



## Editorial

# Mapping the historical development of research in physical activity and health: Providing a platform for future research



## ARTICLE INFO

## Keywords:

Physical activity  
Public health  
Physical activity guidelines  
Research  
Policy  
Interventions  
Surveillance

## ABSTRACT

This editorial is a commentary on the review paper by Ramirez Varela et al. entitled “Mapping the historical development of physical activity and health research: a structured literature review and citation network analysis.” This editorial highlights the significance and implications of this review, with a particular focus on future research and policy directions.

## 1. Introduction

The paper by Ramirez Varela and colleagues (in press) is the first concerted effort to review the historical development of scientific evidence in the field of physical activity and public health. The authors have used a structured literature review approach and citation network analysis which is both novel and rigorous to assess the evolution of knowledge in this field. Their paper provides not only a narrative review of work in this field but also some quantification of the impact of specific papers through the citation network analysis. The authors have focused their review on five categories: physical activity surveillance and measurement; determinants and correlates of physical activity; health outcomes of physical activity; physical activity interventions; and policy and practice in the field of physical activity. Ramirez Valera and colleagues also identify several critical gaps that remain in this literature and opportunities for future research and policy attention.

## 2. Historical perspective

This review describes the first publications in this field beginning in the 1950s and continues to mid-2016 delineating the major achievements and advances over this 60 year period. The associations between physical activity and coronary heart disease outcomes were the initial focus of research on health outcomes beginning in 1953. By the mid-1990s, there was sufficient evidence for the Centers of Disease Control (CDC) and Prevention and the American College of Sports Medicine (ACSM) to publish the first population-based physical activity recommendations for health promotion and disease prevention (Pate et al., 1995). These recommendations were based on epidemiologic evidence of associations between physical activity with coronary heart disease, hypertension, type 2 diabetes, colon cancer, anxiety and depression. However, of interest, at that time there was only sufficient epidemiologic evidence to establish an association between physical activity and coronary heart disease. The first studies on the association between physical activity and other chronic conditions (e.g. certain cancers, type 2 diabetes) began emerging in the 1980s (Albanes et al., 1989; Nelson et al., 1988; Severson et al., 1989) and it would take nearly 20 more years before disease-specific recommendations are published. The first physical activity recommendations for cancer prevention and survivorship were published in 2006 by the American Cancer Society (Doyle et al., 2006). At that time, given the lack of evidence on physical activity and cancer survivorship, the ACS recommendations were based on the evidence accumulated in healthy populations for cancer prevention. Although considerable evidence now exists for the role of physical activity and specific health outcomes, more research is warranted for the prevention and treatment of specific chronic diseases.

Ramirez Valera et al. found that the first papers on the correlates and determinants of physical activity were only published in 1985 to be followed by the first policy publications in 1992 and intervention publications in 1996. They noted that through 2012, research in physical activity has been primarily focused on health outcomes. Hence, there is a clear need for additional research focused on policy and physical activity interventions that is emphasized by these authors.

Ramirez Valera and colleagues also identified that the role of physicians in prescribing physical activity was first discussed in the literature in the mid to late 1990s. Furthermore, from 2000 onwards, research collaborations between different disciplines of exercise science, public health and medicine became more prominent. Indeed, the initial physical activity guidelines published by CDC and ACSM involved a planning committee of five

scientists (Pate et al., 1995), whereas the updated recommendations published in 2007 (Haskell et al., 2007) specifically stated that the expert panel who reviewed the literature included physicians, epidemiologists, exercise scientists and public health specialists. Several governmental agencies worldwide have also contributed to these types of reviews and preparation of physical activity guidelines. A notable contribution has been made by the US National Institutes of Health decadal Physical Activity Guidelines for Americans reports with the second edition to be released in 2018. These reports are comprehensive reviews of the state of evidence on the role of physical activity and all health outcomes that require two years of preparation. They are an authoritative resource for policy makers and health professionals as well as a useful guide for the public seeking the latest knowledge on how physical activity can promote health, including information on exercise dose-response. The involvement of governments, professional societies, non-governmental agencies and health professionals has also contributed to the wide dissemination and acceptance of physical activity guidelines for improved health and well-being in different populations (e.g. children, elderly, persons living with chronic diseases/conditions).

The most recent developments in physical activity and public health research have been in the areas of the built environment and objective physical activity assessment. Progress in technology has led to an increase in the use of physical activity monitors and Global Positioning Systems (GPS) to assess physical activity participation under real-life conditions/within the built environment (Rodriguez et al., 2005; Troped et al., 2010). Findings from these studies support the notion that greater presence of land use mix (combination of residential, commercial, recreational and/or urban public areas), street connectivity and population density are related to higher physical activity participation. The use of these monitoring devices provides objective assessments of all movements (not only planned physical activity) to researchers and reduces participant burden related to self-reported measurements. Research in these emerging areas will provide critical information to urban planners and policy makers to design built environments that promote physical activity participation.

### 3. Significance

This paper is the first ever consideration of how physical activity has been of relevance to public health using quantitative methods that map the most impactful research articles. In so doing, Ramirez Valera and colleagues have provided an excellent overview of the field that will be of interest to trainees and professionals in both physical activity and public health disciplines. A similar methodologic approach was used by Cambrosio et al. (2006) to map the historical use of translational approaches in cancer research from 1980 to 2003. They reported that in the 1980s, research publications were mostly categorized according to whether they used typically laboratory- or clinical-based approaches to study designs and data collection, whereas the 1990s saw an emergence of publications combining work in both clinical and laboratory settings, which was titled the biomedical field. Cambrosio et al. (2006) conclude their article by stating that cancer policy analysts who may draw conclusions based on research performed within a pre-defined discipline (e.g. genetics, clinical) will likely miss the overall interactions between disciplines that form the large domain of cancer research. Ramirez Valera and colleagues do acknowledge that a growing number of collaborations and inter-disciplinary research in the area of physical activity and health has occurred since the year 2000. However, they also report that translational research in physical activity and collaborations between scientists and policy makers is currently infrequent. We re-iterate the conclusions stated by Cambrosio et al. (2006) and encourage policy analysts in the area of physical activity to collaborate closely with scientists to accelerate translation of evidence from recent (and future) inter-disciplinary research into action.

### 4. Implications

These types of review papers provide both retrospective and prospective reflections on how the field has developed and evolved, and which future directions need to be considered to ensure on-going meaningful impact on advancing knowledge to improve health outcomes. Two important areas that have received relatively limited consideration are intervention and policy studies. Ramirez Valera and colleagues have rightly identified the dearth of policy and translational research as significant gaps that will require more sophisticated designs and methods, targeted funding opportunities and highly skilled professionals trained in these fields for significant progress to be achieved. It is important to recognize that advances in data availability and technology allow researchers, trainees and health professionals to disseminate and access physical activity data on a global scale. This capability for data access and dissemination was not possible 10–20 years ago. Future researchers and policy makers should therefore consider global perspectives on monitoring physical activity prevalence and designing interventions with the objectives of implementing physical activity guidelines for different populations and reducing physical inactivity globally.

In conclusion, Ramirez Valera and colleagues have provided a useful summary of evidence on physical activity and public health that is also a call to action for funders, researchers, academics, practitioners and trainees for the future. Their recommendation for multidisciplinary collaboration is to be heeded and should be considered for the development of targeted funding opportunities and research opportunities.

### Transparency document

The [Transparency document](#) associated with this article can be found, in online version.

### Acknowledgments

Dr. Jessica McNeil holds postdoctoral fellowships from the Canadian Institutes of Health Research and Alberta Innovates.

### References

- Albanes, D., Blair, A., Taylor, P.R., 1989. Physical activity and risk of cancer in the NHANES I population. *Amer. J. Pub. Health* 79, 744–750.
- Cambrosio, A., Keating, P., Mercier, S., Lewison, G., Mogoutov, A., 2006. Mapping the emergence and development of translational cancer research. *Eur. J. Cancer* 42, 3140–3148.
- Doyle, C., Kushi, L.H., Byers, T., Courneya, K.S., Demark-Wahnefried, W., Grant, B., McTiernan, A., Rock, C.L., Thompson, C., et al., 2006. Nutrition and physical activity during and after cancer treatment: an American Cancer Society guide for informed choices. *CA: A Cancer J. for Clinicians* 56, 323–353.
- Haskell, W.L., Lee, I.M., Pate, R.R., Powell, K.E., Blair, S.N., Franklin, B.A., Macera, C.A., Heath, G.W., Thompson, P.D., et al., 2007. Physical activity and public health: updated recommendation for adults from the American College of Sports Medicine and the American Heart Association. *Circulation* 116, 1081–1093.
- Nelson, R.G., Everhart, J.E., Knowler, W.C., Bennett, P.H., 1988. Incidence, prevalence and risk factors for non-insulin-dependent diabetes mellitus. *Primary Care* 15, 227–250.

- Pate, R.R., Pratt, M., Blair, S.N., Haskell, W.L., Macera, C.A., Bouchard, C., Buchner, D., Ettinger, W., Heath, G.W., et al., 1995. Physical activity and public health. A recommendation from the Centers for Disease Control and Prevention and the American College of Sports Medicine. *JAMA* 273, 402–407.
- Rodriguez, D.A., Brown, A.L., Troped, P.J., 2005. Portable global positioning units to complement accelerometry-based physical activity monitors. *Med. Sci. Sports Exerc.* 37, S572–S581.
- Severson, R.K., Nomura, A.M., Grove, J.S., Stemmermann, G.N., 1989. A prospective analysis of physical activity and cancer. *Amer. J. Epidemiol.* 130, 522–529.
- Troped, P.J., Wilson, J.S., Matthews, C.E., Cromley, E.K., Melly, S.J., 2010. The built environment and location-based physical activity. *Amer. J. Prev. Med.* 38, 429–438.
- Varela, A.R., Pratt, M., Harris, J., Lecy, J., Salvo, D., Brownson, R.C., Hallal, P.C., 2017. Mapping the historical development of physical activity and health research: a structured literature review and citation network analysis. *Prev. Med.* <http://dx.doi.org/10.1016/j.ypmed.2017.10.020>. (in press).

Christine M. Friedenreich<sup>a,b,c,d,\*</sup>, Jessica McNeil<sup>a</sup>

<sup>a</sup> Department of Cancer Epidemiology and Prevention Research, CancerControl Alberta, Alberta Health Services, Calgary, Alberta, Canada

<sup>b</sup> Department of Oncology, Cumming School of Medicine, University of Calgary, Calgary, Alberta, Canada

<sup>c</sup> Department of Community Health Sciences, Cumming School of Medicine, University of Calgary, Calgary, Alberta, Canada

<sup>d</sup> Faculty of Kinesiology, University of Calgary, Calgary, Alberta, Canada

E-mail address: [Christine.friedenreich@ahs.ca](mailto:Christine.friedenreich@ahs.ca)

\* Corresponding author at: Department of Cancer Epidemiology and Prevention Research, CancerControl Alberta, Alberta Health Services, Holy Cross Center, 2210-2nd St SW, Calgary, AB T2S 3C3, Canada.