Preventive Medicine 69 (2014) S86–S92

Contents lists available at ScienceDirect

Preventive Medicine

journal homepage: www.elsevier.com/locate/ypmed

# Overcoming the challenges of conducting physical activity and built environment research in Latin America: IPEN Latin America

Deborah Salvo [a,b,c,*], Rodrigo S. Reis [d,e], Olga L. Sarmiento [f], Michael Pratt [a,f]

[a] Nutrition and Health Sciences, Graduate Division of Biological and Biomedical Sciences, Emory University, Atlanta, GA, USA
[b] Nutrition and Health Research Center, National Institute of Public Health of Mexico, Mexico
[c] Stanford Prevention Research Center, Stanford University School of Medicine, Stanford, CA, USA
[d] Research Group of Physical Activity and Quality of Life (GPAQ), School of Health and Biosciences, Pontificia Universidade Católica do Paraná, Curitiba, Brazil
[e] Department of Physical Education, Universidade Federal do Paraná, Curitiba, Brazil
[f] Schools of Medicine and Government, Los Andes University, Bogota, Colombia

ARTICLE INFO

Available online 16 October 2014

*Keywords:*
Physical activity
Built environment
Latin America

ABSTRACT

*Objective.* There is evidence linking the built environment (BE) with physical activity (PA), but few studies have been conducted in Latin America (LA). State-of-the-art methods and protocols have been designed in and applied in high-income countries (HIC). In this paper, we identify key challenges and potential solutions to conducting high-quality PA and BE research in LA.

*Methods.* The experience of implementing the IPEN data collection protocol (IPEN: International Physical Activity Environment Network) in Curitiba, Brazil; Bogotá, Colombia; and Cuernavaca, Mexico (2010–2011); is described to identify challenges for conducting PA and BE research in LA.

*Results.* Five challenges were identified: lack of academic capacity (implemented solutions (IS): building a strong international collaborative network); limited data availability, access and quality (IS: partnering with influential local institutions, and crafting creative solutions to use the best-available data); socio-political, socio-cultural and socio-economic context (IS: in-person recruitment and data collection, alternative incentives); safety (IS: strict rules for data collection procedures, and specific measures to increase trust); and appropriateness of instruments and measures (IS: survey adaptation, use of standardized additional survey components, and employing a context-based approach to understanding the relationship between PA and the BE). Advantages of conducting PA and BE research in LA were also identified.

*Conclusions.* Conducting high-quality PA and BE research in LA is challenging but feasible. Networks of institutions and researchers from both HIC and LMIC play a key role. The lessons learned from the IPEN LA study may be applicable to other LMIC.



## Introduction

Latin America (LA) has fascinated and intrigued people since the first European conquerors arrived in the late 1400s (Bakewell, 2004). Its combination of complex indigenous societies and abundant natural resources attracted several waves of immigration from Europe (Bakewell, 2004; Lockhart, 1983). The term "Latin America" expresses the strong influences from Spanish, Portuguese, Italian and French cultures (Bakewell, 2004; Lockhart, 1983). However, this idyllic vision of the past contrasts with LA's current health, social and economic reality (Furtado, 1976).

### *Demographic and epidemiologic transition in LA*

Over the past decades, LA has experienced accelerated demographic and epidemiological transitions, and many countries are facing a *double burden of disease*, characterized by the coexistence of communicable and non-communicable diseases (NCDs) among the population (Barreto et al., 2012). LA's aging population has grown, pushing up rates of NCDs risk factors and the prevalence of NCDs in the region. Obesity and physical inactivity are now especially important public health challenges (Barreto et al., 2012; Frenk et al., 1991; Kain et al., 2014; Rivera et al., 2002).

### *Urbanization, economic and social inequalities in LA*

LA is the most urbanized region in the world, with nearly eight out of ten people living in cities (United Nations, 2012). LA cities tend to have high population density patterns (Knox and McCarthy, 2011), and the

* Corresponding author at: 1070 Arastradero Rd, Suite 100. Palo Alto, CA, 94304, USA.
*E-mail addresses:* dsalvo@stanford.edu, deborah.salvo@insp.mx, debosaldo@yahoo.com.mx (D. Salvo).

http://dx.doi.org/10.1016/j.ypmed.2014.10.014
0091-7435/

transition from traditional public transportation systems to private cars and motorcycles has resulted in increased traffic congestion, air pollution and traffic accidents (Becerra et al., 2013). LA has also become a region of pronounced inequalities, having the largest proportion of population in the world living in slums (United Nations, 2012), and 224 million people living in poverty (Barreto et al., 2012), as well as increasingly high crime rates (Ayres, 1998; Soares and Naritomi, 2010).

### *PA and the built environment (BE)*

While there is substantial evidence linking the BE with PA from high-income countries (HIC) (Bauman et al., 2012; Sallis et al., 2012; Saelens and Handy, 2008; Saelens et al., 2012), few reports come from LA or other LMIC (Bauman et al., 2012; Reis et al., 2013; Parra et al., 2011; Hino et al., 2013; Salvo et al., 2014a). Some studies suggest that the relationship between the BE and PA may be context specific, making this gap in the literature especially important (Parra et al., 2011; Hino et al., 2011; Salvo et al., 2014a; Ebrahim et al., 2013). In HIC, the walkability index, a construct incorporating residential density, street connectivity and land-use mix, has been positively associated with PA for leisure and transport (Cerin et al., 2007; Frank et al., 2010; Van Dyck et al., 2010). While findings from Brazil are consistent with those from HIC (Reis et al., 2013), in Mexico and other LMIC, the walkability index, as defined for HIC, is inversely related to PA (Islam, 2009; Salvo et al., 2014a).

High-quality studies on the BE and PA, allowing for the identification of context-specific relationships, are important for both research and policy but are not easy to carry out. Most assessment methods and data collection protocols have been designed and tested in HIC and often do not adapt well to LA urban environments and populations (Ebrahim et al., 2013; Brownson et al., 2009; Hallal et al., 2010). In 2009, we conducted a literature review to identify available tools to measure the BE as it relates to PA. Out of the ninety identified assessment tools, only six were in Spanish (the predominant language in Latin America), and they were all translations of tools designed to assess U.S. neighborhoods (National Center for Safe Routes to Schools, 2009; National Highway Traffic Safety Administration, 2008a,b; Partnerships for Healthy Communities, 1999; Centers for Disease Control and Prevention, 2008; University of California in Los Angeles and San Francisco Dept of Public Health, 2008).

### *The IPEN study*

IPEN is a 12-country study (Australia, Belgium, Brazil, Colombia, Czech Republic, Denmark, Hong Kong, Mexico, New Zealand, Spain, United Kingdom and United States), designed to measure the associations between PA and BE features, by conducting a pooled analysis. IPEN is the first large-scale international study employing state-of-the-art, standardized protocols and instruments for sampling, data collection and analysis, thus ensuring comparability across the 12 participating countries (Kerr et al., 2013). Furthermore, IPEN is the first study in Latin America (Brazil, Colombia and Mexico) to use objective measures for both PA and the BE (accelerometry and Geographic Information Systems) in large representative samples. More information on the IPEN data collection protocol is available elsewhere (Kerr et al., 2013).

### *Study aim and approach*

The aim is to document the process of adapting state-of-the-art research methods in order to conduct research in LA of the quality required for publication in first order international scientific journals. The urban environment, culture and academic environment in LA differ substantially from those in the U.S., where IPEN was designed, funded and piloted. Thus, the investigators in Curitiba, Brazil; Bogotá, Colombia; and Cuernavaca, Mexico had to systematically assess which components of the study protocol required changes in order to be relevant for the study populations and feasible to implement. The research teams from the three IPEN-LA sites worked closely together during this process, sharing experiences, translating and adapting instruments, and in some cases jointly developing new data collection instruments and protocols. In this paper, we describe the key challenges encountered by the study teams and the solutions that were developed. It is likely that other investigators in LA and in LMIC will face similar challenges and may benefit from the summary of challenges and solutions that follows.

## Results

The IPEN study was successfully conducted in Brazil, Colombia and Mexico in 2010–2011 (Table 1). Five main challenges were identified by IPEN-LA investigators for conducting PA and BE research in LA. In this section, we describe each challenge, followed by the solutions implemented by IPEN-LA investigators. Additionally, some advantages of conducting this type of research in LA in comparison to HIC are described. An itemized summary of recommendations based on our findings is found in Appendix A.

### *Challenge 1: lack of academic capacity*

The extensive evidence base on the health effects of physical inactivity and the BE correlates of PA comes almost entirely from HIC (Lee et al., 2012; Pratt et al., 2012; Bauman et al., 2012). PA and public health research remains a nascent field in LA and LMIC. This is demonstrated by the substantially fewer publications from LMIC for PA interventions and correlate studies (Bauman et al., 2012; Pratt et al., 2012). There is a lack of recognition of PA as a public health priority at the policy level worldwide (Bull and Bauman, 2011). Yet in most LMIC, the lack of recognition of the importance of PA extends beyond the policy level, to academia and research. Few graduate level training programs exist in LA for PA epidemiology, behavioral science related to PA, or PA and public health (Barboza et al., 2013). As a result, there are limited numbers of researchers in LA specifically trained to address PA as a public health issue. Most researchers who do focus in this area are graduates of top academic institutions in HIC.

### *IPEN-LA solution*

#### *Building a strong international collaborative network*

Collaborations are known to be important for advancing knowledge in any setting or field (Keusch, 2010). For IPEN-LA, building a well-connected, international collaborative network was essential. The extensive sharing of resources (intellectual and physical) was identified as a key element for building and strengthening the IPEN-LA network, leading in turn to successful implementation of the IPEN protocol in LA.

1. Sharing of intellectual resources included (a) experience-based knowledge (e.g., Colombia and Brazil began data collection prior to Mexico, and shared firsthand fieldwork logistics experience, challenges and pitfalls with IPEN-Mexico researchers), (b) skill-based knowledge (e.g., informal geographic information system (GIS) training through student exchanges across the network) and (c) human resources (e.g., an IPEN-Colombia researcher spent one month in Mexico coordinating data collection start-up for IPEN-Mexico).
2. Sharing of physical and electronic resources included (a) accelerometers, and (b) electronic resources such as code for data analysis on open source software, templates for database management and for individualized participant reports.

A key aspect that strengthened the collaboration was having substantial in-person time investment. This was achieved through several short visits to other IPEN-LA countries for research meetings (mainly senior investigators), and longer-term exchanges (mainly graduate