

PE4ME Planning and Oversight Team

Final Report

*to the Joint Standing Committee on Education and Cultural Affairs
and the Joint Standing Committee on Health and Human Services*

*Responding to RESOLVE, Chapter 102,
To Increase Physical Education for Elementary School Students*

January 31, 2008

*Convened by
The Maine Governor's Council on Physical Activity
Commissioner of Education
Commissioner of Health and Human Services*

Questions or requests for further information can be directed to the Maine Governor's Council on Physical Activity, 11 Parkwood Drive, Augusta, ME 04330 ~ 622-7566, ext. 230 or info@maineinmotion.org.

PE4ME Planning and Oversight Team

Final Report

*to the Joint Standing Committee on Education and Cultural Affairs
and the Joint Standing Committee on Health and Human Services*

*Responding to RESOLVE, Chapter 102,
To Increase Physical Education for Elementary School Students*

January 31, 2008

TABLE OF CONTENTS

I. OVERVIEW	Page 1
A. Why Physical Education?	Page 1
B. Physical Education in Maine Today	Page 1
II. PE4ME BASELINE UNDERSTANDINGS	Page 2
III. RECOMMENDATIONS	Page 3
A. Physical Education and Physical Activity Requirements	Page 3
B. Teachers and Teacher Training	Page 3
C. Maine Learning Results	Page 3
D. Funding	Page 4
E. Evaluation	Page 5
F. Small, Rural, and Isolated Schools	Page 5
IV. IMPLEMENTATION	Page 6
A. Overview	Page 6
B. Timeline	Page 7
V. CONCLUSION	Page 8
TABLE OF APPENDICES AND WEBLINKS	Page 9

PE4ME Planning and Oversight Team

Final Report

*to the Joint Standing Committee on Education and Cultural Affairs
and the Joint Standing Committee on Health and Human Services*

*Responding to RESOLVE, Chapter 102,
To Increase Physical Education for Elementary School Students*

January 31, 2008

I. OVERVIEW

A. Why Physical Education?

Physical Education (PE) for all K-8 students is an essential element in any comprehensive plan to reduce obesity and chronic disease. Physical Education should be combined with Physical Activity, Nutrition, and Weight-Management programs delivered in school and community settings to children and adults via education and outreach strategies.

There is now indisputable evidence that obesity and overweight are fast overtaking tobacco use as the number one cause of chronic disease and early death in Maine and the nation. The percentage of youth who are obese and overweight has more than tripled since 1980. Overweight adolescents have a 70% chance of becoming overweight adults. Overweight/obesity is a major risk factor for a number of chronic diseases, including cardiovascular disease, Type II diabetes, and several types of cancer. Over \$350 million is spent every year in Maine on medical expenditures attributable to obesity. Lost productivity costs in Maine total another \$2 billion per year. As a result of overweight/obesity, this generation of children may be the first in recent history to not live as long as their parents.

The good news is that overweight/obesity and the chronic diseases they can lead to are almost entirely preventable. With focused and coordinated effort, it will ultimately be possible to reverse this deadly trend. For example, a 2007 study by Chenoweth & Associates reports that even a 5% improvement in the number of Maine's physically inactive and overweight adults would save \$150 million every year. And in a recent "Medscape Medical News" report, studies show that every day of PE participation decreases the odds by 5% that that student will be an overweight adult. Participation in PE all five days of the week decreases the odds by 28%. But it will take leadership at every level of government to swiftly recognize the crisis and take aggressive steps to confront it.

Support for Physical Education in schools is strong and instinctive. In a national survey as reported in "Shape of the Nation," 85% of parents, 81% of teachers, and 92% of teens believe that students in every grade level should receive PE every day. Meanwhile, the evidence continues to grow that children benefit from a combination of cardio-respiratory fitness, muscular fitness, and speed/agility. These fitness markers reduce rates of cardiovascular disease, cancer, and obesity while improving mental and skeletal health. This strong and direct relationship between physical fitness and overall health makes Physical Education for all K-8 students a vital next step in the fight against overweight/obesity.

B. Physical Education in Maine Today

Maine Learning Results states: "Students will acquire the knowledge needed to be physically fit and take part in healthful physical activity on a regular basis." Physical Education is also a core content area

*Convened by the Governor's Council on Physical Activity, the Commissioner of Education,
and the Commissioner of Health and Human Services*

requiring “adequate time” in the school day. But what is “a regular basis”? What is “adequate time”? The reality is it’s different for every school, even though obesity doesn’t discriminate and is a growing problem in all Maine schools.

Some Maine schools have shown leadership by implementing programs and developing school-wide policies that create more opportunities for Physical Activity in the school day. In both Union 106 in Calais and SAD #75 in Topsham a district-wide policy for daily physical activity in grades K-8 has been established and is getting excellent results. Other examples include the 44 schools participating in the “Take Time” program, and the seven “WinterKids” programs that had over 27,000 Maine children participating and active last winter. But for every Maine school district taking action, there are too many others that aren’t. In fact, it is likely that less than 10% of Maine schools are providing nationally recommended levels of Physical Education.

Maine’s patchwork quilt of Physical Education offerings is the result of no overarching vision and commitment to providing all K-8 students a high quality evidence-based Physical Education program. For the health of Maine’s children, that has to change.

II. PE4ME BASELINE UNDERSTANDINGS

- **All PE4ME recommendations represent the 100% consensus agreement of all PE4ME members.**
- PE4ME recognizes and endorses the national standard that all children and youth participate in at least 60 minutes per day of moderate-to-vigorous physical activity. Support for this standard includes the Centers for Disease Control and Prevention, the Institute of Medicine, the American Academy of Pediatrics, the National Association of State Boards of Education, and two Surgeon General’s Reports.
- PE4ME recognizes and endorses the National Association of Sports & Physical Education (NASPE) definition of Physical Activity as “bodily movement of any type that may include recreational, fitness, and sport activities such as jumping rope, playing soccer, lifting weights, as well as daily activities such as walking to the store, taking the stairs or raking leaves” (see full definition in attached Appendix Item #3).
- PE4ME recognizes and endorses the NASPE definition of a quality school Physical Education Program as one that “offers the best opportunity to provide physical activity to all children and to teach them the skills and knowledge needed to establish and sustain an active lifestyle... Based on sequence of learning, Physical Education should not be compared to or confused with other Physical Activity experiences such as recess, intramurals, or recreational endeavors. (It) provides learning opportunities, appropriate instruction, (and) meaningful and challenging content for all children...” (see full definition in attached Appendix Item #3).
- PE4ME believes it is essential that high quality Physical Education programs are always evidence-based in their design - meaning that they are proven effective and can be replicated.
- PE4ME believes that, in general, more emphasis must be placed on incorporating Physical Activity into the regular school day (see attached Appendix Item #7)
- PE4ME recognizes the American Heart Association’s 2006 Scientific Statement “Promoting Physical Activity in Children and Youth” as the foundation for its recommendations (see attached Appendix Item #2)

*Convened by the Governor’s Council on Physical Activity, the Commissioner of Education,
and the Commissioner of Health and Human Services*

III. RECOMMENDATIONS

A. Physical Education and Physical Activity Requirements

PE4ME recommends the following Physical Education (PE) and Physical Activity (PA) practices be required for all K-8 students in all Maine schools:

1. At least 30 minutes per day of moderate-to-vigorous PA, which must be structured and can include time spent active in PE classes.
2. At least 150 minutes per week of PE that is evidence-based, health-related, and teaches students the motor and behavioral skills needed to develop an active, physically fit lifestyle.

B. Teachers and Teacher Training

PE4ME recommends the following regarding teachers and teacher training:

1. All PE classes are to be taught by certified and highly qualified PE teachers.
2. All statewide teacher conferences are to include workshops on physical activity opportunities for all classes, including ways to get students outside all year round. The organizations WinterKids and Maine Association of Health, Physical Education, Recreation, and Dance (MAHPERD) already provide such trainings at no cost and are willing to conduct them regionally.
3. Maine colleges and universities are to provide professional preparation programs that produce teachers who are highly qualified to deliver evidence-based PE and health education programs. Opportunities to cross-train existing teachers of other subjects in PE, including training in evening hours, should also be provided.
4. Statewide assessments (including regional data) are to be conducted in order to accurately calculate the number of PE teachers that will be needed and the number of existing certified PE teachers available to join the workforce. The following current data suggests that there may be adequate capacity to meet future needs:
 - a. Maine colleges/universities have the capacity to train 155 physical education teachers every year. At this time, approximately 65% of all graduates look for work in Maine.
 - b. There are currently over 500 certified PE teachers in Maine who are not currently practicing as PE teachers.
 - c. Between 221 and 425 new PE teaching positions will be created over a period of five years as a result of implementing the PE4ME recommendations.
5. A system of incentives is to be designed for the purpose of retaining graduates of Maine colleges/universities for employment as PE teachers in Maine schools.
6. At the local level, PE should be graded and reported like all other subjects.

C. Maine Learning Results

PE4ME recommendations for PE and PA in schools are in harmony with the Maine Learning Results (MLR). While the Maine Learning Results provides a consistent means to define outcomes, the PE4ME recommendations provide the evidence-based means to achieve the MLR outcomes and maximize success.

D. Funding

PE4ME recommends the following budget, method of funding, and integration into Maine Essential Programs and Services (EPS):

1. Budget (see funding summary in attached Appendix Item #8)
 - The total new cost to provide PE for all K-8 students is approximately \$9.5 to \$18.3 million per year. This cost represents funds needed over and above what is currently being spent from state and local sources on existing PE programs.
 - The total new cost of PE is based on the estimate of needing to hire an additional 221 to 425 PE teachers. It includes the cost of salaries and benefits.
 - The total new cost of PE also includes an additional 10% for equipment, training and technical assistance, preliminary statewide assessments, baseline fitness assessments, local and statewide program evaluation, and incentives for capacity building and implementation.
 - The new cost to fully implement PE is to be funded through the EPS system within the “Total Adjustments and Miscellaneous Costs” line item. Statutory changes are to be made accordingly.
 - A statewide assessment of all school districts (including regional data) is to be conducted to verify current PE capacities and gaps, including staffing, equipment, and facilities.
 - Additional funding is to be provided for:
 - Obesity prevention and control efforts via Maine’s Physical Activity and Nutrition (PAN) program (\$5 million per year in additional funds – program details provided in Appendix Item #8)
 - Coordinated School Health (CSH) Programs and their work in promoting healthy school environments for youth (\$3 million per year in additional funds will cover all Maine students K-12)
2. Funding sources
 - Federal and private funding are not viable options to supplement or supplant state funding. These sources would be neither adequate nor sustainable for this long-term investment.
 - New state revenues are to be raised in order to provide 100% of the total new cost of providing PE for all K-8 students in Maine.
 - A new state fund called the “Obesity and Chronic Disease Fund” is to be created that will collect new revenue from sources identified as being related to the causes of obesity and other chronic disease. Allocations from the new fund will be made for efforts that will reduce obesity and promote physical activity and good nutrition.
 - Possible funding sources include:
 - Junk food (foods of minimal nutritional value):
 - Apply Maine sales tax to foods of minimal nutritional value
 - Revenue raised equals at least \$13 million per year (based on 2001 “snack tax” revenue)
 - Soda/syrup
 - Apply tax of \$.42/gallon of soda plus \$4/gallon of syrup
 - Revenue raised equals approximately \$12 million per year
 - Non-cigarette tobacco products
 - Equalize the tax on loose tobacco, “little cigars,” and chewing tobacco to that of cigarettes (\$2/pack)
 - Revenue raised equals approximately \$5 million per year

*Convened by the Governor’s Council on Physical Activity, the Commissioner of Education,
and the Commissioner of Health and Human Services*

E. Evaluation

PE4ME recommends the following regarding evaluation of PE in Maine schools:

1. An efficient and effective common evaluation system will be designed and implemented that maximizes data value for the local level while also feeding data up to the state level for aggregation and consistent reporting:
2. The evaluation system will measure a quality PE program in terms of:
 - a. **Infrastructure:** What is in place to support PE? (e.g. facilities, equipment, schedules, student/teacher ratio, school policies on physical activity, staff education & development opportunities)
 - b. **Content:** Does the PE class meet or come close to best practice? (e.g. defined curriculum and curriculum elements, active time in class, activities included that support lifelong physical activities)
 - c. **Impact:** What are the individual health effects? (e.g. student-based measures such as cardio-respiratory fitness, strength, flexibility, BMI, reported physical activity levels, knowledge and understanding of key physical activity concepts)
3. Details of the evaluation system include:
 - a. **Infrastructure** and **Content** will be evaluated in every school every three years. The evaluation may include elementary and middle school-specific questions to account for the various grades that can be present within a single school.
 - b. **Impact** will be evaluated through fitness assessments completed by the PE teacher(s) and reported to the state in an interval and manner that will allow the data to be reported by grade level, school unit, district, and region statewide.
 - c. **Individual fitness data** will be reported back to families in an appropriate and sensitive way from the local level. It will be treated with confidentiality consistent with other student data within the school.
4. A statewide assessment is to be conducted that identifies what evaluation tools are currently being used at the local level to evaluate PE student and program success. Examples could include the “Fitness gram” and the “President’s Challenge” tools (see Appendix Weblink #2)
5. A baseline fitness assessment of all K-8 students is to be conducted prior to the first full evaluation year. Every school will collect data and report it to the state in a manner that will allow the data to be reported by grade, school unit, district and region statewide.

F. Small, Rural, and Isolated Schools

Small, rural, and isolated (SRI) schools are to be held to the same quality PE standards as other schools and given the same time to meet those standards. However, SRI schools are to be offered enhanced support through technical assistance, priority funding for equipment, and priority training and professional development opportunities.

IV. IMPLEMENTATION

A. Overview

1. PE4ME recommends that all Maine schools implement a high quality evidence-based PE and PA program as outlined above by the 2013/2014 academic year.
2. In recognition of the preference for local leadership, PE4ME recommends that PE implementation be driven from the local-level using the PE4ME recommendations as strict guidelines for implementation.
3. The newly established Obesity and Chronic Disease Fund will provide financial resources in the form of grant funds and other incentives for fully implementing evidence-based PE beyond what is currently being offered and funded.
4. In additional recognition of the vital importance of evidence-based PE to the children of Maine and to the state as a whole, the locally driven implementation process is to be monitored closely and assessed annually starting in AY/FY 2009/2010.
5. PE4ME is to become an ongoing oversight committee meeting two to four times per year as needed to assess PE implementation and make recommendations to the Legislature for changes to the implementation process.
6. The following benchmarks are to be established for implementation of a high quality evidence-based PE and PA program as outlined by PE4ME. The Department of Education will collect implementation data annually and provide it to the PE4ME committee for ongoing assessment.
 - AY/FY 2009/2010: implementation by 15% of all Maine schools
 - AY/FY 2010/2011: implementation by 40% of all Maine schools
 - AY/FY 2011/2012: implementation by 65% of all Maine schools
 - AY/FY 2012/2013: implementation by 90% of all Maine schools
 - AY/FY 2013/2014: implementation by 100% of all Maine schools
7. The new fund will begin allocating resources for the following items as soon as possible:
 - Preliminary Assessments:
 - a. Teachers needed and current teacher capacity (statewide with regional data)
 - b. Current PE capacities and gaps, including staffing, equipment, facilities, and SRI needs (by school district with regional data)
 - c. Evaluation tools currently being used (statewide)
 - d. Baseline fitness assessment of all K-8 students (by school district, with grade and regional data)
 - Ongoing Assessment:
 - a. Implementation of PE4ME recommendations (by school)
 - New PE costs, including all associated costs as delineated in the “Funding” recommendation
 - Obesity prevention and control efforts (approximately \$5 million per year)
 - Coordinated School Health Program for every school district (approximately \$3 million per year with a three year timeline for full implementation)
8. To encourage and enforce implementation, financial incentives for early adoption and ongoing improvements are to be built into the funding plan. Enforcement options will include the withholding of funding if the PE program fails to meet established operational criteria.
9. If interim benchmarks are not met by AY/FY 2010/2011, PE4ME will recommend immediate adjustments to the PE implementation plan in order to meet all further benchmarks. Options for additional legislation will remain open to PE4ME at any time during implementation. **A legislative mandate on implementing PE in the timeline provided is the most likely next step in order to protect the health of Maine children and reduce the physical and financial burden that lack of PA and PE places on all Maine people.**

*Convened by the Governor’s Council on Physical Activity, the Commissioner of Education,
and the Commissioner of Health and Human Services*

B. Timeline

Implementation steps by academic and fiscal year (AY/FY) are as follows:

AY/FY 2007/2008:

- Pass legislation to implement the recommendations of PE4ME, including establishment of the Obesity and Chronic Disease Fund and designated funding sources (see legislation summary in attached Appendix Item #9)
- Establish criteria for Small, Rural, and Isolated (SRI) schools

AY/FY 2008/2009:

- Allocate revenue to assessments, obesity prevention and control efforts, CSH Program, and preliminary costs related to new PE programs
- Conduct statewide assessments regarding teacher capacities, funding needs, evaluation tools, and SRI needs
- Schools with capacity submit proposals for Phase One PE funding and implementation
- Evaluation tools and systems established, including training and technical assistance program
- All Maine schools conduct baseline fitness assessments for all K-8 students

AY/FY 2009/2010:

- Phase One schools funded to implement PE (10% of schools)
- Evaluation system pilot tested
- Training and technical assistance initiated, with priority given to SRIs
- Ongoing funding to obesity prevention and control efforts and CSH Program

AY/FY 2010/2011:

- Phase Two schools funded to implement PE (40% of schools)
- Evaluation of PE Infrastructure, Content, and Impact begins
- Ongoing training and technical assistance provided, with priority given to SRIs
- Implementation benchmarks evaluated by PE4ME
- Ongoing funding to obesity prevention and control efforts and CSH Program

AY/FY 2011/2012:

- New legislation introduced if necessary to mandate PE implementation
- Ongoing evaluation of PE Infrastructure, Content, and Impact
- Ongoing training and technical assistance provided, with priority given to SRIs
- Phase Three schools funded to implement PE (65% of schools)
- Ongoing funding to obesity prevention and control efforts and CSH Program

AY/FY 2012/2013:

- Ongoing evaluation of PE Infrastructure, Content, and Impact
- Ongoing training and technical assistance provided, with priority given to SRIs
- Phase Four schools funded to implement PE (90% of schools)
- Ongoing funding to obesity prevention and control efforts and CSH Program

AY/FY 2013/2014:

- Ongoing evaluation of PE Infrastructure, Content, and Impact
- Ongoing training and technical assistance provided, with priority given to SRIs
- Phase Five (final phase) schools funded to implement PE (100% of schools)
- Ongoing funding to obesity prevention and control efforts and CSH Program

*Convened by the Governor's Council on Physical Activity, the Commissioner of Education,
and the Commissioner of Health and Human Services*

V. CONCLUSION

PE4ME is proposing a clear seven-year roadmap to implementation of a statewide evidence-based physical education program for all K-8 students. The roadmap includes legislation to be submitted immediately for consideration in the Second Regular Session of the 123rd Maine Legislature that supports the recommendations outlined in this report. If the proposed roadmap is adopted, PE4ME will continue to meet and provide oversight for this process.

The benefits of physical education and physical activity go well beyond obesity prevention and control. The value of the physical, mental, and social benefits cannot be understated. Students who get recommended levels of physical activity are more confident, better learners, less likely to get chronic diseases, and more likely to avoid unhealthy behaviors like tobacco and drugs. Physical activity strengthens bones and joints, builds muscle, improves balance, improves blood pressure and cholesterol, can help control diabetes and helps relieve the symptoms of depression and anxiety.

It is important to remember that physical education alone will not solve the obesity problem. As in the fight to reduce tobacco use, it will take a comprehensive approach that includes state policies, school programs (including Coordinated School Health Programs), community and family-based programs, public education, and strong partnerships with medical providers. But implementing a high-quality evidence-based PE program for every K-8 student in Maine is an essential next step in our efforts to reduce obesity, chronic disease, and the resulting health costs that burden Maine citizens and Maine businesses.

TABLE OF APPENDICES AND WEBLINKS

Attachments:

1. National Association for Sport & Physical Education, “Physical Education is Critical to a Complete Education,” July 2001 (www.aahperd.org/naspe/pdf_files/pos_papers/pe_critical.pdf)
2. American Heart Association, Scientific Statement: “Promoting Physical Activity in Children and Youth,” September 2006 (<http://circ.ahajournals.org/cgi/content/full/114/11/1214>)
3. National Association for Sport & Physical Education, “Is It Physical Education or Physical Activity,” 2006 (www.aahperd.org/NASPE/template.cfm?template=difference.html)
4. New England Journal of Medicine, “Childhood Obesity – The Shape of Things to Come,” by David S. Ludwig, M.D., Ph.D., December 2007 (Copyright © 2007, Massachusetts Medical Society. All rights reserved.)
5. Chenoweth & Associates, Inc., “An Economic Cost Appraisal of Physical Inactivity, Overweight, and Obesity Among Maine Adults,” May 2007
6. Maine’s Physical Activity and Nutrition (PAN) Program, “Obesity Prevention and Control in Maine – The Case for New Funding,” January 2008
7. Guiding Document for School Physical Activity Policy Development as Recommended by PE4ME Planning and Oversight Team
8. Summary of Funding Proposal Recommended by PE4ME Planning and Oversight Team
9. Summary of Legislation Recommended by PE4ME Planning and Oversight Team
10. PE4ME Member Roster

Web Links Only:

1. International Journal of Obesity, “Pediatric Review, Physical Fitness in Childhood and Adolescence: A Powerful Marker of Health,” January 2008 (www.nature.com/ijo/journal/v32/n1/abs/0803774a.html;jsessionid=F27DFD3253A6259C2C845E65A7E3C7FO)
2. Sample Fitness Assessments:
 - a. Fitnessgram/Activitygram (<http://www.fitnessgram.net/faqparents/>)
 - b. The President’s Challenge (http://www.presidentschallenge.org/educators/program_details.aspx)

*Convened by the Governor’s Council on Physical Activity, the Commissioner of Education,
and the Commissioner of Health and Human Services*

PE4ME Planning and Oversight Team

APPENDICES **to the Final Report**

*to the Joint Standing Committee on Education and Cultural Affairs
and the Joint Standing Committee on Health and Human Services*

*Responding to RESOLVE, Chapter 102,
To Increase Physical Education for Elementary School Students*

January 31, 2008

*Convened by
The Maine Governor's Council on Physical Activity
Commissioner of Education
Commissioner of Health and Human Services*



Physical Education is Critical to a Complete Education

A Position Paper from the National Association for Sport and Physical Education

Overview

Physical education plays a critical role in educating the *whole* student. Research supports the importance of movement in educating both mind and body. Physical education contributes directly to development of physical competence and fitness. It also helps students to make informed choices and understand the value of leading a physically active lifestyle. The benefits of physical education can affect both academic learning and physical activity patterns of students. The healthy, physically active student is more likely to be academically motivated, alert, and successful. In the preschool and primary years, active play may be positively related to motor abilities and cognitive development. As children grow older and enter adolescence, physical activity may enhance the development of a positive self-concept as well as the ability to pursue intellectual, social and emotional challenges. Throughout the school years, quality physical education can promote social, cooperative and problem solving competencies. Quality physical education programs in our nation's schools are essential in developing motor skills, physical fitness and understanding of concepts that foster lifelong healthy lifestyles.

Physical Benefits

Physical education is unique to the school curriculum as the only program that provides students with opportunities to learn motor skills, develop fitness and gain understanding about physical activity. Physical benefits gained from physical activity include: disease prevention, safety and injury avoidance, decreased morbidity and premature mortality, and increased mental health. The physical education program is the place where students learn about all of the benefits gained from being physically active as well as the skills and knowledge to incorporate safe, satisfying physical activity into their lives.

Elementary

In the elementary grades, the physical education program emphasizes the development of fundamental locomotor, non-locomotor, and manipulative skills through the main content areas of educational games, dance, and gymnastics. The movement framework, (i.e., body, space, effort, and relationship) is also a part of the core content and is the basis for developing, expanding, and refining children's range of motor skills and awareness. Quality instruction by physical education professionals is critical if children are to develop fundamental motor patterns (e.g. jump, throw, skip, hop, catch, and kick). The motor skill foundations established during the elementary grades may enhance children's social, cognitive and physical development and increase the likelihood of continued interest and participation in physical activity. Fitness at elementary grades is supported by a rich experience in many basic movement forms.

Middle School

The middle school student is ready to experience a wide variety of applications of fundamental movements, including traditional sports, adventure activities (e.g., rock climbing, ropes, kayak, skiing), and lifetime or leisure-oriented activities (e.g., roller-blading, biking, dance). It is during this period when students are capable of refining, combining and applying a variety of sport-related and lifetime skills. Students may explore after-school opportunities for specialized or/and competitive physical activity programs.

Rapid growth during the pre-adolescent years may affect students' interests, choices, and activity patterns. Therefore physical education programs offer a variety of activities to meet and expand student interests. Fitness development becomes more systematic. Students develop specific fitness components, set goals and assess personal fitness levels.

High School

High school students become increasingly more independent as their daily lives become more complex and diversified. High school students begin to make decisions and choices in taking increased responsibility for themselves. Quality high school physical education programs provide students conceptual and practical understanding of: 1) health-related physical fitness, and 2) how to maintain a health-related level of physical fitness. Physical education plays a vital part in helping high school students maintain and refine the skills and knowledge needed to select physical activities to use throughout their lives.

Cognitive Benefits

Children learn through a variety of modalities (e.g., visual, auditory, tactile, physical). Teaching academic concepts through the physical modality may nurture children's kinesthetic intelligence.

Academic constructs have greater meaning for children when they are taught across the three realms of learning, including the cognitive, affective and psychomotor domains. Greater depth and relevance can be achieved when the subject matter constructs are related to each domain of learning. Research has demonstrated that children engaged in daily physical education show superior motor fitness, academic performance, and attitude towards school versus their counterparts who did not participate in daily physical education. Physical education learning experiences also offer a unique opportunity for problem solving, self-expression, socialization, and conflict resolution.

Elementary

Research suggests that young children learn through active engagement with the "stuff" of their world. Children in elementary school acquire knowledge through physical exploration of their environment. Physical education may provide children with learning experiences essential to the formation of mental schemes (i.e., mental patterns or systems that describe the ways people think about the

world; building blocks of thinking). Children form more effective schemes by physically interacting with their environment. Quality physical education programs facilitate exploration of movement in various contexts that enhance acquisition of knowledge.

Middle School

Middle school students are intensely curious, prefer active to passive learning, and definitely favor interaction with peers during learning activities. The early adolescent exhibits a strong willingness to learn things they consider useful. They enjoy using skills to solve real life problems. Quality physical education programs provide a medium through which middle school students can refine and expand upon their physical repertoire of skills. It has been shown that students miss fewer days of school because of illness and exhibit greater academic achievement because of the physical vitality gained in physical education.

High School

During the high school years students should be given more in-depth learning opportunities so they can understand the mechanical, physiological and social-psychological aspects of physical activity. High school students' growing ability to compare and contrast, analyze, and synthesize information enables them to apply movement principles in new and meaningful ways. Students can more fully understand the role of physical activity in preventive health and analyze the pros and cons of various types of physical activity in lifelong health.

Affective Benefits

Physical competence builds self-esteem. Quality physical education programs enhance the development of both competence and confidence in performing motor skills. Attitudes, habits, and perceptions are critical prerequisites for persistent participation in physical activity. Appropriate levels of health-related fitness enhance feelings of well being and efficacy.

Elementary

Quality physical education programs can contribute to the development of self-esteem among children. Children who are more active may have greater social success and positive relations with peers. Children need many opportunities to experience personal feelings of success and achievement in physical activity settings. Explorations of various movement capabilities contribute to feelings of joy and accomplishment.

Middle School

Quality middle school physical education programs provide students unique opportunities for demonstrating leadership, socialization, and goal setting skills. Involvement in physical activity has shown a consistent relationship with mood, self-esteem, and other indices of psychological well-being in early adolescence. Student preferences become more specialized at this age and the preference

influences students' motivation to continue in physical activities. A youngster's feelings of perceived competence also affects future participation and self-esteem. Despite the physiological changes that occur at this age, students are generally willing to work cooperatively toward common goals because the desire for peer group acceptance is strong. Risk taking is attractive and students accept the challenge of setting and achieving personal goals. Physical education programs have a unique opportunity to provide learning experiences that enhance middle school students' self-esteem.

High School

During this phase of development, students begin to select activities based more on personal interests. Other factors affecting students' choices of physical activity may be their level of health-related physical fitness, body type, geographical location, and socio-economic group or circle of peers. Physical education programs must continue to enhance students' fitness development and offer an array of activities from which students can select.

Attitudes, habits, and perceptions are critical prerequisites for persistent participation in physical activities. To help students achieve self-realization through physical activity, the physical education program can guide student choices and help them become self-directed in the selection of activities that are satisfying. The importance of commitment and dedication in achieving success may be emphasized in physical education. Physical activity habits and preferences are not static, but are continually in a state of flux throughout one's lifetime. High school is a time when students can establish habits and attitudes about the role physical activity will play in their lifetime. This is the time for students to explore their preferences related to physical activity and perhaps specialize based on abilities and interests.

Physical Activity Improves the Quality of Life

Regular physical activity improves functional status and limits disability during the middle and later adult years. Physical activity contributes to quality of life, psychological health, and the ability to meet physical work demands. Physical education can serve as a vehicle for helping students to develop the knowledge, attitudes, motor skills, behavioral skills, and confidence needed to adopt and maintain physically active lifestyles. The outcomes of a quality physical education program include the development of students' physical competence, health-related fitness, self-esteem, and overall enjoyment of physical activity. These outcomes enable students to make informed decisions and choices about leading a physically active lifestyle.

In early years children derive pleasure from movement sensations and experience challenge and joy as they sense a growing competence in their movement ability. Evidence suggests that the level of participation, the degree of skill, and the number of activities mastered as a child directly influences the extent to which children will continue to participate in physical activity as an adult.

In early adolescence participation in physical activity provides important opportunities for challenge, social interaction, group membership, as well as opportunities for continued personal growth in physical skill.

Participation for high school students continues to provide enjoyment and challenge as young people express preferences for activities that meet their specific interests. A comprehensive, well-implemented physical education program is an essential component to the total education of students. Physical education prepares students to maintain healthy, active lifestyles and engage in enjoyable, meaningful leisure-time pursuits.

References

Barton, G.V., Fordyce, K., & Kirby, K. (1999). The importance of the development of motor skills to children. *Teaching Elementary Physical Education*, 10(4), 9-11.

Calfas, K. & Taylor, W. (1994). The effects of physical activity on psychological variables in adolescents. *Pediatric Exercise Science*, 6, 302-314.

California Department of Education. (1987). *Caught in the middle: Educational reform for young adolescents in California public schools*.

Edith Cowan University (1991, August). *Youth Studies*, 10(3), 1-8.

Eggen, P. & Kauchak, D. (1999). *Educational psychology: A window on classrooms* (4th ed.). Upper Saddle River, NJ: Prentice-Hall, Inc.

Evans, J. & Roberts, G. (1987). Physical competence and the development of children's peer relationships. *Quest*, 39, 23-25.

Gruber, J.J. (1985). Physical activity and self-esteem development in children: A meta-analysis. *The Academy Papers*, 19, 30-48.

Hannaford, C. (1995). *Smart Moves*. Arlington, VA. Great Ocean.

Keays, J. & Allison, R. (1995). The effects of regular moderate to vigorous physical activity on student outcomes: A review. *Canadian Journal of Public Health*, 86, 62-66.

Mohnsen, B.S. (1997). *Teaching middle school physical education: A blueprint for developing an exemplary program*. Champaign, IL: Human Kinetics.

Pate, R.R., Trost, S.G., Dowda, M. Ott, A.E., Ward, D.S., Saunders, R., & Felton, G. (1999). Tracking of physical activity, physical inactivity, and health related physical fitness in rural youth. *Pediatric Exercise Science*, 11, 364-376.

Rink, J. E. (1998). *Teaching physical education for learning* (3rd ed.). New York: McGraw-Hill.

The National Center for Chronic disease Prevention and Health Promotion, Centers for Disease Control and Prevention . (1997). Guidelines for school and community programs to promote lifelong physical activity among young people. *Journal of School Health*, 76(6), 202-219.

The National Association for Sport and Physical Education (NASPE, 1995). *Moving into the future. National standards for physical education: A guide to content and assessment*. St. Louis: Mosby.

The National Association for Sport and Physical Education (NASPE, 1999). *Sport and physical education advocacy kit II (Speak II)*.

The U.S. Department of Health and Human Services (USDHHS). (1996). *Physical activity and health: A report of the Surgeon General*. Atlanta, GA: USDHHS, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion.

National Association for Sport and Physical Education (NASPE)

1900 Association Drive

Reston, VA 20191

(p) 703-476-3410

(f) 703-476-8316

<http://www.naspeinfo.org/>

Suggested Citation:

National Association for Sport and Physical Education. (2001). *Physical education is critical to a complete education* [Position paper]. Reston, VA: Author.

Circulation

JOURNAL OF THE AMERICAN HEART ASSOCIATION



Promoting Physical Activity in Children and Youth. A Leadership Role for Schools. A Scientific Statement From the American Heart Association Council on Nutrition, Physical Activity, and Metabolism (Physical Activity Committee) in Collaboration With the Councils on Cardiovascular Disease in the Young and Cardiovascular Nursing

Russell R. Pate, Michael G. Davis, Thomas N. Robinson, Elaine J. Stone, Thomas L. McKenzie and Judith C. Young

Circulation published online Aug 14, 2006;

DOI: 10.1161/CIRCULATIONAHA.106.177052

Circulation is published by the American Heart Association, 7272 Greenville Avenue, Dallas, TX 75214

Copyright © 2006 American Heart Association. All rights reserved. Print ISSN: 0009-7322. Online ISSN: 1524-4539

The online version of this article, along with updated information and services, is located on the World Wide Web at:

<http://circ.ahajournals.org>

Subscriptions: Information about subscribing to *Circulation* is online at
<http://circ.ahajournals.org/subscriptions/>

Permissions: Permissions & Rights Desk, Lippincott Williams & Wilkins, 351 West Camden Street, Baltimore, MD 21202-2436. Phone 410-5280-4050. Fax: 410-528-8550. Email:
journalpermissions@lww.com

Reprints: Information about reprints can be found online at
<http://www.lww.com/static/html/reprints.html>

Promoting Physical Activity in Children and Youth A Leadership Role for Schools

A Scientific Statement From the American Heart Association Council on Nutrition, Physical Activity, and Metabolism (Physical Activity Committee) in Collaboration With the Councils on Cardiovascular Disease in the Young and Cardiovascular Nursing

Russell R. Pate, PhD, FAHA, Chair; Michael G. Davis, PED;
Thomas N. Robinson, MD, MPH, FAHA; Elaine J. Stone, PhD, MPH, FAHA;
Thomas L. McKenzie, PhD; Judith C. Young, PhD

Schools have played a central role in the provision of physical activity to American children and youth for more than a century. Physical education (PE) has been an institution in American schools since the late 1800s,¹ and school sports have been a growing component of the educational enterprise since the early 1900s. Traditionally, students have engaged in physical activity during recess breaks in the school day and by walking or riding bicycles to and from school. However, as we move into the 21st century, alarming health trends are emerging, suggesting that schools need to renew and expand their role in providing and promoting physical activity for our nation's young people.

Over the past 20 years, obesity rates in US children and youth have skyrocketed. Among children ages 6 to 11, 15.8% are overweight (≥ 95 th percentile body mass index [BMI] for age) and 31.2% are overweight or at risk for overweight (≥ 85 th percentile BMI for age).² Among adolescents ages 12 to 19, 16.1% are overweight (≥ 95 th percentile BMI for age) and 30.9% are overweight or at risk for overweight (≥ 85 th percentile BMI for age).² The rapid increase in the prevalence of obesity in American young people has occurred concurrently with other disquieting trends. Between 1991 and 2003, enrollment of high school students in daily PE classes decreased from 41.6% to 28.4%.³ Physically active transport to and from school has declined from previous generations; only one third of trips to school ≤ 1 mile and $< 3\%$ of trips ≤ 2

miles are made by walking or biking.^{4,5} Even recess has been reduced or eliminated in some elementary schools.^{6,7}

Over the years, many public health, medical, and educational authorities have called on schools to give greater attention to provision of physical activity to students. It has often been recommended that PE programs be expanded, and for several decades professional organizations have indicated that the provision of "quality, daily physical education" should be a standard to which schools aspire.⁸⁻¹¹ Unfortunately, few American schools meet that standard, and little evidence indicates that progress has been made toward attaining that goal.^{3,12}

The recent rapid increase in childhood obesity rates suggests that a reconsideration of the role of the schools in addressing this problem is necessary and appropriate. The American Heart Association recently issued a scientific statement on overweight in children and adolescents that drew attention to the severity of the problem and identified the importance of prevention and treatment.¹³ The Institute of Medicine recently issued a report on prevention of childhood obesity that placed major emphasis on the potential role of schools.¹⁴ Other leading organizations have recommended that schools adopt policies that require daily PE, elementary school recess, and physical activity opportunities before, during, and after school.¹⁵ Over the past decade, several organizations have recommended that children and youth participate in ≥ 60 minutes of physical activity each day.^{16,17}

The American Heart Association makes every effort to avoid any actual or potential conflicts of interest that may arise as a result of an outside relationship or a personal, professional, or business interest of a member of the writing panel. Specifically, all members of the writing group are required to complete and submit a Disclosure Questionnaire showing all such relationships that might be perceived as real or potential conflicts of interest.

This statement was approved by the American Heart Association Science Advisory and Coordinating Committee on April 7, 2006. A single reprint is available by calling 800-242-8721 (US only) or writing the American Heart Association, Public Information, 7272 Greenville Ave, Dallas, TX 75231-4596. Ask for reprint No. 71-0367. To purchase additional reprints: Up to 999 copies, call 800-611-6083 (US only) or fax 413-665-2671; 1000 or more copies, call 410-528-4121, fax 410-428-4264, or e-mail kelle.ramsay@wolterskluwer.com. To make photocopies for personal or educational use, call the Copyright Clearance Center, 978-750-8400.

Expert peer review of AHA Scientific Statements is conducted at the AHA National Center. For more on AHA statements and guidelines development, visit <http://www.americanheart.org/presenter.jhtml?Identifier=3023366>.

Permissions: Multiple copies, modification, alteration, enhancement, and/or distribution of this document are not permitted without the express permission of the American Heart Association. Instructions for obtaining permission are located at <http://www.americanheart.org/presenter.jhtml?identifier=4431>. A link to the "Permission Request Form" appears on the right side of the page.

(*Circulation*. 2006;114:000-000.)

© 2006 American Heart Association, Inc.

Circulation is available at <http://www.circulationaha.org>

DOI: 10.1161/CIRCULATIONAHA.106.177052

Recently, an expert panel conducted a comprehensive review of the literature on physical activity in school-age youth and recommended that children and youth participate in ≥ 60 minutes per day of physical activity that is developmentally appropriate, enjoyable, and involves a variety of activities.¹⁸ The panel's report suggested that the ≥ 60 minutes can be accumulated throughout the day in school, during PE and recess, during intramural sports, and in before-school and after-school programs.¹⁸

It appears that the time has come to consider a markedly expanded role for schools in providing physical activity to our children and youth. Schools could become the central element in a community system that ensures that students participate in enough physical activity to develop healthy lifestyles. Although nutrition also clearly plays an important role in the promotion of health and prevention of obesity,¹³ the present document focuses on physical activity. It describes a renewed and expanded role for schools in the area of physical activity. Furthermore, it addresses the current state of affairs and summarizes the evidence supporting schools' potential for effectively providing and promoting physical activity. In addition, this statement recommends several key changes in school policy and practice.

The Current State of Affairs

The status of physical activity participation by children and youth in the United States and the status of the schools' promotion of physical activity are monitored systematically by the Centers for Disease Control and Prevention. The Youth Risk Behavior Surveillance System (YRBSS) is a survey of high school youth conducted regularly through national, state, and local education and health agencies.¹² The system collects self-reported data related to 6 health-risk behaviors, including physical activity, in nationally representative samples of youth. In addition, the School Health Policies and Programs Study (SHPPS) regularly assesses school health policies and programs at the state, district, school, and classroom levels.¹⁹ It is likely that vigorous physical activity is overreported and moderate physical activity is underreported in the YRBSS data.²⁰ However, the YRBSS data are the only national surveillance data currently available for this population.

Participation in Physical Activity

Children are more active than adults, but their activity levels decline as they move toward adolescence, and significant numbers of young people do not participate in recommended levels of physical activity.²¹ The 2003 YRBSS provides documentation of the inadequate levels of physical activity among high school-age youth. Thirty-seven percent of students did not participate in ≥ 20 minutes of vigorous physical activity on ≥ 3 of the previous 7 days, and black, Hispanic, and female students were less likely than their white male counterparts to participate in vigorous physical activity at recommended levels. More than one third (38.2%) of students spent > 3 hours per day watching television.¹²

Physical Education

PE is a mandated part of the school curricula in most states,^{19,22} and daily PE is recommended by numerous enti-

ties.^{5,21,23} In addition to providing opportunities for physical activity, PE has traditionally pursued objectives that are not necessarily directly related to health outcomes. These include objectives in the cognitive, social, and emotional domains. According to the 2003 YRBS, 55.7% of high school students were enrolled in PE classes, 28.4% attended PE class daily, and 80.3% of those attending PE classes spent ≥ 20 minutes being active during class.¹² Enrollment in PE remained steady from 1991 through 2003; however, the percentage of students participating in daily PE classes decreased significantly from 1991 to 1995 (from 41.6% to 25.4%) and rose only slightly from 1995 to 2003 (from 25.4% to 28.4%).³

The 2000 SHPPS report addressed PE, standards and guidelines, evaluation, elementary school recess, intramurals, and interscholastic sports.¹⁹ At the middle school level, the study found that only 6.4% of middle schools provided daily PE for the entire school year, whereas 15.5% offered daily PE (or its equivalent) for at least half the school year, and 34.4% offered it 3 days per week for at least half of the school year.¹⁹ Only a few studies other than SHPPS have focused on middle school PE. One of those found that PE in middle schools ranged from a low of 54 hours per year (grades 6 to 8, South Carolina) to a high of 156 hours per year (grades 6 to 8, California).²⁴ Direct observations of individuals in PE classes in both elementary^{25,26} and secondary²⁷ schools indicated that students typically engage in moderate-to-vigorous physical activity (3.0 to 5.9 METS) $< 40\%$ of PE class time, far short of the 50% recommended by the *Healthy People 2010* objectives.⁵

Enrollment Requirements

At the state level, 78.4% of states required elementary schools to provide PE, whereas 85.7% required middle schools and 82.4% required high schools to do so.¹⁹ At the school level, a large majority ($> 95\%$) of schools required that PE be offered in the curriculum. Requirements for student participation in PE, however, were lower in the higher grades. Forty percent of elementary schools required students to participate in PE, but only 5.4% of high schools required that seniors enroll.

Time Requirements

Only 8% of elementary schools, 6.4% of middle/junior high schools, and 5.8% of senior high schools provided PE daily or allocated the recommended amount of time per week (150 minutes for elementary schools; 225 minutes for middle/junior and senior high schools).¹⁹ Participation in PE also was reduced by substitutions of other activities for PE and student exemptions. Seventeen percent of elementary schools allowed exemptions from required PE courses because of competency test scores or participation in other school, community sports, or community service activities. At the middle and high school levels, 25.3% and 40%, respectively, allowed students to be exempt from PE for the same reasons, as well as for enrollment in other school courses and participation in school sports and vocational training.¹⁹ Although these substitute activities provide physical activity in some cases, they do not replace the educational aspects of PE that are designed to develop the knowledge, behavioral skills,

and motor skills necessary to develop and maintain a physically active and healthy lifestyle.

Physical Education Content

SHPPS reported that the content of PE included a wide array of activities, but traditional activities predominated. For example, 98.2% of schools taught group or team activities, 97.4% taught individual or partnered activities, 69.3% taught dance activities, and 12.5% taught aquatic activities.¹⁹ Eighty-four percent of elementary schools, 77.4% of middle/junior high schools, and 79.5% of senior high schools reported following state or national standards in the PE curriculum.

Teacher Qualifications and Class Size

A significant percentage of states, districts, and schools have established requirements for teacher qualifications and class size for PE. The majority of schools (80.6%) required newly hired PE teachers to have undergraduate or graduate training in PE or a related field, and 73.2% required new teachers to be state certified, licensed, or endorsed in PE.¹⁹ Funding for staff development in PE was offered in 66% of the states and 80.7% of the districts. In 89.3% of the schools, physical educators had received staff development on at least 1 PE topic in the previous 2 years. However, the survey did not document whether or not teachers used the skills learned in PE staff development in their PE classes. Of the schools with PE requirements, 41.9% had a maximum student-to-teacher ratio. The average maximum ratio was 28:1 for elementary schools, 31:1 for middle/junior high schools, and 33:1 for senior high schools. Large class sizes, common in many PE programs, are associated with reduced levels of student physical activity.¹⁹

Recess, Intramurals, and Other School Programs

SHPPS found that a majority (71.4%) of elementary schools provide regularly scheduled recess for grades K to 5.¹⁹ Few states require that schools provide a recess break, but 46.3% of school districts require schools to do so. Recess periods do not necessarily require or even encourage activity; in fact, some schools cited injuries and supervision issues as reasons for restricting recess and physical activity during recess. Nearly half (49%) of schools offered physical activity clubs or intramurals, and more than half of students participated in at least 1 club or intramural team. Few schools offered transportation home after club or intramural programs, and these activities may be accessible only to students who can resolve transportation needs. The activities offered in intramural programs tend to be traditional sports programs. Although these programs have not been formally studied, physical activity professionals believe that the students who elect to participate tend to be those who are already more active.

School Sports

Data from the 2003 YRBSS survey indicate that 57.6% of students in grades 9 to 12 played on at least 1 sports team during the prior year.¹² The National Federation of High School Activities Associations reports that 53% of all high school students, approximately 7 million students, participate in high school sports teams. Of this number, approximately 4 million are boys and 3 million are girls.

The SHPPS survey found that interscholastic sports teams were available in a majority of middle schools and high schools, but intramural activities or physical activity clubs were offered by only about half (49.0%) of those schools.¹⁹ As a result, nonathletes have fewer school-based opportunities for after-school physical activity than do students who are interested in competitive athletics. The National Middle Schools Association reported that approximately 77% of middle schools offered interscholastic sports programs.

Evidence: Physical Activity During the School Day and Within the School Program

Physical Education

Perhaps because schools have been unable to provide sufficient time and resources for students to meet all the objectives of standard PE, the concept of “health-related PE” has been promoted.^{28,29} A major goal of health-related PE is the development of lifelong physical activity. As such, the priority for PE is seen as providing opportunities for students to engage in enjoyable physical activity, to become physically fit, and to learn generalizable motor and behavioral skills.³⁰

A number of carefully designed studies that incorporated health-related PE concepts and used physical activity in PE classes as the primary outcome have been conducted in the United States.^{31–33} In most of these, PE was one component of a multidisciplinary and multifaceted intervention package. These studies moved beyond the focus on knowledge and attitudes that characterized earlier health behavior change studies and used behavioral models from social psychology as the theoretical underpinning for changing behaviors, including physical activity. Many also focused on a Coordinated School Health Program model, so that multiple environmental components and policies supported a topic addressed in the classroom.^{21,34,35} In addition, the school-based research field advanced to using more robust research designs, selection of more appropriate theoretical models, improved measurement approaches, and more appropriate analysis strategies for the multiple health behaviors and multiple component programs being implemented. Studies that adopted these approaches to promotion of physical activity in schools included the Child and Adolescent Trial for Cardiovascular Health (CATCH),^{37,38} Go for Health,^{27,39} Lifestyle Education for Activity Program (LEAP),^{40,41} Middle School Physical Activity and Nutrition (M-SPAN),^{42,43} Pathways,⁴⁴ Sports, Play, and Active Recreation for Kids (SPARK),^{45,46} and Trial of Activity for Adolescent Girls (TAAG).^{24,47} Several comprehensive reviews summarize many of these studies.^{32,33,48,49}

The majority of physical activity intervention studies have been conducted at the elementary school level and have involved grades 3, 4, 5, and 6 in some combination.^{32,48,49} Most of these studies were designed to intervene on multiple cardiovascular disease behavioral risk factors—primarily physical activity, sedentary behaviors, and dietary behaviors. Most involved changes to PE, the classroom health curriculum, and the food service program and included some family, community, and policy change components. In most, existing school staff were trained to implement the interventions,

although the Stanford Adolescent Heart Health Program was implemented by project staff from outside the school, and SPARK was implemented by both outside PE specialists and school staff who were trained in the intervention.^{46,50} Some programs increased both the number of minutes and the proportion of lesson time that students were vigorously active in PE classes.^{38,45} For example, without a modification to either the frequency or the duration of lessons, moderate-to-vigorous physical activity during PE increased from 37% to 52% in CATCH intervention schools.³⁸

Middle school studies include M-SPAN, Planet Health, and the Oslo Youth Study. In the M-SPAN intervention schools, moderate-to-vigorous physical activity in PE classes increased by 18%.⁴² The results of Planet Health showed that the prevalence of obesity was reduced among girls, but not boys, as compared with controls, and that a reduction in TV-watching predicted a change in obesity.^{51,52} The Oslo Youth Study addressed multiple cardiovascular health behaviors and used multiple intervention components in grades 5 and 7, with follow-up in grade 7 and at 12 years after the intervention. Results showed an increase in knowledge and in frequency of vigorous physical activity, which persisted to the 12-year follow-up for boys but not for girls.⁵³ Fitness also was increased for boys in the intervention group. TAAG, a national multisite randomized intervention study, is currently under way at 6 sites across the country. It is testing a school and community multicomponent intervention designed to prevent the decline in physical activity in middle school girls.⁴⁷

Only a few studies have tested programs designed to promote physical activity in high school students. The Stanford Adolescent Heart Health Program was a curriculum-based program designed to improve physical activity, nutrition, smoking, and stress behaviors. Students in the intervention schools reported significant knowledge gains and increases in regular exercise.^{50,54} Positive treatment effects also were observed for BMI, skinfolds, and resting heart rate. LEAP was a comprehensive physical activity intervention designed to change the instructional program and school environment to increase support of physical activity for ninth-grade girls. LEAP focused on 6 components of the Coordinated School Health Program model: PE, health education, school environment, school health services, faculty/staff health promotion, and family/community involvement. After the 1-year intervention, the prevalence of vigorous physical activity was significantly higher in the LEAP intervention schools than in the control schools.⁴⁰ Other high school studies that addressed physical activity through multiple component interventions include the Australia School Project⁵⁵ and Slice of Life.⁵⁶ The Class of 89 Study,⁵⁷ which was part of a larger community study, had multiple intervention components and addressed multiple cardiovascular health behaviors. It involved grades 6 to 12, with follow-up through grade 12. The results showed smaller declines in physical activity for intervention students, with the most significant effect on girls. The study also showed that physical activity tracks during youth (ie, high activity at one age is associated with high activity at an older age).

Most of the interventions to date have focused on increasing physical activity during the school day. It is possible that students who increase their physical activity levels during the school day may compensate by decreasing out-of-school physical activity. Additional research is needed to clarify the relationship between in-school and out-of-school activity. In addition, it has not yet been demonstrated that school-based interventions can reduce BMI or the prevalence of overweight.

Very few studies have examined the long-term effects of health-related PE interventions, either the maintenance of physical activity in study children or the maintenance of programs within a school.^{58,59} SPARK-trained classroom teachers maintained student activity levels at about 89% of their intervention rates 1.5 years after intervention,⁴⁵ and some effects of the CATCH intervention remained after 5 to 7 years.⁶⁰ In both studies, moderate levels of physical activity were retained in school PE with more success than were vigorous levels, and this reduction in vigorous activity was accompanied by teachers' reducing fitness activities and increasing time for game play. In the CATCH study, <50% of the teachers conducting PE in the schools at follow-up had received CATCH PE training, suggesting that staff development in PE needs to occur regularly. A study of the sustainability of SPARK found that a large majority of schools that received SPARK training continued to implement the program up to 4 years after training.⁶¹ Sustainability of interventions is associated with increased training, support within the school (especially from the principal), and availability of adequate equipment.^{61,62}

The effects of different teacher preparation programs on the abilities of physical educators to develop and implement health-related PE programs also are not known. An evaluation of these programs is in order because PE currently provides students with insufficient amounts of physical activity and adults graduating from schools do not engage in sufficient physical activity. McKenzie and Kahan⁶³ have suggested that colleges' physical education teacher education (PETE) programs, in addition to teaching PE content and pedagogical skills, should expand to prepare future physical educators to develop natural linkages to physical activity and public health. An adoption of a public health approach would require a modification to the current traditional coursework, which emphasizes the biological sciences and school-based training experiences. It would require those who are preparing to become PE teachers to spend time in community-based settings, where they could master behavioral approaches to enhancing youth physical activity, practice communication and collaboration skills, and work with diverse learners.

Recess and Active Transport to School

Although little research specifically documents the impact of recess, common sense suggests that, at the very least, providing a recess period gives an additional opportunity for physical activity. The research has suggested that recess has educational and developmental benefits.^{64,65} Various organizations and experts have called for regular recess periods in elementary schools (eg, the American Association for the Child's Right to Play, the Centers for Disease Control and

Prevention, and the American Academy of Pediatrics). Guidelines for recess include not replacing PE with unstructured recess, scheduling recess periods so that they do not precede or follow PE, encouraging physical activity during recess, and ensuring the availability of safe facilities and equipment.

Little is known about the contribution of active transport to school to overall physical activity. Trips to school by walking and biking have decreased in recent years,⁶⁶ and most studies of walking to school have been based on parent reports.^{67,68} A recent study used direct observation to determine the prevalence of walking and biking to school at 8 urban and suburban schools in 1 city. The vast majority of students rode a school bus or were driven to school; only 5% walked or rode a bike to school.⁶⁹ A small number of interventions have been designed to increase the prevalence of walking to school.⁷⁰

School Sports

Participation in sports has long been assumed to provide health benefits to young athletes. Despite some questions about this assumption,^{71–73} a number of studies have shown that health benefits accrue to young people who participate in sports. An analysis of the 1997 YRBSS data found that students who reported participating in 1 or more sports teams were more likely to report multiple positive health behaviors and less likely to report negative health behaviors than students who did not participate in sports.⁷⁴ The association was stronger for white students than for black and Hispanic students. Other studies have found increased physical fitness and lower body fat⁷⁵ and lower prevalence of a number of health risk behaviors in students who participate in sports.^{76,77} Some negative health behaviors may be associated with sports participation, and these associations may vary by race, ethnicity, and gender.⁷⁴

School intramural and club programs at middle and high school levels have not been studied extensively. The available programs vary widely in terms of numbers of students served, types of activities offered, and the possible impact on physical activity levels. Issues that must be addressed in planning and implementing physical activity–based programs include transportation, qualified supervision, selection of activities to meet student needs and interests, and access to appropriate facilities, often in competition with interscholastic sport needs. Many programs are highly dependent on teacher interest and availability. Often teachers volunteer to sponsor or supervise student clubs. Although stipends are available for some student activity support, they may not be available for physical activity–based clubs. The additional potential liability of physical activity also may deter schools from sponsoring such activities.

Although interscholastic sports provide more than half of the student population with significant amounts of physical activity, the other half of the students may be very sedentary and represent those who most need greater amounts of physical activity. In fact, in large schools, access to interscholastic sports programs may be limited to a much smaller percentage of the student body. Most athletic teams are of similar size, and although large schools may offer more sports than smaller ones, the total number of students that can be

served does not increase proportionately to enrollment. In addition, highly competitive sports programs may not be reinforcing positive health aspects of sports participation. Teacher certification was once a prerequisite for school coaches, but this credential is now required in many fewer states. Coach qualifications are often focused on win-loss records. When education or training is required, it often focuses on care for and prevention of athletic injuries. However, efforts to promote higher qualifications and education for school coaches have increased recently.

Physical Activity in the Academic Classroom

Recently, several programs have been designed to incorporate physical activity into the academic curriculum and allow students to be physically active during classroom instruction. One example is TAKE 10! Stewart et al⁷⁸ reported the results of a small study that evaluated exercise intensity levels and estimated energy expenditure by first, third, and fifth graders participating in TAKE 10! activities. Positive findings were reported for each age group. Pathways used a similar exercise break box designed to be used by the classroom teacher any time during the day as an in-classroom exercise break.⁷⁹ Process evaluation showed high rates of use by the classroom teachers implementing the activities.

Increased Emphasis on Academic Achievement

With the adoption of the No Child Left Behind Act⁸⁰ and increases in mandated high-stakes testing across the United States, districts are attempting to allocate more time to “core” subjects such as math and reading. As a result, time for students to engage in physical activity during recess and during structured PE is being threatened. This is occurring in an unknown number of schools across the nation, even though studies have shown that no meaningful relationship exists between time allocated for PE and academic achievement.⁸¹ Additionally, some intervention studies have shown that increasing time for structured PE did not reduce students’ academic achievement and may have even contributed to it.^{82,83} Van der Mars recently reviewed studies in the area and concluded that, on the basis of the best available knowledge, it appears that (1) increased time in PE does not impede students’ classroom academic performance, (2) increased time in PE may contribute slightly to academic performance, and (3) decreased time for PE in favor of academic work does not necessarily result in improved academic performance.⁸⁴

Evidence: Physical Activity Beyond the School Day

Reducing Inactivity

Two randomized controlled trials have shown some promise of classroom-based screen time reduction curricula to prevent inactivity and obesity. Gortmaker and colleagues⁵² examined the effects of the 2-year Planet Health curriculum that focused on decreasing television viewing as well as decreasing high-fat food intake, increasing fruit and vegetable intake, and increasing moderate and vigorous physical activity among students in grades 6 to 8. In a 10-school randomized trial, boys and girls in the intervention schools reported reducing their television viewing more than controls. The

prevalence of obesity (defined by age-specific and sex-specific thresholds using a combination of BMI and triceps skinfold thickness) decreased significantly among intervention girls, but no significant effects on obesity were observed in boys. No significant changes occurred in self-reported physical activity. Although this study did not test the effects of reducing screen viewing behaviors alone, reductions in television viewing were associated with changes in obesity and were found to “mediate” the intervention effect in a regression analysis.⁵²

Robinson⁸⁵ completed a school-based study specifically designed to examine the causal relationship between reducing screen time and body fatness. This randomized controlled trial involved third and fourth graders in 2 sociodemographically and scholastically comparable public elementary schools in San Jose, California. The 18-lesson Stanford Student Media Awareness to Reduce Television (SMART) classroom curriculum aimed to reduce television, videotape, and video game use, without specifically promoting more active behaviors as substitutes, therefore isolating the effects of reduced television viewing behaviors alone, apart from promotion of specific alternatives. Over a 7-month period, the curriculum was successful at significantly decreasing children’s television viewing and video game use, BMI, triceps skinfold thickness, and waist circumference, as compared with controls.⁸⁵ No statistically significant differences in reported levels of moderate and vigorous physical activity or a test of cardiorespiratory fitness were detected among schools.

Despite the lack of clear effects of school-based screen time–reduction curricula on physical activity, some results from other settings suggest that reducing screen time may play a role in promoting physical activity in children. In laboratory studies, for example, Epstein and colleagues have found that obese children increased physical activities when access to sedentary activities (including screen viewing) was limited⁸⁶ or when they were either negatively reinforced for sedentary activities or positively reinforced for limiting them.⁸⁷ Epstein and colleagues also examined the effects of manipulating sedentary behaviors among 13 nonobese 8- to 12-year-olds in their home settings. When time in sedentary behaviors was increased by an average of 50% above baseline, physical activity trended lower. However, when the children reduced their sedentary behavior time by about half, there was no associated change in physical activity.⁸⁸ Some additional evidence comes from a randomized controlled pilot and feasibility trial of counseling to reduce screen time among 28 families with 7- to 12-year-old black children receiving primary care at a low-income, urban community clinic. Ford et al⁸⁹ found that families randomized to receive counseling plus a behavioral intervention, including goal setting and an electronic television time manager, reported significant increases in organized physical activity and a trend toward greater increases in playing outside, as compared with families receiving brief counseling alone.

In sum, despite the demonstrated promise of screen time–reduction curricula to prevent obesity, experimental data do not yet support a direct link between screen time–reduction curricula and increased physical activity. Additional experi-

mental studies, using more sensitive and valid measures of physical activity, are needed to adequately test and better understand the effects, if any, of screen time–reduction curricula on physical activity.

After-School Programs

The after-school time period represents one of the largest blocks of discretionary time in a child’s typical day. As a result, after-school programs are considered to have great potential to provide opportunities for increasing physical activity.¹⁴ After-school programs to promote physical activity include competitive sports teams, clubs, classes or training, recreational and intramural sports, or nonathletic activities that involve physical activities (eg, outdoor education, some community service programs). In recent years, there has been substantial interest in offering additional after-school activities to serve the needs of more students. For example, researchers at Stanford University are testing after-school ethnic and popular dance classes for girls in grades 2 to 5⁹⁰ and an after-school team sports program designed exclusively for overweight children in grades 4 and 5, a population that would not normally participate in sports teams.

Despite the logic of offering more physical activity during after-school hours, data are not yet available to show that more after-school activity programs result in increases in total daily physical activity or associated health benefits. It is unknown whether students compensate for increased after-school physical activity by being less active during the rest of the day or during other days of the week. However, studies of structured vigorous physical training in obese children and adolescents during the after-school hours have demonstrated improvements in some physiological risk factors.^{91,92}

School–Community Linkages

Traditionally, the role of schools in providing and promoting physical activity has been during the school day (eg, PE, recess) and/or on the school campus immediately after school (eg, interscholastic and intramural sports). Although there have been exceptions, school-based programs usually have been sponsored by the schools themselves and supervised by school employees. However, enormous potential appears to exist for schools to expand their role in providing students with additional physical activity by building institutional relationships with community-based providers of physical activity. Such relationships could manifest in several ways. Schools can make their facilities available to community-based organizations during after-school, weekend, and summer periods. Also, schools can collaborate with community organizations in promoting physical activity programs to students and their parents. Because transportation can be a barrier to students’ participation in after-school programs, schools can collaborate with community organizations, including transit authorities, to ensure that students have the opportunity to participate in programs beyond the school day.

Although school–community linked physical activity programs offer much promise, little research has addressed the efficacy of such initiatives for increasing physical activity in children and youth. One notable exception is TAAG, a large-scale randomized trial involving 36 schools at 6 study

sites across the country and sponsored by the National Heart, Lung, and Blood Institute.⁴⁷ This large-scale study is examining the effects of a school–community linked intervention on overall physical activity in middle school girls. Intervention strategies emphasize enriching the after-school physical activity programming environment of middle schools, with particular focus on the needs and interests of girls. Although the results of this study are not yet available, experience gained in TAAG should provide important information on ways in which schools and community agencies can collaborate in meeting the physical activity needs of youth. Various efforts have been made to allow community programs to benefit from the availability of school facilities, but these efforts have not always resulted in positive linkages. There are many opportunities for collaborative programs and for schools to promote physical activity opportunities available in the community. Leveraging the resources of schools and organizations in the community can provide expanded opportunities for improving the health status of children and families.

Policy and Practice Recommendations

Children and youth spend more time in schools than any other setting with the exception of their homes. Accordingly, if young people are going to engage in adequate amounts of physical activity, it is essential that schools systematically and effectively provide and promote participation in physical activity. Most schools already have programs that provide students with some physical activity, but population trends for obesity suggest that American children and youth need more physical activity than their current levels. Although parents, community agencies, and healthcare providers share the responsibility for ensuring that young people are physically active, schools are uniquely positioned to address this critical public health concern. The following recommended school policies and practices, if implemented nationally, would move America's schools into an appropriate position of leadership in providing our nation's children and youth with the physical activity they need for lifelong health.

1. Schools should ensure that all children and youth participate in a minimum of 30 minutes of moderate-to-vigorous physical activity during the school day; this includes time spent being active in PE classes. Additional physical activity should be provided through extracurricular and school-linked community programs.
2. Schools should deliver evidence-based health-related PE programs that meet national standards to students at all school levels. These programs should provide substantial amounts of moderate-to-vigorous physical activity (ie, 50% of class time) and should teach students the motor and behavioral skills needed to engage in lifelong physical activity.
3. States and school districts should ensure that PE is taught by certified and highly qualified PE teachers at all school levels.
4. States should hold schools accountable for delivering PE programs that meet national standards for quality and quantity (ie, 150 minutes per week for grades K to 8 and 225 minutes per week for grades 9 to 12). Specifically, each state should include PE in its core

educational accountability system and should incorporate PE into its system national standards for curriculum and instructional quality.

5. Schools should expand physical activity opportunities by providing clubs, lessons, intramural sports, and interscholastic sports programs that meet the physical activity needs and interests of all students. Coaches and other leaders of such programs should be well qualified and, where appropriate, certified.
6. Schools should promote walking and bicycling to school, and school leaders should work with local governments to ensure that students have safe routes for walking and bicycling to school.
7. Child development centers and elementary schools should provide children with at least 30 minutes of recess during each school day.
8. Schools should provide evidence-based health education programs emphasizing behavioral skills focused on increasing physical activity and decreasing sedentary behaviors.
9. Colleges and universities should provide professional preparation programs that produce teachers who are highly qualified to deliver evidence-based PE and health education programs.

Summary

Schools are potentially attractive settings in which to promote positive health behaviors because students spend large amounts of time in the school environment, elements of the traditional school curriculum relate directly to health, and schools typically provide extracurricular programs that can promote health. Although schools are under increasing pressure to increase student scores on standardized tests, the recent dramatic rise in the prevalence of obesity in children and adolescents in the United States suggests that there is a pressing need for the nation's schools to systematically and effectively promote behaviors that will prevent the development of overweight. Physical activity is a key determinant of weight status. Disquieting trends in other segments of American society, such as increased “screen time” and decreased reliance on physically active transport, indicate that the schools should assume a leadership role in ensuring that young people engage in adequate amounts of physical activity each day. This statement advances policy initiatives that, if fully implemented, would position American schools as societal leaders in addressing an enormous public health challenge.

Appendix

Terms and Definitions

Physical activity—any body movement produced by skeletal muscles that results in energy expenditure.⁹³

Moderate-to-vigorous physical activity—activity that causes some increase in breathing and heart rate, an activity level usually associated (in a healthy person) with brisk walking, dancing, swimming, or cycling on flat terrain. Energy expenditure is usually at the level of ≥ 3 METS (metabolic equivalents), and the activity expends ≥ 3.5 kcal/min.⁹³

Exercise—physical activity that is planned or structured, involving repetitive body movements done to improve or maintain one or more of the components of physical fitness (ie, aerobic fitness,

muscular strength, muscular endurance, flexibility, and/or body composition).⁹³

Physical fitness—a set of physical attributes related to a person's ability to perform activities that require aerobic fitness, endurance, strength, and flexibility. A person's level of physical fitness is a determined by a combination of regular physical activity and genetic attributes.⁹³

Overweight—Overweight in children and adolescents is defined as ≥ 95 th percentile BMI-for-age, meaning that 95% of children of the same age and gender have a lower BMI. "At risk of overweight" is defined as ≥ 85 th percentile and < 95 th percentile BMI-for-age.⁹⁴

Physical education—a school-based program that provides students with opportunities to be physically active and to acquire the skills and knowledge needed to establish and sustain an active lifestyle.⁹⁵

Health-related physical education—a type of physical education program that emphasizes in-class participation in moderate-to-vigorous physical activity and mastery of motor and behavioral skills that promote lifelong physical activity.

Prevalence—the percentage of a population that is affected with a particular condition or disease at a given time.⁹⁶

Intervention—a program or set of actions designed to modify a health outcome.

Acknowledgment

The authors thank Gaye Groover Christmus, MPH, for expert editorial assistance in the preparation of this Scientific Statement.

Disclosures

Writing Group Disclosures

Writing Group Member	Employment	Research Grant	Other Research Support	Speakers' Bureau/Honoraria	Ownership Interest	Consultant/Advisory Board	Other
Russell R. Pate	University of South Carolina	None	None	None	None	None	None
Michael G. Davis	American Alliance for Health, PE, Recreation, and Dance	None	None	None	None	None	None
Thomas L. McKenzie	San Diego State University	None	None	None	None	Occasionally serve	None
Thomas N. Robinson	Stanford University	None	None	None	None	None	None
Elaine J. Stone	University of New Mexico*	None	None	None	None	None	None
Judith C. Young	American Alliance for Health, PE, Recreation, and Dance	None	None	None	None	Action for Healthy Kids (BOD); Council for Fitness and Nutrition; Council for Healthy, Active Americans; Council for Corporate and School Partnerships	None

*Formerly with the National Institutes of Health.

This table represents the relationships of writing group members that may be perceived as actual or reasonably perceived conflicts of interest as reported on the Disclosure Questionnaire, which all members of the writing group are required to complete and submit.

Reviewer Disclosures

Reviewer	Employment	Research Grant	Other Research Support	Speakers' Bureau/Honoraria	Ownership Interest	Consultant/Advisory Board	Other
Patty Freedson	University of Massachusetts, Amherst	None	None	None	None	National Heart, Lung, and Blood Institute	None
Sarah M. Lee	Centers for Disease Control and Prevention	None	None	None	None	None	None
Reginald L. Washington	Rocky Mountain Pediatric Cardiology	None	None	Pfizer	None	None	None
Deborah Rohm Young	University of Maryland	None	None	None	None	None	None

This table represents the relationships of reviewers that may be perceived as actual or reasonably perceived conflicts of interest as reported on the Disclosure Questionnaire, which all reviewers are required to complete and submit.

References

- Wuest DA, Bucher CA. Historical foundations of physical education and sport. In: Wuest DA, Bucher CA, eds. *Foundations of Physical Education and Sport*. 13th ed. Boston, Mass: WCB/McGraw Hill; 1999:146–193.
- Hedley AA, Ogden CL, Johnson CL, Carroll MD, Curtin LR, Flegal KM. Prevalence of overweight and obesity among US children, adolescents, and adults, 1999–2002. *JAMA*. 2004;291:2847–2850.
- Centers for Disease Control and Prevention. Participation in high school physical education—United States, 1991–2003. *MMWR Morb Mortal Wkly Rep*. 2004;53:844–847.
- Centers for Disease Control and Prevention. Kids Walk-to-School: Resource Materials: Fact Sheet. Available at: http://www.cdc.gov/nccdphp/dnpa/kidswalk/fact_sheet.htm. Accessed March 10, 2005.
- US Department of Health and Human Services. *Healthy People 2010*, conference ed. Washington, DC: US Department of Health and Human Services; 2000.
- Johnson D. Many schools putting an end to child's play. *New York Times*. April 7, 1998:A1.
- Waite-Stupinsky S, Findlay M. The fourth R: recess and its link to learning. *The Educational Forum*. 2001;66:16–25.
- American Heart Association. Exercise (physical activity) and children: American Heart Association scientific position. Available at: www.americanheart.org/presenter.jhtml?identifier=4596. Accessed August 1, 2006.
- American Academy of Pediatrics. Physical fitness and activity in schools. *Pediatrics*. 2000;105:1156–1157.
- Fletcher GF, Balady G, Blair SN, Blumenthal J, Caspersen C, Chaitman B, Epstein S, Sivarajan Froelicher ES, Froelicher VF, Pina IL, Pollock ML; Committee on Exercise and Cardiac Rehabilitation of the Council on Clinical Cardiology, American Heart Association. Statement on exercise: benefits and recommendations for physical activity programs for all Americans. *Circulation*. 1996;94:857–862.
- National Association for Sport and Physical Education. *Physical Education Is Critical to a Complete Education*. Reston, Va: National Association for Sport and Physical Education; 2001.
- Grunbaum JA, Kann L, Kinchen S, Ross J, Hawkins J, Lowry R, Harris WA, McManus T, Chyen D, Dollins J; Centers for Disease Control and Prevention. Youth Risk Behavior Surveillance—United States, 2003 [published corrections appear in *MMWR Morb Mortal Wkly Rep*. 2004;53:536; *MMWR Morb Mortal Wkly Rep*. 2005;54:608]. *MMWR Surveill Summ*. 2004;53:1–96.
- Daniels SR, Arnett DK, Eckel RH, Gidding SS, Hayman LL, Kumanyika S, Robinson TN, Scott BJ, St Jeor S, Williams CL. Overweight in children and adolescents: pathophysiology, consequences, prevention, and treatment. *Circulation*. 2005;111:1999–2012.
- Institute of Medicine (US) Committee on Prevention of Obesity in Children and Youth. Kaplah JP, Liverman CT, Kraak VI, eds. *Preventing Childhood Obesity: Health in the Balance*. Washington, DC: Institute of Medicine; 2004:237–284.
- Model School Wellness Policies. National Alliance for Nutrition and Activity. Available at: <http://www.schoolwellnesspolicies.org>. Accessed May 3, 2005.
- Biddle S, Sallis JF, Cavill NA. *Young and Active? Young People and Health Enhancing Physical Activity—Evidence and Implications: A Report of the Health Education Authority Symposium, Young and Active?* London, UK: Health Education Authority; 1998.
- US Department of Health and Human Services, US Department of Agriculture. *Dietary Guidelines for Americans, 2005*. Washington, DC: US Department of Health and Human Services/US Department of Agriculture; 2004.
- Strong WB, Malina RM, Blimkie CJ, Daniels SR, Dishman RK, Gutin B, Hergenroeder AC, Must A, Nixon PA, Pivarnik JM, Rowland T, Trost S, Trudeau F. Evidence based physical activity for school-age youth. *J Pediatr*. 2005;146:732–737.
- Burgeson CR, Wechsler H, Brener ND, Young JC, Spain CG. Physical education and activity: results from the School Health Policies and Programs Study 2000. *J Sch Health*. 2001;71:279–293.
- Pate RR, Freedson PS, Sallis JF, Taylor WC, Sirard J, Trost SG, Dowda M. Compliance with physical activity guidelines: prevalence in a population of children and youth. *Ann Epidemiol*. 2002;12:303–308.
- Centers for Disease Control and Prevention. Guidelines for school and community programs to promote lifelong physical activity among young people. *MMWR Recomm Rep*. 1997;46:1–36.
- National Association for Sport and Physical Education, American Heart Association. *2006 Shape of the Nation Report: Status of Physical Education in the USA*. Reston, Va: National Association for Sport and Physical Education; 2006.
- US Department of Health and Human Services, US Department of Education. *Promoting Better Health for Young People Through Physical Activity and Sports: A Report to the President from the Secretary of Health and Human Services and the Secretary of Education*. Washington, DC: US Department of Health and Human Services/US Department of Education; 2000.
- Moe SG, Pickrel J, McKenzie TL, Strikmiller PK, Coombs D, Murrie D. Using school-level interviews to develop a multisite PE intervention program. *Health Educ Behav*. 2006;33:52–65.
- Nader PR. Frequency and intensity of activity of third-grade children in physical education. *Arch Pediatr Adolesc Med*. 2003;157:185–190.
- McKenzie TL, Feldman H, Woods SE, Romero KA, Dahlstrom V, Stone EJ, Strikmiller PK, Williston JM, Harsha DW. Children's activity levels and lesson context during third-grade physical education. *Res Q Exerc Sport*. 1995;66:184–193.
- Simons-Morton BG, Taylor WC, Snider SA, Huang IW, Fulton JE. Observed levels of elementary and middle school children's physical activity during physical education classes. *Prev Med*. 1994;23:437–441.
- Sallis JF, McKenzie TL. Physical education's role in public health. *Res Q Exerc Sport*. 1991;62:124–137.
- Pate RR, Hohn RC, eds. *Health and Fitness Through Physical Education*. Champaign, Ill: Human Kinetics; 1994.
- McKenzie TL. Health-related physical education: physical activity, fitness and wellness. In: Silverman SJ, Ennis D, eds. *Student Learning in Physical Education: Applying Research to Enhance Instruction*. Champaign, Ill: Human Kinetics; 2003.
- Kahn EB, Ramsey LT, Brownson RC, Heath GW, Howze EH, Powell KE, Stone EJ, Rajab MW, Corso P. The effectiveness of interventions to increase physical activity: a systematic review. *Am J Prev Med*. 2002;22(4 suppl):73–107.
- Stone EJ, McKenzie TL, Welk GJ, Booth ML. Effects of physical activity interventions in youth: review and synthesis. *Am J Prev Med*. 1998;15:298–315.
- Hayman LL, Williams CL, Daniels SR, Steinberger J, Paridon S, Dennison BA, McCrindle BW; Committee on Atherosclerosis, Hypertension, and Obesity in Youth (AHOY) of the Council on Cardiovascular Disease in the Young, American Heart Association. Cardiovascular health promotion in the schools: a statement for health and education professionals and child health advocates from the Committee on Atherosclerosis, Hypertension, and Obesity in Youth (AHOY) of the Council on Cardiovascular Disease in the Young, American Heart Association. *Circulation*. 2004;110:2266–2275.
- Allensworth DD, Kolbe LJ. The comprehensive school health program: exploring an expanded concept. *J Sch Health*. 1987;57:409–412.
- Committee on Comprehensive School Health Programs. Building the infrastructure for comprehensive school health programs in grades K-12. In: Allensworth DD, Lawson E, Nicholson L, Wyche J, eds. *Schools and Health*. Washington, DC: National Academy Press; 1997:237–270.
- Deleted in proof.
- McKenzie TL, Nader PR, Strikmiller PK, Yang M, Stone EJ, Perry CL, Taylor WC, Epping JN, Feldman HA, Puetker RV, Kelder SH. School physical education: the effect of the Child and Adolescent Trial for Cardiovascular Health (CATCH). *Prev Med*. 1996;25:423–431.
- McKenzie TL, Stone EJ, Feldman HA, Epping JN, Yang M, Strikmiller PK, Lytle LA. Effects of the CATCH physical education intervention: teacher type and lesson location. *Am J Prev Med*. 2001;21:101–109.
- Parcel GS, Simons-Morton BG, O'Hara NM, Baranowski T, Kolbe LJ, Bee DE. School promotion of healthful diet and exercise behavior: an integration of organizational change and social learning theory interventions. *J Sch Health*. 1987;57:150–156.
- Pate RR, Ward DS, Saunders RP, Felton G, Dishman RK, Dowda M. Promotion of physical activity in high-school girls: a randomized controlled trial. *Am J Public Health*. 2005;95:1582–1587.
- Dishman RK, Motl RW, Saunders R, Felton G, Ward DS, Dowda M, Pate RR. Enjoyment mediates effects of a school-based physical activity intervention. *Med Sci Sports Exerc*. 2005;37:478–487.

42. Sallis JF, McKenzie TL, Conway TL, Elder JP, Prochaska JJ, Brown M, Zive MM, Marshall SJ, Alcazar JE. Environmental interventions for eating and physical activity: a randomized controlled trial in middle schools. *Am J Prev Med*. 2003;24:209–217.
43. McKenzie TL, Sallis JF, Prochaska JJ, Conway TL, Marshall SJ, Rosengard P. Evaluation of a two-year middle-school physical education intervention: M-SPAN. *Med Sci Sports Exerc*. 2004;36:1382–1388.
44. Davis SM, Clay T, Smyth M, Gittelsohn J, Arviso V, Flint-Wagner H, Rock BH, Brice RA, Metcalf L, Stewart D, Vu M, Stone EJ. Pathways curriculum and family interventions to promote healthful eating and physical activity in American Indian schoolchildren. *Prev Med*. 2003;37(6 pt 2):S24–S34.
45. McKenzie TL, Sallis JF, Kolody B, Faucette FN. Long-term effects of a physical education curriculum and staff development program: SPARK. *Res Q Exerc Sport*. 1997;68:280–291.
46. Sallis JF, McKenzie TL, Alcazar JE, Kolody B, Faucette N, Hovell MF. The effects of a 2-year physical education program (SPARK) on physical activity and fitness in elementary school students. *Am J Public Health*. 1997;87:1328–1334.
47. Stevens J, Murray DM, Catellier DJ, Hannan PJ, Lytle LA, Elder JP, Yong DR, Simons-Morton DG, Webber LS. Design of the Trial of Activity for Adolescent Girls (TAAG). *Contemp Clin Trials*. 2005;26:223–233.
48. Baranowski T, Klesges LM, Cullen KW, Himes JH. Measurement of outcomes, mediators, and moderators in behavioral obesity prevention research. *Prev Med*. 2004;38(suppl):S1–S13.
49. Resnicow K, Robinson TN. School-based cardiovascular disease prevention studies: review and synthesis. *Ann Epidemiol*. 1997;7(S7):S14–S31.
50. Killen JD, Telch MJ, Robinson TN, Maccoby N, Taylor CB, Farquhar JW. Cardiovascular disease risk reduction for tenth graders: a multiple-factor school-based approach. *JAMA*. 1988;260:1728–1733.
51. Gortmaker SL, Cheung LW, Peterson KE, Chomitz G, Cradle JH, Dart H, Fox MK, Bullock RB, Sobol AM, Colditz G, Field AE, Laird N. Impact of a school-based interdisciplinary intervention on diet and physical activity among urban primary school children: eat well and keep moving. *Arch Pediatr Adolesc Med*. 1999;153:975–983.
52. Gortmaker SL, Peterson K, Wiecha J, Sobol AM, Dixit S, Fox MK, Laird N. Reducing obesity via a school-based interdisciplinary intervention among youth: Planet Health. *Arch Pediatr Adolesc Med*. 1999;153:409–418.
53. Tell GS, Vellar OD. Physical fitness, physical activity, and cardiovascular disease risk factors in adolescents: the Oslo Youth Study. *Prev Med*. 1988;17:12–24.
54. Killen JD, Robinson TN, Telch MJ, Saylor KE, Maron DJ, Rich T, Bryson S. The Stanford Adolescent Heart Health Program. *Health Educ Q*. 1989;16:263–283.
55. Homel PJ, Daniels P, Reid TR, Lawson JS. Results of an experimental school-based health development programme in Australia. *Int J Health Educ*. 1981;24:263–270.
56. Perry CL, Klepp K, Halper A, Dudovitz B. Promoting healthy eating and physical activity patterns among adolescents: a pilot study of Slice of Life. *Health Educ Res*. 1987;2:93–103.
57. Kelder SH, Perry CL, Klepp KI. Community-wide youth exercise promotion: long-term outcomes of the Minnesota Heart Health Program and the Class of 1989 Study. *J Sch Health*. 1993;63:218–223.
58. Marcus BH, Dubbert PM, Forsyth LH, McKenzie TL, Stone EJ, Dunn AL, Blair SN. Physical activity behavior change: issues in adoption and maintenance. *Health Psychol*. 2000;19(1 suppl):32–41.
59. Trudeau F, Laurencelle L, Tremblay J, Rajic M, Shephard RJ. Daily primary school physical education: effects on physical activity during adult life. *Med Sci Sports Exerc*. 1999;31:111–117.
60. McKenzie TL, Li D, Derby CA, Webber LS, Luepker RV, Cribb P. Maintenance of effects of the CATCH physical education program: results from the CATCH-ON study. *Health Educ Behav*. 2003;30:447–462.
61. Dowda M, Sallis JF, McKenzie TL, Rosengard P, Kohl HW. Evaluating the sustainability of SPARK physical education: a case study of translating research into practice. *Res Q Exerc Sport*. 2005;76:11–19.
62. Kelder SH, Mitchell PD, McKenzie TL, Derby C, Strikmiller PK, Luepker RV, Stone EJ. Long-term implementation of the CATCH physical education program. *Health Educ Behav*. 2003;30:463–475.
63. McKenzie TL, Kahan D. Impact of the Surgeon General's Report: through the eyes of physical education teacher educators. *J Teaching Physical Educ*. 2004;23:300–317.
64. Jarrett OS, Maxwell DM, Dickerson C, Hoge P, Davies G, Yetley A. Impact of recess on classroom behavior: group effects and individual differences. *J Educ Res*. 1998;92:121–126.
65. Pellegrini AD, Davis PD. Relations between children's playground and classroom behaviour. *Br J Educ Psychol*. 1993;63:88–95.
66. McCann B, DeLille B. *Mean Streets 2000: Pedestrian Safety, Health and Federal Transportation Spending*. Washington, DC: Surface Transportation Policy Project; 2000.
67. Centers for Disease Control and Prevention. School transportation modes—Georgia, 2000. *MMWR Morb Mortal Wkly Rep*. 2002;51:704–705.
68. Centers for Disease Control and Prevention. Barriers to children walking and biking to school—United States, 1999. *MMWR Morb Mortal Wkly Rep*. 2002;51:701–704.
69. Sirard JR, Ainsworth BE, McIver KL, Pate RR. Prevalence of active commuting at urban and suburban elementary schools in Columbia, SC. *Am J Public Health*. 2005;95:236–237.
70. Rossi G, Moretti R, Pirone M, Locatelli W. Promoting physical activity: going to school by the Piedibus (walking school bus) [in Italian]. *Epidemiol Prev*. 2004;28:346–349.
71. Aaron DJ, Dearwater SR, Anderson R, Olsen T, Kriska AM, Laporte RE. Physical activity and the initiation of high-risk health behaviors in adolescents. *Med Sci Sports Exerc*. 1995;27:1639–1645.
72. D'Elia MA, Mundt DJ, Bush PJ, Iannotti RJ. Healthful behaviors: do they protect African-American, urban preadolescents from abusable substance use? *Am J Health Promot*. 1993;7:354–363.
73. Skolnick AA. Studies raise doubts about benefit of athletics in reducing unhealthy behavior among adolescents. *JAMA*. 1993;270:798, 800.
74. Pate RR, Trost SG, Levin S, Dowda M. Sports participation and health-related behaviors among US youth. *Arch Pediatr Adolesc Med*. 2000;154:904–911.
75. Ara I, Vicente-Rodriguez G, Jimenez-Ramirez J, Dorado C, Serrano-Sanchez JA, Calbet JA. Regular participation in sports is associated with enhanced physical fitness and lower fat mass in prepubertal boys. *Int J Obes Relat Metab Disord*. 2004;28:1585–1593.
76. Winnail SD, Valois RF, Dowda M, McKeown RE, Saunders RP, Pate RR. Athletics and substance use among public high school students in a southern state. *Am J Health Stud*. 1997;13:187–194.
77. Kullig K, Brener ND, McManus T. Sexual activity and substance use among adolescents by category of physical activity plus team sports participation. *Arch Pediatr Adolesc Med*. 2003;157:905–912.
78. Stewart JA, Dennison DA, Kohl HW, Doyle JA. Exercise level and energy expenditure in the Take 10! in-class physical activity program. *J Sch Health*. 2004;74:397–400.
79. Going S, Thompson J, Cano S, et al. The effects of the Pathways Obesity Prevention Program on physical activity in American Indian children. *Prev Med*. 2003;37:S62–S69.
80. The No Child Left Behind Act. Pub Law No 107–110 (2002).
81. Wilkins JL, Graham G, Parker S, Westfall S, Fraser RG, Tembo M. Time in the arts and physical education and school achievement. *J Curriculum Studies*. 2003;35:721–735.
82. Sallis JF, McKenzie TL, Kolody B, Lewis M, Marshall S, Rosengard P. Effects of health-related physical education on academic achievement: project SPARK. *Res Q Exerc Sport*. 1999;70:127–134.
83. Shephard RJ, Volle M, Lavallée H, LaBarre R, JeQuier J, Rajic M. Required physical activity and academic grades: a controlled longitudinal study. In: Ilmarinen J, Valimaki I, eds. *Children and Sport*. Berlin, Germany: Springer Verlag; 1984:58–63.
84. van der Mars H. Physical education time and academic achievement. In: Kirk D, O'Sullivan M, McDonald D, eds. *Handbook of Physical Education*. Thousand Oaks, Calif: Sage Publications. In press.
85. Robinson TN. Reducing children's television viewing to prevent obesity: a randomized controlled trial. *JAMA*. 1999;282:1561–1567.
86. Epstein LH, Smith JA, Vara LS, Rodefer JS. Behavioral economic analysis of activity choice in obese children. *Health Psychol*. 1991;10:311–316.
87. Epstein LH, Saelens BE, Myers MD, Vito D. Effects of decreasing sedentary behaviors on activity choice in obese children. *Health Psychol*. 1997;16:107–113.

88. Epstein LH, Paluch RA, Consalvi A, Riordan K, Scholl T. Effects of manipulating sedentary behavior on physical activity and food intake. *J Pediatr*. 2002;140:334–339.
89. Ford BS, McDonald TE, Owens AS, Robinson TN. Primary care interventions to reduce television viewing in African-American children. *Am J Prev Med*. 2002;22:106–109.
90. Robinson TN, Killen JD, Kraemer HC, Wilson DM, Matheson DM, Haskell WL, Pruitt LA, Powell TM, Owens AS, Thompson NS, Flint-Moore NM, Davis GJ, Emig KA, Brown RI, Rochon J, Green S, Varady A. Dance and reducing television viewing to prevent weight gain in African-American girls: the Stanford GEMS pilot study. *Ethnic Dis*. 2003;13:S1-65–S1-77.
91. Gutin B, Owens S, Okuyama T, Riggs S, Ferguson M, Litaker M. Effect of physical training and its cessation on percent fat and bone density of children with obesity. *Obes Res*. 1999;7:208–214.
92. Gutin B, Barbeau P, Owens S, Lemmon CR, Bauman M, Allison J, Kang HS, Litaker MS. Effects of exercise intensity on cardiovascular fitness, total body composition, and visceral adiposity of obese adolescents. *Am J Clin Nutr*. 2002;75:818–826.
93. Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Division of Nutrition and Physical Activity. Physical activity for everyone: physical activity terms. Available at: <http://www.cdc.gov/nccdphp/dnpa/physical/terms/index.htm>. Accessed July 14, 2006.
94. Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Division of Nutrition and Physical Activity. BMI—body mass index: BMI for children and teens. Available at: http://www.cdc.gov/nccdphp/dnpa/bmi/childrens_BMI/about_childrens_BMI.htm. Accessed July 14, 2006.
95. National Association for Sport and Physical Education. National Standards for Physical Education. Available at: <http://www.aahperd.org/NASPE/template.cfm?template=publications-nationalstandards.html>. Accessed August 1, 2006.
96. Merriam-Webster Online Dictionary. “Prevalence,” definition No. 2. Available at: <http://www.m-w.com/dictionary/prevalence>. Accessed July 14, 2006.

KEY WORDS: AHA Scientific Statements ■ exercise ■ pediatrics ■ physical activity ■ prevention



Circulation

JOURNAL OF THE AMERICAN HEART ASSOCIATION



National Association for Sport & Physical Education

an association of the American Alliance for Health, Physical Education, Recreation and Dance

NASPE Sets the Standard

1900 Association Drive,
Reston, Virginia 20191
Telephone (703) 476-3410
Fax (703) 476-8316
E-mail naspe@aahperd.org
Web www.naspeinfo.org

Understanding the Difference

IS IT PHYSICAL EDUCATION OR PHYSICAL ACTIVITY?

With heightened attention on childhood obesity prevention efforts, there seems to be some confusion between the terms “physical education” and “physical activity.” Often the words are used interchangeably but they differ in important ways. Understanding the difference between the two is critical to understanding why both contribute to the development of healthy, active children. The National Association for Sport and Physical Education (NASPE) believes every child in the United States deserves both a quality physical education and physical activity program.

School **physical education programs** offer the best opportunity to provide physical activity to all children and to teach them the skills and knowledge needed to establish and sustain an active lifestyle. Physical education teachers assess student knowledge, motor and social skills, and provide instruction in a safe, supportive environment. NASPE recommends that schools provide 150 minutes of instructional physical education for elementary school children, and 225 minutes for middle and high school students per week for the entire school year. Based on sequence of learning, physical education should not be compared to or confused with other physical activity experiences such as recess, intramurals, or recreational endeavors.

A quality physical education program provides learning opportunities, appropriate instruction, meaningful and challenging content for all children, and should include:

Opportunity to Learn:

- Instructional periods totaling 150 minutes per week (elementary) and 225 minutes per week (middle and high school)
- Qualified physical education teachers providing a developmentally appropriate program
- Teacher/student ratio in physical education no greater than 1:25 (elementary) and (1:30 middle/high) for optimal instruction (similar to other classroom settings)
- Adequate equipment and facilities for all students to be active at the same time

Appropriate Instruction:

- Full inclusion of all students
- Maximum participation and ample practice opportunities for class activities
- Well-designed lessons that facilitate student learning
- Out of school assignments that support learning and practice of learned skills
- Appropriate discipline and class management (physical activity should never be used as punishment)
- Use of regular assessment to monitor and reinforce student learning

Meaningful Content:

- Instruction in a variety of motor skills that are designed to enhance the physical, mental, and social/emotional development of every child
- Fitness education and assessment to help children understand, improve and/or maintain their physical well-being
- Development of cognitive concepts about motor skill and fitness
- Opportunities to improve emerging social and cooperative skills through physical activity and gain a multi-cultural perspective
- Promotion of recommended amounts of physical activity now and throughout life

Physical activity is bodily movement of any type and may include recreational, fitness and sport activities such as jumping rope, playing soccer, lifting weights, as well as daily activities such as walking to the store, taking the stairs or raking the leaves. Similar health benefits to those received during a physical education class are possible during physical activity bouts when the participant is active at an intensity that increases heart rate and produces heavier than normal breathing. NASPE recommends school-age children accumulate at least 60 minutes and up to several hours of physical activity per day while avoiding prolonged periods of inactivity.

Opportunities to accumulate physical activity during the school day include time spent in physical education class, classroom-based movement, recess, walking or biking to school, and recreational sport and play that occurs before, during, and after school. Parents and grandparents are urged to get active with their children. The benefits of regular physical activity include:

- Reduces the risk for overweight, diabetes and other chronic diseases
- Assists in improved academic performance
- Helps children feel better about themselves
- Reduces the risk for depression and the effects of stress
- Helps children prepare to be productive, healthy members of society and
- Improves overall quality of life.

NASPE encourages parents and community members to visit the local schools to view daily developmentally appropriate physical education classes and supplementary physical activity opportunities such as recess, physical activity breaks and after school programs.

To learn more about the importance of physical education and physical activity, visit the NASPE website at www.naspeinfo.org.

Citation: Ballard, K, Caldwell D, Dunn C, Hardison A, Newkirk, J, Sanderson M, Thaxton Vodicka S, Thomas C Move More, NC's Recommended Standards For Physical Activity In School. North Carolina DHHS, NC Division of Public Health, Raleigh, NC; 2005.

Childhood Obesity — The Shape of Things to Come

David S. Ludwig, M.D., Ph.D.

Related articles, pages 2329 and 2371

Last week, I met with the G. family in the Optimal Weight for Life (OWL) clinic at my hospital. One of the parents was overweight, and the other was obese. The five children were more severely obese and had numerous weight-related complications — one had evidence of fatty liver, one had high blood pressure, two had gastroesophageal reflux, two had orthopedic problems, three had marked insulin resistance, four had dyslipidemia, and all had emotional problems related to their weight.

Sadly, this family might be a microcosm of 21st-century America: if we don't take steps to reverse course, the children of each successive generation seem destined to be fatter and sicker than their parents. How will obesity affect the physical and psychological well-being of children in coming decades? What effects will childhood obesity have on life expectancy, the national economy, and our society? To explore these questions, one might view the obesity epidemic as consisting of four overlapping phases.

Phase 1 began in the early 1970s and is ongoing: average weight is progressively increasing among children from all socioeconomic levels, racial and ethnic groups, and regions of the country. Today, about one in three children and adolescents is overweight (with a body-mass index, or BMI, in the 85th to 95th percentile for age and sex) or obese

(BMI above the 95th percentile), and the proportion approaches one in two in certain minority groups.¹ Though it has attracted much attention from the medical profession and the public, childhood obesity during this phase has actually had little effect on public health, because an obese child may remain relatively healthy for years.

Phase 2, which we are now entering, is characterized by the emergence of serious weight-related problems.² The incidence of type 2 diabetes among adolescents, though still not high, has increased by a factor of more than 10 in the past two decades and may now exceed that of type 1 diabetes among black and Hispanic adolescents. Fatty liver associated with excessive weight, unrecognized in the pediatric literature before 1980, today occurs in about one in three obese children. Other obesity-related complications affecting virtually every organ — ranging from crippling orthopedic problems to sleep apnea — are being diagnosed with increasing frequency in children (see table). There is also a heavy psychosocial toll: obese children tend to be socially isolated and have high rates of disordered eating, anxiety, and depression. When they reach adulthood, they are less likely than their thinner counterparts to complete college and are more likely to live in poverty.

It may take many years to reach phase 3 of the epidemic, in

which the medical complications of obesity lead to life-threatening disease. As Baker et al. (pages 2329–2337) and Bibbins-Domingo et al. (pages 2371–2379) report in this issue of the *Journal*, overweight or obesity in childhood or adolescence increases the risk of coronary heart disease (CHD) in adulthood; by 2035, Bibbins-Domingo et al. predict, the prevalence of CHD will have increased by 5 to 16%, with more than 100,000 excess cases attributable to increased obesity among today's adolescents. Preliminary data from Canada suggest that adolescents with type 2 diabetes will be at high risk for limb amputation, kidney failure requiring dialysis, and premature death. In some, fatty liver will progress to hepatitis and cirrhosis, which may remain asymptomatic until irreversible organ damage has occurred. Poverty and social isolation would complicate the timely identification and management of such problems. Shockingly, the risk of dying by middle age is already two to three times as high among obese adolescent girls as it is among those of normal weight, even after other lifestyle factors are taken into account.³ My colleagues and I have predicted that pediatric obesity may shorten life expectancy in the United States by 2 to 5 years by midcentury — an effect equal to that of all cancers combined.⁴

Without effective intervention, phase 4 of the epidemic will entail an acceleration of the obesity

Complications of Childhood Obesity.	
Psychosocial	Poor self-esteem Anxiety Depression Eating disorders Social isolation Lower educational attainment
Neurologic	Pseudotumor cerebri
Endocrine	Insulin resistance Type 2 diabetes Precocious puberty Polycystic ovaries (girls) Hypogonadism (boys)
Cardiovascular	Dyslipidemia Hypertension Coagulopathy Chronic inflammation Endothelial dysfunction
Pulmonary	Sleep apnea Asthma Exercise intolerance
Gastrointestinal	Gastroesophageal reflux Steatohepatitis Gallstones Constipation
Renal	Glomerulosclerosis
Musculoskeletal	Slipped capital femoral epiphysis Blount's disease* Forearm fracture Back pain Flat feet

* Blount's disease is a growth disorder of the tibia that causes the lower leg to angle inward (tibia vara).

rate through transgenerational mechanisms. Obese children tend to be heavy in adulthood, in part because obesity-promoting habits persist. In addition, carrying excessive weight early in life may elicit irreversible biologic changes in hormonal pathways, fat cells, and the brain that increase hunger and adversely affect metabolism. Furthermore, adult obesity

and its complications appear to increase the risk of obesity and its complications in offspring through nongenetic influences, a phenomenon termed perinatal programming. For example, a recent study found that maternal hyperglycemia during pregnancy strongly predicted BMI in offspring at 5 to 7 years of age, after adjustment for maternal weight gain and birth weight.⁵

Currently, the economic costs of pediatric obesity in the United States are relatively small — probably several hundred million dollars annually. Without effective intervention, the costs of obesity might well become catastrophic, arising not only from escalating medical expenses but also from diminished worker productivity, caused by physical and psychological disabilities. Future economic losses could mean the difference between solvency and bankruptcy for Medicare, between expanding and shrinking health care coverage, and between investment in and neglect of our social infrastructure, with profound implications for our international competitiveness. The human costs would be incalculable.

Like global warming, the obesity epidemic is a looming crisis that requires action before all the scientific evidence is in. And as with climate change, some have questioned experts' forecasts, doubting the far-reaching impact of obesity, though skepticism is gradually being overcome by accumulating data. Others would defer concerted efforts to address the problem, placing hope in the development of new drugs or surgical procedures that, like some

abundant and nonpolluting energy source, might offer a painless technological fix. Or they argue that the costs of action are too great, not recognizing that our survival depends on solving the problem. But I believe that obesity differs in one important respect from global warming: simple solutions are available, and with a comprehensive national strategy, we may be able to implement them without great sacrifice.

Certainly, we have much to learn about the regulation of body weight. Low-fat diets have yielded disappointing results, and very-low-carbohydrate diets appear to be more effective only in the short term. Novel approaches that focus on the quality rather than the ratio of macronutrients appear promising, and other areas warrant study, including the effects of sleep deprivation, stress, infectious agents, and endocrine-disrupting environmental toxins on weight. Unfortunately, the U.S. government has thus far invested only a fraction of a cent in research for every dollar that obesity costs society. And although broad consensus exists regarding the dietary and lifestyle habits needed to prevent and treat childhood obesity, we lack anything resembling a comprehensive strategy for encouraging children to eat a healthful diet and engage in physical activity. Such a strategy would include legislation that regulates junk-food advertising, provides adequate funding for decent lunches and regular physical activities at school, restructures the farm-subsidies program to favor nutrient-dense rather than

calorie-dense produce, and mandates insurance coverage for preventing and treating pediatric obesity.

Parents must take responsibility for their children's welfare by providing high-quality food, limiting television viewing, and modeling a healthful lifestyle. But why should Mr. and Ms. G.'s efforts to protect their children from life-threatening illness be undermined by massive marketing campaigns from the manufacturers of junk food? Why are their children subjected to the temptation of such food in the school cafeteria and vending machines? Why don't they

have the opportunity to exercise their bodies during the school day? And why must Mr. and Ms. G. fight with their insurance company for reimbursement to cover the costs of their children's care at the OWL clinic? Fortunately, with the exercise of both personal and social responsibility, we have the power to choose the shape of things to come.

An interview with Dr. Ludwig can be heard at www.nejm.org.

Dr. Ludwig is director of the Optimal Weight for Life Program in the Division of Endocrinology, Children's Hospital Boston, and an associate professor of pediatrics at Harvard Medical School — both in Boston.

1. Ogden CL, Carroll MD, Curtin LR, McDowell MA, Tabak CJ, Flegal KM. Prevalence of overweight and obesity in the United States, 1999-2004. *JAMA* 2006;295:1549-55.
 2. Ebbeling CB, Pawlak DB, Ludwig DS. Childhood obesity: public health crisis, common sense cure. *Lancet* 2002;360:473-82.
 3. van Dam RM, Willett WC, Manson JE, Hu FB. The relationship between overweight in adolescence and premature death in women. *Ann Intern Med* 2006;145:91-7.
 4. Olshansky SJ, Passaro DJ, Hershow RC, et al. A potential decline in life expectancy in the United States in the 21st century. *N Engl J Med* 2005;352:1138-45.
 5. Hillier TA, Pedula KL, Schmidt MM, Mullen JA, Charles MA, Pettitt DJ. Childhood obesity and metabolic imprinting: the ongoing effects of maternal hyperglycemia. *Diabetes Care* 2007;30:2287-92.
- Copyright © 2007 Massachusetts Medical Society.

A Lifestyle We Can't Afford

How physical
inactivity and
excess weight are
costing Maine
billions of dollars
each year



A Topline Report

From the study, *An Economic Cost Appraisal of Physical Inactivity, Overweight, and Obesity Among Maine Adults*

Conducted by Chenoweth & Associates, Inc.



www.anthem.com/maine/weightstudy



www.mainehealth.org

WE ALL KNOW PEOPLE WHO LIVE BEYOND THEIR MEANS, continually spending more and more on a lifestyle they can't afford until it eventually catches up with them, often bringing financial ruin and intense hardship. Fortunately, people like that are the exception to the rule.

But there is another kind of lifestyle – another form of living beyond our means – that is even more costly and all too prevalent in Maine and around the country. It is a sedentary, unhealthy lifestyle that is making us sick, even killing us, and costing us huge sums of money that individually and collectively we can no longer afford.

Our bodies, like our personal finances, have limits, and too many of us in Maine are living beyond our means in terms of our physical and mental well-being. We are physically inactive and/or overweight to the point where we have put ourselves and our state at great risk.

But we are dealing with many individuals and their individual choices, so how do we capture the magnitude of the problem in a way that everyone can understand? How do we sound the alarm in a way that can reach every person in Maine? One way is to put the risk in dollars and cents.

That is the approach we followed in asking David Chenoweth, Ph.D., to undertake a study to quantify the cost of three risk factors – physical inactivity, overweight and obesity – on three major cost components – medical care, workers' compensation, and lost productivity. Dr. Chenoweth and his colleagues at Chenoweth & Associates have pioneered this work, performing similar cost appraisals in California and six other states.

Like the findings in those other states, the cost of these three risk factors in Maine is staggering – more than \$2.5 billion in total direct and indirect costs. That's the bad news. The good news is that even very modest improvements in physical activity and weight among Maine adults can save us hundreds of millions of dollars.

We have prepared this report to alert you to the magnitude of the problem of physical inactivity and excess weight in

Maine and to give you an overview of the Chenoweth report, *An Economic Cost Appraisal of Physical Inactivity, Overweight and Obesity among Maine Adults*. As Maine's largest health insurer and the state's largest health system, Anthem Blue Cross and Blue Shield and MaineHealth are collaborating to assure that timely, relevant information and data are available to address key drivers of increasing health care costs in Maine.

It is our hope that this cost appraisal encourages you and others to join us in promoting public policies and practices that will improve the health of Maine people and dramatically reduce the risks and costs of physical inactivity, overweight and obesity in Maine. As this report so clearly demonstrates, these risk factors represent a lifestyle that we can no longer afford.

Sincerely,



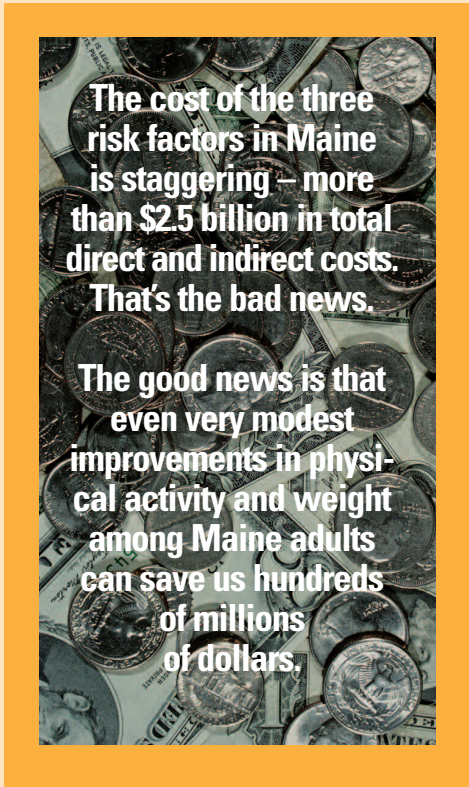
Jeffrey Holmstrom, D.O.
Medical Director



Lisa M. Letourneau MD, MPH
Senior Director, Clinical Integration

Anthem 

MaineHealth[®]



Executive summary

Physical inactivity and excess weight are at epidemic rates throughout the United States, and Maine is no exception. The most recent data from the Centers for Disease Control and Prevention (CDC) classifies Maine adults as follows:

- **46.9 percent of Maine adults are physically inactive;**
- **43.9 percent of Maine adults are overweight; and**
- **29.4 percent of Maine adults are obese**

Obesity has quickly become a leading cause of disease, disability, and death in Maine. Nationally, according to research published in the Journal of the American Medical Association, physical inactivity and poor nutrition have nearly caught up with tobacco use as the leading underlying causes of death in the United States¹.

Obviously we didn't get to this point overnight. Comparing our lives today with those of our ancestors, the Healthy Maine 2010 report notes that "...today, physical activity is completely segregated from our work lives. Many of us sit the vast majority of our workday. And, in terms of nutrition, instead of eating locally grown food high in fiber, many of the foods we eat are processed, high in fat, high in sugar, and low in fiber."

Looking to the future, the next generation is continuing this trend at an accelerated pace. Over the past two decades the number of American youth who are overweight has seen a 100% increase².

We know intuitively that physical inactivity, overweight and obesity carry an extremely high cost, both human and financial. The human cost takes its toll on the quality of life experienced by individuals and families all across Maine; the financial cost impacts everyone of us as taxpayers, workers and consumers.

That is why Anthem Blue Cross and Blue Shield and MaineHealth asked Chenoweth & Associates, Inc. to conduct an economic cost appraisal of physical inactivity and excess weight among 18-64 year-old adults in the

State of Maine. The study looked at the impact of these risk factors on three major cost areas:

- **medical care**
- **workers' compensation**
- **lost productivity**

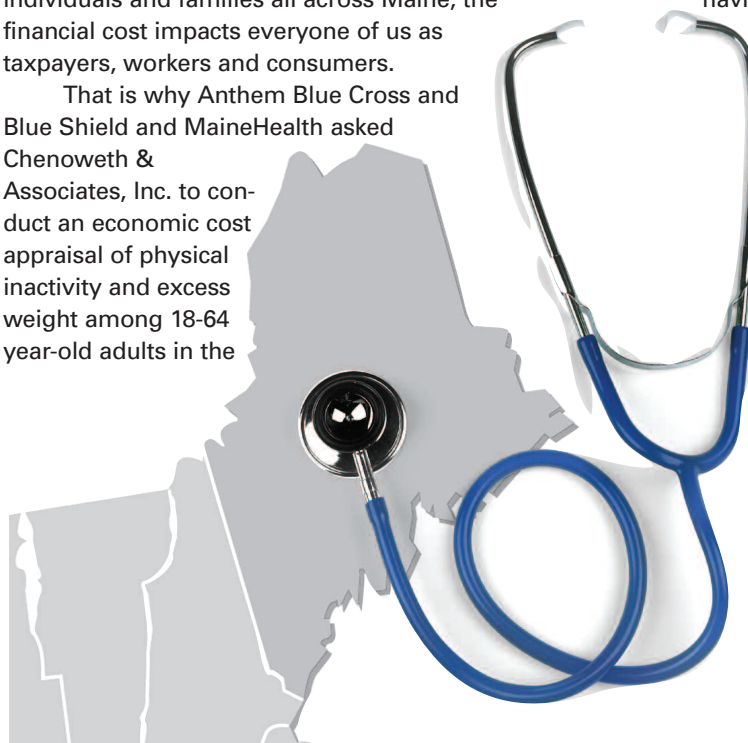
Its conclusion: based on 2004 data, the combined direct and indirect cost of the three risk factors of physical inactivity, overweight and obesity is \$2.56 billion a year. That's a staggering amount of money and a wake-up call to everyone in Maine.

Going forward, this number will inevitably increase due to Maine's aging population, our modest population growth, increasing labor costs, the prevalence of high risk factors in our state and medical care inflation.

For example, if the medical care, workers' compensation, and employment cost index components used in this study continue to rise at current rates, the cost of physical inactivity and excess weight will increase from \$2.56 billion in 2004 to more than \$3.10 billion in 2009, a cumulative 5-year increase of more than 21%.

But while the size of the problem is daunting, even modest improvements in these risk factors can yield significant results. For example, a mere 5% improvement in the percentage of Maine's physically inactive and overweight adults would save \$750 million over a five-year timeframe, or about \$150 million per year.

The cost analysis clearly demonstrates that physical inactivity, overweight and obesity are having a profound impact on our current and future health, our health care system, and our economy. The good news is that these risk factors are largely preventable. With leadership and sound public policies, we can dramatically improve the health of Maine people and reduce the extraordinary costs of these risk factors – costs that are borne by us all.



About the study

In early 2006, Chenoweth & Associates, Inc. was hired by Anthem Blue Cross and Blue Shield and MaineHealth to conduct an initial [Phase I] financial cost analysis of physical inactivity, obesity, and overweight among adults in the State of Maine. The purpose of the study was to determine:

- the direct cost of each risk factor on specific medical conditions
- the direct cost of each risk factor on specific workers' compensation conditions
- the direct cost of each risk factor on lost productivity
- the cumulative – direct and indirect – cost of each risk factor
- a cost estimate per risk factor if current trends continue; and
- the cost-savings if 5% of at-risk adults eliminate one or more of the risk factors.

Medical care claims data used for this analysis were obtained from the Maine Health Information Center (MHIC), the state's largest repository of medical claims data. Workers' compensation and productivity data were obtained from various state government sources and nationwide databases.

Various methodologies, including the Proportionate Risk Factor Cost Appraisal™ (PRFCA) developed by Dr. Chenoweth, were used to quantify the direct medical care costs associated with each of the selected risk factors. Indirect costs, based on conservative multiples, were factored in where applicable.

The Phase I analysis included medical care claims data for the calendar year of 2003 and focused on 18 to 64 year-old adult Mainers with employment-based or individual health insurance. Later in 2006, Chenoweth & Associates conducted

a subsequent [Phase II] and nearly identical analysis of physical inactivity, overweight, and obesity using medical care data for the calendar year of 2004. This report is based on the Phase II analysis.

Chenoweth & Associates

Dr. David H. Chenoweth is director of the Worksite Health Promotion Program at East Carolina University. He has a Ph.D. from The Ohio State University and is the author of eight books on health promotion and health care costs. He is a contributor to numerous publications and has made hundreds of presentations to business and health care groups.

In 1979, he created Chenoweth & Associates, Inc., an econometric data analysis and consulting firm, that employs principles from various fields, including economics, health education, epidemiology,

and risk management. In addition to consulting for some of the country's leading corporations, Chenoweth & Associates has performed analyses of obesity, physical inactivity and other risk factors in California, Massachusetts, New York and Michigan, Texas, Washington, North Carolina and Maine.

The Risk Factors

The cost analysis performed by Chenoweth & Associates in Maine is based on three risk factors: **physical inactivity**, **overweight and obesity**. Each one is defined in the following way.

The definitions for overweight and obese are based on Body Mass

Index (BMI), which refers to a person's weight relative to height³. The calculation for BMI is:

$$[\text{Weight (lbs.)} / \text{ht. (inches sq)}] \times 704.5.$$

Healthy Weight: BMI between 18.6 to 24.9

Overweight: BMI between 25.0 to 29.9

Obesity: BMI between 30.0 to 39.9, with severe obesity defined as BMI > 40.0

Underweight: BMI < 18.5



According to the National Heart, Lung, and Blood Institute, approximately 55%, or more than 110 million adults in the United States, are overweight or obese. Numerous studies indicate that even a moderate weight gain or being moderately overweight can significantly increase medical risk factors.

A major source of weight data in the U.S. is the Behavioral Risk Factor Surveillance Survey (BRFSS), a nationwide telephone-based survey. Since recent studies have found that the prevalence of excess weight is greatly underestimated, the 2004 BRFSS data used in the cost appraisal were adjusted upward by 6%⁴.

Individuals are classified as being physically inactive if they do not engage in “moderate physical activity for 30 or more minutes per day, five or more days per week – or vigorous physical activity for 20 or more minutes per day, three or more days per week.”

Based on the most recent BRFSS, approximately 46.9% of Maine adults do not meet this standard⁵.

The cost components

Taking the three risk factors, Chenoweth & Associates then applied them to three major units of cost: **medical care (including prescription drugs); workers’ compensation; and lost productivity.**

The data to make these cost appraisals came from several key sources. Medical care claims information relevant to targeted medical conditions was provided by the Maine Health Information Center (MHIC). Claims data were restricted to adults who were (a) 18-64 years of age and (b) insured by an employer-sponsored or individual policy in the calendar year of 2004.

MHIC’s “All Claims Database” covers approximately 650,000 lives or about 50% of all Maine residents. Since the database comprises approximately 50% of the target population, a multiple of two was used to project a total statewide estimate. Individuals who were unin-

sured or covered by either Medicaid or Medicare in 2004 were excluded from the analysis.

Targeted workers’ compensation claims and cost data were based on data obtained from the Maine Bureau of Labor Standards. The data spanned a timeframe from 1994 to 2005.

Lost Productivity costs were calculated using several sources. Short-term disability (STD) days associated with targeted medical conditions were estimated and based on Occupational Safety & Health Administration (OSHA) data published in the 2001 Official Disability Guidelines Manual. Absenteeism and “presenteeism” rates associated with physical inactivity, overweight, and obesity were estimated and based on actual U.S. worksite case studies. Lastly, the median annual

employee income for the calendar year of 2005 was obtained from the Maine Department of Administrative & Financial Services, Bureau of Human Resources.



Medical costs

Medical care

Nearly one of every seven dollars spent on primary medical care for major medical conditions is attributed to the three risk factors.

Physical inactivity, overweight, and obesity are seen as independent risk factors and/or contributing factors for conditions found in at least ten Major Diagnostic Categories (MDC), ranging from certain cancers, to circulatory diseases, musculo-skeletal conditions, mental health issues and injuries.



The first step to accurately measure the financial impact of physical inactivity and excess weight on targeted medical conditions was to review all medical claims and cost data provided by MHC. Medical care costs associated with the targeted medical conditions were \$260.61 million.

Using the Proportionate Risk Factor Cost Appraisal™ (PRFCA) to determine the portion of each medical condition associated with risk factors, it was determined that the combined cost of these targeted risk factors comprise \$38.05 million, or 14.58% of total medical care costs.

Prescription drugs

Overall, prescription drug costs associated with the targeted risk factors are estimated to comprise more than one of every eight prescription drug dollars in 2004.

According to national estimates, a prescription for medication is written in nearly two out of every three (66.1%) health care visits⁶. As a state, Maine has a high ranking for total drug utilization per capita, as well as for high use of anti-depressants and lipid-lowering drugs⁷⁻⁸.

Drug costs are seen as a direct cost of care because they are prescribed in conjunction with a primary diagnosis or treatment. Moreover, pharmaceutical costs can comprise a significant portion of an organization's total medical expenses and that trend is increasing. In fact, according to the 2005 edition of Merck Medco Health's Drug Trend Report, more people are using more prescription drugs for longer periods of time. If the current trend continues, prescription drug spending could soon outpace spending for inpatient hospital services⁹.

The Chenoweth analysis used various data sources to determine approximate prescription drug use and the costs tied to the study's selected medical conditions, including consulting with several licensed pharmacists to identify the most commonly prescribed drugs for each of the targeted medical conditions.

Using a prescription drug cost estimation model based on (a) actual medical care utilization patterns in Maine and (b) national prescription drug cost norms, the study estimated total prescription drug costs for the targeted medical conditions at more than \$824 million, with the costs attributable to physical inactivity and excess weight at nearly \$102 million.



Total Medical Care and Rx Drug Costs

Combined, the cost of direct medical care and prescription drugs for the three risk factors was more than \$140 million in 2004.

Risk Factor	Medical Costs	Rx Drug Costs	Total Costs
Physical inactivity	\$18.24 million	\$ 39.24 million	\$ 57.48 million
Overweight	8.07 million	20.86 million	28.93 million
Obesity	11.74 million	41.86 million	53.60 million
Total	\$38.05 million	\$101.97 million	\$140.02 million

Workers' Compensation costs

The aggregate cost of medical care and compensable wages attributable to physical inactivity and excess weight is more than \$3 million in workers' compensation claims.

Nationally, many workers' compensation claims have a musculo-skeletal origin, mostly strains and sprains. Many are related to cumulative trauma disorders (CTD), such as carpal tunnel syndrome, and sprains and strains of joints and muscles. Despite their high per case cost, CTDs are among the most preventable work-related conditions¹⁰.



The financial impact of musculo-skeletal injuries applies directly to the two major components of workers' compensation costs: medical care covered by workers' comp insurance and payments for lost wages. The decision to include compensable musculo-skeletal injuries in the cost appraisal is based on the fact that 1) they represent a high percentage of workers' compensation costs, and 2) a substantial percentage of workers' compensation-based musculo-skeletal claims relate to a person's physical fitness status¹¹⁻¹².

As with other parts of the study, a Proportionate Risk Factor Cost AppraisalTM was prepared to compute the cost of each risk factor related to workers' comp-specific strains and sprains.

The analysis shows that physical inactivity is responsible for nearly \$1.5 million of direct workers' compensation medical costs per year, with overweight and obesity responsible for more than another \$1 million of care.

In addition to medical payments, employers also are responsible for paying lost wages while an injured employee is off work. Using additional data, including the total number of claims filed, the median duration of disability and the weekly compensation payments, analysts determined compensatory wage costs associated with sprains and strains related to each risk factor totaled more than \$725,000.

When the medical and wage costs are combined for each risk factor, the total cost of workers' compensation related to physical inactivity, overweight and obesity is \$3,353,690.

Workers' Compensation Costs per Risk Factor

	Physical Inactivity	Overweight	Obesity	Combined costs
Medical Care	\$ 1,491,282	\$ 436,216	\$ 701,125	\$ 2,628,623
Total Wage Payments	351,548	109,858	263,661	725,067
Total	\$ 1,842,830	\$ 546,074	\$ 964,786	\$3,353,690

Lost Productivity

Physical inactivity, overweight and obesity are responsible for more than \$2.09 billion in lost productivity in Maine, far more than medical and workers' comp costs combined.

When measuring the cost of lost productivity, analysts have traditionally included cost units such as absenteeism and short-term disability into their cost equations. In the last decade, a new dimension has been added to the productivity equation: presenteeism.

Presenteeism speaks to lost productivity that occurs when workers are on the job but not fully functioning¹³. It addresses situations where an employee is present at work but limited in some aspect of job performance by one or more health problems. The impacts of presenteeism include: time not on task (e.g., in the workplace, but not working); decreased quality of work (e.g., increased injury rates, product waste, product defects); decreased quantity of work; unsatisfactory employee interpersonal factors (e.g., personality disorders); and an unsatisfactory work culture¹⁴.

When absenteeism, short-term disability, and presenteeism are integrated into a single analysis, they yield a far more accurate picture of lost productivity than focusing only on a single dimension of the problem. However, due to the possibility that two or more of these lost productivity measures can co-exist, it is important to distinguish between multiple outcome measures. The lost productivity outcome measures selected for the cost analysis include the following:

- Absenteeism
- Short-term disability
- Presenteeism
- On-the-job [lost-time] injuries

- Absenteeism
- Short-term disability
- Presenteeism
- On-the-job [lost-time] injuries

Because different methodologies are used to analyze each of the four outcome measures, the first three are addressed separately from on-the-job injuries.

Since Maine's economy and workforce is diversifying more each year, it is important that appropriate lost productivity formulas be used to account for this diversification. The formulas in the cost appraisal are based on composite data, derived from the 2001 Official Disability Guidelines and worksite profiles described in the professional literature.

The Chenoweth analysis uses the data sources to compute the average hours lost due to each risk factor and applies those lost hours to the average compensation and number of workers in Maine.

On-the-job injuries in the study refer to on-

Productivity Loss Costs by Risk Factor

	Physical Inactivity	Overweight	Obesity
Absenteeism	129,819,475	51,386,876	165,519,831
Presenteeism	2,072,784,287	591,327,710	1,901,855,312
S.T. Disability	126,573,988	79,947,160	257,475,292
On-the-job injury	1,159,289	466,391	1,101,325
Sub-total	2,330,337,039	723,128,137	2,325,951,760
Risk Factor Prevalence	x 0.469	x 0.439	x 0.294
Total Costs	\$1,092,928,071	\$317,453,252	\$683,829,817

Overall Productivity Loss Costs \$2,094,211,140

the-job incidents that resulted in lost time from scheduled work, but did not qualify as workers' comp claims or short-term disabilities. Although these incidents are, by and large, typically classified outside the scope of workers' compensation, they still result in lost income to employees, lost payroll dollars to employers, and lost productivity.

Arriving at a cost for on-the-job injuries, involved first identifying which types of on-the-job injuries are directly related to physical inactivity, overweight, or obesity. The second step was to determine an average annual salary and total compensation for Maine workers (\$34,988 including fringe benefits, according to the Maine Department of Labor). The final step involved computing daily and yearly costs of lost-time injuries for each of the targeted risk factors.

Collectively, these risk factors are directly responsible for more than \$2.09 billion in lost productivity.

Indirect costs

When direct and indirect costs are combined, the total impact of the three risk factors on the State of Maine is \$2,566,008,947 – that's more than two and a-half billion dollars.

Direct costs represent only a portion of all physical inactivity, overweight, and obesity costs. In fact, indirect costs can be several times greater than direct costs, and they are real costs that are borne by employees, employers, and government¹⁵⁻¹⁷. To get a complete picture of the impact of the risk factors, it was essential to calculate and factor indirect costs into the overall analysis.



Direct & Indirect Costs (2004) Associated with Targeted Risk Factors

(Adults 18-64 Years of Age)

	Physical Inactivity		Overweight		Obesity	
	Direct	Indirect	Direct	Indirect	Direct	Indirect
Medical Care						
1. Treatments	\$18,244,352	\$41,414,679	\$ 8,076,700	\$18,334,109	\$11,747,927	\$26,667,794
2. Rx Drugs	39,242,531	89,080,545	20,864,983	47,363,511	41,863,148	95,029,346
Subtotal	57,486,883	130,495,224	28,941,683	65,697,620	53,611,075	121,697,140
Workers' Compensation						
1. Medical	\$ 1,491,282	\$ 5,965,128	\$ 436,216	\$ 1,744,864	\$ 701,125	\$ 2,804,500
2. Wages	351,548	0	109,858	0	263,661	0
Subtotal	1,842,830	5,965,128	546,074	1,744,864	964,786	2,804,500
Lost Productivity*						
	\$1,092,928,071	0	\$ 317,453,252	0	\$ 683,829,817	0
Sub-totals	\$1,152,257,784	\$136,460,352	\$346,941,009	\$67,442,484	\$738,405,678	\$124,501,640

* Indirect costs are not applicable in this category, since lost productivity measures, as characterized in the Chenoweth analysis, are considered to be immediate (direct) costs to employers.

Risk Factor	Total Cost
Physical Inactivity	\$1,288,718,136
Overweight	414,383,493
Obesity	862,907,318
Grand Total	\$2,566,008,947

We all pay

The bulk of medical care, lost productivity, and workers' compensation costs highlighted in this cost analysis are paid by Maine employers and taxpayers. While the gross numbers are hard to fathom, distributing the cost of the physical inactivity and excess weight equally among Maine residents, adults, workers and worksites, shows how these risk factors affect each and every one of us¹⁸.

What We Pay

Sector (2004)	Per Capita Cost
• Maine resident (1,283,700)	\$ 1,998
• Maine adult (852,376)	\$ 3,010
• Maine worker (618,400)	\$ 4,149
• Maine worksite (39,650)	\$ 64,716

The potential for savings

Annual cost savings from a modest 5% improvement in the three risk factors would be more \$150 million, enough to fund more than 4,300 new jobs in Maine.

The implications of the cost analysis are clear: the cost of physical inactivity and excess weight is huge and if we do not improve our levels of physical activity and body weight in Maine we will bear an increasingly heavy burden as more aging, physically inactive and obese adults develop premature and/or chronic illnesses.

Make no mistake about it, these costs will inevitably rise due to Maine's population growth, aging population, prevalence of risk factors, and medical care inflation. In just a few years, physical inactivity and excess weight could be costing us more than \$3 billion a year.

But what if we go in the other direction? Let's say the percentage of adult Mainers who are physically-inactive (46.9%), overweight (43.9%) or obese (29.4%) could be reduced by at least five percent, a modest but conceivable goal.

Over a five-year period that cost savings would grow to \$750 million – that's real money that could be invested in many other positive ways!

Of the three risk factors measured in the study, physical inactivity holds the potential for the largest cost savings. After all, it is the most prevalent risk factor among adult Mainers, it is financially tied to all three cost areas (medical care, workers' comp, and lost productivity), and it comprises a substantial portion of each sector's unit cost.

Remember that physical activity guideline: moderate physical activity for 30 or more minutes per day, five or more days per week – or vigorous physical activity for 20 or more minutes per day, three or more days per week. **Think about how much money we could save and how much more productive we could be as a state if more Maine people would just get up off**

the couch and go for a brisk walk five days a week.

Even if you can't find a 20- or 30-minute block of time for sustained physical activity, there are many other ways to work that amount of activity into your day. As the Centers for Disease Control and Prevention (CDC) tells us: "Think about your weekly or daily schedule and look for or make opportunities to be more active. Every little bit helps."

For example, take the stairs and burn almost five times more calories than riding the elevator. Park your car further from your destination so you can walk for a few minutes. Take fitness breaks – walking or doing exercises – instead of a coffee break. Exercise while watching television, using hand weights or stretching. Work in the garden. Ride a bicycle. Take up a sport or get some friends to join you for a walk after work or on weekends.

The possibilities for physical activity are endless – and so are the benefits.



Taking Action

The economic cost appraisal of physical inactivity, overweight and obesity among Maine adults makes it clear that we simply cannot afford the lifestyles that we are living. It affects the taxes we pay, the cost of medical care, and the performance of our workforce. The \$2.5 billion these risk factors are costing is money that could be better invested in other ways than can have a positive impact on our future health and prosperity.

The incidence and prevalence rates used in this cost analysis were generally conservative. Consequently, **cost estimates assigned to each of the selected risk factors do not reflect the full financial cost of each risk factor and, perhaps, most significantly, do not reflect the full potential cost-savings projected with a reduction in any of the targeted risk factors.**

Nonetheless, this cost analysis shows that the targeted risk factors – individually and collectively – have profound consequences on Maine’s citizens and employers. Maine’s worksites, in particular, have a huge stake in promoting healthier lifestyles among Maine adults.

Employers provide health care benefits to nearly eight of every ten workers and, thus, pick up most of the tab for illnesses caused by each of the targeted risk factors. Of course, as taxpayers we also bear a huge stake in reversing this course as we pay directly for many illnesses related to our risk factors via Medicare and Medicaid contributions.

Remember, a mere **5% impact** would generate cost-savings of **approximately \$150 million per year – just in the 18-64 year-old population.** An even higher amount of cost-savings could be achieved by getting the Medicare population – who tend to incur twice as many health care dollars than those under 65 years of age – to become more physically active.

And think about how much we could save if a new generation of Mainers can grow up placing greater importance on physical activity, weight and their own personal well-being.

It is obvious that our public and private-sector organizations need to work together to provide more opportunities and incentives for Maine adults and their families to become more physically active on a daily basis. The numbers make it clear that well-crafted efforts in Maine communities can reduce the unacceptably high prevalence of physical inactivity and excess weight and, at the same time, slow the rising cost of associated health care, workers’ comp, and lost productivity expenses.

To impact each of the cost sectors, it is essential these efforts be:

- **initiated in all public and private-sector schools, churches, community centers, and worksites;**
- **directed to persons of all ages, genders, lifestyles, and economic status levels;**
- **tailored to mesh with the unique needs and interests of all groups;**
- **aligned to each community’s physical environment; and**
- **subjected to objective evaluations to determine short-term, intermediate, and long-term impact.**

We must press for public policies that facilitate and support individual behavior changes. We must pay more attention to our built environment, making sure that walking paths, sidewalks, playgrounds and gymnasiums are easily accessible and available to all.

The combined impact of these efforts can lead to a healthier Maine, plain and simple. Every man, woman, and child can benefit from even a small investment in a more active lifestyle – a lifestyle that we can afford.

Taking action at the community level

Anthem Blue Cross and Blue Shield and MaineHealth have teamed up with Hannaford Bros. Co., Maine Medical Center, TD Banknorth, Unum, and the United Way of Greater Portland to create the **LET’S GO!** program as a way to increase the proportion of children and youth at a healthy weight in 12 Portland area communities. This partnership has already contributed \$1.8 million to promoting physical activity and healthy eating through this innovative demonstration program.



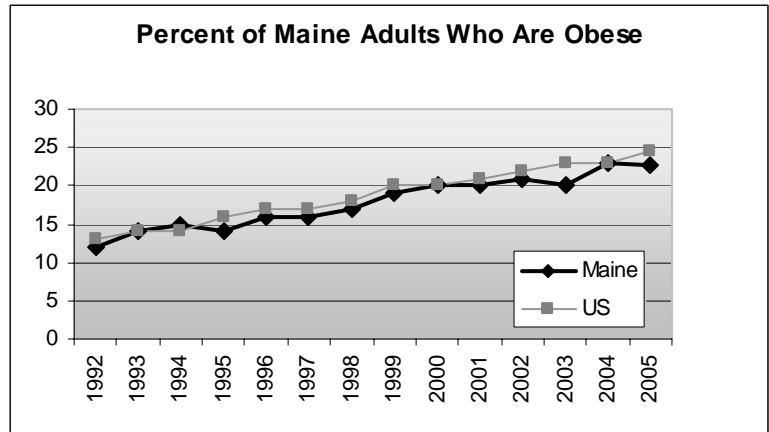
End Notes

- 1 Mokdad, A. Marks, D. Stroup, D. and Gerberding, J. (2004). Actual causes of death in the United States, 2000. **Journal of the American Medical Association**, 291, 10, 1238-45
- 2 Mills, D. (2002). Healthy Maine 2010, Longer and Healthier Lives. Maine Bureau of Health
- 3 **National Heart, Lung, and Blood Institute. Clinical Guidelines on the Identification, Evaluation, and Treatment of Obesity in Adults.** U. S. Department of Health and Human Services, Washington, D.C., 1998.
- 4 Ezzati, M., Martin, H., Skjold, S., Vander Hoorn, S. and Murray, C. (2006). Trends in national and state-level obesity in the USA after correction for self-report bias: analysis of health surveys. **Journal of Royal Society of Medicine**, 99: 250-257.
- 5 **Behavioral Risk Factor Surveillance Survey (2003).** National Center for Chronic Disease Prevention and Health Promotion. State of Maine.
- 6 Hing, E., Cherry, D. and Woodwell, D. National **Ambulatory Medical Care Survey: 2003 Summary**, #365, October 4, 2005.
- 7 **Maine: Retail Prescription Drugs Filled at Pharmacies (Per Capita)**, 2004. The Henry J. Kaiser Family Foundation, [www.statehealthfacts.org]
- 8 Levy, S. (2006). Report Finds Wide Regional Variation in Rx Drug Use. **Drug Topics: The Online Newsmagazine for Pharmacists.** Health System Edition, February 6, 2006.
- 9 Medco Health Solutions. **2005 Drug Trend Report.** News Release.
- 10 Mandelker, J. (1993). Cumulative Trauma Increases Workers' Compensation Claims. **Occupational Health & Safety**, 62: 29-32.
- 11 Forrester, B. et al (1996). Personal Health Risk Predictors of Occupational Injury Among 3,415 Municipal Employees. **Journal of Occupational & Environmental Medicine**, 38:5:515-521.
- 12 Bigas, S. and Battie, M. (1993). Risk Factors For Industrial Back Problems. **Seminars in Spine Surgery**, 4:1:2-11.
- 13 Burton, W. and Conti.D. (1999) The Real Measure of Productivity. **Business & Health**, 11, 34-36
- 14 Loeppke, R., Hymel, P. et al. (2003). Health-related workplace productivity measurement: General and migraine-specific recommendations from the ACOEM Expert Panel. **Journal of Occupational & Environmental Medicine**, 43:10-17
- 15 Ibid.
- 16 Glied, S. (1996). Estimating the Indirect Cost of Illness: An Assessment of the Forgone Earnings Approach. **American Journal of Public Health**, 86:12:1723-1728.
- 17 Brady, W., Bass, J. et al. (1997). Defining Total Corporate Health and Safety Costs - Significance and Impact. **Journal of Occupational and Environmental Medicine.** 39:3:224-231.
- 18 State and County Quick Facts, U.S. Census Bureau, (<http://quickfacts.census.gov/qfd/states/23000.html>)

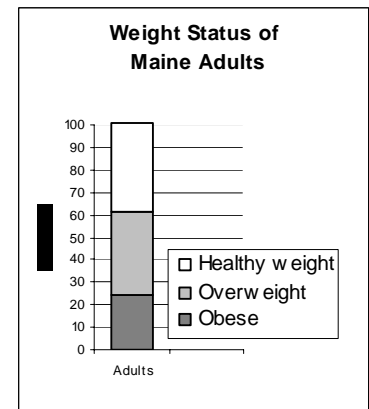
Obesity Prevention and Control in Maine – The Case for New Funding

The Epidemic

Obesity is arguably one of the most serious public health threats in the United States today. The percentage of people in Maine and the U.S. who are overweight or obese has been steadily increasing over the past several decades, nearly doubling since 1992.



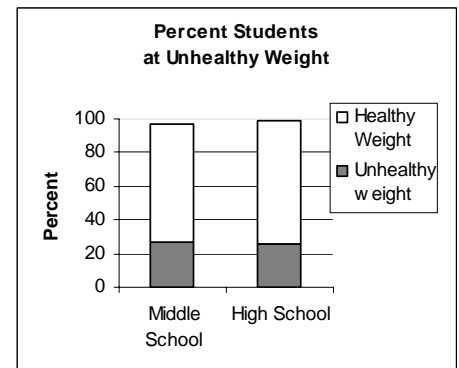
Today, well under half of Maine adults (39%) are considered to be at a healthy weight; most adults are overweight or obese (61%). Nutrition and physical activity affect death and disability from many diseases and can impact a person’s physical, mental, and emotional quality of life. Maine ranks 19th in the nation for deaths due to the four major chronic diseases: cardiovascular disease, cancer, chronic respiratory diseases, and diabetes. These four represent the top four causes of death from chronic disease in Maine, and are all influenced directly by diet and physical inactivity.



The problems of excess weight are not limited to adults. Overall, more than a quarter of both middle school students and high school students are at an unhealthy weight. Childhood obesity has tripled since the 1970s. This has resulted in a doubling of hospital admissions for diabetes among our youth in the last few years (type 2 diabetes was formerly known as adult-onset diabetes, but is now found among children). Additionally, obesity-related and gallbladder disease admissions have tripled. Of great concern is that with more children than ever before being overweight or obese, there is increasing risk for an acceleration of the obesity epidemic in coming decades: obese children tend to be obese adults, leading to increased risk of obesity and complications in offspring; transgenerational effects on obesity may result in new growth in obesity prevalence. The result? Economic costs of obesity could become catastrophic due to diminished worker productivity, bankruptcy of Medicare, shrinking health care coverage, and neglect of the social structure.

The Maine Physical Activity and Nutrition Program

The Maine Physical Activity and Nutrition (PAN) Program was funded in July 2003 by the Federal Centers for Disease Control (CDC). As the Maine’s Obesity Prevention and Control Program, the PAN program leads the statewide efforts to plan, develop and implement public health interventions relating to PAN and obesity. The program works to change state and local policies and physical and social environments to support increased physical activity and healthy eating. The overarching goal of the program is to reduce the



rising tide of overweight and obesity among Maine citizens. Additionally, the PAN Program provides needed resources to coordinate program efforts with other State-wide programs intended to promote health and reduce chronic disease.

The PAN Program's direct funding to date has been limited to capacity funding provided by the Federal CDC (\$450,000). Compared to other chronic disease programs and health promotion programs at the Federal and Maine CDC, this funding falls far short of what is necessary for funding a fully effective obesity prevention and control program.

The PAN Program intends further development of its program to reflect the comprehensive, multifaceted public health approach demonstrated by the Partnership for Tobacco-Free Maine, which has been shown to be effective in reducing youth and adult smoking in Maine over the last 10 years. Based on Federal CDC's tobacco control program funding model for states, the recommendation for tobacco program expenditures in Maine for 2007 was \$18.5 million (range \$13-27.5 million); Maine's actual expenditures of \$16.9 million compares favorably.

To date, CDC has not developed a comparable funding model for obesity programming. However, based on deaths attributable to obesity compared to tobacco caused deaths, obesity related funding should approach \$7 - \$14.9 million annually using an equivalent approach to obesity program development, implementation and funding as for tobacco. Using medical expenditures as the basis of comparison, it could be argued obesity related expenditures should be 50% higher than tobacco program expenditures.

In any case, expenditures for obesity prevention and control need to be increased if we are to turn the tide of the obesity epidemic in Maine. Projections of increases in coronary heart disease incidents and deaths and obesity co-morbidities in conjunction with potentially catastrophic economic consequences on our healthcare system relating to trends of childhood obesity require immediate and effective action. Maine cannot afford to wait for Federal funding to do the job - CDC's Division of Nutrition, Physical Activity and Obesity, which funds state programs like Maine's, received a meager 3% increase in funding for the current fiscal year compared to last. This level of increase is inadequate to meet the state's programming needs.

On the other hand, Maine does an excellent job leveraging other federal funding to address PAN in the state. Currently, the US Department of Agriculture (USDA) provides Food Stamp Nutrition Education (FSNE) funds to Maine which support a PAN Program – Maine Nutrition Network collaboration forming the Healthy Weight Awareness Campaign (\$250,000 media campaign). Additionally, FSNE funds have been braided into the contracts for the Healthy Maine Partnerships (HMP) (\$300,000) and specific nutrition education interventions in three counties (\$150,000) extending the reach of HMP programs and objectives relating to nutrition. However, all these FSNE funds are spent on initiatives that intentionally address the food stamp eligible population; they do not necessarily reach the rest of the 1+ million Mainers not on or eligible for food stamps.

Diseases Associated with Obesity/Overweight

- Heart Disease
- Stroke
- Type 2 diabetes
- Cancer
- Chronic Lung Disease
- Gallbladder Disease
- Sleep Apnea
- Osteoarthritis
- High Blood Pressure
- High Cholesterol
- Infertility
- Pregnancy Complications
- Gout
- Bladder Control Problems
- Psychological Disorders
 - Depression
 - Low Self-Esteem
 - Eating Disorders

The Healthy Maine Partnerships with support from the Fund for a Healthy Maine (tobacco settlement dollars) have addressed tobacco program and PAN related objectives over the last six years; it is estimated that approximately \$2.7 million of the funds support efforts specific to PAN related policy and environmental change at the local level. Additionally, a limited portion of the Fund for Healthy Maine (\$175,000) supports the Maine-Harvard Prevention Research Center whose focus is childhood obesity research.

This partial funding picture is only a start – much more needs to be done if we are to emulate the tobacco program’s multifaceted, comprehensive approach to reversing a public health crisis. The PAN Program with its partners has developed a preliminary picture of funding needs that currently go unmet. The CDC funding model described above for Maine’s tobacco control program has been applied to obesity prevention and control components with the associated funding recommendations from CDC. The similarities between tobacco prevention and control and obesity prevention and control components suggests that the following funding model is a reasonable basis on which to plan future funding.

PAN Program Components and Funding

Continued efforts to address the obesity epidemic in Maine will require addressing and supporting the following components of a program that promotes physical activity, nutrition and healthy weight. These program components are:

		CDC Funding Model (\$millions)		
		<u>Recommended</u>	<u>Low</u>	<u>High</u>
State and Community Interventions	Multiple societal resources working together have the greatest long-term population impact.	\$4.2	\$3.6	\$5.9
Health Communications	Media interventions promote PA and N, help prevent weight gain, promote weight loss, and shape social norms.	\$1.7	\$0.9	\$2.8
Weight Management Interventions	Weight management programs are necessary to treat obesity and reduce impact of epidemic over time	\$2.8	\$1.6	\$4.2
Surveillance	Publicly financed programs should be accountable and demonstrate effectiveness.	\$0.09	\$0.6	\$1.3
Administration and management	Complex, integrated programs require experienced staff to provide fiscal management, accountability, and coordination.	\$0.4	\$0.3	\$0.6
		\$10.0	\$7.0	\$14.9

In adding the PAN leveraged funding described above, it is clear that current level of funding supporting PAN Program interests (~ \$4 million) falls far short of the CDC funding model. Additional funding is needed across all components. On a preliminary basis, the following additional annual funding needs demonstrate potential areas of work that the PAN Program and its partners believe can lead to significantly bolstering prevention and control activities across Maine.

- ◆ **PAN Program expansion** **\$425,000**
 - Increased staffing for the Governor’s Council on Physical Activity and PAN Program staff, including epidemiology, surveillance, policy analysis, weight management expertise, administration and intervention support staff
 - Evaluation costs (10% of program investment is devoted to evaluation)
 - Support for the Maine Youth Advocacy Network

- ◆ **Cooperative Extension Service (University of Maine, Orono)** **\$540,000**
 - Complete statewide coverage of the Eat Well Program implemented by the Nutrition Associates (currently 31) requires 14 additional Nutrition Associates and one additional supervisor. This ensures all the food stamp eligible population have access to the Cooperative Extension nutrition education services.

- ◆ **Identified Research and Evaluation Projects (See appendix A)** **\$875,000**
 - BMI Surveillance in Schools
 - Head Start PAN activities
 - Evaluation of Take Time implementation in schools
 - Reaching parents with lifestyle information
 - Evaluation of walking and biking path use and impact
 - Worksite wellness evaluation
 - Expansion of public health nursing role in follow-up with MaineCare children
 - Development and evaluation of healthy weight management programs

- ◆ **Intervention Research** **\$100,000 to \$1,000,000**

There are gaps in the scientific evidence base regarding which specific PAN interventions are proven to be effective in reversing the obesity epidemic for a variety of populations in different settings, particularly with respect to Maine’s rural population. There is a paucity of longitudinal data on children growing into adulthood regarding chronic disease risk factors for obesity such as eating and physical activity habits. Federal funding sources received by Maine such as from USDA and the Centers for Disease Control and Prevention (CDC) do not allow funds to be used for research, creating a wider gap in the ability for Maine to generate new scientific knowledge in this area. It is also difficult to apply for funds from foundations whose focus tends to be on larger states with racial disparities and greater obesity prevalence rates.

One small research study (n=500 in one setting such as schools) costs approximately \$100,000 per year. This is primarily to fund staff time, including a Principal Investigator, incentives for participation, study materials, and data analysis. A community wide research study (multiple settings such as home, schools, worksites) would cost approximately \$1,000,000 per year, as this requires more staff time to reach more individuals in different settings (children and adults), use more sophisticated and varied study materials, complex data analysis, and have the potential to create a successful model to be replicated in other communities.

- ◆ **Health Communications and Media Campaign (Appendix B)** **\$2,500,000**
 CD&M Communications, the media communications consulting firm for the Maine CDC has designed a media and education campaign similar to what it has implemented in recent years for the Partnership for a Tobacco Free Maine. The campaign is to consist of paid media (TV, radio and web placements similar to the tobacco campaigns), expansion of the PAN website, print materials, lifestyle sponsorships, public relations and press launches and expanded existing programs. Campaign components are (see the appendix for more detail):

 - Awareness of importance of PE for all school children
 - Motivate adult Mainers to increase level of physical activity
 - Encourage communities, employers and health care systems to support physical activity
 - Educate Parents and the health care community about the importance of healthy weight maintenance in children and adults
 - Increase awareness of benefits of healthy nutrition for children and adults

- ◆ **School Health Coordinators** **\$3,000,000**
 There are currently 42 school health coordinators serving school districts around the state financed by the Fund for Healthy Maine. The goal is to have a school health coordinator in all ~80 school districts after school consolidation is complete. This will require approximately ~ 40 additional coordinators. It is well demonstrated that school systems in which school health coordinators assist the superintendents and principals through organizing and developing health promotion programs to support policy and environmental change improve the likelihood of positive PAN related change in the school setting. For example, in 2006, compared to schools without an HMP-FHM funded school health coordinator, schools with a coordinator are:

 - Over 3 times more likely to be associated with intramural or physical activity club offerings
 - Over 2.5 times more likely to be associated with fruit and vegetable offerings at concessions, parties and events, and
 - Over 2 times more likely to be associated with tobacco cessation program offerings to faculty and staff and to students.

- ◆ **Physical Activity Interventions in Schools** **\$75,000 per 20 schools**
 The Take Time! Program in Schools has been proven to increase the time children and school staff spend being physically active during the school day, separate from Physical Education. This proven program could provide an important vehicle for schools to meet the American Heart Association and National Association of Sports and Physical Education recommendation of 30 minutes of physical activity per day (in addition to requirements for PE). The current USDA FSNE funding for the Take Time! Program does not allow this program to be implemented in schools where less than 50% of the students are enrolled in the free and reduced school meal program. This leaves a gap in providing this program to elementary, middle and high schools throughout Maine. For every 20 schools, the annual funding required to implement this program is approximately \$75,000. This includes 2 regional trainings for school faculty and staff, educational and resource materials, and staff

time and travel to provide ongoing technical assistance. There are a total of 797 early K-12 schools in Maine, 671 are public and 126 are private.

◆ **Physical Education in Schools**

\$9,500,000 - \$18,000,000

Physical education in school is considered an important component in obesity prevention and control, with strong scientific evidence supporting it. It is currently proposed to expand PE in schools to match the recommendations of the AHA and NASPE. Rather than burden local communities with the costs of expanded PE programs, it has been proposed that new funding sources should be sought to cover these costs. The additional costs are estimated based on the following:

- K-8 population: 132,000 students
- Student-teacher ratio for K-4, 1:25, 5 – 6th grade, 1:30
- 6 – 8 periods per day taught by certified PE teachers
- 390 existing PE teachers
- \$39,000 wage and benefit costs per teacher
- 10% of total teacher costs are added to expenditures to account for materials, supplies, evaluation, DOE staffing etc. to support the additional PE.
- 221 to 425 new teachers will be required to meet recommendations.

The above expanded funding described above represent the current perspectives on how Maine could be making increased investment in obesity prevention and control. The PAN Program has initiated a planning process with PAN stakeholders to evaluate current funding and future funding priorities and will refine plans for program expenditures for maximum impact of limited resources. Additionally, a plan will be developed to determine what immediate priorities should receive funding if and when it becomes available. The health and economic well-being of the State of Maine is at stake, and investments in curtailing the obesity epidemic must be significant and ongoing if Maine's future is to be a positive one.

Appendix A

Proposed Research and Evaluation Projects to Support Promotion of Healthy Lifestyles and Prevention of Obesity

Background on M-HPRC

The Maine-Harvard Prevention Research Center (M-HPRC) was established in 2000 is a collaboration of the Harvard Prevention Research Center, the Maine Center for Public Health and the Maine Center for Disease Control and Prevention. The goal of the M-HPRC is to increase physical activity, improve nutrition and reduce overweight and obesity in Maine.

The primary role of the M-HPRC in efforts to reduce morbidity and mortality related to overweight and obesity is to promote evidence based practice and measure outcomes. Efforts will focus on addressing disparities and working to improve and develop collaborations that will lead to systems and policy changes. In developing strategies, the ecological model will be utilized in order to address the problem through multiple channels and at multiple levels that will improve the lives of individuals and families where they work, play and live.

Potential Research/Evaluation Projects

The list below includes potential research/evaluation projects that could help Maine improve or initiate efforts that show promise in addressing the obesity epidemic. All projects could not be done in a single year – it would take several years to complete this list.

Schools

Issue	Project	Research/Evaluation Questions	Cost/year for 2 years
BMI Surveillance in Schools	<ul style="list-style-type: none"> Support the implementation, reporting and analysis of consistent BMI measurement in schools 	<ul style="list-style-type: none"> What are the trends for obesity in different regions of the state? Where are the disparities? How can communities use this data to support or initiate programs or policies? 	\$40,000 (for TA, training and data analysis – not equipment)
Promote increased physical activity and improved nutrition in Head Start and day care centers	<ul style="list-style-type: none"> Implement policy and environmental changes in Head Start Centers and day care centers that improve nutrition, increase physical activity, promote wellness for staff and connect with parents 	<ul style="list-style-type: none"> Do environmental and policy changes in centers lead to increased physical activity and improved nutrition by children, families and staff? What are the most effective ways to increase physical activity and improve nutrition? How best can centers communicate healthy messages to families? What strategies are most effective for staff wellness in this setting? 	\$75,000

Schools continued

Physical activity in schools	<ul style="list-style-type: none"> Implement Take Time in schools and determine effect of daily physical activity on students 	<ul style="list-style-type: none"> Does daily physical activity increase fitness and reduce BMI in students? Does daily physical activity improve student performance? How can schools fit daily physical activity into the school day? What other effects does daily physical activity have on students? 	\$100,000
------------------------------	--	---	-----------

Community Setting

Issue	Project	Research/Evaluation Questions	Cost per year for 2 years
Reaching parents and families with healthy lifestyle information	<ul style="list-style-type: none"> Develop pilot projects to determine most effective ways to reach families with healthy lifestyle, nutrition and physical activity messages. 	<ul style="list-style-type: none"> What are the most effective strategies for reaching parents and families with healthy lifestyle information? What messages/strategies lead to behavior change? How can schools, health care providers and work most effectively with families? 	\$150,000
Bike paths and walking trails	<ul style="list-style-type: none"> Examine new and existing bike paths and trails to assess use and impact. 	<ul style="list-style-type: none"> What impact do trails/paths have on increasing physical activity and who uses them? What is the economic impact of bike paths and trails on communities? 	\$150,000

Worksite

Issue	Project	Evaluation/Research Questions	Cost
Effective worksite wellness programs	<ul style="list-style-type: none"> Pilot health promotion programs that address both individual risks and the worksite environment 	<ul style="list-style-type: none"> What strategies are most effective in engaging worksites in wellness programs? What is the ROI? Can worksite wellness improve employee health behaviors? 	\$200,000

Health Care Setting

Issue	Project	Evaluation/Research Questions	Cost
Role of public health nurses in supporting health messages	<ul style="list-style-type: none"> Expand a pilot program that utilizes public health nurses to follow up with MaineCare children identified by providers as being obese 	<ul style="list-style-type: none"> Are public health nurses effective in helping families reach goals to help obese children reach a healthy weight? Are systems in place to use public health nurses to follow up on certain patients? 	\$50,000
Healthy weight programs	<ul style="list-style-type: none"> Work with health care settings interested in healthy weight programs to develop, implement and evaluate their programs 	<ul style="list-style-type: none"> What are the components of successfully healthy weight programs? What are realistic outcomes that can be achieved? How can better outcomes be realized? Who do they serve? 	\$100,000

Appendix B

Maine Physical Activity and Nutrition Program CD&M Communications / Media Work plan July 2008 – June 2009

Maine Physical Activity and Nutrition Program

The following presents an education and media plan to promote the benefits of regular physical activity, healthy nutrition, and weight management to all Maine citizens. Media campaigns in conjunction with the other multi-faceted components of a public health prevention program are important to the overall success of such programs as demonstrated by the tobacco control program.

Forward

People of all ages and abilities in Maine can gain dramatic health benefits through regular physical activity, sound nutrition, and weight management. A large body of scientific evidence supports the long-term health and quality of life benefits that these lifestyle changes offer.

However, the barriers to making exercise and nutritional changes a part of every day life are complex in Maine. Access to physical-activity environments at school, work, and in the community is inconsistent and seasonally limited in many areas. In many ways, today's societal and consumer conveniences have frustrated many opportunities for communicating the benefits of healthy nutrition and weight management. And, there are not enough role models for children or adults.

In addition, information in Maine about the benefits of these positive lifestyle changes is often unclear and inconsistent not only for the general population, but for health professionals, schools, communities and employers. Research regarding the perceptions and benefits of physical activity, healthy nutrition, and weight management is limited. Not enough effective messages to effectively improve changes by the population have been produced or tested.

This plan identifies five targeted areas for public education and media campaigns to improve awareness of the benefits of physical activity, healthy nutrition, and weight management throughout Maine. The plan includes market research for communications initiatives, the use of mass and targeted media, the internet, print, collateral materials, and lifestyle marketing.

Goal One: Raise Awareness of The Importance of Physical Education and Activity For All School Age Children in Maine.

The primary goal of this initiative is to target and encourage parents to support their children's participation in physical education and activity. This campaign will strongly emphasize the immediate and life-long benefits that regular physical activity has for youth and the importance that adults have as role models in encouraging their participation. Benefits include:

- Improved health-related youth fitness
- Improved learning abilities
- Self confidence, competence, and enjoyment of physical activity
- Self responsibility and improved social interaction

Budgeted components of this initiative:

Research, testing and assessment - statewide focus groups to establish benchmarks for perceptions held by youth and parents about physical activity at school and at home. Secondary focus groups to test communications themes, materials and language for all target audiences.

Paid media: Television, Radio, and Web Placements – a high-energy campaign that empowers youth and parents to make physical activity a part of individual and family life. This campaign will creatively establish the life-long benefits and the pleasure of year-round exercise that can start at an early age.

Revised the Physical Activity & Nutrition Web Site – to include an interactive section for youth and parents with physical activity resources, self-guided fitness tests, tips, and links to further promote year-round physical activity.

Mailings and Print Materials – posters, brochures and targeted direct mail materials for homes, community organizations and with emphasis on take-home materials from schools and before/after school programs. Materials to include translation into multiple language settings and a distribution system for storing, tracking, mailing and distributing collateral materials.

Public Relations and Press Launch - press conference to introduce new statewide media campaign, to stimulate public dialog, and capture attention of State policy makers and legislature

Lifestyle Marketing Sponsorships – messages placed in locations and at events to encourage physical activity, including malls, theatres, school sporting arenas, parks, through recreational programs and areas, public transportation sites, and other relevant opportunities.

Goal Two: Educate and Motivate Adult Maine Citizens To Increase Their Level of Physical Activity

This campaign goal targets parents, family members, and adults of all ages to make moderate physical activity a cornerstone and natural part of their lives. This goal seeks to improve the quality of life and long-term health of all Maine citizens by strongly emphasizing the benefits of regular physical activity:

- Strengthened cardiovascular and respiratory systems
- Manage weight and keep bones and muscles strong
- Prevent and manage diabetes, blood pressure & cholesterol
- Ease depression and manage stress and anxiety
- Reduce risks of certain types of cancer
- Sleep better and enjoy life more
- Encourage adults and families to become role models for youth

Budgeted components of this campaign:

Research, Testing and Assessment – focus groups to uncover perceptions and obstacles to year-round physical activity by adults of all ages, including seniors age 65 and older. Benchmarks will be set for message testing and refinement.

Paid media: Television, Radio, E-blasts and Web Placements – an entertaining and benefit-driven campaign that encourages adults of all ages to include moderate physical activity as a part of every day life. The campaign will encourage adults to promote physical activity with their peers at work and in the community.

Revise the Physical Activity & Nutrition Web Site – will continue to promote moderate physical activity throughout all stages in adult life. In addition, a self-guided page will feature the benefits of physical activity from the youngest to elder adults of all abilities in Maine. Appropriate medical and physician information will be included with tips for activity, fitness testing, and links to physical activity resources.

Public Relations and Press Launch - a statewide promotions program to stimulate broad public dialog about the benefits of physical activity to individuals and to the overall physical and economic health of the State.

Related Print Materials – brochures, posters and other collateral materials that support physical activities by adults through all seasons in Maine.

Lifestyle Marketing Sponsorships – messages placed in locations and at events to encourage physical activity, including malls, theatres, sporting arenas, parks, recreational areas, public transportation sites, and other relevant opportunities.

Expanded Outreach of Existing Programs - We will continue to use existing Radio, Television, Direct Mail and Print campaign materials to help support new campaigns that are created. These include:

- Healthy Maine Walks
 - Walk for Life
- Using your Home as a Gym
- Winter Physical Activity
- Simple Steps Toward Better Health
- Make Time for Family Fun

Goal Three: Encourage communities, employers, and health care systems to support physical activity by all Maine citizens

The third goal in this campaign seeks to help reduce the barriers to physical activity encountered by working and older adults. Communications will be targeted to the places where people live, work, receive health care treatment, and other social networks. The goal is to encourage the creation of access to activity-friendly environments and to provide information, resources and counseling to promote physical activity to people of all ages and physical ability.

Benefits include:

- Stronger, healthier families and communities
- Healthier, more productive workers
- More independent and active older adults
- Reduce disease and illness in the population
- Reduced, long-term, health care costs

Budgeted components of this campaign:

Mailings to Statewide Employers, Communities and Health organizations – a direct mail program and newsletter to encourage businesses, communities, health organizations, senior citizen organizations and others to introduce or support regular physical activity by adults.

Related Printed Materials – poster, brochures, display banners and other materials for distribution to businesses and other organizations to include and to support physical exercise by adults in their daily work or other activity schedules.

Public Relations: Press Conferences for Partnership Events – press events with corporate, community and health sponsors for year-round physical activity events. Campaigns will include statewide goal-setting events and appropriate celebratory events when goals are achieved.

Goal Four: Educate Parents and The Health Care Community About the Importance of Healthy Weight Maintenance in Children and Adults

Changes in healthy weight management that will reduce obesity in children and adults requires the education of parents and the greater community. The focus of this initiative is to clearly, yet sensitively, correct misinformation and perceptions about healthy weight levels and the actions needed to improve weight

maintenance. Behavioral issues such as where, how, and when families and individuals eat meals are as important as what they eat. Parents will be encouraged to take responsibility for becoming role models and for creating an appropriate food environment for their children. Outreach for healthy weight management will include the general health care community. Benefits of this campaign include:

- Healthier children and adults
- More productive work force
- Lower rates of diabetes, blood pressure, cholesterol, heart disease, and others illnesses attributed to being overweight or obese
- Reduced, long-term, health care costs

Budgeted components of this campaign:

Research, Testing and Assessment – focus groups of targeted parents to uncover beliefs and understandings of healthy weight levels, good nutrition, weight reduction programs or actions, and role model responsibilities. Benchmarks will be set for message testing and refinement. Careful attention will be given to specific language and visual cues in all proposed communications and messaging.

Paid media: Television, Radio, and Web Placements – a campaign to set a positive, model environment for healthy weight management with a focus on eating choices such as portion control, eating together as a family, and reducing sugar-sweetened beverage consumption and fast food dining.

Mailings and Print Materials – posters, brochures and targeted direct mail materials for targeted families. The program will include a separate mailing for physicians to insure more accurate diagnosis of overweight children. Materials to include translation into multiple language settings and a distribution system for storing, tracking, mailing and distributing collateral materials.

Goal Five: Increase Awareness of the Benefits of Healthy Nutrition for Children and Adults

The fifth goal of this plan is to increase awareness of the benefits of good nutrition and to help individuals and families make the right food choices. Knowing which foods to eat and in what quantities can be difficult even for the most knowledgeable individuals. This campaign is designed to motivate people to make healthy food choices by making nutritional information resources easily available, simple, and entertaining.

Benefits of this campaign:

- Healthier children and adults of all ages
- Lower rates of heart disease, blood pressure & cholesterol, certain cancers, diabetes, and others diseases attributed to poor nutrition
- Reduced, long-term, health care costs

Budgeted components of this campaign:

Paid media: Television, Radio, and Web Placements – an entertaining and resource-driven campaign that seeks to make healthy nutrition a part of every day life. Media messaging will emphasize how people can improve the health of their families and themselves by making simple and affordable changes in their food choices. The campaign will be strongly linked to the Physical Activity & Nutrition web site and to printed resource materials.

Revise & Expand the Physical Activity & Nutrition Web Site – to include a self-guided page that entertains and informs which foods are good nutritional choices and which foods should be reduced or avoided. Will be based on current, best-accepted food guidelines with extensive resource information to cover the wide range of food choices. The site will include recipes, seasonal food selections, tips for eating out, self-guided quizzes, and comprehensive Q & As.

Related Print Materials – detailed brochures, posters and other collateral materials that support making healthy food choices at home and eating out. Program will include Healthy Maine Recipes and tips for making easy, healthy snacks and dinners.

Lifestyle Marketing Sponsorships – entertaining and benefit-driven messages that encourage making healthy food choices. To be placed in locations and at events, including malls, theatres, sporting arenas, parks, recreational areas, public transportation sites, and other relevant opportunities.

Public Relations and Press Launch - a statewide promotion to introduce and support healthy nutrition, making the right food choices at home and eating out, and seasonally supporting Healthy Maine Recipes.

Expanded Outreach of Existing Programs - we will continue to expand, as well as, use existing Radio, Television, Direct Mail and Print campaign materials to support new campaigns. These include:

- Portions Sizes
- Add a Fruit or Vegetable to Every Meal

Budget

An approximate budget for the above campaign is estimated as follows, based on comparable costs associated with similar tobacco campaign elements.

Research and Evaluation	\$100,000
Collateral (print materials)	\$400,000
Media buys and production	\$1,200,000
Personnel, resources, and Distribution	<u>\$800,000</u>
	\$2,500,000

PE4ME Planning and Oversight Team

Guiding Document for School Physical Activity Policy Development

Maine's Obesity Problem:

Maine is facing a youth obesity epidemic. Physical inactivity and poor diet is quickly approaching tobacco use as the leading cause of death for Americans. In 2004, 33% of Maine kindergarten children were overweight or at risk for becoming overweight. It is likely that these children will face significant health problems during early adulthood including cardiovascular disease, diabetes and depression. In the short-term, poor health negatively impacts a student's capacity to learn.

Schools Can Be Part of the Solution:

Schools can help students establish and maintain lifelong health habits including being physically active. Increasing physical activity in youth while at school can be successfully shared among administrators, teachers, parents and students. All students need opportunities during the school day to be active in a variety of ways in order to be better learners, to eliminate unnecessary behavioral issues, and to increase self-esteem. In addition, the skills and knowledge gained from physical education classes should be integrated and reinforced throughout the entire school culture as a coordinated approach to better health.

Maine Schools Demonstrating the Way:

Teachers and administrators across the state have demonstrated how schools can be the ideal place for students to be active in practical and manageable ways. Supported and encouraged by their principals, teachers from Hartland, Stratton, Madison, Athens, Cornville, Waterville, Pittston, Gardiner, and Belfast and elsewhere are providing opportunities for every student to be active every day by incorporating physical activity into academic lesson plans in the classroom. In addition, they are providing walking, dancing or other active breaks during the day. Both Union 106 in the Calais area and SAD 75 in the Topsham area have instituted district-wide policies that ensure physical activities are integrated into every school day for every student K-8.

Rationale for School Physical Activity Policy Development:

Schools have an opportunity to provide students with positive physical activity experiences at a young age, which will support development of lifelong physical activity habits. This can be accomplished not only through time spent active in physical education classes, but also by providing opportunities throughout the day for other physical activities. Schools that adopt a more creative approach to accumulating the 30 minutes of daily physical activity will reap the health and learning benefits that have been demonstrated through research. Promoting a physically active lifestyle among young people is important because physical activity has been proven to:

- Prevent and control many chronic diseases such as cardiovascular disease, diabetes, osteoporosis and some cancer.
- Positively affect mental and physical health and overall well-being.

- Increase students' capacity for learning.
- Improve students' learning environment.
- Decrease discipline problems in the classroom and outside of school.
- Increase endurance and muscular strength.
- Help regulate the body's metabolism to maintain a healthy body weight.

Ensuring that every student is active for at least 30 minutes a day while at school is only a small step to reaching the national health recommendations for optimal level of daily physical activity for youth. National recommendations encourage all school-aged youth to accumulate at least 60 minutes of physical activity daily.

Procedures for Developing a Physical Activity Policy:

The principal has the responsibility for ensuring that a plan is in place for all students to participate in 30 minutes of physical activity every day. The principal will work with the staff and students to develop a plan that meets the needs of their school.

Teachers will be supported and encouraged to find creative ways to integrate physical activity into their lesson plans and discipline styles. In addition, time will be set aside at staff meetings or workshop days to discuss strategies to increase opportunities for physical activity, discuss problems, and share success stories. Physical education teachers will be an important resource to support implementation of the plan.

Students will be included in the process of developing and implementing plans for increasing physical activity opportunities at school. Students with special needs will be provided with conditions that appropriately support their safe participation.

Parents will be informed and educated about ways to support their child's participation in physical activity.

Physical activity can take place in the classroom, gymnasium, playing fields, nearby sidewalks, appropriate community settings or other safe alternative settings.

Foundational Principles Behind a Physical Activity Policy:

- All students will be provided with opportunities to be physically active in a supervised manner for a minimum of 30 accumulated minutes each day during school hours.
- Activities should be adapted for students with special needs or health conditions if necessary in order to assure that all students participate.
- Emphasis is on enjoyment and fun.
- Teachers and administrators are role models for a physically active lifestyle and will encourage and support creative ways to incorporate it into daily practice during
- Opportunities for physical activity can include time spent active in structured physical education classes.
- Mandatory physical activity will not be used as punishment (e.g. drop and give me 20), and physical activity opportunities will not be taken away as a form of

punishment (e.g. taking away recess). Positive experiences with physical activity ensure the necessary motivation for a lifelong physically active lifestyle.

- Physical activity may be used as a positive behavior reward (e.g. walking as a class or taking a physical activity break).
- school.
- Daily physical activity in classrooms does not supplant the current physical education program.

Sample Strategies:

The following sample activities can be combined or used alone to accumulate 30 minutes of physical activity each day.

Sample Strategy #1: All students will participate in three 10-minute walks each day. The walks will take place on the perimeter of the school grounds in fair weather and will take place inside the school halls or gymnasium in foul weather. The first walk will take place first thing in the morning and be led by a designated student on a rotating system. The second walk will take place after the last lunch period and will be led by the principal or designated teacher on a rotating system. During the winter snowshoeing or cross-country skiing may replace the walk if resources are available. The perimeter “trail” may also include appropriate signage to indicate distance and identify the positive effects of daily physical activity.

Sample Strategy #2: All students will participate in structured recess such as games, sports walking/jogging or other activities for up to 30 minutes each day. Current recommendations are that recess be taken prior to lunch.

Sample Strategy #3: All students will participate in up to six, 5-minute sessions of physical activity during the school day. All teachers are responsible for leading structured breaks for physical activity such as walking around the classroom or integrating active movement into lesson plans.

Sample Strategy #4: A peer educator or mentor system will be implemented, encouraging older students to interact with younger students by taking them for walks, playing ball, or participating in other activities that promote and encourage physical activity.

Sample Strategy #5: Daily physical education classes that include at least 30 minutes of time spent moderately to vigorously active.

PE4ME Planning and Oversight Team: Summary of Funding Proposal

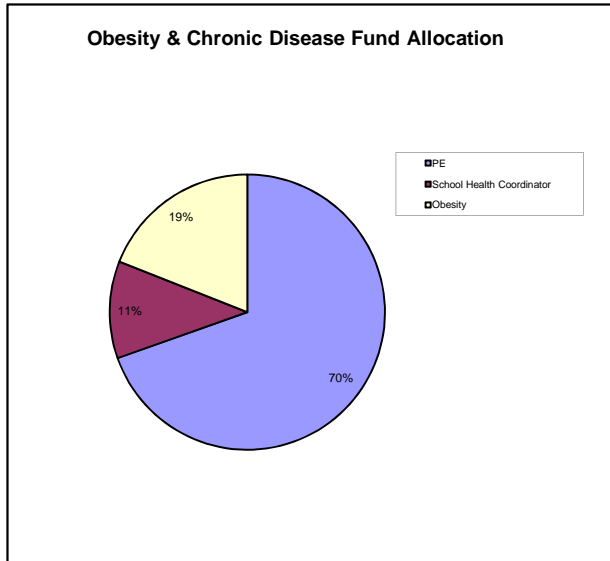
Year	PE teachers					Coordinated School Health			OP&C**	Total PE and Program Cost		Tax Revenues	Balance in Fund*** <small>(based on high cost estimate)</small>	Cumulative Balance
	Additional % hired	low estimate		high estimate		Additional % hired	3 millions	cum millions	millions	low estimate millions	high estimate millions	millions	millions	in Fund millions
		9.5 millions	cum millions	18.3 millions	cum millions									
2009*	0	0	0	0	0	20%	0.60	\$ 0.60	\$ 5.00	\$ 5.60	\$ 5.60	\$ 22.50	\$ 16.90	\$ 16.90
2010	15%	1.43	\$ 1.43	2.75	\$ 2.75	35%	1.05	\$ 1.65	\$ 5.00	\$ 8.08	\$ 9.40	\$ 30.00	\$ 20.61	\$ 37.51
2011	25%	2.38	\$ 3.80	4.58	\$ 7.32	45%	1.35	\$ 3.00	\$ 5.00	\$ 11.80	\$ 15.32	\$ 30.00	\$ 14.68	\$ 52.19
2012	25%	2.38	\$ 6.18	4.58	\$ 11.90			\$ 3.00	\$ 5.00	\$ 14.18	\$ 19.90	\$ 30.00	\$ 10.11	\$ 62.29
2013	25%	2.38	\$ 8.55	4.58	\$ 16.47			\$ 3.00	\$ 5.00	\$ 16.55	\$ 24.47	\$ 30.00	\$ 5.53	\$ 67.82
2014	10%	0.95	\$ 9.50	1.83	\$ 18.30			\$ 3.00	\$ 5.00	\$ 17.50	\$ 26.30	\$ 30.00	\$ 3.70	\$ 71.52

* 3/4 year revenue generation

**Obesity Prevention and Control

*** Obesity & Chronic Disease Fund

PE School Health Coordinator or Obesity	18.3	70%
	3	11%
	5	19%
	26.3	



PE Teachers calculation

K-8 population: 132,000
 9 grades, 14,667 per grade
 k-4 pop 73333
 5-6th grades pop 58667
 k-4 st/T ratio 25 2933 classes needed
 5-6th st/T ratio 30 1956 classes needed

	6 periods/day teachers		8 periods/day teachers	
k-4	2933	489		367
5-6th	1956	326		245
		815		611
existing teachers		390		390
new teachers		425		221
cost: \$30,000 salary, \$9,000 benefits				
mat'l's, evaluation	\$ 39,000	\$ 16,570,580		\$ 8,625,435
	10%	\$ 1,657,058		\$ 862,544
		\$ 18,227,638		\$ 9,487,979
		\$ 18,300,000	<i>rounded</i>	\$ 9,500,000

PE4ME Planning and Oversight Team
Summary of Recommended Legislation
January 31, 2008

1. **Establish Physical Education (PE) guidelines for K-8 schools to implement**, including guidelines for class time, teacher qualifications, grading, and reporting
2. **Establish guidelines for Maine colleges/universities to train Physical Education teachers**, including guidelines for cross-training of existing teachers
3. **Establish ongoing PE4ME oversight committee**
 - a. Define structure, governance, and reporting requirements
 - b. Define timeline for evaluation
 - c. Define options available for enforcement, mandates, and any other future legislation necessary to fully implement PE4ME recommendations regarding school implementation, teachers/teacher training, funding, and evaluation
4. **Establish Obesity and Chronic Disease Fund (OCDF)**
 - a. Define purposes:
 - i. Physical Education (PE), including all related costs outlined in PE4ME report
 - ii. Obesity Prevention and Control (reduce obesity and promote PA and good nutrition) via PAN Program
 - iii. Coordinated School Health Program
 - b. Include language that requires “supplement not supplant” of other funding sources, including Fund for a Healthy Maine and General Fund
5. **Establish funding sources for OCDF**
 - a. Junk food (foods of minimal nutritional value)
 - i. Define “foods of minimal nutritional value” based on USDA school lunch standards
 - ii. Apply Maine sales tax to foods of minimal nutritional value
 - iii. Revenue raised equals at least \$13 million per year (based on 2001 “snack tax” revenue)
 - b. Soda/syrup
 - i. Apply tax of \$.42/gallon of soda plus \$4/gallon of syrup
 - ii. Revenue raised equals approximately \$12 million per year
 - c. Non-cigarette tobacco products
 - i. Equalize the tax on loose tobacco, “little cigars”, and chewing tobacco to that of cigarettes (\$2/pack)
 - ii. Revenue raised equals approximately \$5 million per year
6. **Establish system for funding allocations from OCDF**
 - a. Define what constitutes PE per report detail
 - b. Define what additional costs are part of funding package per report detail
 - c. Integrate into Essential Programs and Services (“Total Adjustments and Miscellaneous Costs” line)
 - d. Define how schools apply for and receive funds
 - e. Define funding timeline (estimated percentage of schools funded by year)
7. **Establish evaluation system**
 - a. Full implementation of PE at school level: DOE to perform and report to PE4ME and Legislature
 - b. Infrastructure and Content by school: Local schools to perform; DOE to compile and report to Legislature and public
 - c. Impact by student:
 - i. Local schools to perform and report individual data to families in appropriate and sensitive way
 - ii. DOE to compile school data and report to Legislature and public
8. **Allocate FY08/FY09 funds**
 - a. Assessments
 - b. Planning for implementation, evaluation, and incentive systems
 - c. Technical assistance, especially for small, rural, and isolated schools
 - d. Obesity Prevention and Control (via PAN Program)
 - e. Coordinated School Health Program

PE4ME Planning and Oversight Team Participant Summary

January 31, 2008

Participants

1. Naomi Anderson Schucker, *MaineHealth*
2. Susan Berry, *Maine Department of Education*
3. Stephen A. Butterfield, *University of Maine, Governor's Council on Physical Activity*
4. Sue Campbell, *Maine School Boards Association*
5. Diane M. Campbell, *Medical Care Development and Governor's Council on Physical Activity*
6. David W. Crawford, *Maine Center for Disease Control and Prevention, Physical Activity and Nutrition Program*
7. Jocelyn Dill, *Maine Association for Health, Physical Education, Recreation and Dance, Retired Physical Education Teacher*
8. Rebecca Drewette-Card, *Maine Center for Disease Control and Prevention, Physical Activity and Nutrition Program*
9. Liz Giles-Brown, *Physical Education Teacher*
10. Andy Hamblett, *Boothbay Region YMCA*
11. Robbie Lipsman, *Portland United Way "Let's Go" Program*
12. Richard Lyons, *Maine Superintendent's Association*
13. Carla Marcus, *WinterKids and Governor's Council on Physical Activity*
14. Karen O'Rourke, *Maine Center for Public Health*
15. Roger Park, *Governor's Council on Physical Activity*
16. Amy Root, *Maine Nutrition Network and Governor's Council on Physical Activity*
17. Lee Scott, *American Lung Association of Maine and Governor's Council on Physical Activity*
18. Becky Smith, *Health Policy Partners of Maine*
19. Erik Steele, DO, *Eastern Maine Health Care Systems and Governor's Council on Physical Activity*
20. David Stockford, *Maine Department of Education*
21. Jeff Sturgis, *Maine Principal's Association*
22. Kawika Thompson, *University of Maine and Governor's Council on Physical Activity*
23. Dennise Whitley, *American Heart Association, Founders Affiliate and Governor's Council on Physical Activity*
24. Jean Zimmerman, *Maine Department of Education*

Facilitator:

Carol Kelly, *Pivot Point Inc.*