Physical Activity and Obesity in the Worst- and Best-Designed Neighborhoods:

The 12-Country IPEN (International Physical Activity and Environment Network) Adult Study

Background

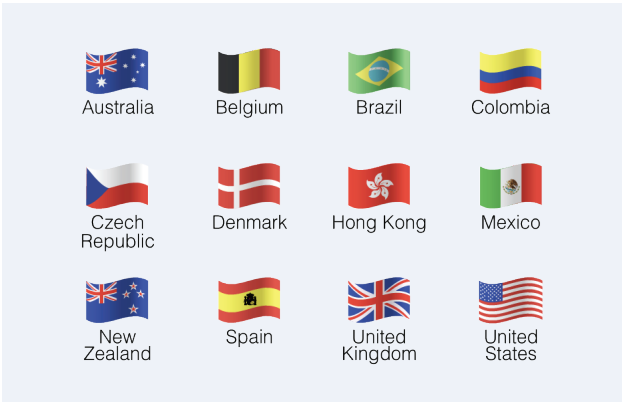
Physically inactive lifestyles are one of the biggest threats to health and quality of life. Worldwide, over 5 million deaths per year can be attributed to physical inactivity – due to its effects on heart disease, stroke, at least 8 cancers, and diabetes. The World Health Organization identified increasing physical activity as a priority strategy for preventing these non-communicable diseases (NCDs).

We now know physical activity can vary markedly, depending on the design of neighborhoods and cities where people live. Built environments that are better designed for physical activity include 'walkable' neighborhoods – those with destinations near homes, access to parks, availability of public transit, and quality of pedestrian and bicycling facilities. However, most studies have been conducted in just one city or one country. Because each study used different methods, it is unknown whether associations between built environments and physical activity are similar or different across countries.

Our 12-country IPEN Adult study examined (a) what is the relation of neighborhood built environments with physical activity and obesity across the full range of international environments, (b) do the relationships differ by outcomes and by method of measuring environments, and (c) do the relationships vary across countries, or are these environmental factors important under differing social, cultural, and political circumstances? Our paper in the 2020 Annual Review of Public Health reports new analyses designed to reveal new patterns across findings reported in eight earlier scientific publications.

The International Physical Activity and Environment Network (IPEN) Adult Study

IPEN Adult was conducted in 17 cities in 12 countries on five continents with more than 14,000 adults. Participating cities and countries were diverse in built environments and cultures: Adelaide in Australia (AUS), Ghent in Belgium (BEL), Curitiba in Brazil (BRZ), Bogota in Colombia (COL), Olomouc and Hradec Králove in the Czech Republic (CZ), Aarhus in Denmark (DEN), Hong Kong in China (HK), Cuernavaca in Mexico (MEX), North Shore, Waitakere, Wellington, and Christchurch in New Zealand (NZ), Pamplona in Spain (SP), Stoke-on-Trent in the United Kingdom (UK), and Baltimore and Seattle regions in the United States of America (USA).



IPEN
INTERNATIONAL PHYSICAL ACTIVITY AND THE ENVIRONMENT NETWORK

ACU
AUSTRALIAN CATHOLIC UNIVERSITY

In the IPEN study, physical activity was measured both by questions asked of our participants and with them wearing electronic accelerometers on their waists for a week. Neighborhood environments were measured by asking what people thought about where they lived, and by using geographic information systems data (GIS; widely-used mapping software). Height and weight were assessed, so the percent of participants overweight and obese could be calculated.

Our analyses compared physical activity and overweight/obesity rates among people living in the bottom 5% and top 5% of activity-supportive neighborhoods. We report physical activity and overweight/obesity results separately for neighborhoods measured by participant surveys and by more-objective GIS methods.

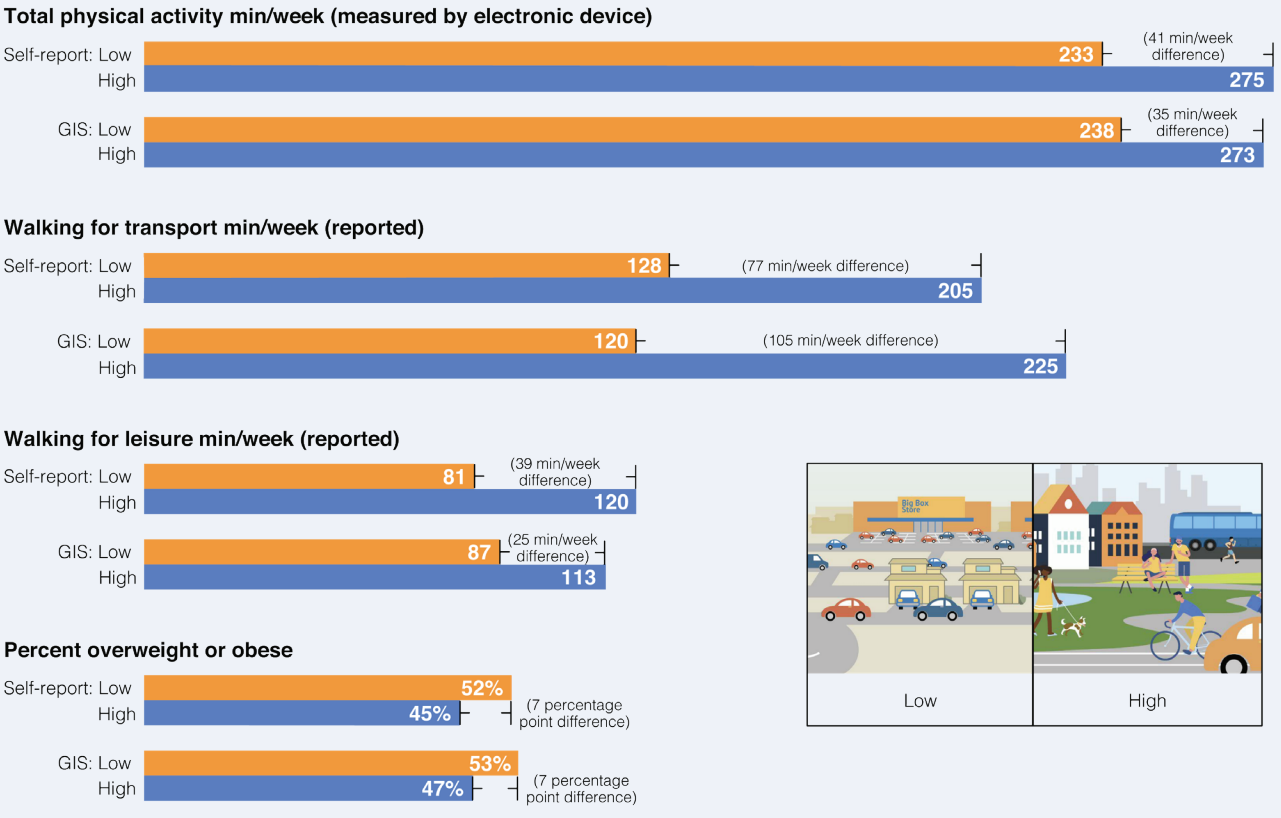
For participants' reports of the characteristics of their neighborhoods, the activity-supportive environment index could contain:

- residential density
- mix of land uses
- street connectivity
- pedestrian/bike infrastructure and safety
- aesthetics
- proximity to a transit stop
- proximity to the nearest park

For our objective measures based on GIS data, the activity-supportive environment index could contain:

- residential density
- mix of land uses
- street connectivity
- number of nearby transit stops
- number of nearby parks

What We Found: Comparing Neighborhoods with Low versus High Activity-Supportive Environments



Conclusions and Recommendations

Synthesizing the evidence from our IPEN Adult study of 12 diverse countries provided new insights into the international relevance of built environments for health. The importance of considering combinations of built environment variables was demonstrated by strong associations with all physical activity and overweight/obesity outcomes. Single environmental attributes were not as consistently and strongly related to all the outcomes, suggesting a combination or pattern of environmental attributes is needed to support physical activity.

Residents of activity-supportive neighborhoods did more walking for transportation, walking for leisure, and total physical activity. And, they were more likely to be at a healthy weight. The same combination of built environment attributes supports several types of physical activity plus healthy weights. This is strong evidence that neighborhood built environments are important for health. Activity-supportiveness is a combination of built environment features. This is consistent with recommendations of the US Community Preventive Services Task Force (https://www.thecommunityguide.org/findings/physical-activity-built-environment-approaches).

Key Learnings

Living in an activity-supportive neighborhood can help adults meet 1/3 to 1/2 of the recommended 150 min/week of physical activity. Living in activity-supportive neighborhoods could contribute to reducing the global obesity epidemic.

Whether environments were measured by self-report surveys or using objective GIS data, results were similar. Thus, either self-report or GIS methods can be used to assess neighborhood environments for research and practice.

Results were similar across 17 cities in 12 diverse countries, indicating there are general principles of active design, at least in middle- and higher-income countries. Future studies should include low-income countries.

This evidence can be used by transportation, city planning, and parks and recreation departments in governments worldwide to design neighborhoods that help residents be active and healthy.

This evidence can be used in advocacy for active design policies that can be controversial, such as increasing density of development, creating mixed use neighborhoods, making greater investments in public transportation, and devoting more road space to sidewalks and safe bicycling facilities.

IPEN Findings Are Relevant to Multiple International Priorities

These results show how active design of neighborhoods can support global initiatives, such as:

- United Nations Sustainable Development Goals (https://sustainabledevelopment.un.org/?menu=1300),
- WHO's Global Action Plan for Non-Communicable Diseases (https://www.who.int/nmh/events/ncd_action_plan/en/),
- WHO's Global Action Plan for Physical Activity (https://www.who.int/ncds/prevention/physical-activity/gappa/action-plan), and
- National physical activity plans.

Designing activity-supportive built environments should be a higher international health priority.

About the study

The IPEN Adult Study Coordinating Center was funded the US National Institutes of Health/National Cancer Institute grant R01 CA127296. Studies in each country were funded by various sources.

This issue brief is based on: Sallis, J.F., Cerin, E., Kerr, J., Adams, M.A., Sugiyama, T., Christiansen, L.B., Schipperijn, J., Davey, R., Salvo, D., Frank, L.D., De Bourdeaudhuij, I., and Owen, N. (2020). Built environment, physical activity and obesity: Findings from the International Physical Activity and Environment Network (IPEN) Adult Study. Annual Review of Public Health, 41, 119-139.
Open access PDF: **https://www.annualreviews.org/doi/pdf/10.1146/annurev-publhealth-040218-043657**

www.ipenproject.org

IPEN
INTERNATIONAL PHYSICAL ACTIVITY AND THE ENVIRONMENT NETWORK

ACU
AUSTRALIAN CATHOLIC UNIVERSITY