

# Using School-Level Interviews to Develop a Multisite PE Intervention Program

Stacey G. Moe, BA  
Julie Pickrel, MPH  
Thomas L. McKenzie, PhD  
Patricia K. Strikmiller  
Derek Coombs, MPH  
Dale Murrie, MAT

The Trial of Activity for Adolescent Girls (TAAG) is a randomized, multicenter field trial in middle schools that aims to reduce the decline of physical activity in adolescent girls. To inform the development of the TAAG intervention, two phases of formative research are conducted to gain information on school structure and environment and on the conduct of physical education classes. Principals and designated staff at 64 eligible middle schools are interviewed using the School Survey during Phase 1. The following year (Phase 2), physical education department heads of the 36 schools selected into TAAG are interviewed. Responses are examined to design a standardized, multicomponent physical activity intervention for six regions of the United States. This article describes the contribution of formative research to the development of the physical education intervention component and summarizes the alignment of current school policies and practices with national and state standards.

*Keywords:* formative research; middle schools; physical education; intervention; adolescent girls

## INTRODUCTION AND BACKGROUND

Physical activity during youth is associated with many positive health outcomes, including aerobic fitness, bone mass, and high-density lipoprotein cholesterol (McKenzie et al., 1996). In addition, physical activity may help to alleviate depression, anxiety, and self-esteem issues in both adolescents and adults (Calfas & Taylor, 1994; Mutrie & Parfitt, 1998). Unfortunately, adolescents are less active than recommended and do not meet national goals for health-related physical activity (U.S. Department of

---

Stacey G. Moe, University of Minnesota. Julie Pickrel, Thomas L. McKenzie, San Diego State University. Patricia K. Strikmiller, Tulane University. Derek Coombs, University of North Carolina at Chapel Hill. Dale Murrie, University of South Carolina.

*Address reprint requests to* Stacey G. Moe, Division of Epidemiology, University of Minnesota, 1300 South Second Street, Suite 300, Minneapolis, MN 55454; phone: (612) 626-8607; fax: (612) 624-0315; e-mail: moe@epi.umn.edu.

*Authors' Note:* This research was funded by grants from the National Heart, Lung, and Blood Institute (U01HL66858, U01HL66857, U01HL66845, U01HL66856, U01HL66855, U01HL66853, and U01HL66852).

*Health Education & Behavior*; Vol. 33 (1): 1-14 (February 2006)

DOI: 10.1177/1090198105282418

© 2006 by SOPHE

Health and Human Services [USDHHS], 2000). Results from the Youth Risk Behavior Survey (Adams, Schoenborn, Moss, Warren, & Kann, 1995; Centers for Disease Control and Prevention, 1995) indicate that the prevalence of inactivity increases during adolescence (Centers for Disease Control and Prevention, 1998; Pate, Matthews, Alpert, Strong, & DuRant, 1994). Research has shown that the transition from childhood to adolescence is associated with a 34% decline in physical activity in girls (Kimm et al., 2000), and twice as many high school girls as boys report no vigorous physical activity during the past 7 days (13.8% vs. 7.3%) (USDHHS, 2000).

Healthy People 2010 goals for youth physical activity include (a) increasing the proportion of adolescents who engage in at least 30 min of moderate physical activity 5 or more of the previous 7 days from 27% to 35% and (b) increasing the proportion of adolescents who engage in vigorous physical activity that promotes cardio-respiratory fitness on 3 or more days per week for at least 20 min per occasion from 65% to 85% (USDHHS, 2000). Additionally, Healthy People 2010 lists several school-related objectives for physical education (PE) classes.

Youth spend the majority of their waking hours in school (USDHHS, 2000), and schools provide a safe setting for students to learn about and practice important health behaviors, including health-related physical activity. Within schools, PE classes provide a critical opportunity for youth to engage in physical activity, become physically fit, and learn movement skills. Daily PE is frequently recommended for all students (Centers for Disease Control and Prevention, 1997; National Association for Sport and Physical Education [NASPE], 2002; USDHHS, 2000), but there is no federal law that requires it to be offered. In fact, states and school districts usually provide the specific direction for PE and mandate time allocations, content, and minimum standards (NASPE, 2002; USDHHS, 1996). Currently, students have limited opportunities for physical activity in PE, and only 32% of females and 45% of males report being physically active for 20 min or more in their classes (Centers for Disease Control and Prevention, 1997; McKenzie et al., 2000; USDHHS, 2000). Moreover, students engage in moderate to vigorous physical activity (MVPA) much less than the recommended 50% of PE class time (Centers for Disease Control and Prevention, 1997; McKenzie et al., 2000; USDHHS, 2000).

The Trial of Activity for Adolescent Girls (TAAG) is a multisite, randomized controlled trial with the goal of reducing the decline in physical activity among middle school girls. Six sites, representing diverse geographic locations and populations, are conducting this study: University of Arizona, University of Maryland, University of Minnesota, University of South Carolina, San Diego State University (California), and Tulane University (Louisiana). The trial is coordinated by the Collaborative Studies Coordinating Center of the University of North Carolina at Chapel Hill in a partnership with the National Heart, Lung, and Blood Institute (NHLBI).

The theoretical basis for TAAG is a social-ecological model that focuses on physical and social environments and the characteristics of different types of girls. Through four intervention components, including a health education component, a promotions component, a physical activity component taking place after school, and a PE component, TAAG addressed how to increase physical activity levels in middle school students. The PE component, and the topic of this article, has four specific objectives: (a) to increase the proportion of adolescents who spend at least 50% of class time being physically active (as recommended in the Healthy People 2010 school-specific objectives; USDHHS, 2000); (b) to provide opportunities for girls to participate, practice skills, and be physically active; (c) to provide opportunities for girls to be successful and enjoy physical activity; and (d) to encourage girls to participate in physical activity outside of PE class.

There were racial, ethnic, socioeconomic, and geopolitical regional differences among the sites that would likely produce variation among girls' physical activity levels and interests. Thus, TAAG needed to develop an intervention that was flexible and could be tailored to meet the needs of individual schools. We completed formative research to generate information to develop an intervention that was both feasible and that optimized the chance of being effective across all six sites. We conducted interviews, focus groups, and surveys with different populations, including middle school girls and boys, parents of girls, PE teachers, principals and other school staff, community agency representatives, and physical activity program leaders to yield information beneficial for the development of the specific components of the intervention.

This article focuses on development of the PE component of the intervention through the use of formative research findings and summarizes how school policies and practices aligned with national standards for PE. The three other intervention components and the research that informed their development are described elsewhere in this special issue (Saunders & Moody, 2006; Staten et al., 2006; Vu et al., 2006; Young et al., 2006).

## METHOD

### Study Design and Sample

TAAG Formative Assessment Working Group members interviewed school officials using the School Survey early in the development of TAAG (June to August 2001, or Phase 1) to obtain information about the operations and policies of schools potentially eligible to participate in the TAAG trial. Sixty-four of 69 potentially eligible schools participated (response rate = 93%; range = 7 to 16 schools per field site). Typically, only the principal was interviewed, but assistant principals, guidance counselors, and others provided additional information when needed. The interview format was appropriate for this data collection because it was the first interaction between schools and TAAG staff members and allowed for dialogue about current practices in the schools.

Later, in Phase 2 (April 2002 to January 2003), before schools were randomized to treatment condition, trained TAAG PE interventionists conducted the PE Instructor Interview with the PE department heads of the 36 schools recruited into the main trial to learn more about the environments of specific schools in TAAG.

These schools included 24 schools that had participated earlier in the School Staff Survey and 12 new schools that met the TAAG eligibility requirements. The requirements schools had to meet to be eligible to participate in the TAAG study included (a) being a public middle school or junior high school with sixth through eighth grade in the same building, (b) having at least 100 girls in each grade, (c) having a PE requirement where at least half the girls had PE during the spring semester, and (d) having no more than 28% of girls leave the school in any given year.

### Instruments

The School Survey was designed to obtain information on the structure of the school day, health education and PE requirements, physical activity facilities, after-school programs, and partnerships with community organizations. The 34-question interview was developed by a formative assessment working group, comprising members from each

TAAG site, after receiving input on important topics from site interventionists. The interview took approximately 30 min to complete.

The PE Instructor Interview consisted of 37 questions about health education and PE requirements, curriculum resources and materials, barriers to teaching quality PE, and activity units offered. The interview was created by the formative assessment working group after receiving in-depth input from site interventionists about items they deemed important to collect. Interviews were approximately 30 to 45 min in length. Nationally recognized university and public school PE specialists were involved in the design of both instruments to enhance the face validity of questions. Both instruments were pilot tested before being used in the study.

### **Data Collection**

Institutional review boards from each site reviewed and approved all instruments and procedures. Training and certification for data collection occurred as part of TAAG's quality control procedures. Most interviews were face to face, although administering the School Survey was permitted via telephone if preferred by the interviewee. Completed School Surveys were mailed to the TAAG coordinating center for data entry and analysis, and information from the PE Instructor Interviews was entered at field sites and sent to the coordinating center via an Internet-based data management system.

### **Data Analysis**

The two instruments provided detailed, quantitative data. When appropriate, descriptive statistics, including frequency distributions, means, standard deviations, and ranges, were computed using Statistical Analysis System software (Version 8e; SAS Institute, Inc., Cary, NC).

## **RESULTS**

### **Formative Research Phase 1—School Survey**

*PE Time Requirements.* Results of interviews in 64 schools showed that conduct of PE varied across schools at the TAAG sites, with yearly requirements ranging from 36 to 200 days of PE. (Additional data are available from the lead author.) Almost all schools from California, Louisiana, and Minnesota required PE for the entire school year, but some schools from other sites required PE for only one quarter or semester. Schools in California required the most PE, with means of 165.0, 185.5, and 185.5 days of required PE in sixth, seventh, and eighth grade, respectively. Schools in Maryland, with 82.7, 87.3, and 68.0 mean days per year in sixth, seventh, and eighth grades, respectively, required the least PE. Within each field site, the range of days required for PE also varied dramatically across schools.

Overall, however, there was little difference in the mean number of days PE was required by grade (129, 134.9, and 129.7 days per year for sixth, seventh, and eighth grades, respectively), and 75% of schools had the same requirement for all three grades.

*Gender Format of PE.* PE was provided in a coeducational format in more than 80% of the schools, with approximately 20% of schools providing both coed and gender-separate

classes. In South Carolina, a majority of schools (55%) offered both coed and gender-separate classes, whereas the remaining schools provided only coed classes. Maryland was the only site with more schools offering gender-separate classes (either exclusively or in combination with coed classes) than coeducational classes alone. California was the only site that offered no gender-separate classes.

### **Formative Research Phase 2— PE Instructor Interview**

*PE Time Requirements.* Similar to the surveys of 64 schools a year earlier (Phase 1), there was a wide range of PE requirements across and within sites in the 36 main trial schools (Table 1). These schools, with an overall mean of 126.6, 121.5, and 122.1 days per year for sixth, seventh, and eighth grades, respectively, required PE about 5 days less than the initial 64 schools.

Schools in California, Louisiana, and South Carolina ( $n = 18$ ) required at least 225 min per week, and those in Arizona, Maryland, and Minnesota ( $n = 18$ ) required at least 120 min. It is important to note, however, that these numbers reflect requirements only during the weeks that PE was offered; the number of weeks that PE was required also varied greatly across sites.

Because requirements in days per week and weeks per year varied among sites, the clearest indicator of potential PE exposure time for students is the number of hours required per year. Overall, the mean hours required per year was 108.8 in sixth grade, 105.3 in seventh grade, and 105.8 in eighth grade. It ranged from a mean high of 155.5 hr (all grades, California) to a mean low of 53.8 hr (all grades, South Carolina). The least amount of PE required was for sixth grade in Arizona (37.5 hr per year). All sites except South Carolina, and Arizona's sixth grade, required at least 70 hr per year for all grades. Within half the sites, required hours varied by grade; Maryland had the largest difference, requiring sixth graders to have 28.9 more hr per year than seventh and eighth graders.

*Gender Format of PE.* Few schools provided only gender-separate classes (16.7% for sixth grade; 13.9% for seventh and eighth grades), and even fewer offered a combination of both coeducational and gender-separate classes (5.6% for sixth grade; 8.3% for seventh and eighth grades) (see Table 2). The proportion offering gender-separate PE was similar to the 64 schools in Phase 1, but the proportion offering a combination of coed and gender separate was lower. California and Minnesota offered coeducational PE classes only, and a third of the schools in Arizona, Louisiana, and Maryland ( $n = 6$ ) offered only gender-separate classes.

*Activity Units.* PE department heads reported the activities taught in their schools. A comprehensive list of instructional activity units taught across all sites, including those offered in coeducational and gender-separate classes, is shown in Table 3. Activity units were typically short (2 to 4 weeks), and some were taught in both coeducational and gender-specific formats within the same schools. Traditional sports activities, including volleyball, basketball, and baseball and softball, were the most common for coeducational classes. Dance was offered at a little more than half (55.6%) of schools, and cultural games and gymnastics were offered less frequently (at 38.9% and 27.8% of the time, respectively). Football and basketball were the two units most commonly taught with boys and girls separated (27.8% and 25% of the time, respectively).

Table 1. PE Requirements in 36 TAAG Main Trial Schools by Site and by Grade Level (Phase 2)

	Average Number of Minutes per Week			Average Number of Minutes per Week			Average Number of Minutes per Week		
	Average Number of Minutes per Week	SD	Range	Average Number of Minutes per Week	SD	Range	Average Number of Minutes per Week	SD	Range
Arizona									
Sixth grade	201.7	74.3	120.0 to 280.0	102.3	46.5	45.0 to 180.0	84.7	44.7	37.5 to 168.0
Seventh grade	206.7	68.5	135.0 to 280.0	114.0	33.5	90.0 to 180.0	97.8	34.9	75.0 to 168.0
Eighth grade	178.8	67.9	135.0 to 280.0	126.0	36.0	108.0 to 180.0	107.3	40.7	81.0 to 168.0
Maryland									
Sixth grade	212.5	46.8	125.0 to 250.0	141.8	34.7	100.0 to 190.0	123.8	27.3	83.3 to 158.3
Seventh grade	158.3	51.6	125.0 to 225.0	107.2	14.4	95.0 to 135.0	94.9	21.1	79.2 to 135.0
Eighth grade	158.3	51.6	125.0 to 225.0	107.2	14.4	95.0 to 135.0	94.9	21.1	79.2 to 135.0
South Carolina									
Sixth grade	229.2	10.2	225.0 to 250.0	62.5	14.7	45.0 to 90.0	53.8	13.8	45.0 to 75.0
Seventh grade	229.2	10.2	225.0 to 250.0	62.5	14.7	45.0 to 90.0	53.8	13.8	45.0 to 75.0
Eighth grade	229.2	10.2	225.0 to 250.0	62.5	14.7	45.0 to 90.0	53.8	13.8	45.0 to 75.0
California									
Sixth grade	259.2	15.6	240.0 to 280.0	180.0	0.0	180.0 to 180.0	155.5	9.4	144.0 to 168.0
Seventh grade	259.2	15.6	240.0 to 280.0	180.0	0.0	180.0 to 180.0	155.5	9.4	144.0 to 168.0
Eighth grade	259.2	15.6	240.0 to 280.0	180.0	0.0	180.0 to 180.0	155.5	9.4	144.0 to 168.0
Louisiana									
Sixth grade	279.2	24.6	250.0 to 300.0	142.5	44.2	90.0 to 180.0	131.3	37.9	82.5 to 180.0
Seventh grade	279.2	24.6	250.0 to 300.0	142.5	44.2	90.0 to 180.0	131.3	37.9	82.5 to 180.0
Eighth grade	279.2	24.6	250.0 to 300.0	142.5	44.2	90.0 to 180.0	131.3	37.9	82.5 to 180.0
Minnesota									
Sixth grade	203.2	51.9	125.0 to 250.0	130.5	30.5	90.0 to 180.0	103.5	16.2	75.0 to 120.0
Seventh grade	203.2	51.9	125.0 to 250.0	123.0	19.4	90.0 to 135.0	98.5	14.7	75.0 to 112.5
Eighth grade	203.2	51.9	125.0 to 250.0	115.5	22.3	90.0 to 135.0	92.7	17.9	70.5 to 112.5
All									
Sixth grade	230.8	50.0	120.0 to 300.0	126.6	48.0	45.0 to 190.0	108.8	42.4	37.5 to 180.0
Seventh grade	222.6	56.3	125.0 to 300.0	121.5	43.1	45.0 to 180.0	105.3	39.4	45.0 to 180.0
Eighth grade	220.3	57.1	125.0 to 300.0	122.1	44.0	45.0 to 180.0	105.8	40.5	45.0 to 180.0

Table 2. Characteristics of PE Classes in 36 TAAG Schools by Site and by Grade Level (Phase 2)

	Arizona	Maryland	South Carolina	California	Louisiana	Minnesota	Overall
Gender format of PE							
Sixth grade							
Proportion all coed	66.7	66.7	66.7	100.0	66.7	100.0	77.8
Proportion all gender separate	33.3	33.3	—	—	33.3	—	16.7
Proportion both	—	—	33.3	—	—	—	5.6
Seventh grade							
Proportion all coed	66.7	66.7	66.7	100.0	66.7	100.0	77.8
Proportion all gender separate	16.7	33.3	—	—	33.3	—	13.9
Proportion both	16.7	—	33.3	—	—	—	8.3
Eighth grade							
Proportion all coed	66.7	66.7	66.7	100.0	66.7	100.0	77.8
Proportion all gender separate	16.7	33.3	—	—	33.3	—	13.9
Proportion both	16.7	—	33.3	—	—	—	8.3
PE requirements							
Proportion of schools with the same requirements for sixth, seventh, and eighth grade	50.0	50.0	100.0	100.0	100.0	66.7	77.8

Table 3. Most Common Instructional Activity Units Taught in 36 TAAG Schools (Phase 2)

Type of Unit	Coed		Boys Only (Not Offered to Girls)		Girls Only (Not Offered to Boys)		Boys and Girls Separately	
	N	%	N	%	N	%	N	%
Aquatics	5	13.9	0	0.0	0	0.0	0	0.0
Basketball	28	77.8	2	5.6	0	0.0	9	25.0
Baseball and softball	28	77.8	0	0.0	0	0.0	7	19.4
Cooperative activities	23	63.9	0	0.0	1	2.8	1	2.8
Cultural games	14	38.9	0	0.0	0	0.0	2	5.6
Dance	20	55.6	0	0.0	3	8.3	1	2.8
Football	24	66.7	2	5.6	0	0.0	10	27.8
Group fitness	25	69.4	0	0.0	3	8.3	2	5.6
Gymnastics	10	27.8	0	0.0	4	11.1	2	5.6
Hockey	22	61.1	0	0.0	2	5.6	4	11.1
Racquet sports	30	83.3	1	2.8	1	2.8	4	11.1
Recreational games	25	69.4	0	0.0	1	2.8	2	5.6
Skating	9	25.0	0	0.0	0	0.0	0	0.0
Soccer	26	72.2	0	0.0	2	5.6	4	11.1
Track and field	25	69.4	0	0.0	1	2.8	4	11.1
Volleyball	30	83.3	0	0.0	1	2.8	6	16.7
Walking, jogging	26	72.2	0	0.0	0	0.0	4	11.1

NOTE: N = number of schools offering instructional activity units. Note that some schools may offer individual units in a coeducational setting, a gender-separate setting, or both.

*Barriers to Teaching Quality PE.* Girls' lack of interest in PE was the most commonly reported barrier (55.6% of respondents) to teaching quality, effective PE lessons. This was followed by lack of teacher in-services (47.2%), lack of gender-separate classes (44.4%), and PE not being a priority for girls (30.6%). Other barriers included lack of girl-friendly curriculum (25%), girl-friendly equipment and materials (13.9%), and girl-friendly activities (13.9%).

## DISCUSSION

Collecting two phases of formative research data is useful in large multicenter interventions such as TAAG. As details for school eligibility were being considered, we were able to begin the early phases of the intervention work using data from schools that fit broader criteria. Phase 1 allowed us to become familiar with issues we would likely encounter in implementing a program. After the final 36 schools were identified, Phase 2 findings assisted us in further refining intervention plans to accommodate the needs of the specific, participating schools.

The use of the PE Instructor Interview during Phase 2 was important to the development of the PE intervention component for two reasons. First, TAAG intervention staff learned about specific baseline practices relative to PE, including requirements, instructional activity units taught, resources and materials available, and various items perceived by teachers as barriers to quality PE. Having this information in advance allowed interventionists to address potential challenges, including the need to be flexible, and to tailor training and the overall intervention to meet the needs of individual teachers and schools. For instance, information from the interview was used to obtain the years of experience of PE staff at the schools as well as their areas of expertise. Trainings were then tailored accordingly; the more experienced the teachers, the more in-depth and diverse the training was. Second, having TAAG PE intervention staff conduct the interviews with the PE department heads provided the groundwork for establishing relationships among the school PE teachers and TAAG PE intervention staff.

### Comparison of Potential Schools and TAAG Schools

The overall similarity between the Phase 1 ( $n = 64$ ) and Phase 2 ( $n = 36$ ) schools reinforced the notion of having completed the initial interviews. Although there were some adjustments, the data from Phase 1 provided a good representation of what would be encountered in PE across TAAG schools and sites.

### Comparison of TAAG Schools With National and State Standards

Comparing data from TAAG schools to national and state standards provided a base from which the TAAG intervention could start. The NASPE in its *2001 Shape of the Nation Report* summarized information on the status of PE in all 50 states. That study found diverse patterns of PE mandates, with few states mandating daily quality PE, which is recommended by the American Academy of Pediatrics, NASPE, the National Association of State Boards of Education, Healthy People 2010, and the Centers for Disease Control and Prevention (Burgeson, Wechsler, Brener, Young, & Spain, 2001; NASPE, 2002).

Table 4. State Minimum Requirements and State Mandates for Participating TAAG Schools

State	Sixth Grade	Seventh & Eighth Grade
Arizona	PE required No time requirement per week	PE required No time requirement
California	PE required 200 min each 10 days	PE required 400 min each 10 days
Louisiana	Health and physical education requirement 150 min per week (No direction on how to divide this time)	Health and physical education, elective, exploratory studies requirement 6 period day, 275 min per week 7 period day, 250 min per week (No direction on how to divide this time)
Maryland	PE required No time requirement per week	PE required No time requirement
Minnesota	PE required No time requirement per week, semester, year, or level	PE required No time requirement per week, semester, year, or level
South Carolina	PE required No time requirement per week	PE required No time requirement per week

SOURCE: National Association for Sport and Physical Education, 2002.

Forty-eight states have mandates requiring that PE be provided, but local districts or schools are left to prescribe the content and time allocations.

The national recommendation set forth by NASPE is 225 min per week with daily PE required (NASPE, 2002), which is equivalent to approximately 8,100 min or 135 hr per year (based on a 36-week school year). In the NASPE study, requirements for middle schools ranged from 80 to 257 min per week across states, and only Illinois and Alabama required daily PE for all students kindergarten to eighth grade (NASPE, 2002). The School Health Policies and Programs Study (Burgeson et al., 2001) conducted in 2000 also found variability in PE offerings at middle schools. Only 6.4% of middle schools provided daily PE for the entire school year; 15.5% offered daily PE (or its equivalent) for at least half the school year, and 34.4% offer PE 3 days per week for at least half the school year.

State PE requirements and mandates for the six TAAG field sites are shown in Table 4 (NASPE, 2002). It is interesting that although all six TAAG field sites are located in states requiring PE instruction, only California has specific time requirements. All TAAG schools in California were in compliance with their state's mandate (400 min per 10 days). Overall, however, TAAG schools spent only about 106 hr per year in PE, 29 hr short of the recommendations. Although all schools in California and some in Arizona, Louisiana, and Maryland met the NASPE requirement, the data indicated that there was work to be done at the six TAAG field sites to elevate PE in all schools to the recommended levels.

#### **Application of the Formative Research to TAAG PE Intervention Development**

TAAG needed to design a PE intervention that could be implemented within the existing structures of the schools in the six field sites. Formative data indicated that there were

substantial variations in facilities, course offerings, and teacher backgrounds among schools and sites. Thus, a flexible intervention was needed both for the immediate trial and for enhancing the generalizability of potential results to other school districts. In response, rather than creating a rigid curriculum and training method, TAAG PE interventionists created a flexible, philosophically driven intervention component that could be adapted to the widely differing needs. TAAG intervention schools were encouraged to provide diverse course offerings and to use a variety of instructional methods as long as they promoted the PE intervention goals.

Because the main target of the intervention was a cohort of girls recruited in sixth grade and exposed to the 2-year program during seventh and eighth grades, it was necessary to train all PE teachers in the school to implement the intervention. With so little time available for PE, it was also deemed important to bolster and integrate the other three TAAG intervention components, which focused primarily on promoting physical activity outside of PE.

It takes substantial class time for students to accrue physical activity and motor skills, and some schools required PE for as few as 45 days per year. This prompted TAAG to design an intervention that focused on maximizing activity time during class in numerous ways, including providing clear and efficient instruction, more equipment, modifying inactive games and sports (i.e., those not requiring MVPA), and providing more girl-friendly activities.

Middle school teachers often spend nearly half the lesson time organizing, changing activities, and giving directions in large classes, thereby decreasing actual activity time (McKenzie et al., 2000). Because of this, safety and effective management of classes became important areas of focus during the intervention. The TAAG PE intervention component uses a number of effective management strategies (e.g., equipment set up before class) and small-sided games (i.e., using more teams with smaller numbers on each team) to maximize student activity time, all of which are generalizable to classes of any length or size.

Prior to Title IX (U.S. Congress, 1972), a federal law addressing sex discrimination in education passed in 1972, PE classes in schools were primarily separated by gender (Neumark-Sztainer, Story, Hannan, & Rex, 2003). They became primarily coeducational when Title IX was passed into law. Nonetheless, some research has shown that for personal, psychological, and social reasons, some girls prefer to participate in girls-only PE. This structure might help create an environment where some girls feel more comfortable about their appearance and skill levels and be more willing to be physically active and learn skills (Neumark-Sztainer et al., 2003). Although school policies at most TAAG schools prohibited offering a girls-only format, the TAAG intervention was designed to make PE in all schools girl friendly. For example, studies have shown that girls are less likely to participate in team sports and more likely to participate in aerobics or dance than boys (Centers for Disease Control and Prevention, 1997). As well, formative data indicated that many girls were interested in cooperative and noncompetitive activities (Vu et al., 2006), but schools were primarily implementing traditional sport activities, such as volleyball and basketball. The TAAG PE intervention therefore focuses on creating additional offerings and modifying traditional sport practices by making learning experiences more active and enjoyable.

Girl-friendly strategies were designed to increase girls' enjoyment of PE by making it more interesting and offering specific activities in which girls liked to participate. TAAG PE also supports offering equitable opportunities for girls to participate in PE class, offering a choice between activities, and adapting activities for the incorporation of a variety

of skill levels so girls feel more able and interested to participate in PE class. TAAG PE also emphasizes the promotion of lifetime physical activities, such as step aerobics, jump rope, kickboxing, dance, health-related fitness, and cooperative activities. Although the activities were designed to be inclusive of both boys and girls, emphasizing girl-friendly strategies needed to be handled carefully because of the potential for boys to feel discounted or excluded. How to do this was addressed through focus groups conducted with boys and is discussed elsewhere in this special issue (Vu et al., 2006).

The list of barriers to teaching quality PE identified by PE department heads was not surprising. They are similar to those found in the CATCH-ON study, conducted with 88 elementary schools in California, Texas, Minnesota, and Louisiana (Kelder et al., 2003). Addressing these barriers is a strength of the TAAG PE intervention, which includes sample materials and equipment, three staff development sessions per year, and on-site follow-up interactions with teachers and administrators.

In summary, the examination of formative research data resulted in specific recommendations for designing the TAAG PE intervention component. TAAG PE needed to be designed with a flexibility that incorporated a standardized philosophy for which implementation could be tailored to the needs of individual schools. Emphasis on increasing the amount and levels of physical activity in PE classes was universally applicable, although the methods employed to accomplish this in a girl-friendly manner adaptable to different school and PE environments was accomplished with the assistance of the information obtained through the formative research that was conducted.

### **Implications for Practice**

Conducting formative research is important to the success of intervention studies, particularly in multicenter trials where variability is likely to exist in schools and among field sites. The utility of formative research, however, depends on the quality and types of questions asked, the targeted respondents, and the timeframe in which data are collected and analyzed. Formative data provide a picture at a specific time period, so the process may need to be repeated. This is particularly important in trials such as TAAG, where PE requirements, offerings, and policies may change frequently and information needs to be current.

Conducting two phases of formative research about PE was useful in TAAG but may not be possible in smaller studies with a limited scope or in those with less planning time. It allowed us to gain early understanding of the overall structure of PE in potential schools as we began to develop our intervention. Later, we were able to refine and expand our assessments to both gain insights into more recent practices of the 36 schools and to clarify more detailed information needs. Having PE interventionists provide input on the type of data being collected ensured that the formative research would provide useful and appropriate data for intervention development. Furthermore, having intervention implementers conduct the Phase 2 interviews with the PE department heads was particularly beneficial because it helped establish rapport between school and project intervention staff.

Finally, conducting formative research can increase the likelihood that an intervention will meet the needs of targeted communities. In the case of TAAG PE, this targeted community consisted of both PE teachers and the students, particularly girls, in their PE classes. Although relevant for studies of any scale, conducting formative research becomes particularly important in multicenter trials where variability may exist both within and across field sites.

## References

- Adams, P. F., Schoenborn, C. A., Moss, A. J., Warren, C. W., & Kann, L. (1995). Health-risk behaviors among our nation's youth: United States, 1992. *Vital Health and Statistics, 10*(192), 1-51.
- Burgeson, C. R., Wechsler, H., Brener, N. D., Young, J. C., & Spain, C. G. (2001). Physical education and activity: Results from the School Health Policies and Programs Study 2000. *Journal of School Health, 71*(7), 279-293.
- Calfas, K., & Taylor, W. (1994). Effects of physical activity on psychological variables in adolescents. *Pediatric Exercise Science, 6*, 406-423.
- Centers for Disease Control and Prevention. (1995). Youth risk behavior surveillance—US 1995. *Morbidity and Mortality Weekly Report, 45*, SS-4.
- Centers for Disease Control and Prevention. (1997). Guidelines for school and community programs to promote lifelong physical activity among young people. *Morbidity and Mortality Weekly Report, 47*(RR-6), 1-36.
- Centers for Disease Control and Prevention. (1998). Youth risk behavior surveillance—United States 1997. *Morbidity and Mortality Weekly Report, 47*(55-3), 1-89.
- Kelder, S. H., Mitchell, P. D., McKenzie, T. L., Derby, C., Strikmiller, P. K., Luepker, R. V., et al. (2003). Long-term implementation of the CATCH physical education program. *Health Education & Behavior, 30*(4), 463-475.
- Kimm, S. Y., Glynn, N. W., Kriska, A. M., Fitzgerald, S. L., Aaron, D. J., Similo, D. J., et al. (2000). Longitudinal changes in physical activity in a biracial cohort during adolescence. *Medicine and Science in Sports and Exercise, 32*(8), 1445-1454.
- McKenzie, T. L., Marshall, S. J., Sallis, J. F., & Conway, T. L. (2000). Student activity levels, lesson context, and teacher behavior during middle school physical education. *Research Quarterly for Exercise and Sport, 71*(3), 249-259.
- McKenzie, T. L., Nader, P. R., Strikmiller, P. K., Tang, M., Stone, E. J., Perry, C. L., et al. (1996). School physical education: Effect of the Child and Adolescent Trial for Cardiovascular Health. *Preventive Medicine, 25*(4), 423-431.
- Mutrie, N., & Parfitt, G. (1998). Physical activity and its link with mental, social, and moral health in young people. In S. Biddle, J. Sallis, & N. Cavill (Eds.), *Young and active? Young people and health-enhancing physical activity: Evidence and implications* (pp. 49-68). London: Health Education Authority.
- National Association for Sport and Physical Education. (2002). *2001 shape of the nation report: Status of physical education in the USA*. Reston, VA: American Alliance for Health, Physical Education, Recreation and Dance.
- Neumark-Sztainer, D., Story, M., Hannan, P. J., & Rex, J. (2003). New moves: A school-based obesity prevention program for adolescent girls. *Preventive Medicine, 37*(1), 41-51.
- Pate, R. R., Matthews, C., Alpert, B. S., Strong, W. B., & DuRant, R. H. (1994). Systolic blood pressure response to exercise in black and white preadolescent and early adolescent boys. *Archives of Pediatrics and Adolescent Medicine, 148*(10), 1027-1031.
- Saunders, R. P., & Moody, J. (2006). Community Agency Survey Formative Research Results From the TAAG Study. *Health Education & Behavior, PE: PLS INSERT VOLUME NUMBER, PE: PLS INSERT PAGE NUMBERS*.
- Staten, L. K., Birnbaum, A. S., Jobe, J. B., & Elder, J. P. (2006). A typology of middle school girls: Audience segmentation related to physical activity. *Health Education & Behavior, PE: PLS INSERT VOLUME NUMBER, PE: PLS INSERT PAGE NUMBERS*.
- U. S. Congress. (1972). *Title IX of the Educational Amendments of 1972 to the 1964 Civil Rights Act*. Washington, DC: Author.
- U.S. Department of Health and Human Services. (1996). *Physical activity and health: A report of the Surgeon General*. Atlanta, GA: Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion.

- U.S. Department of Health and Human Services. (2000). *Healthy People 2010: National health promotion and disease prevention objectives*. Atlanta, GA: Center for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion.
- Vu, M. B., Murrie, D., Gonzalez, V., & Jobe, J. B. (2006). Listening to girls and boys talk about girls' physical activity behaviors. *Health Education & Behavior*, **PE: PLS INSERT VOLUME NUMBER, PE: PLS INSERT PAGE NUMBERS**.
- Young, D. R., Johnson, C. C., Steckler, A., Gittelsohn, J., Saunders, R., Saksvig, B. I., et al. (2006). Data to action: Using formative research to develop intervention programs to increase physical activity in adolescent girls. *Health Education & Behavior*, **PE: PLS INSERT VOLUME NUMBER, PE: PLS INSERT PAGE NUMBERS**.