Women living in US neighbourhoods with higher levels of 'walkability' have lower risks of obesity related cancers, including postmenopausal breast, endometrial, ovarian, and multiple myeloma. The prospective study, published in *Environmental Health Perspectives*, 10 October, found women living in neighbourhoods judged to be in the top quartile of neighbourhood 'walkability' had a 26% lower risk of obesity related cancers compared to women living in neighbourhoods in the bottom quartile.

"These results contribute to the growing evidence of how urban design affects health and wellbeing in ageing populations," says Andrew Rundle, one of the study authors. "Urban design can create a context that promotes walking, increases overall physical activity, and reduces car-dependency, which could lead to subsequent improvements in preventing diseases attributed to unhealthy weight."

Among women, obesity has been linked to increased risk of 13 different cancers, with obesity-related cancers constituting 55% of all cancers in comparison to just 24% in men. Physical inactivity is known to be a major risk factor for obesity-related cancers, with even low-intensity exercise having protective effects against cancer risk. The built environment, defined as human-made surroundings, can provide the setting for activities influencing health and disease. The concept of neighbourhood 'walkability' describes a set of urban design features promoting pedestrian activity.

In the New York University Women's Health Study (NYUWHS) investigators, led by Yu Chen, from NYU Grossman School of Medicine, New York, New York, explored the association between average annual neighbourhood 'walkability' and risk of any incident obesity-related cancer and site-specific obesity related cancers.

To define 'walkability' the team utilised two metrics: population density (describing how tightly packed together people's residential neighbourhoods are) and density of destinations (describing how close together places that people need to visit regularly, like supermarkets, banks, and libraries, to support living needs are). The two metrics were then combined to create a single index. "This is a pragmatic measure that can be calculated for neighbourhoods across the U.S. and for several past decades, and we've shown it is highly correlated with more elaborate measures of walkability," says Rundle, from Columbia University, New York, New York. "The rationale is that in places with high population densities people tend to have more pedestrian lifestyles while in places with low population densities they drive more."

Between 1985 and 1991, the team recruited 14,272 women, aged between 34 and 65 years, who attended a mammography screening centre in New York. For each address, they calculated scores for population density and density of destinations using data from the census tract (an administrative area defined by the US census) for each year of the study. Then for each individual participant, taking into consideration residential moves and changes in urban environments over the years, they calculated their annual measure of neighbourhood walkability, which was averaged across an average of 24 years of follow-up. "Our study is unique because we were able to use the participant's historical addresses and come up with an average index score that took into consideration all the places that they've lived," Chen tells *Cancerworld*. "Previous studies have mostly used measures of walkability calculated at one time point and not taken into consideration the fact environments change and people move home."

Participants completed a baseline and up to six follow-up questionnaires capturing data on socioeconomic factors, lifestyle variables, and health conditions. Cancer status was ascertained through state tumour registries. The team then used Cox proportional hazards models to assess the association between average neighbourhood walkability and risk of overall and site-specific obesity-related cancers.

Results showed that, among women involved in the study, 18.2% (n=2,411) had developed an obesity related cancer by the end of 2016 (53% postmenopausal breast cancer, 14% colorectal and 12% endometrial cancer).

Women who lived in neighbourhoods in the highest quartile of walkability had 26% lower risk of developing obesity-related cancers compared with those living in neighbourhoods in the lowest quartile of walkability.

The hazard ratios associated with a 1-standard deviation increase in average annual neighbourhood walkability was 0.89 for all obesity related cancers (95%CI: 0.85-0.93). For postmenopausal breast cancer the HR was 0.89, for ovarian cancer 0.82, for endometrial cancer 0.87 and for multiple myeloma 0.68.

Finally, the association between neighbourhood walkability and risk of overall obesity-related cancers was stronger among women living in neighbourhoods with higher levels of poverty compared with that in women living in areas with lower poverty levels (P-interaction =0.006). “We think that the association is stronger in poorer neighbourhoods because the walkability of a neighbourhood influences how much women exercise to a greater extent than for someone living in a wealthier neighbourhood who is likely to have access to other forms of exercise, like gyms, fitness studios and high-quality parks,” explains Chen.

Possible mechanisms that underlie the association of neighbourhood walkability with the risk of cancer, suggest the authors, include the potential effects of obesity and walking on hormone levels, chronic inflammation, or metabolic changes, such as insulin resistance.

The investigators hope that their results can be used as evidence to support planning policies that promote the built environment as a way to increase physical activity. “When designing new areas or redeveloping existing neighbourhoods planners often consider the costs and benefits for one set of urban design features versus another. We hope our data on cancer will make health outcomes a stronger consideration in urban design and planning decisions,” says Rundle. Planning strategies that can be used to promote walkability, he adds, include abolishing zoning rules that stipulate commercial and residential land cannot be mixed, increasing bus and subway routes to allow people to be less dependent on cars, and promoting grid layouts in streets, allowing people to travel between A and B on foot.

In an accompanying invited perspective Charlotte Roscoe and Cindy Hu (both Chan School of Public Health, Harvard), and Paul Villeneuve (Carleton University, Ottawa), write, “Within the role of the built environment in the aetiology of cancer, studies linking walkability exposure to key risk factors for cancer, such as physical activity, provide a mechanistic rationale. The next natural step is to begin disentangling the mechanisms that drive associations between walkability and cancer, with a future vision of leveraging population-wide walkability exposure to contribute to cancer prevention.”