

**Minnesota Heart Disease and Stroke Prevention Initiative  
Literature Review – October 2004  
Environmental Setting: Schools**

**American Heart Association's *Jump Rope for Heart*.**

**Reference**

American Heart Association's *Jump Rope for Heart* (n.d.)

**Environmental Intervention and Policies**

Students in schools were the targeted population.

The intervention method promotes the value of physical activity to students while they participate in a team or cooperative effort. This method:

- increases understanding of the seriousness of heart disease and stroke and the lifelong health benefits of physical activity and a heart healthy lifestyle;
- teaches students to set and achieve goals and discover that they can make a difference;
- builds character through the spirit of volunteerism and community service; and
- develops rope-jumping skills that are fun for everyone.

**Key Findings**

The following indicate results:

- integrates physical activity (PA) and critical thinking skills as students help plan, organize and participate in the event;
- encourages cross-age cooperative activity;
- rallies the students, parents, school and community around a fun-filled event; and
- gives the school gift certificates for physical education (PE) equipment based on dollars raised.

## **Are differences in exposure to a multi-component school-based intervention associated with varying dietary outcomes in adolescents?**

### **Reference**

Birnbaum, A., Lytle, L., Story, M., Perry, C., & Murray, D. (2002) Are differences in exposure to a multi-component school-based intervention associated with varying dietary outcomes in adolescents? *Health Education and Behavior*. 29, 427-443.

### **Environmental Intervention and Policies**

A cohort of students in middle and junior high schools (7<sup>th</sup> Grade followed through 8<sup>th</sup> Grade) in 16 schools in Minneapolis and St. Paul, Minnesota was the targeted population.

Intervention methods included:

- *Teens Eating for Energy and Nutrition at School* (TEENS);
- four incremental exposures during 2-year period with:
  - school environment interventions (promotion of fruits/vegetables in school lunches) only,
  - classroom curriculum plus environment interventions,
  - peer leaders plus classroom curriculum plus environment interventions, and
  - control;
- classroom intervention with 7<sup>th</sup> Grade which included ten curriculum sessions using social-cognitive theory;
- parent packs were mailed home to students receiving curriculum intervention; and
- a *School Nutrition Advisory Council* (SNAC) was developed with 6 of the 8 intervention schools made up of school staff, parents and students with goal of developing policy practices to make school environment healthy.

### **Evaluation**

Student surveys conducted at baseline were done in Fall 1998 and at the end of the 7<sup>th</sup> Grade intervention in Spring 1999. A modified *Behavior Risk Factor Surveillance System* (BRFSS) was used to measure the usual fruit/vegetable intake. Assessment of hypothesized psychosocial mediators of eating behavior change was measured using items based on the theory of planned behavior and each item was presented in a Likert-type scale format.

### **Key Findings**

- Patterns were observed suggesting dose response.
- Students with the most intensive intervention (with peer leaders) reported largest increases in fruit/vegetable consumption (almost 1 full serving) and lower fat food consumption.
- Students exposed to classroom plus environment also improved (increased fruit/vegetable consumption by half-serving), although this did not always reach statistical significance and were of smaller magnitude than group with peer leaders.
- Controls remained stable.
- Classroom curriculum is feasible for most teachers and teacher/student response was favorable.

**Lessons Learned**

Students only exposed to school environment showed declining fruit intake and no change in vegetable intake, although they showed trends toward choosing lower fat food. This outcome was unexpected and doesn't fit dose response model. No differences were detected in psychosocial mediators of eating behavior.

**Additional Comments**

The study demonstrates it is possible to improve dietary intake of middle-aged students. An overall positive dose response pattern reinforces the importance of multiple intervention components. The peer-led curriculum appears beneficial.

## **Cardiovascular risk factor prevention in Black school children: The “Know Your Body” evaluation project.**

### **Reference**

Bush, P., Zuckerman, A., Taggart, V., Theiss, P., Peleg, E., & Smith, S. (1989) Cardiovascular risk factor prevention in black school children: The “Know Your Body” evaluation project. *Health Education Quarterly*. 16, 215-227.

The study was also published in (1989) *American Journal of Epidemiology*. 129, 466-481.

### **Environmental Intervention and Policies**

The intervention was conducted with 1,041 African American students in Grades 4-6 at nine schools in the District of Columbia.

The environmental interventions included the following:

- full intervention group:
  - beginning in Grade 4 through Grade 6 and continuing consecutively into Grade 7 through Grade 9, students received the *Know Your Body* (KYB) curriculum and a personalized health screening in the Fall of each school year;
- part-intervention group:
  - students received curriculum and health screening, but only their parents received the results of their cholesterol tests; and
- control
  - students did not receive curriculum and were not provided the results of their health screening (only their parents were given the results).

*Know Your Body* (KYB) was taught in four 3-hour sessions throughout the school year.

### **Evaluation**

Methods of evaluation included:

- an annual personal health screening of height/weight, skin fold thickness, blood pressure, fitness test, cholesterol, and diet;
- students completed surveys (one for elementary and one for junior high) to measure:
  - health knowledge of nutrition, physical fitness and substance abuse prevention;
  - health behavior (substance abuse and physical activity, PA);
  - health attitudes (tobacco and marijuana use); and
  - psychosocial factors (health locus-of-control and self-esteem).

### **Key Findings**

The results are more complicated than needed for this purpose – see additional comments for overall results/implications of study.

### **Additional Comments**

The magnitude of favorable changes in risk factors after two years of *Know Your Body* (KYB) was small but affected four major risk factors for cardiovascular disease (CVD) – blood lipids, blood pressure, fitness and cigarette smoking along with increased health knowledge. These positive changes may enhance the possibility that further intervention will achieve greater effects. There were several problems with implementation and measurement of this program which may have decreased the effectiveness of this program.

## **Enhanced physical education classes in schools are recommended to increase physical activity among young people.**

### **Reference**

Division of Nutrition & Physical Activity, Centers for Disease Control and Prevention. (2002, December 26) Enhanced physical education classes in schools are recommended to increase physical activity among young people. *The Guide to Community Preventive Services (Community Guide)* retrieved (n.d.) from [www.thecommunityguide.org/pa/](http://www.thecommunityguide.org/pa/).

### *Additional referenced publications:*

Increasing physical activity. A report on recommendations of the Task Force on Community Preventive Services. (2001, October 26) *Morbidity & Mortality Weekly Report/Recommendations and Reports*. A report on findings. 50(RR18).

A report on evidence and findings (2002) *American Journal of Preventive Medicine*. 22(4S), 73-102.

### **Environmental Intervention and Policies**

*“Regular physical activity is associated with a healthier, longer life and with a lower risk of heart disease, high blood pressure, diabetes, obesity, and some cancers. Despite all the benefits of physical activity, most school-aged children in this country are sedentary—only one in four gets the recommended amount of physical activity each day (30 minutes of moderate activity or 20 minutes of vigorous activity). Lack of physical activity has also contributed to a sharp rise in childhood obesity over the last 20 years. Given that regular physical activity will help young people stay healthier, it is important to know what strategies work best to increase physical activity.”*

*A systematic review of published studies, conducted on behalf of the Task Force on Community Preventive Services by a team of experts, found that physical education (PE) classes taught in schools that included which enhance the length or activity levels, are effective in improving both physical activity levels and physical fitness among school-aged children. Based on this review, the Task Force issued a recommendation to implement programs that increase the length of, or activity levels in, school-based PE classes based on strong evidence of effectiveness.”*

The following summarizes the background on the interventions:

- *“To increase the amount of time students spend doing moderate or vigorous activity in PE class, these programs seek to change PE curricula by making classes longer or having students be more active during class.*
- *Interventions reviewed included changing the activities taught (e.g., substituting soccer for softball) or modifying the rules of the game so that students are more active (e.g., in softball, have the entire team run the bases together when the batter makes a base hit). Many interventions also included health education.”*

### **Key Findings**

The findings from the systematic review included:

- In all 14 studies reviewed, students’ physical fitness improved.

- In 5 studies measuring activity levels during PE class, all recorded increases in the:
  - number of minutes spent in moderate or vigorous physical activity,
  - percentage of class time spent in moderate or vigorous physical activity, and/or
  - intensity level of physical activity during class.
- The median estimates from the reviewed studies suggest that modifying school PE curricula as recommended will result in an 8% increase in aerobic fitness among school-aged children.
- Modifying school PE curricula was effective across diverse racial, ethnic, and socio-economic groups, among boys and girls, elementary- and high-school students, and in urban and rural settings.
- In a separate literature review, having students attend school PE classes was not found to harm academic performance.

## **Implementation of “Heart Smart:” A cardiovascular school health promotion program.**

### **Reference**

Downey, A., Frank, G., Webber, L., Harsha, D., Virgilio, S., Franklin, F., & Berenson, G. (1987) Implementation of “Heart Smart:” A cardiovascular school health promotion program. *Journal of School Health*. 57, 98-104.

### **Environmental Intervention and Policies**

The setting for the cardiovascular school health promotion program was with four elementary schools (K-6) in Jefferson Parish, a suburb of New Orleans.

The strategies included:

- population (public health) strategy:
  - integrates classroom cardiovascular (CV) health education curricula with positive supportive changes in school environment (offer heart healthy school lunches, aerobic exercise component in physical education (PE), and comprehensive staff development program); and
  - parent education program to enhance family involvement.
- high-risk strategy:
  - family health promotion – a two-phase program to modify cardiovascular (CV) risk factors and promote adoption of healthy lifestyles;
  - focuses on individuals/families with high probability for cardiovascular disease (CVD); and
  - children and their families receive intensive, individualized intervention in 12-weekly sessions, supported by long-term monthly follow-up sessions.

### **Evaluation**

Evaluation of the program included the following measurements:

- changes in children’s and adult’s cardiovascular (CV) health knowledge, attitudes, beliefs and behaviors assessed in a pretest/posttest basis during school year;
- exercise behavior changes evaluated by resting heart rate, percent body fat, blood pressure and field test assessments (i.e. 1 mile run/walk); and
- risk factors evaluated by height, weight, skin fold measurements and cholesterol levels.

### **Additional Comments**

The article didn’t present results. It just indicated how the implementation of *Heart Smart* was evaluated.

## **Gender and ethnic differences in health behaviors and risk factors for coronary artery disease among urban teenagers: The PATH Program.**

### **Reference**

Fardy, P., Azzollini, A., Magel, J., White, R., Schmitz, M., Agin, D., et al. (2000) Gender and ethnic differences in health behaviors and risk factors for coronary artery disease among urban teenagers: The PATH Program. *Journal of Gender-Specific Medicine*. 3, 59-68.

### **Environmental Intervention and Policies**

The setting for the program was with 1,362 teenage boys and girls from three New York City public high schools between 1993 and 1996 as part of the PATH program.

The objective was to assess gender and ethnic differences among teenagers in heart healthy behaviors, risk factors for coronary artery disease and cardiovascular fitness.

### **Evaluation**

Students were compared on height, weight, body mass index (BMI), percentage of body fat, cholesterol, blood pressure, heart health knowledge, family history, socio-economic status (SES), dietary habits, smoking, physical activity (PA), and estimated aerobic capacity.

The students anonymously completed self-administered questionnaires in school regarding lifestyle indicating age, ethnic background, family history of coronary artery disease (CAD) and risk factors, cigarette smoking history, physical activity (PA), dietary habits, self-perception of health and socio-economic status (SES).

### **Key Findings**

- Significant gender and ethnic differences in health behaviors and coronary artery disease (CAD) risk factors.
- Girls had poorer health habits and more risk factors than boys.
- African Americans had poorer health habits and more risk factors than students of other ethnic groups.
- Boys demonstrated significantly greater aerobic capacity, frequency of physical activity (PA), and resting systolic blood pressure.
- Girls had significantly higher cholesterol, percentage of body fat and *Heart Health* knowledge test scores.
- White boys and girls had the highest prevalence of smoking.

### **Lessons Learned**

Through the program, the following lessons were learned:

- The percentage of girls with one or more risk factors was not significantly different among ethnic groups nor was obesity.
- Among boys, a significantly higher percentage of Hispanics had one or most risk factors, followed by Asian American, Africa American and White. Hispanics also had the highest prevalence of obesity.

**Additional Comments**

- An interesting finding was the girls mean *Heart Health* knowledge is higher than boys, yet the girls have poorer health behaviors.
- Of the sample, 53% had at least one of the major risk factors for coronary artery disease (CAD).

Results suggest gender and ethnic differences in risk factors for coronary artery disease (CAD) may indicate a need for gender-specific curriculum materials and teaching strategies.

## **Coronary disease risk factor reduction and behavior modification in minority adolescents: The PATH Program.**

### **Reference**

Fardy, P., White, R., Schmitz, K., Magel, J., McDermott, K., Clark, L., & Hurster, M. (1996) Coronary disease risk factor reduction and behavior modification in minority adolescents: The PATH Program. *Journal of Adolescent Health*. 18, 247-253.

### **Environmental Intervention and Policies**

The targeted population was 346 high school students in a New York City inner-city public high school.

The intervention methods included:

- Health Promotion Curriculum:
  - featured 30-minute classes 5 times per week for 11 weeks (each class 20-25 minute circuit training and 5-minute health behavior lecture-discussion focused on one key point)
- Each student received a workbook from the *Stanford Adolescent Heart Health Program* and the *Physical Activity and Teenage Health (PATH)* pilot study.
- A program was offered as a regular physical education (PE) class with students assigned to intervention or volleyball control groups.

### **Evaluation**

Methods of evaluation included:

- measurements of height, weight, total cholesterol, percent of body fat, resting systolic and diastolic blood pressure;
- a self-administered questionnaire gathering information on age, ethnicity, family history of cardiovascular disease (CVD), cigarette smoking history, physical activity (PA), and diet habits, stress, health attitude, self-perception of health and socio-economic status (SES).

### **Key Findings**

Discoveries included:

- cardiovascular health (CVH) knowledge was significantly greater for both boys and girls in intervention group;
- significant changes in self-reported dietary behavior for females (a behavioral change), decreased intake of high-fat/cholesterol foods by 10% per week;
- significant reduction in cholesterol (10%) in females;
- significant changes in cardio-fitness in predicted maximum oxygen uptake for girls;
- girls found health promotion curriculum to their liking; and
- learning can occur immediately following vigorous exercise.

### **Lessons Learned**

No significant differences between intervention and control for:

- systolic and diastolic blood pressure;

- obesity as determined by percentage of body fat, skin fold measures or body mass index (BMI);
- self-reported physical activity (PA) ; and
- health attitude scores.

Dietary education may be gender sensitive and may have to be presented differently for boys than girls.

**Additional Comments**

Results provide support that aerobic exercise should be a routine part of the physical education (PE) curriculum.

## **Impact of a school-based interdisciplinary intervention on diet and physical activity among urban primary school children.**

### **Reference**

Gortmaker, S., Cheung, L., Peterson, K., Chomitz, G., Cradle, J., Dart, H., et al. (1999) Impact of a school-based interdisciplinary intervention on diet and physical activity among urban primary school children. *Archives of Pediatric & Adolescent Medicine*. 153, 975-983.

### **Environmental Intervention and Policies**

The targeted population in Baltimore, Maryland was 479 students, initially in Grade 4, in six public elementary schools from the years of 1995 to 1997. Income was considered; median household income was lower (\$22,700) than that for all households (\$33,952) in the U.S.

The *Eat Well and Keep Moving Program* was taught by teachers for over two years (13-lessons) during math, science, language arts and social studies classes. The materials focused on:

- decreased consumption of high fat foods
- increased fruit/vegetable intake to 5-a-day or more
- decreased television (TV) viewing to less than 2 hours per day
- increased moderate and vigorous physical activity (PA)

Classroom-based materials were developed and grounded in social-cognitive theory to help enhance cognitive and behavioral skills by enabling students to make changes in their own behavior, develop skills to maintain new behavior, and provide support to the new behaviors. Also included were campaigns to build links with families and communities such as: promotion of fruits and vegetables, *Get 3 At School* and *5 A Day*; limiting TV, *My TV Unplugged*; and increasing walking, *Walking Clubs*. A coalition was developed linking parent liaisons at schools with representatives of organizations that provided free or low cost nutrition and PA programs to parents.

### **Evaluation**

The primary outcome was behavioral change. Dietary intake and physical activity were measured via a repeated 24-hour recall and student food/activity survey. Classroom interventions were measured by teacher surveys.

### **Key Findings**

This program improves dietary intake and reduces TV viewing in students. It is replicable and sustainable because the curriculum is integrated into existing classes. Materials were well liked by teachers and students.

### **Additional Comments**

Program materials were designed to be low-cost and sustainable. A key strategy of the program was to integrate the program into existing school structures and curricula. It was grounded in social cognitive theory. The program has been expanded to an additional 50 schools in Baltimore (as of June 1998).

## **Reducing obesity via a school-based interdisciplinary intervention among youth: Planet Health.**

### **Reference**

Gortmaker, S., Peterson, K., Wiecha, J., Sobol, A., Dixit, S., Fox, M., & Laird N. (1999) Reducing obesity via a school-based interdisciplinary intervention among youth: Planet Health. *Archives of Pediatric & Adolescent Medicine*. 153, 409-417.

### **Environmental Intervention and Policies**

The target population was boys and girls in Grades 6 through Grades 8. Participating were 1,295 students, Grades 6 and Grades 7 from ten public schools in four Massachusetts communities.

Students participated in a school-based interdisciplinary intervention over two school years. *Planet Health* sessions (a total of 32 in two years) were included with existing curricula using teachers in language arts, math, science, social studies and physical education (PE) classes. Sessions were focused on decreasing television (TV) viewing to less than 2-hours per day, decreasing consumption of high-fat foods, increasing fruit/vegetable intake to 5 A Day or more, and increasing moderate/vigorous physical activity (PA).

### **Evaluation**

Evaluation included the following measurements:

- weight, skin fold thickness, body mass index (BMI); and
- food and activity survey – measured TV/video, physical activity (PA) and dietary intake.

### **Key Findings**

- Obesity prevalence among girls in intervention schools was significantly reduced compared with females in control schools.
- Number of hours watching TV was reduced among both boys and girls in intervention schools.
- Increased fruit/vegetable consumption in girls and reduced increase in dietary energy intake over two school years was measured.
- In girls, reduction in TV viewing predicted reductions in obesity, which suggests a causal pathway.

### **Lessons Learned**

There is no significant difference in obesity prevalence in boys.

### **Additional Comments**

Lack of an intervention effect in boys suggests that different causal factors may operate in boys versus girls.

## **A public health vs a risk-based intervention to improve cardiovascular health in elementary school children: The cardiovascular health in children study.**

### **Reference**

Harrell, J., McMurray, R., Gansky, S., Bangdiwala, S., & Bradley, C. (1999) A public health vs a risk-based intervention to improve cardiovascular health in elementary school children: The cardiovascular health in children study. *American Journal of Public Health*, 89, 1529-1535.

*Also published in:*

Harrell, J., Gansky, S., McMurray, R., Bangdiwala, S., Frauman, A., & Bradley, C. (1998) School-based interventions improve heart health in children with multiple cardiovascular disease risk factors. *Pediatrics*, 102, 371-380.

### **Environmental Intervention and Policies**

The targeted population was elementary school children, 7 to 12 years old. Eighteen elementary schools in North Carolina were involved for a period of eight weeks.

Intervention methods included:

- a classroom-based (public health) approach for all children – American Heart Association:
  - lower and upper elementary school site program kits were used 2 times per week, and
  - physical activity (PA) intervention 3 times per week;
- risk-based approach for those with identified risk factors:
  - nutrition classes 2 times per week,
  - physical activity (PA) classes 3 times per week, and
  - “don’t start smoking” classes;(Children could be assigned to multiple interventions based on their risk factors.)
- control

### **Evaluation**

Through an evaluation students:

- were asked if they smoked;
- completed revised form of *Know Your Body* health habits survey;
- completed adapted *Heart Smart* test (posttest only); and
- were examined for baseline blood pressure (BP), total serum cholesterol, sub-maximal predicted aerobic power, skin folds, and body mass index (BMI).

### **Key Findings**

It was discovered through the classroom-based intervention children had:

- more knowledge about heart health,
- showed a reduction in cholesterol and skin folds,
- had increase in predicted aerobic power,
- diastolic blood pressure did not increase as much as other two groups.

Other findings indicated:

- stronger trends than with risk-based interventions;
- yields greater benefit in health of population than did targeted interventions; and
- builds on programs readily available to schools, doesn't require additional teachers or expensive materials.

Through the risk-based intervention children had:

- decrease in sum of skin folds, and
- increase in BMI (due to increase in muscle mass from PA intervention).

### **Lessons Learned**

It was revealed through the study that risk-based intervention:

- required as many resources as classroom-based intervention, and
- achieved a lower level of improvement in target population's health.

### **Additional Comments**

The authors suggest other factors may have contributed to success of the classroom-based intervention. Teachers may have used reinforcement at other times during the day. In addition, this age group may respond best to a unified, peer effort. Providing intervention for all children avoided "labeling" at-risk children.

## **The new physical education.**

### **Reference**

Lambert, L. (2000, March) The new physical education. *Educational Leadership*. 57(6), 34.

### **Environmental Intervention and Policies**

The article discusses how rethinking physical education (PE) can help students lead healthier lives.

### **Key Findings**

Students are more likely to be active if:

- programs teach learning skills, fitness concepts, lifetime physical activity (PA), such as individual/dual and adventure sports;
- follow good example from Wyoming regarding gym designed as a heart so students travel path of circulation during activity;
- curriculum integrates health-fitness concepts and activities into educational games, gymnastics & dance;
- activities are developmentally appropriate.

### **Lessons Learned**

A discovery of why students are minimally active during physical education (PE) includes the following:

- waiting turns,
- too much time for roll call,
- team sports do not allow everyone to attain moderate physical activity (PA), and
- multi-activity format does not allow confidence building in one area.

## **The Child and Adolescent Trial for Cardiovascular Health (CATCH).**

### **Reference**

Luepker, R., Perry, C., McKinlay, S., Nadir, P., Parcel, G., & Stone, E., et al. (1996) Outcomes of a field trial to improve children's dietary patterns and physical activity: The Child and Adolescent Trial for Cardiovascular Health (CATCH). *Journal of the American Medical Association*. 275, 768-776.

### *Additional reference:*

Nader, P., Stone, E., Lytle, L., Perry, C., Osganian, S., Kelder, S., et al. (1999) Three-Year Maintenance of Improved Diet and Physical Activity: The CATCH Cohort. *Archives of Pediatrics and Adolescent Medicine*. 153, 695-704.

### **Environmental Intervention and Policies**

Conducted from 1991-1994, this multi-component intervention targeted 5,106 initially 3<sup>rd</sup> Grade students in Minnesota, California, Louisiana and Texas. Of the 56 intervention schools, 28 received enhanced physical education, classroom health curricula, and food service modifications. The other 28 schools received these components of the intervention plus family education.

### **Evaluation**

The intervention and control schools were compared on two levels. At the school level the primary endpoints were reduction of total fat and sodium content in school food and an increase in the amount of moderate to vigorous physical activity during physical education class. At the individual level, the primary endpoint was serum cholesterol concentration in addition to recall measures of eating and physical activity patterns.

### **Key Findings**

- Compared to the control schools, the intervention schools' lunches had a significant decrease in the amount of fat; and the intensity of physical activity significantly increased.
- There was no significant difference in the amount of sodium.
- Students in the intervention schools had significantly greater response scores of dietary knowledge, dietary intentions and self-reported food choice changes.
- In comparison to the school-only intervention group, the school plus family education intervention group had greater positive changes in dietary knowledge.

The CATCH intervention is a good model for school-based primary prevention of cardiovascular disease. It demonstrates that school policies and practices can change without substantial new resources and time.

### **Additional Comments**

A follow-up (Nader, 1999) of 73% of the initial CATCH cohort, three years after the intervention, found that the behavior changes of the students in the intervention school remained. The magnitude of the differences between the intervention and controls had narrowed over time, indicating that programs must continue past elementary school for behavior changes to persist. This supports a multi-component intervention as a suitable model for school-based primary prevention of cardiovascular disease.

## **Minneapolis Heart Institute Foundation's *Jump Start to a Healthy Heart*.**

### **Reference**

Minneapolis Heart Institute Foundation's *Jump Start to a Healthy Heart* (n.d.)

### **Environmental Intervention and Policies**

The targeted population includes 3<sup>rd</sup> grade and 4<sup>th</sup> grade students in schools.

The following lesson plans have been developed as a resource for classroom teachers, and other potential program facilitators, for use in educating children about the heart, how it works and, most importantly, how to take care of it.

Lesson 1: Your Heart: A Working Machine

Lesson 2: Know Your Heart Parts

Lesson 3: Smoking: Don't Be Sucked In!

Lesson 4: Exercise: Work Your Body!

Lesson 5: Do Your Heart A Flavor: Eat Heart-Healthy Foods

Lesson 6: It All Ads Up

Each lesson contains a goal, objective, lesson content, and activities.

### **Evaluation**

These lesson plans have been developed with input from classroom teachers, curriculum specialists and health educators and extensively pilot tested with third grade and fourth grade students.

### **Additional Comments**

It was their intention, in developing these materials, to provide a resource that could easily be incorporated into an existing classroom curriculum to enhance student knowledge of heart health.

### **Three-year maintenance of improved diet and physical activity: The CATCH cohort.**

#### **Reference**

Nader, P., Stone, E., Lytle, L., Perry, C., Osganian, S., Kelder, S., et al. (1999) Three-year maintenance of improved diet and physical activity: The CATCH cohort. *Archives of Pediatric & Adolescent Medicine*. 153, 695-704.

#### **Environmental Intervention and Policies**

The targeted population included 3,714 (73%) of the initial CATCH cohort in the states of California, Louisiana, Minnesota and Texas.

The intervention method was CATCH which included a school curriculum, food service and physical education (PE), with 50% of schools also having a family involvement component.

This study is a 3-year follow-up of the CATCH interventions.

#### **Evaluation**

Evaluation included:

- daily intakes of saturated fat;
- levels of moderate to vigorous physical activity (PA);
- psychosocial factors; and
- physiologic factors (cholesterol, body mass index, skin fold thickness, blood pressure, and self-report of smoking).

#### **Key Findings**

- The behavior changes resulting from a multi-component intervention (including classroom curricula, food service modifications, physical education (PE) changes, and family reinforcement) were sufficient to produce an intervention effect three years later.
- Findings suggest CATCH or a similar multi-component approach qualify as suitable models for school-based primary prevention programs.

#### **Lessons Learned**

It was discovered there were:

- no differences in physiologic measures, and
- differences between controls and experimental are narrowing in magnitude over time.

#### **Additional Comments**

Schools are an important setting for programs to influence the development of healthy behaviors at a young age. For behavior change to occur and persistence of new goals, programs must continue past elementary to junior and senior high school.

## **5 A Day Power Plus.**

### **Reference**

Perry, C.L., et al. (1998) Changing fruit and vegetable consumption among children: The 5 A Day Power Plus program in St. Paul, Minnesota. *American Journal of Public Health*. 88(4), 603-609.

### **Environmental Intervention and Policies**

The targeted population was multi-ethnic children in Grades 4 and 5. The setting included 20 elementary schools in St. Paul, Minnesota.

This program was guided by the social cognitive theory and consisted of four components, behavioral curricula, parent involvement/education, changes in school food service, and industry involvement and support. The curricula involved 16 classroom sessions, 40-45 minute segments, which were implemented 2-times per week for eight weeks. Intervention activities included comic books (i.e. role modeling), team competitions to eat fruits/vegetables, incentive/prizes, and teacher training and improvement. The parent's involvement component included five information/activity packets sent home with the students. Examples of home activities included having children make healthy snacks for their families, and work in activity booklets. The foodservice intervention consisted of:

- selection and consumption of fruits/vegetables using point-of-purchase information,
- enhancing the attractiveness of items, and
- increasing the variety of fruit/vegetable options available.

The industry component of the program included:

- educational support from the Minnesota 5 A Day coalition, and
- local and national produce vendors and grocery stores providing sample food items and incentives.

### **Evaluation**

This program was evaluated in many different ways, including pre- and post-intervention measures, process evaluations and more. Examples of specific measures included:

- 24-hour diet recalls;
- student lunchroom observations;
- parent telephone surveys;
- health behavior questionnaires (students); and
- collection of demographic information.

### **Key Findings**

The authors reported that the program increased lunchtime fruit consumption and combined fruit/vegetable consumption among all children. In addition, lunchtime vegetable consumption was improved among girls. Total daily fruit consumption and proportion of total daily calories from fruits and vegetables also increased. The program also helped raise parent awareness of the 5 A Day program. The authors concluded, "*The 5 A Day Power Plus program used a creative, behavioral, multi-component intervention to improve the fruit and total fruit and vegetable consumption of urban children in St. Paul* (pg. 606)."

## **Parent involvement with children's health promotion: The Minnesota Home Team.**

### **Reference**

Perry, C., Luepker, R., Murray, D., Kurth, C., Mullis, R., Crockett, S., & Jacobs, D. (1988) Parent involvement with children's health promotion: The Minnesota Home Team. *American Journal of Public Health*. 78, 1156-1160.

### **Environmental Intervention and Policies**

The targeted population was Grade 3 students, ages of 7-9, in 31 urban Minnesota elementary schools.

The intervention model included:

- school-based *Hearty Heart* program (HH) – a 5-week, 15-session curriculum targeting changes in specific environment, personality and behavioral factors;
- home-based *Home Team* program (HT) – a 5-week correspondence course for Grade 3 students and their parents and a packet mailed every week designed as a family game using a baseball motif;
- both programs (HH & HT) were done in sequence; and
- no-treatment control (C)

### **Evaluation**

An outcome evaluation was done by a trained survey team, measuring height, weight, skin fold thickness, and using a psychosocial questionnaire. Higher scores on the questionnaire were associated with healthy behavior, greater skills and accurate knowledge. Also used was a urine sample (for sodium), 24-hour diet recall, food shelf inventory.

### **Key Findings**

Results included:

- parent involvement enhanced outcomes of eating patterns interventions;
- self-reported food selections, 24-hour diet recall, and food shelf inventory all showed a positive effect for the *Home Team*;
- students in school-based intervention gained more knowledge and skills; and
- cost of home intervention was about \$7.00 per family.

### **Lessons Learned**

Increased knowledge gained in the classroom did not necessarily lead to greater behavior change (at least in the short-term). The suggested school-based programs are effective in providing a foundation for informed decision making, but parental involvement may be necessary for substantial dietary change in children.

Neither intervention effected changes in urinary sodium or sodium consumption.

### **Additional Comments**

Optimally school and home interventions would be complementary. Home intervention was only five weeks. The study suggested a greater benefit with longer intervention across more ages of children.

## **Evaluation of the effectiveness of a high school course in cardiovascular nutrition.**

### **Reference**

Podell, R., Keller, K., Mulvihill, M., Berger, G., & Kent, D. (1978) Evaluation of the effectiveness of a high school course in cardiovascular nutrition. *American Journal of Public Health*. 8, 573-576.

### **Environmental Intervention and Policies**

A Grade 10 class of biology students was targeted. Intervention methods included:

- During “Heart Disease Awareness Week”, activities were conducted at a high school. These activities were publicized in school newspapers. Low cholesterol diets were demonstrated in home economics classes.
- Five hours of cardiovascular education in biology classes consisted of lectures, movies from the American Heart Association, and reading materials. Each student kept a 2-day food diary and calculated their individual saturated/polysaturated fat and cholesterol consumption.

### **Evaluation**

A survey was conducted Fall 1974 with the biology students regarding their knowledge about cardiovascular nutrition; attitudes and dietary habits; and an initial cholesterol level. A follow-up was given at 4-, 7- and 12-months following the initial survey.

The survey asked these six questions:

1. How do you feel about your cholesterol eating style?
2. Do you currently make any attempt to eat so as to keep your blood cholesterol down?
3. Does anyone living in your home try to eat foods to keep his or her cholesterol down?
4. Since the Fall, have you changed the degree of attention you give dietary intake of cholesterol and saturated fats?
5. Do you think your family has changed in the degree of attention they pay to cholesterol and saturated fats?
6. Do you think it is important for a person with higher than average blood cholesterol to watch the amount of cholesterol and saturated fat in his diet?

Note:

- Questions 1 to 4 were asked at both the pretest and the posttest.
- Questions 5 to 6 were asked at posttest only.

The week after the initial survey, 46% were screened for fasting cholesterol levels.

### **Key Findings**

The findings of what worked included:

- Large scale cholesterol screening is feasible as part of high school education.
- Students had significantly increased their knowledge, as illustrated by the fact that:
  - 65% said they had increased their attention to intake of cholesterol and fat;
  - 47% felt their family had increased attention;
  - 85% of those with cholesterol in upper quartile were making an effort to watch intake of cholesterol (as opposed to 67% in lower quartile).

- Significant improvement was seen on reported eating patterns, with families reporting greater dietary change.
- The majority of the students rated the course as “good” and felt it should be part of the regular curriculum.
- Parents reported their children were interested and enthusiastic about the program and demanded changes in their family’s diet.

### **Lessons Learned**

There were several areas of learning which included:

- Cholesterol level for both groups increased, which suggested reported attitudes and diet do not reflect actual attitudes and diet.
- An effort was made to try to develop a low cholesterol, low saturated fat option in the school cafeteria, but it did not work.
- The majority of parents did not see the need for dietary change unless there was a high cholesterol problem in the family.

### **Additional Comments**

Overall, authors say they need more research to draw substantial conclusions from this study.

## “Healthy Schools, Healthy Kids.”

### Reference

*Project 48 – Healthy Schools, Healthy Kids.* G8 database project summary retrieved (n.d.) from Canadian Heart Health Database Centre, Memorial University, St. John's, NF, <http://www.med.mun.ca/g8hearthealth>.

### Environmental Intervention and Policies

A population of 2,500 elementary school children per year was targeted at 25 school sites in an urban region of Ontario, Canada.

This program appeared to be modeled after the CATCH (*Child and Adolescent Trial for Cardiovascular Health*) intervention. It was similar in that teachers are used to convey the information about making healthy lifestyle choices to the students. Administrators sat on “Healthy Schools Planning Teams” and provided advice and expertise to the group regarding the needs of the schools. The intervention utilized a variety of strategies and activities including:

- developing healthy public policy,
- building coalitions,
- doing advocacy work,
- holding workshops for teachers,
- forming advisory committees,
- starting support groups, and
- developing partnerships with other groups in the community, and
- building the capacity of the school communities involved.

### Evaluation

The purpose of their evaluation was to examine how well integrated the program was within the schools. This information was obtained through a questionnaire for teachers and principals that used concepts derived from the comprehensive school health framework.

### Key Findings

The results of the evaluation demonstrated the “*overwhelming success*” of the program, especially with regard to nutrition and physical activity. They reported changes in the school environment and individual behavior change within students and staff. In addition, 94% of parents said they found the nutrition information from the schools helpful. Teachers reported that school lunches appeared more nutritious, there were fewer junk food items available to students and there were a greater number of hours of physical activity (PA) available to the students. The authors also reported they were able to secure continued funding for the program and were able to establish an intervention model that can be used by other schools. These findings were published in Ontario’s Heart Health “*What Worked for Us*” catalog.

## **Calgary Comprehensive School Heart Health Project.**

### **Reference**

*Project 64 – Calgary Comprehensive School Heart Health Project.* G8 database project summary retrieved (n.d.) from Canadian Heart Health Database Centre, Memorial University, St. John's, NF, <http://www.med.mun.ca/g8hearthealth>.

### **Environmental Intervention and Policies**

A population of 5,000 children, teens and adults were targeted in Calgary, Canada.

The goal of this program was to:

- strengthen existing school activities and programs aimed at heart enhancing behaviors in school-aged students and their parents;
- promote health supporting environments in the school;
- increase self-confidence, communication skills, and enhance decision making; and
- develop a comprehensive model of heart health for schools.

Main delivery channels were the schools and worksites. There were many activities and strategies used in this program, including:

- contests,
- workshops and classes,
- forming advisory committees,
- a public education campaign,
- printed resource materials,
- initiation of walking clubs,
- developing partnerships, and
- developing healthy policy.

### **Evaluation**

This program was evaluated for process and impact. Methods used in the evaluation included case studies, key informant interviews, focus groups and questionnaires measuring knowledge, attitude and behavior

### **Key Findings**

The authors don't go into great detail regarding the results in the G8 summary, but state, "*positive results regarding process (e.g. capacity building) and impact (e.g. smoking and knowledge).*"

## **Preschool Wellness Fair, Manitoba Heart Health Project (MHHP).**

### **Reference**

*Project 66 – Preschool Wellness Fair.* G8 database project summary retrieved (n.d.) from Canadian Heart Health Database Centre, Memorial University, St. John's, NF, <http://www.med.mun.ca/g8hearthealth>.

### **Environmental Intervention and Policies**

A population of 104 preschool children and their parents during the year from Manitoba, Canada was targeted. The project was a local community-centered and sponsored health fair.

The goal of this program was to increase awareness of community resources for child health and parenting among relatives, parents and caregivers of preschool children. There were 14 health information booths. Some of the health topics covered included diet/nutrition, smoking, physical activity, stress, and overall heart health. Main strategies of the program were public education and community mobilization. Main activities included participating in an established community event.

### **Evaluation**

The goals of the project evaluation included:

- determining the learning achieved by participants,
- ascertaining whether the fair met the expectations of the participants, and
- to decide if the event was worth repeating, as well as what needed improving.

To accomplish this evaluation, staff conducted follow-up interviews with presenters and administered participant questionnaires.

### **Key Findings**

A reviewer notes that no outcome evaluation information from this project was given, only implementation and process evaluations. It was not considered a strong design, but may be informative for community and school partners.

The authors report there was “general support” for the fair, but improvements should be made. In the future, for example, the assessment stations should be held in a quieter location and the child’s assessment tool (a passport) should be duplicated so staff can get the information they need (to judge participation and reach). In addition, children will then have a souvenir to take home with them.

## **High 5: School-based intervention to promote fruit and vegetable consumption.**

### **Reference**

Reynolds, K.D., et al. (2000) Increasing the fruit and vegetable consumption of fourth-graders: Results for the High 5 project. *Preventive Medicine*. 30, 309-319.

### **Environmental Intervention and Policies**

The targeted population was 28 elementary schools with students in Grades 3-5. The setting was in the school; seeking information on individual behavioral change and environmental change.

*High 5* had three main intervention components (i.e. classroom, food service, and parent components). It was based on the social cognitive theory. The classroom component consisted of a 14-lesson curriculum, which involved stories, role-playing, self-monitoring activities, problem-solving, reinforcement, taste-testing, and more. Curriculum coordinators employed by the intervention taught the lessons. Curriculum was delivered three days a week and lasted 30-45 minutes per session. The parent component included the kick-off night at school, and seven homework assignments to be completed by student and parent. The food service component included a half-day training of staff on how to purchase, prepare, and promote the *High 5* program. Staff also received a calendar outlining *High 5* tasks. Tasks included following *5 A Day* guidelines in food preparation, offering taste-tests, offering salad bars, displaying food cues and wearing *High 5* aprons.

### **Evaluation**

Evaluation measures were completed at baseline, 1-year follow-up, and 2-year follow-up.

- Child-measures – included 24-hour diet recall interviews, and cafeteria observation of randomly selected children for the quantity of fruit/vegetable items served and the amount of plate-waste left at the end of the lunch period. Children were also assessed on psychosocial variables using a questionnaire administered in the classroom.
- Parent measures – included a paper-and-pencil questionnaire sent home with the child. The questionnaire asked about health habits, their child's eating habits, as well as knowledge and attitudes regarding eating habits.

### **Key Findings**

Children in the intervention conditions ate significantly more fruits/vegetables at follow-up periods of 1 and 2. At follow-up period-1, intervention parents ate more fruits/vegetables than control parents, but the effect was lost at follow-up period-2. At follow-up period-1, children in intervention schools had more knowledge of the food guide pyramid, more knowledge of *5 A Day* servings and improved family norms with regard to eating *5 A Day*. For intervention parents it was found that self-efficacy and knowledge of *5 A Day* improved at follow-up period-1 but was lost at period-2. The authors state, "*The duration of the student effects across 1-year post-intervention period is encouraging, suggesting that the program may produce long-term changes in dietary behavior ....The intervention effect might be sustained longer than one year if additional and more aggressive booster sessions are delivered* (pg. 317)."

## **Heart Partners: A Strategy for promoting effective diffusion of school health promotion programs.**

### **Reference**

Roberts-Gray, C., Solomon, T., Gottlieb, N., & Kelsey, E. (1998) Heart Partners: A strategy for promoting effective diffusion of school health promotion programs. *Journal of School Health*. 68, 106-110.

### **Environmental Intervention and Policies**

*Heart Partners* is a theory-based strategy for strengthening the effectiveness of the American Heart Association's (AHA) current system of volunteer support for school-based health promotion.

Intervention methods included:

- recruitment of 150 individual allies in the resource system and established formal, interactive partnerships with campus-level advocates in schools to increase use and reach of AHA curriculum kits;
- materials for campus-level advocates were organized into the *Heart Partners* resource kit; and
- launched in 1993 and evaluated at the close of the school year in 1994.

### **Evaluation**

Three studies were conducted:

1. tracking of use and reach of school-site kits – at schools that did and did not have a campus advocate
2. mailed survey of advocates and allies – documented their perceptions of strengths and weaknesses in the program
3. template matching – compared implementation and outcomes of program against a program template based on the developers' assumptions and expectations

### **Key Findings**

- Study 1 – Schools with *Heart Partner* advocates used more AHA kits, conducted more activities, reached more students, and involved more teachers. It was discovered that establishing interpersonal partnerships between allies in resource system and advocates in user system is an effective strategy.
- Study 2 – Eighty-two percent of campus-level advocates (most respondents were school nurses) endorsed the program as a “good” or “excellent” way to involve schools in establishing positive health life styles. Most advocates said they devoted between 4 and 24 hours to *Heart Partners* tasks between August, 1993 and May, 1994 – less than 3-hours per month.
- Study 3 – The program met or exceeded most developers' criteria for success.

The evaluation showed a 2-fold to a 4-fold increase in actual use and reach of school health promotion packages and programs.

### **Lessons Learned**

- Study 1 – In schools that lost their advocate, a corresponding decline occurred in use and reach of AHA school-site programs.
- Study 2 – Forty-nine percent of advocates stated the resource-system partner who recruited them had not assisted them other than to orient them to tasks and inform them of new AHA programs. The authors believe the beneficial effects of the advocates would have been even more impressive if their allies had been stronger partners.

### **Additional Comments**

The appeal of *Heart Partners* is that it is simple, inexpensive and effective. This model demonstrates redirecting rather than adding tasks. By 1997 there were 2,734 campus-level advocates. *Heart Partners* was approved for nationwide distribution in 1995. Future partners can obtain information on *Heart Partners* by calling any local AHA office.

## **The association of school environments with youth physical activity.**

### **Reference**

Sallis, J., Conway, T., Prochaska, J., McKenzie, T., Marshall, S., & Brown, M. (2001) The association of school environments with youth physical activity. *American Journal of Public Health*. 91, 618-620.

### **Environmental Intervention and Policies**

The targeted population was middle school children in 24 public middle schools in San Diego County, California during Spring 1997. The mean enrollment was 1,081 students with:

- 43% non-White,
- 39% who received subsidized meals, and
- 38% who received bus transportation.

The hypothesis was: *schools with adequate space, facilities, equipment and supervision stimulate students to be physically active at school during free time.*

### **Evaluation**

An assessment by observation was conducted at 137 physical activity areas.

The environmental variables included:

- area type—court space, open field space and indoor activity space;
- area size; and
- permanent improvements—including number of basketball hoops, tennis courts, baseball diamonds, and football/soccer goals.

SOPLAY (*System for Observing Play and Leisure Activity in Youth*) was used to:

- code the number of participants and their activity levels (sedentary, walking, or very active); and
- record the temperature, accessibility of the area and presence of supervision, organized activities and equipment.

### **Key Findings**

Discoveries included the following findings:

- The average number of girls observed being physically active was 1.6%.
- The average number of boys observed being physically active was 5.5%.
- More girls were active when equipment was *not* present in indoor areas, but equipment enhanced activity levels in outdoor areas.
- Girls were most active when school environments had high levels of both improvements and supervision.
- The boys were most likely to be active on courts with high supervision.
- Boys were in the largest proportion active on courts when equipment was available.
- Boys were the highest proportion active when areas had both high levels of improvements and supervision.

### **Lessons Learned**

Several lessons were learned including:

- Fewer than 2% of girls and 6% of boys chose to be physically active during unstructured time.
- An absence of environmental support was associated with near-zero levels of student physical activity (PA).

### **Additional Comments**

The main point of the study can be summed up by paraphrasing a line from *Field of Dreams*—*if you build it they will come*—and be active. The results of the study raise the possibility that making realistic improvements to school environments could increase physical activity (PA) of students throughout the school day.

When the school environment had high levels of both physical improvements and adult supervision the percentage of PA for boys and girls was 4-fold and 5-fold higher, respectively, than when the school was deficient in both.

## **A school-based intervention to teach third grade children about the prevention of heart disease.**

### **Reference**

Skybo, T., & Ryan-Wenger, N. (2002) A school-based intervention to teach third grade children about the prevention of heart disease. *Pediatric Nursing*. 22, 223-235.

### **Environmental Intervention and Policies**

Targeted population was with 58 third graders in two public schools in a large metropolitan area in a midwestern city taking part in the program.

The intervention methods included:

- comparison of school-based educational program *HeartPower!* to the standard health education curriculum;
- during 1999-2000 school year for 30 minutes per week, intervention school was taught the American Heart Association's (AHA's) *HeartPower!* program and the control school was taught other health-related topics;
- *HeartPower!* sessions were on heart function, nutrition, physical activity (PA) and living tobacco-free; and
- standard curriculum included information on alcohol, tobacco and other drugs (ATOD) use, overall view of the human body with a focus on digestive system, recommended food groups, and how to plan healthy meals.

### **Evaluation**

Methods of evaluation included:

- All students completed student survey and 10-question knowledge test.
- Parents completed a survey about their family history, risk factors for cardiovascular heart disease (CHD) and lifestyle choices.
- Parents also did two activities about structure of the heart and nutrition.
- Also measured were students' cholesterol level, nutritional assessment, height, weight, body fat percentage, aerobic activity, blood pressure, exposure to cigarette smoke, and parental participation.

### **Key Findings**

The intervention group showed:

- significant improvement in knowledge of healthy lifestyles;
- modest improvements in hypertension and exposure to tobacco smoke; and
- parents reported 6% decrease in amount of smoking in household (compared with no reduction in controls).

A focused instruction on important health issues may be preferable to a broad approach.

### **Lessons Learned**

- Cholesterol levels were consistent over the duration of the study in both groups.
- Children in the control group developed higher body fat percentages (while the intervention group held steady).
- The parents' interest in the study declined over time as measured by percent of completed activities.

### **Additional Comments**

Children looked forward to the *HeartPower!* lessons and participated enthusiastically. Future investigations need to be conducted on how to maintain parent interest, for what is taught in the classroom may be untaught at home.

## **Promoting physical activity and a healthful diet among children: Results of a school-based intervention study.**

### **Reference**

Simons-Morton, B., Parcel, G., Baranowski, T., Forthofer, R., & O'Hara, N. (1991) Promoting physical activity and a healthful diet among children: Results of a school-based intervention study. *American Journal of Public Health*. 81, 986-991.

### **Environmental Intervention and Policies**

The targeted population was an elementary school (K-4) with elementary children. Two Texas elementary schools were involved.

An intervention method, the *Go For Health* (GFH) program, included:

- six modules of behaviorally-based health education curriculum (*Go For Health* curriculum)
- five 6 to 8 week units of fitness-oriented physical education (Children's Active PE)
- lower fat and sodium school lunches (New School Lunch)

### **Evaluation**

The evaluation included:

- analyzing nutrient contents of 12 lunches
- conducting 24-hour diet recall to children at posttest
- observing students physical activity (PA) during physical education (PE) over two months.

### **Key Findings**

Results of this school-based intervention study revealed:

- total fat, saturated fat, and sodium levels were less at posttest than pretest while other levels of other essential nutrients were maintained; and
- students in the intervention group reported fewer calories, less total fat, saturated fat, and sodium levels for the total day.

### **Additional Comments**

Children did not make up in other meals for the reductions of fat and sodium in school lunches.

## **Results of a heart disease risk-factor screening among traditional college students.**

### **Reference**

Spencer, L. (2002, May) Results of a heart disease risk-factor screening among traditional college students. *Journal of American College Health*. 50(6), 291-296. Abstract retrieved June 13, 2004 from PubMed database, National Library of Medicine, <http://www.ncbi.nlm.nih.gov/entrez/query.fcgi>.

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### **Environmental Intervention and Policies**

College students aged 18 to 26 years old were in the targeted population. The screening intervention was low-cost due to the use of trained students serving as screeners in the program. Data collection with the 226 college students included:

- serum cholesterol,
- blood pressure, and
- self-reported health behavior.

### **Evaluation**

The college student participant's screening revealed:

- 29% had undesirable total cholesterol levels;
- 10% had high cholesterol;
- 10% had high systolic blood pressure, and
- 11% had high diastolic blood pressure.

Other risk factors reported that 50% or more of the participants indicated:

- a diet high in saturated fats,
- binge drinking
- parental risk for high cholesterol or blood pressure, or
- elevated stress levels experienced.

Higher risk-factor levels were signified more with men than women.

### **Key Findings**

*“Findings from a regression analysis revealed that smoking, binge drinking, lack of cardiovascular exercise, and eating a high saturated-fat diet were predictive of undesirable cholesterol levels.”*

### **Lessons Learned**

*“Study limitations included self-selection of participants and single measurements of blood pressure and cholesterol.”*

## **Modification of risk factors for coronary heart disease: Five-year results of a school-based intervention trial.**

### **Reference**

Walter, H., Hofman, A., Vaughan, R., & Wynder, E. (1988) Modification of risk factors for coronary heart disease: Five-year results of a school-based intervention trial. *New England Journal of Medicine*. 318, 1093-1100.

### **Environmental Intervention and Policies**

The setting for the school-based intervention trial was with 3,388 children in 37 schools in the Bronx and Westchester County in and around New York City.

The curriculum targeted voluntary changes in risk-related behavior in diet, physical activity (PA), and smoking.

The intervention was taught 2-hours per week during the entire school year. The nutrition curriculum promoted adopting a low-fat/cholesterol diet high in carbohydrates and fiber. The physical activity (PA) curriculum promoted adopting a regular exercise program. The smoking curriculum promoted abstinence from the use of tobacco.

### **Evaluation**

- Levels of risk factors, which included blood pressure, cholesterol, height, and weight, were measured at baseline (Grade 4) and at four follow-up points (Grade 5, Grade 6, Grade 7 and Grade 9).
- In the Fall of Grade 4 and Grade 9, dietitians interviewed students about their dietary intake during the previous 24-hours.
- A questionnaire assessing knowledge of the relation of diet, physical activity (PA), and tobacco use to the prevention of chronic disease was administered in the classroom at baseline and at four follow-up points.

### **Key Findings**

The intervention produced favorable trends in cholesterol.

### **Lessons Learned**

The program had no effects on body mass, physical fitness, pulse rate, or blood pressure. The intervention group knowledge and behavior were not significantly different from controls.

### **Additional Comments**

This is an older study that basically only drew the conclusion that school-based, teacher-delivered interventions can be implemented among populations of school children.