urban design initiatives. In addition, my project will investigate whether findings from Japan would be different from studies on Western countries such as Australia.

8. Research methodology

This project mainly used two datasets in which physical activity and sedentary behaviour have been already collected from diverse locations within Japan. One of the datasets available

for the project was from a nationwide internet survey conducted by Prof Hanibuchi (Chukyo University, my host university). The survey collected information from 5,002 adults (aged 20-64 years old) about physical activity, self-rated health, and socio-demographic characteristics, as well as their residential locations. The second dataset was from a project conducted by Prof Oka (Waseda University) called Healthy Built Environment in Japan. In this project data on walking, sitting, and health were collected from 9,000 residents (aged 40-84 years old) living in Matsuyama city, Koto ward, and Matsudo city. Physical activity and sedentary behaviour measured using accelerometers were also obtained from about 1,000 participants. My project linked these behavioural and health datasets to geographic data. A comprehensive list of urban design attributes such as land use, street layout (based on space syntax theory), residential density, and park availability was calculated for each participant included in the datasets, using geographic information systems (GIS) software. Geographic data were sourced from several national geographical datasets. This project was highly cost-effective as its main cost is the collection of geographic data to determine urban design attributes.

9. Results/impacts

While there have been a growing number of studies examining if and how built environment attributes promote active living in Western countries, there is limited research on this topic in the context of Japan. My project was the first in Japan to comprehensively examine the relationships of urban design attributes with active living. It provided unique evidence that assists urban designers and policy-makers to produce built environments supporting active living in Japan. This is consistent with the overall goal of the 'Healthy Japan 21'. In addition, the findings from studies in Western countries may not be directly applicable to Japan; because of the urban areas of Japan substantially different from Western countries. My project added to the international literature on this topic by identifying the potential differences between Japanese and Western cities in how urban design factors would influence active living. The results of this project were published in several high-ranked journals in the fields of public health, urban design, transportation, and geography (the full list can be found below). A total of 13 first-author peer-reviewed papers were published. For example, two papers were published at *Cities* journal, a top journal in urban design and planning field. Two other papers were also published at *Health & Place* journal, a top journal in the field of public health and geography. We made almost all the publications Open-Access, so they can be easily obtained for anyone.

Note: As much as possible, describe the contents and results of your research in a manner that is easily understandable to a non-specialist in your field. Provide a concrete description if (1) papers related to your work have been published in major academic journals, (2) particularly outstanding research results were achieved, or (3) patent applications have been made or other tangible outcomes achieved through the research.

10. Research Presentations during the period of the fellowship (Name of the conference, title, place, date)

Koohsari, M. J., Sugiyama, T., Shibata, A., Ishii, K., Hanibuchi, T., Liao, Y., Owen, N., & Oka, K., 3-6 June 2018. Walk Score® and Japanese adults' physically-active and sedentary behaviors, The International Society of Behavioral Nutrition and Physical Activity (ISBNPA) 2018 Annual Meeting, Hong Kong, China.

11. A list of paper published during or after the period of the fellowship, and the names of the journals in which they appeared (Please fill in the format below). Attach a copy of each article if available.

1. **Koohsari, M. J.**, Nakaya, T., McCormack, G., Shibata, A., Ishii, K., Yasunaga, A., & Oka, K. (accepted on 20th March 2019). Cognitive function of elderly persons in Japanese neighbourhoods: The role of street layout. *American Journal of Alzheimer's Disease and Other Dementias*. 5-year IF=1.81; Ranked 39/53 (Q3) JCR 2017 Geriatrics & Gerontology.
2. **Koohsari, M. J.**, Oka, K., Owen, N. & Sugiyama, T (2019). Natural Movement: A Space Syntax Theory Linking Urban Form and Function with Walking for Transport. *Health & Place*. 5-year IF=3.38; Ranked 24/157 (Q1) JCR 2016 Public, Environmental & Occupational Health.
3. **Koohsari, M. J.**, Kaczynski, A. T., Nakaya, T., Shibata, A., Ishii, K., Yasunaga, A., Stowe, E. W., Hanibuchi, T., & Oka, K. (2018). Walkable Urban Design Attributes and Japanese Older Adults' Body Mass Index: Mediation Effects of Physical Activity and Sedentary Behavior. *American Journal of Health Promotion*. 5-year IF=2.13; Ranked 59/145 (Q2) JCR 2014 Public, Environmental & Occupational Health.
4. **Koohsari, M. J.**, McCormack, G., Nakaya, T., Shibata, A., Ishii, K., Yasunaga, A., Hanibuchi, T., & Oka, K. (2018). Urban design and Japanese older adults' depressive symptoms. *Cities*. 5-year IF=3.50; Ranked 6/40 (Q1) JCR 2017 Urban Studies.
5. **Koohsari, M. J.**, Nakaya, T., & Oka, K. (2018). Activity-friendly built environments in a super-aged society, Japan: Current challenges and toward a research agenda. *International Journal of Environmental Research & Public Health*, 15(9): 2054. 5-year IF=2.61; Ranked 73/180 (Q2) JCR 2017 Public, Environmental & Occupational Health.
6. **Koohsari, M. J.**, Oka, K., Shibata, A., Liao, Y., Hanibuchi, T., Owen, N., & Sugiyama, T. (2018). Associations of neighbourhood walkability indices with weight gain. *International Journal of Behavioral Nutrition & Physical Activity*, 15: 33. 5-year IF=6.21; Ranked 7/81 (Q1) JCR 2017 Nutrition & Dietetics.
7. **Koohsari, M. J.**, Kaczynski, A. T., Hanibuchi, T., Shibata, A., Ishii, K., Yasunaga, A., Nakaya, T., & Oka, K. (2018). Physical activity environment and Japanese adults' body mass index. *International Journal of Environmental Research & Public Health*, 15(4): 596. 5-year IF=2.61; Ranked 73/180 (Q2) JCR 2017 Public, Environmental & Occupational Health.
8. **Koohsari, M. J.**, Sugiyama, T., Shibata, A., Ishii, K., Hanibuchi, T., Liao, Y., Owen, N., & Oka, K. (2018). Walk Score[®] and Japanese adults' physically-active and sedentary behaviors. *Cities*, 74: 151-155. 5-year IF=3.50; Ranked 6/40 (Q1) JCR 2017 Urban Studies.
9. **Koohsari, M. J.**, Badland, H., Mavoa, S., Villanueva, K., Francis, J., Hooper, P., Owen, N., & Giles-Corti, B. (2018). Are public open space attributes associated with walking and depression?. *Cities*, 74: 119-125. 5-year IF=3.50; Ranked 6/40 (Q1) JCR 2017 Urban Studies.
10. **Koohsari, M. J.**, Sugiyama, T., Hanibuchi, T., Shibata, A., Ishii, K., Liao, Y., & Oka, K. (2018). Validity of Walk Score[®] as a measure of neighborhood walkability in Japan. *Preventive Medicine Reports*, 9: 114-117. IF=N/A; N/A JCR 2017 Ranking.
11. **Koohsari, M. J.**, Hanibuchi, T., Nakaya, T., Shibata, A., Ishii, K., Liao, Y., Oka, K., & Sugiyama, T. (2017). Associations of neighbourhood environmental attributes

with walking in Japan: moderating effects of area-level socioeconomic status. *Journal of Urban Health*, 94: 847-854. 5-year IF=2.39; Ranked 69/154 (Q2) JCR 2017 Medicine, General & Internal.

12. **Koohsari, M. J.**, Sugiyama, T., Shibata, A., Ishii, K., Liao, Y., Hanibuchi, T., Owen, N., & Oka, K. (2017). Associations of street layout with walking and sedentary behaviors in an urban and a rural area of Japan. *Health & Place*. 45: 64-69. 5-year IF=3.74; Ranked 40/180 (Q1) JCR 2017 Public, Environmental & Occupational Health.
13. **Koohsari, M. J.**, Owen, N., Cole, R., Mavoa, S., Oka, K., Hanibuchi, T., & Sugiyama, T. (2017). Built environmental factors and adults' travel behaviors: role of street layout and local destinations. *Preventive Medicine*, 96: 124-128. 5-year IF=3.75; Ranked 32/180 (Q1) JCR 2017 Public, Environmental & Occupational Health.

- ✓ 12. Awards during the period of the fellowship (Name of the award, Institution, date etc.)

2018 Publons' Peer Review Awards For Placing in the Top 1% of Reviewers in the Field of Social Sciences, General During the 2017-2018, Publons, Clarivate Analytics