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## Dance for Health: An Intergenerational Program to Increase Access to Physical Activity

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## ABSTRACT

**Purpose:** The purpose of this study was to evaluate Dance for Health, an intergenerational program to increase access to physical activity in an underserved, high risk urban community.

**Design and Methods:** Dance for Health was developed using community-based participatory research methods and evaluated using an observational study design. The program entailed two hour line dancing sessions delivered by trained dance instructors in the neighborhood recreation center. The weekly sessions were delivered for one month in the spring and one month in the fall from 2012–2016. Nurse practitioner students mentored local high school students to assess outcomes: achievement of target heart rate, Borg Rating of Perceived Exertion, number of pedometer steps during dance session, Physical Activity Enjoyment Scale, and adiposity. Analytic methods included descriptive statistics and mixed effects models.

**Results:** From 2012–2016, 521 participants ranging from 2–79 years attended Dance for Health. Approximately 50% of children and 80% of adults achieved target heart rate. Achievement of target heart rate was not related to perceived exertion, though it was related to pedometer steps in adults. All participants rated the program highly for enjoyment. There was no change in adiposity.

**Conclusions:** Dance for Health demonstrated high levels of community engagement and enjoyment. It led to adequate levels of exertion, particularly for adults. Our evaluation can inform program refinement and future intergenerational physical activity programs.

**Practice Implications:** Dance is an enjoyable, culturally appropriate, low cost method for increasing access to physical activity for children and families.

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## Introduction

Physical activity is associated with decreased risk of heart disease (Lee, Rexrode, Cook, Manson, & Buring, 2001; Sattelmair et al., 2011), stroke (Do Lee, Folsom, & Blair, 2003), type 2 diabetes (Krishnan, Rosenberg, & Palmer, 2009), colon cancer (Boyle, Keegel, Bull, Heyworth, & Fritschi, 2012), breast cancer (Wu, Zhang, & Kang, 2013), and mortality (Oguma, Sesso, Paffenbarger, & Lee, 2002; Samitz, Egger, & Zwahlen, 2011; Wen et al., 2011). Lack of physical activity during childhood can contribute to worse academic performance, poor cognitive skills (e.g., concentration, creativity), and negative attitudes (e.g., motivation, self-esteem) (Rasberry et al., 2011). As a result, increasing physical activity is a Healthy People 2020 objective (Healthy People 2020, 2017). Unfortunately, 73% children do not engage in the recommended 60 minutes per day of physical activity (Kann et al., 2014; US Department of Health and Human Services, 2008). Longitudinal

evidence documents that low levels of physical activity in adolescence persist into adulthood (Gordon-Larsen, Nelson, & Popkin, 2004), highlighting the importance of establishing healthful physical activity levels at a young age.

Social determinants of health (SDOH) are the social, economic, and physical factors that account for up to 75% of health, functioning, and quality of life outcomes (Centers for Disease Control and Prevention, 2014). Access to resources and opportunities for physical activity is a key SDOH (Healthy People 2020, 2017; Shelton et al., 2011). Children from racial/ethnic minority groups, or who live in areas of poverty, are more likely to reside in neighborhoods with less opportunity for physical activity (Watson, 2016), which contributes to low levels of activity in these populations. In West Philadelphia, a neighborhood with a population that is largely African American and has a poverty rate among the highest in the country (Pew Charitable Trusts, 2015), four out of five children do not participate in the recommended amount of physical activity. One out of five Philadelphia children participate in no physical activity at all, a problem especially prevalent among African American girls (29.8%)

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(Troost et al., 2013). This only amplifies the other risk factors for disease in the West Philadelphia community, including high levels of obesity, limited access to healthy foods, and poor cardiovascular fitness (Lipman et al., 2011).

When developing physical activity programs, it is critical to consider SDOH and how they interact to influence activity level. For example, determinants such as neighborhood safety (when walking or in playgrounds) and physical environment (access to green spaces) impact the ability of children to be physically active in their home community. In addition, family-level SDOH such as social support (participation in physical activity by family and friends), and family income (parents' ability to afford sports programs) influence children's activity levels (Bauman et al., 2012; Ding, Sallis, Kerr, Lee, & Rosenberg, 2011; Gordon-Larsen, McMurray, & Popkin, 2000). Despite the significant impact on health outcomes, SDOH are often overlooked by existing clinical and health behavior change interventions (Ball, Carver, Downing, Jackson, & O'Rourke, 2015; Gottlieb, Sandel, & Adler, 2013). Upstream interventions (those approaches that can affect large populations through regulation, increased access, or economic incentives) that address SDOH are more likely to meet the needs of children and families (Ball, 2015; Ball et al., 2015).

One potential strategy for increasing physical activity in children from underserved communities is to develop intergenerational programs (Davison, Jurkowski, Li, Kranz, & Lawson, 2013; Flora & Faulkner, 2007; Swanson, Studts, Bardach, Bersamin, & Schoenberg, 2011; Werner, Teufel, Holtgrave, & Brown, 2012). Given that children's health habits develop within the context of a family, intergenerational interventions that include parents, grandparents, or other adult caregivers can be promising modalities for supporting health behaviors (Kuo et al., 2012). Furthermore, interventions that include two or more generations can improve the health not only of participating children - but of entire families - an important consideration given that lack of physical activity is not only a problem for children; 51% of adults do not meet guidelines for aerobic physical activity (Ward, Barnes, Freeman, & Schiller, 2012). An intergenerational approach provides a source of social support within an intervention and encourages development of healthy behaviors at the family level (Swanson et al., 2011). This approach may be of most benefit for African American families, who ascribe more importance to social supports and prefer health programs that target the whole family (Lipman et al., 2012).

Dance has been identified as a beneficial program for intergenerational physical activity for underserved communities and has been shown to increase physical fitness, decrease stress, and decrease psychosomatic symptoms in children (Duberg, Hagberg, Sunvisson, & Möller, 2013; Quin, Frazer, & Redding, 2007). In adults, dance has demonstrated beneficial effects on anxiety, depression, physical function, disability, and memory (Jeong et al., 2005; Koch, Morlinghaus, & Fuchs, 2007; Murrock & Graor, 2014; Weuve et al., 2004). Previously studied dance interventions have decreased BMI, body fat, and blood pressure and improved quality of life in African American communities (Murrock & Gary, 2008; Murrock, Higgins, & Killion, 2009; Robinson et al., 2010), a population that is affected by multiple health disparities (Agency for Healthcare and Research Quality, 2013). Importantly, members of the African American community have reported dance to be culturally relevant (Murrock & Gary, 2010). Dance programs have also demonstrated lower dropout rates than other fitness programs (Quin et al., 2007) and dance is low cost, can be done at home, and requires no equipment - important considerations for families with limited financial resources.

The purpose of this study was to evaluate Dance for Health, an intergenerational program to increase access to physical activity for the West Philadelphia community. The key components that were evaluated included program attendance, impact on cardiovascular exertion, change in adiposity, and participant enjoyment.

## Methods

### Program Development

Dance for Health was developed using community-based participatory research (CBPR) methods (Minkler & Wallerstein, 2008), to ensure that the program arose from, and was developed in accordance with, the priorities, needs, strengths, and barriers of children and families in West Philadelphia. The program resulted from collaboration among an academic institution, the School District of Philadelphia, and a local school-based health center (Lipman et al., 2011). Prior to developing the Dance for Health, children and parents from West Philadelphia were surveyed and focus groups were conducted to determine their interest in various programs to increase their activity. Results demonstrated that families desired an activity that was easily accessible, free, fun, in a safe area, involved both parents and children, and could be done at home. Dance was chosen by both the children and the parents (Lipman et al., 2011). To align with community preferences, Dance for Health was designed to be without cost to participants and in a safe, indoor environment. School staff, students, and parents were engaged as key advisors to guide program development and evaluation (Lipman et al., 2011).

### Intervention

Prior to beginning the study, Institutional Review Board approval was obtained from the University of Pennsylvania. Using a CBPR approach, a convenience sample of participants was recruited in partnership with community members through flyers at local schools and throughout the neighborhood, joint presentations and demonstrations at parent events, announcements at community meetings, radio announcements, and notices in the local newspaper. Dance for Health sessions were offered weekly for one month in the spring and one month in the fall (8 weeks total per year) from 2012 to 2016. Community members assisted with dance event coordination. Sessions took place in the evenings at a recreation center located in the West Philadelphia neighborhood. The dance entailed two hour group line dancing, led by two trained dance instructors well known by the local community.

### Outcome Measurement

All outcome measures were collected weekly by local high school students trained and mentored by pediatric acute care nurse practitioner students. Training included both didactic content (e.g., normal patterns of child growth, the effects of physical activity on health) and interactive learning (e.g., measurement of heart rate, height, and weight). Training on measurement of heart rate, height, and weight was conducted in the high school's interactive learning lab and included hands-on practice (Lipman et al., 2011).

Participant demographics (age, gender, race) were collected at baseline. Adiposity, height and weight were measured according to methods described in a previous study (Lipman et al., 2004). Baseline and mid-activity heart rates and perceived exertion were assessed to measure cardiovascular exertion. Heart rate was collected by manual palpation of the radial artery, both prior to starting dance and at the midpoint of the session. Perceived exertion - a participant's assessment of how hard the body is working - was collected at the end of the session using the Borg Rating of Perceived Exertion (RPE) (Borg, 1998). The Borg RPE ranges from 6 (no exertion) to 20 (maximal exertion), with a score of 12-14 indicating target moderate levels of exertion, and has been found to be reliable and valid in both adults (Chen, Fan, & Moe, 2002) and children (Lamb, 1995; Pfeiffer, Pivarnik, Womack, Reeves, & Malina, 2002; Ward & Bar-Or, 1987). Participants also wore pedometers on their waistbands during the dance sessions to quantify the number of steps. To measure acceptability of the program, a modified Physical Activity Enjoyment Scales (PACES) was collected at the end of the session.

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