

# The Need for Local, Multidisciplinary Collaborations to Promote Advances in Physical Activity Research and Policy Change: The Creation of the Boston Physical Activity Resource Collaborative (BPARC)

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**Abstract** This commentary describes the development, vision, and initial progress of the newly-founded Boston Physical Activity Resource Collaborative (BPARC). Our aims are to move the field of physical activity forward, with broader dissemination and translation, by creating a local Boston and Massachusetts hub for researchers, practitioners, advocates, and policymakers. Participants come from multiple academic and medical centers, local advocacy groups, and government agencies, all of whom are working on components of physical activity promotion. We have had initial success in collaborating on study design, methodology, and grant applications. Future endeavors aim to produce streamlined methods and products with maximal impact for the field of physical activity research, policy, and practice.

**Keywords:** *physical activity, research, collaboration, dissemination, community*

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## 1. Introduction and Background

Physical activity and reduced sedentary time are widely acknowledged to be protective against chronic diseases, obesity, and mortality. [1,2,3] The benefits of regular physical activity extend to mental health, healthcare costs, academic achievement among children, environmental health, and conversely, physical inactivity leads to poorer health and economic outcomes [4,5,6,7]. Despite these well-documented benefits, only about 23% of US adults, 43% of US children, and 27% of US teenagers meet current physical activity recommendations [8,9].

Though the benefits of physical activity have been well documented, there has been limited success in coordinating and sustaining interventions to increase physical activity, and translating knowledge to practice [10,11]. Barriers include inconsistent research measures, insufficient resources, lack of infrastructure to support activity, and limited communication between researchers and practitioners or

policy-makers [12,13,14]. Physical activity research dissemination has been moving forward, but there is still much work to be done [14,15].

Currently in the United States, physical activity work largely remains in siloed fields including medicine, academia, public health, psychology, kinesiology, nutrition, education, policy, advocacy, economics, and urban planning. For instance, most physical activity research programs are housed in separate academic institutions and are driven by individual researchers or research groups, rather than fostering a collaborative approach that can drive connections between academia and policy-makers or thought leaders. There are institutions that aim to bridge this gap, for instance, the Robert Wood Johnson Foundation’s innovative leadership, community health, and grant-making programs ([www.rwjf.org](http://www.rwjf.org)) and its national program Active Living Research ([www.activelivingresearch.org](http://www.activelivingresearch.org)), and the National Physical Activity Plan ([www.physicalactivityplan.org](http://www.physicalactivityplan.org)).

Despite increased interest and projects bringing this knowledge to community settings [12], there is still much work to do, and few collaborations exist between academic

researchers and grass roots advocacy or public health agencies. This is also partly a result of financial barriers, as there is a paucity of research dollars allocated to physical activity at the national level. [6] Yet, physical activity research thrives on standardized methods, large sample sizes, and collaboration across diverse communities and institutions. In order to take steps to move this field forward into broader dissemination and translation, we have created a local solution.

## **2. The Need for a Local Centralized Physical Activity Hub**

The Boston Physical Activity Resource Collaborative (BPARC) was created in 2016 to streamline communication and resources across the multiple institutions and individuals involved with physical activity research and practice in greater Boston and Massachusetts. Thus far, the wide range of groups from organization and universities include Harvard-affiliated schools and hospitals, Northeastern University, Boston University and Boston Medical Center, Tufts University Friedman School of Nutrition Science and Policy, the University of Massachusetts, Walk Boston, and the Massachusetts Department of Public Health. There are many physical activity researchers and practitioners in the Boston area across diverse fields, but there was limited communication and collaboration among these groups and institutions. We have determined a need for a centralized source for people interested in studying physical activity, increasing available knowledge, sharing ideas, methods and data, participating in outreach, and promoting public health efforts towards increasing physical activity.

BPARC today is in its early stages of development. It is a consortium of local physical activity researchers, healthcare providers, advocates, public health practitioners, and government officials who have come together to create a centralized structure aimed at promoting collaboration and sharing ideas to advance the science and awareness of physical activity for health promotion. As such, we have created BPARC to be a centralized hub for collaboration, methodology standardization, equipment sharing, pooled data collection opportunities, and knowledge dissemination which will serve as a resource to the broader community.

## **3. Gaps that BPARC Aims to Fill**

The main areas of need that the collaborative has decided to focus on are as follows.

### **3.1. Standardization of Physical Activity Measurement Methods**

In 2005, as the result of a two-day scientific conference convened to review the evidence behind using accelerometers to measure physical activity, the National Cancer Institute published best practice guidelines and research recommendations, in which it called for the standardization of accelerometry methods [16]. Despite this call for

creating a unified scientific field, little progress has been made on this front since the report was published. Peer-reviewed scientific journals that publish on physical activity continue to publish scientific studies that utilize a diverse array of accelerometry methods to measure physical activity, largely because the field of research continues to be investigator-driven, and this research for the most part continues to be funded and carried out at siloed academic institutions. This has remained the case within Massachusetts as well as nationally.

Although accelerometry has the potential to harmonize the PA field by providing objective PA measurement, there remains no standardized approach to using accelerometers to measure PA, despite an appreciation for some time that this is a necessary endeavor to move the science of PA measurement forward [17,18]. Further, there may be no one perfect accelerometry approach to measure across various activity types [19]. This is complicated by the fact that technology often moves faster than the timeframe needed to conduct rigorous scientific studies, and increasingly accelerometer-based technologies are available from for-profit industries whose incentives are more aligned with maximization of profit rather than ensuring scientific rigor or validity. Adding to the complication is the fact that accelerometers can be worn in multiple places (e.g., wearables), including the hip, wrist, and ankle, and newer technologies now allow accelerometers to be included in clothing [20], smartphones [21], and other portable electronic devices. Accelerometers are also being combined with other technologies, such as global position system (GPS) receivers to measure and contextualize PA [22]. There remains no consensus or standardized approach to measuring physical activity using any of these modalities [23,24,25]. Without greater efforts at standardization, the field will become increasingly complicated as technology rapidly marches on.

BPARC collaborations will allow members to form a working group to agree upon a standardized method of processing objective PA data from various devices (e.g., accelerometer cut points, valid wear time protocols, different device placement interpretations, machine learning algorithm training). Having such a method, for instance, creating “The Boston Method,” could make research from this group more powerful, and could extend to be an adoptable method for other research groups. This in turn could move PA measurement science forward in a reliable and validated manner [19,26]. We aim to offer resource sharing and consulting to local researchers and practitioners in order to disseminate these findings.

Subjective physical activity assessments (self-report for adults, parent-report for children) are frequently used due to their convenience, low cost, ease of use, and applicability to studies with large number of participants. Yet like all other modalities used to assess physical activity, self-report measures of physical activity remain non-standardized [27,28]. Therefore, this subfield can also benefit from creating consensus and recommendations on specific indications and populations for which to use subjective physical activity assessment, and specific instruments to use in these instances (e.g., large surveys vs. ecological momentary assessment) [29].

### 3.2. Equipment and Data Sharing to Pool Resources, Data, and Open-Sourcing Methods Used for Data Analysis

BPARC members have begun sharing equipment, including an accelerometer loaning program, in an effort to foster collaboration and standardization, and maximize data collection. As part of the accelerometer loaning program, members agree to make the data collected available to other BPARC members after the primary study objectives and analyses are complete. Pooling and sharing data is anticipated to result in several benefits including reduced redundancy and decreased methodological variation across research groups, improved transparency of data collection and analysis, streamlined application of the standardization methods proposed in the previous section, and additional statistical power that comes with increased dataset sizes [30].

Our group is also discussing the potential to create a central site where de-identified data can be safely uploaded, stored, and processed using newly developed algorithms. A similar approach in other fields, including computer vision and machine learning, have helped to advance the fields.

### 3.3. Multidisciplinary Work: A collaborative Approach to Physical Activity Research and Practice with the Overarching Goal of Improving Population Health

Cross-field and cross-institution collaborations are planned to be broadly inclusive and maximize reach. So far, we have members from academic research groups that include epidemiologists, geographers, engineers, biostatisticians, physicians, healthcare facilities, state and local public health departments, and nonprofit and advocacy groups. Regular work-in-progress meetings allow members to stay informed about local research efforts and facilitate the dissemination of projects currently underway. This type of cross-talk can enable and facilitate increased collaboration between BPARC members and disciplines which will move the physical activity promotion field toward broader and more diverse communities [31,32].

### 3.4. Advocacy

Physical activity policy depends on sound research, and researchers depend on advocacy communities to implement research findings [33]. Because it is well established that research should be relevant to the practice setting, context, and population in which they will ultimately be delivered [34], BPARC includes advocacy/practice-based organizations within our collaborative to facilitate the development of research in partnership with members of advocacy communities (i.e., often referred to as practice-based evidence) [35]. These organizations serve as sounding boards, provide input into proposed research designs, can highlight their priorities, and can discuss ways to disseminate effective intervention strategies. It is imperative that research be disseminated as broadly as possible to influence community-based changes that

improve the infrastructure and safety for active living (e.g., pedestrian and bicycle infrastructure).

Advocacy can be a powerful tool in facilitating sustained changes for increased physical activity [36] and is recommended by national and international agencies [37,38]. Advocacy for improved pedestrian, bicycling facilities, and communication with policy and decision-makers are needed in the Boston area. One example is WalkBoston, a community-based organization dedicated to improving walking conditions in Boston and the surrounding communities and has several initiatives including creating and distributing walking maps, acting as an advocacy organization, and equally important, educating others how to effectively advocate for physical activity change. Advocacy initiatives within BPARC to date have included ideas and collaborations between members to improve bicycle safety facilities near a local hospital, with further advocacy actions being planned.

In sum, we describe the creation, vision, and plans for the newly formed Boston Physical Activity Resource Collaborative. Our aims are to provide a centralized resource for physical activity data, resources, community improvements, and collaboration across the greater Boston area, to produce methods and products with maximal impact for the field of physical activity research, policy, and practice.

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