



Seeing ourselves through the obesity epidemic

Prologue: A hopeful view of the future. In 2010 the incidence of obesity has been slowed. Local politicians, school officials, employers and other community leaders, with local, state and federal funding, matched by industry dollars, have collaborated to change policy and implement programs in support of health communities. New communities and community improvement projects are planned to support physical activity. Parks and Recreation programs are fully funded. Worksites have wellness centers, employees are given the opportunity to use them, and employers are reimbursed by health insurance carriers to promote a healthy workplace. Community physical activity promotions for all ages occur throughout the year. In schools, physical education classes are held in all grades from 3 to 5 days a week for 45 minutes each day, with an emphasis on building life-long skills, providing a liberal dose of moderate to vigorous activity, and providing all children throughout their school years the opportunity to experience the joy of physical activity and learn its relation to good health and well-being. Schools are opening their doors to offer exercise facilities and health promotion activities during off-school hours for the surrounding community. Daycare facilities for the elderly are staffed with health promotion professionals, and physical activity programs, health promotions, cafeteria health plans, and health credits are all in place to improve quality of life. Fast foods are

no longer available at schools or in the worksite. Vending machines dispense healthy choices and cafeterias have salad bars, fresh fruit, nutritious soups, skim and low-fat milk and yogurt, and bottled water, along with a balanced menu of complex carbohydrates, healthy protein sources, and foods low in saturated fat. Food is no longer used as a reward in schools. Physical activity events have become the major school fund-raising projects. Community agencies have added physical activity programs before and after school for both adult and child enrichment, and the science of exercise and nutrition are infused throughout the school curriculum. Federal, professional and private organizations such as The President's Council for Physical Fitness and Sports, The Cooper Institute, and AAHPERD have joined together to promote physical activity and health-related physical fitness, offering awards to all children who are active and fit, regardless of their athletic prowess. Schools and worksites are also recognized for their innovative programs for healthy eating and physical activity. Their efforts receive national exposure so others may learn from their success. Consequently, model programs developed in response to the Surgeon General's Call for Action¹ such as the Mayor's Healthy City Initiative in Tucson, Arizona, the state-wide Obesity Prevention Programs in Arkansas and Colorado, and the Federal Hearts and Park program have spread throughout the country. The obesity epidemic is slowed and prevalence in adults and children has decreased to the pre-1980s prevalence.

Published quarterly by the
President's Council on
Physical Fitness and Sports
Washington, D.C.



Guest Authors:

T.G. Lohman¹, Ph.D., S.B. Going^{1,2},
Ph.D., and L. Metcalfe¹, M.S.
University of Arizona, Center for
Physical Activity and Nutrition,
Departments of Physiology¹ and
Nutritional Sciences²



Co-edited by:

Drs. Charles B. Corbin and
Robert P. Pangrazi,
Arizona State University, and
Dr. Deborah Young,
University of Maryland

Ongoing evaluation efforts have also been improved. Children and adults' levels of physical activity and fitness, body composition and eating habits are followed every five years through a national probability sample survey by NCHS and CDC, and well-being indexes are offered on a community, state, and national level to provide guidance and support for individual, family, school, and worksite improvements in health behavior.

In contrast to this, the U.S. currently has the highest prevalence of obesity in the world. Adult obesity has increased steadily over the past 20 years.² Currently 30.4% of the U.S. population is obese (BMI >30).³ Another 34.7% is overweight (BMI between 25 and 30). The prevalence of obesity ranges from 25 to 51% depending on gender, age, and racial/ethnic group with higher levels in Mexican American, African-American and Native American populations. Recent estimates of prevalence have shown obesity has increased 50% or more over the past decade in every state,⁴ with direct annual health costs estimated at \$90 billion.⁵

Recent childhood surveys show obesity has increased at all ages throughout the 1990s to reach levels higher than at any time in our nation's past. Today, 16% of children 6 through 19 years (1999-2002) are overweight (95th percentile of sex-specific BMI-for-age growth charts), and another 31% are at risk for overweight (85th percentile of sex-specific BMI-for-age growth charts).³ Historically, federal surveys have followed the secular changes in height, weight and skinfolds. In the 1990s an indirect body composition measure was added (bioelectrical impedance in NHANES III) and more recently (NHANES IV) a more direct measure of body fatness and fat distribution (DXA estimated fatness). Hopefully, soon we will be able to define childhood and adult obesity in terms of fatness rather than weight for height and thus have a more health-related measure of body composition to follow.

Standards have been developed for children. Using data from the Bogalusa Heart Study, Williams et

al.⁶ and Lohman⁷ showed that body fatness of 25% for boys and 32% for girls was associated with an increase in cardiovascular risk factors in children 8 to 18 years of age independent of age and race. These health-related body composition standards have been used in the national Fitnessgram (Cooper Institute) for the past ten years. BMIs and skinfolds corresponding to 25% fat for boys and 32% for girls have been identified, and are also used in schools throughout the country to encourage health-related fitness.

We know that heavier children are at greater risk for diabetes and for higher levels of fasting glucose and insulin related to body fatness, physical inactivity and low fitness levels. We also know that exercise programs, if vigorous enough, can lower chronic disease risk factors and support healthy body weight and composition at any age. Research has shown that childhood obesity tracks into adolescence, and adolescent obesity is predictive of adult obesity. Thus, early intervention is important.

Much of the increase in obesity in the past 20 years has been associated with environmental rather than genetic factors. Leading candidates include less physical activity and lower caloric expenditure, more time in sedentary pursuits (TV, Internet and video games), less walking to school and in neighborhoods, larger portion sizes, greater consumption of refined carbohydrates, and lack of active time in schools and at the worksite. The International Obesity Task Force⁸ has addressed the prevalent causes of obesity in a comprehensive report. The report identifies underlying social changes in developing countries that have likely contributed to rising levels of obesity throughout the world, including increased motorized transport, increased traffic hazards discouraging pedestrians and cyclists, fewer opportunities for recreational physical activity, increased sedentary recreation, multiple TV channels around the clock, availability of greater quantities and variety of energy-dense foods, increased promotion and marketing of these foods, more frequent and widespread food purchasing opportunities, more use of restaurants and fast food stores, larger

portions and promotion of better “value” for money, increased frequency of eating occasions, and rising use of soft drinks to replace water, especially in schools.⁸ The decline in real food prices, increase in caloric intake from quick-to-prepare foods, urban sprawl, fewer transportation choices, more eating out at restaurants, especially fast food restaurants, scarce leisure time for women, and high cigarette prices and taxes causing more smokers to quit are other likely contributors.⁹ Clearly, the problem is complex and widespread interventions on many levels are drastically needed.

Two major venues for obesity intervention are schools and families. Schools have the advantage of reaching many children with a given intervention. Several school-based interventions have been conducted or are under way: PATHWAYS, CATCH, SPARK, MSPAN, GEMS, TAAG, and STOPP T2D. Although some of these programs have increased physical activity and improved healthy eating, none has decreased obesity (TAAG and STOPP T2D are still in process). In most school-based studies, families have played only a peripheral role in the intervention. We know from other research^{10, 11} that weight loss interventions are most successful when parents and their children together are targeted to lose weight, although some success in both children and adults is possible when only parents are targeted for weight loss. Less success occurs when only children are involved in the intervention. The best long-term success (5 and 10 years after intervention) reported by Epstein et al.¹⁰ occurred when both parents and children lost weight. Thus, it may be that for school-based interventions to be effective, we must find creative ways to involve parents in obesity prevention approaches.

There is growing sentiment that nurture rather than nature is driving the obesity epidemic.¹² Urbanization, mechanization, and the associated cultural and environmental changes have lowered daily energy expenditure. Past generations endeavored to build a society in which the amount of hard physical labor was reduced and there would be an opportunity to enjoy leisure pursuits.

They succeeded, although not without unintended and unexpected consequences. The results of a recent survey suggest present-day Americans have over 33 leisure hours per week.¹³ While better technology has increased production, technology and productivity have created a faster and more stressful pace of life, with time pressures for all of us.¹⁴ Despite what appears to be significant opportunity for leisure pursuits, Americans perceive they have far less (on average about 15 hrs.) leisure time. When they do seek relaxation, people of all ages tend to choose sedentary activities such as watching television, surfing the web, and playing video games more than physical activity. According to the most recent BRFSS Survey, greater than 70% of U.S. adults do not achieve the recommended levels of moderate and vigorous physical activity that have been associated with important health outcomes, and more than 30% of adults report no leisure time physical activity. These numbers have been remarkably stable over recent decades. Research also suggests physical activity levels are low in children and youth. Based on the 1999 Youth Risk Behavior Survey,¹⁵ only 45% of U.S. youth, aged 14-18 years, participate in moderate physical activity (MPA) for 30 minutes on more than two days per week, and only 65% reported participating in vigorous physical activity for 20 minutes on three or more days per week.

While direct evidence for a link between physical activity and obesity is lacking, the ecological evidence is impressive. Sedentary jobs have increasingly replaced jobs with significant physical demands. The number of cars and time spent in cars has increased. Physical education, a child's main opportunity for physical activity during the school day, has been drastically reduced in many schools. Observational studies have shown physical activity is significantly correlated with weight and body fat. Individuals who have successfully lost weight report participating in significant amounts of daily physical activity,¹⁶ and physical activity is the best predictor of weight maintenance after weight loss. The available longitudinal data also suggests physical activity is

vital to maintaining healthy weight.¹⁷ In the Aerobics Center Longitudinal study cohort, improvements in fitness (assessed by treadmill time) over 2 years time were associated with attenuated weight gain over an average of 7.5 years. Considered *in toto*, the available evidence suggests an active lifestyle should be promoted early and maintained throughout adulthood to prevent substantial weight gain and reduce obesity with advancing age.

The optimal dose of physical activity is controversial and undoubtedly depends on the desired outcome. Prevention of weight gain, weight loss, and weight maintenance after loss likely requires different levels of energy expenditure. Current recommendations, released jointly by the CDC and ACSM in 1995,¹⁸ and later endorsed by the U.S. Surgeon General,¹⁹ The National Institutes of Health,²⁰ and the American Heart Association,²¹ promote “30 minutes or more of moderate intensity physical activity on most, preferably all, days of the week,” which equates to about 150 minutes of moderate intensity exercise or approximately 1,000 kcals/week of energy expenditure. Based mostly on epidemiologic data that showed a consistent association between physical activity and disease risk and outcomes, the CDC/ACSM recommendation was aimed at the 40-50 million U.S. adults who are sedentary and who account for much of the public health burden of chronic disease. Weight loss/weight maintenance was not the primary consideration, and whether the CDC/ACSM recommendation represents the optimal dose for maintenance of a healthy weight at different ages is unclear.

More recently, the IOM Committee on Dietary Reference Intakes released its report, which included a recommendation for 60 minutes of daily moderate intensity physical activity.²² The IOM report suggested that “30 minutes per day of regular activity is insufficient to maintain body weight in adults in the recommended body index range of 18.5 up to 25 kg/m² and [to] achieve all the identified health benefits fully.” Hence, to prevent weight gain as well as to accrue additional, weight-independent health benefits, the IOM panel

recommended approximately twice the minutes of moderate physical activity that was recommended by CDC/ACSM.²³

In practice, the discrepancies among activity recommendations are easy to reconcile. Sedentary, overweight individuals will benefit from increasing their daily physical activity, even if they do not lose a significant amount of weight, and 700-1,000 kcals/week is a reasonable initial goal. Once regular activity is adopted and fitness improves, further increases in weekly minutes of moderate intensity and/or vigorous activity can be undertaken to reach a level of activity/energy expenditure that prevents weight gain or regain. The major challenge facing the U.S. today is how to increase physical activity for the population. There are many possible approaches and as with obesity treatment it is quite likely that “one size does not fit all.” As with weight loss, there is substantial physical activity recidivism. Perri and others have suggested that obesity should be treated with a chronic disease model to improve overall success; thus, maintaining some contact with participants is necessary for long-term success.²⁴ A similar approach may be necessary to sustain lifetime physical activity.

Recently, the non-federal Task Force on Community Preventive Services reviewed the literature on physical activity interventions published between 1980-2000.²⁵ Eleven types of interventions described in reports emphasizing effectiveness studies were broadly categorized into informational approaches, behavioral and social approaches, and environmental approaches. Following the *Community Guide* rules of evidence,²⁶ two informational interventions (“point-of-decision” prompts to encourage stair use and community-wide education) three behavioral and social interventions (school-based PE, social support in community settings, and in individually adopted health behavior change) and one environmental and policy intervention (creation of enhanced access to places for physical activity, combined with informational outreach) were recommended for translation and dissemination. These interventions were judged

effective at increasing physical activity (either proportion of active individuals, frequency of engagement, or active minutes) or cardiorespiratory fitness. Results show it is possible to develop interventions that increase activity and fitness and we believe it is vital that translation and dissemination proceed,²⁷ even while research continues to refine and develop new interventions. Five types of interventions were not recommended (classroom-based health education, behavioral and social support in family settings, mass media campaigns, college-aged physical and health education, classroom-based health education focused on reducing television viewing), because of insufficient studies, lack of a consistent effect on physical activity or fitness, or lack of a link to physical activity. This lack of recommendation does not mean that studies in these areas are not worthwhile but simply that sufficient evidence is not yet available to support a recommendation.

A key concept for obesity treatment that is likely to be important for maintenance of desirable physical activity is the approach of continuous care or continuous contact. It is essential to develop and test low-cost strategies, with broad reach, for delivering and sustaining proven interventions. The current lack of information on strategies for long-term maintenance of healthy behaviors that support weight loss represents a major challenge, and long-term studies are greatly needed.²⁸ As with smoking cessation, adoption and maintenance of recommended levels of physical activity and long-term healthy eating patterns will likely require sustained efforts reinforced on multiple levels (individual, family, community) and in multiple venues (physician visit, school and workplace, community, etc.). Interventions that are tailored to the specific circumstances and needs of the individual are likely to be more successful over the long term, particularly if they are designed to adapt to changing situations and needs. Lifestyle activity may be another effective strategy for increasing physical activity, increasing fitness, and modifying body weight in overweight adults.

How can we encourage more people to find the joy

in physical activity and movement? Adopting an active lifestyle is more likely to occur when individuals clearly perceive the personal and social benefits. In general, we need to provide education and skill development, opportunities to build self-efficacy and encourage modeling of physical activity and healthy eating by peers, teachers, parents and co-workers. The incorporation of functional strength training into existing exercise programs to enhance coordination, strength and endurance in everyday activities is also helpful. This “functional” approach to strength training allows individuals to perform their daily activities and recreational pursuits with greater ease and less injury. Goal setting, completing personal contracts, and keeping exercise logs are other strategies for guidance and accountability. Individuals also need to develop coping skills to deal with an increasingly inactive and sedentary society. Coping skills can be defined as ways to problem solve daily challenges that interfere with your best exercise and healthful eating intentions. Some examples would be to schedule physical activity for the week taking into consideration options for morning, work day, and evening activity. Exercising with a partner may improve maintenance because of accountability to another person. Identifying the key benefits and barriers to regular physical activity may also assist in developing a personal plan. If exercise makes you feel better, gives you more energy, clears your head so you can think better, provides social interaction opportunities, allows you the calorie deficit to enjoy a rich dessert, and makes you feel more alive in your body, these insights are invaluable to your decision making process as your day unfolds and the opportunities to make healthy choices become more enticing. Regular evaluation of progress is motivational. Widespread and increasing access to computers and the Internet supports access to downloadable physiological, activity and dietary measurement tools, with the potential for real-time feedback. Personal coaches can, in person or using the Internet, address fitness and nutritional concerns, and also offer support for stress reduction, time management, and other important health and wellness areas.

Primary care doctors should play a pivotal role in addressing sedentary lifestyles and the resulting obesity epidemic. To assist time-pressed primary care doctors to address fitness in their practice, fitness professionals can provide training to physicians to learn to assess body mass index and waist measurement and determine a patient's physical activity level, counsel overweight patients on the potential health risks they face and on reducing their daily calorie intake, write an exercise prescription, encourage using a pedometer with a long-term goal of walking 10,000 steps a day, and recommend strength training exercises for specific needs.⁵

Available research suggests that preventative lifestyle programs by healthcare providers and companies cost far less than treating lifestyle diseases. Obese individuals are at increased risk for physical ailments such as type 2 diabetes, hypertension, stroke and coronary heart disease, and cancer. The easiest and most cost-effective resources a company can provide are websites where employees can access important wellness information, including risk factor assessment tools, fitness calculators, guidelines for beginning a fitness program, guidelines for healthy eating, and how to contact certified fitness and nutrition professionals. These programs should “follow” employees using the Internet, instant messaging, and other tools to promote adherence and long-term success. Many states and cities will provide funding for community health promotion programs including walking programs, weight management,

osteoporosis prevention, diabetes prevention and cancer prevention. Communities will also work with environmental engineers to develop sidewalks, bicycle and walking trails and parks to make it easier for people to be more physically active.

Epilogue. The year 2010 is but 6 years away. Clearly, the challenge is great and there is much work to do. Marshalling changes into sustainable, effective programs that integrate physical activity and healthy eating into daily life aimed at long-term changes in weight-related behaviors reaching into all parts of the community with political and community participation is one way of seeing ourselves through the pandemics of obesity, sedentary lifestyle and poor nutrition. It will take great leadership at all levels to accomplish such an ambitious goal of transforming the social and environmental forces that influence eating and physical activity behaviors at the population level. Effective individual approaches must be coupled with community programs and state and federal policy initiatives, along with research demonstrating social and environmental changes, with due concern for economically disadvantaged and at-risk populations. To quote Dr. David Satcher, our previous U.S. Surgeon General (2001), “This approach should focus on health rather than appearance, and empower both individuals and communities to address barriers, reduce stigmatization and move forward in addressing overweight and obesity in a positive and proactive fashion”.⁸

Much of the increase in obesity in the past 20 years has been associated with environmental rather than genetic factors. Leading candidates include less physical activity and lower caloric expenditure, more time in sedentary pursuits (TV, Internet and video games), less walking to school and in neighborhoods, larger portion sizes, greater consumption of refined carbohydrates, and lack of active time in schools and at the worksite.

T.G. Lohman, Ph.D., S.B. Going, Ph.D.,
and L. Metcalfe, M.S.

University of Arizona, Center for Physical Activity and
Nutrition, Departments of Physiology and Nutritional Sciences

Please Post

President's Council on Physical Fitness & Sports
200 Independence Avenue, S.W., Washington, DC 20201
(202) 690-9000 • FAX (202) 690-5211

References

1. USDHHS, *The Surgeon General's Call to Action to Prevent and Decrease Overweight and Obesity*. 2001, U.S. Dept. of Health and Human Services, Public Health Service, Office of the Surgeon General: Rockville, MD.
2. Flegal, K.M., M.D. Carroll, R.J. Kuczmarski, et al., *Overweight and obesity in the United States: Prevalence and trends, 1960-1994*. *Int J Obes Relat Metab Disord*, 1998. **22**(1): p. 39-47.
3. Hedley, A.A., C.L. Ogden, C.L. Johnson, et al., *Prevalence of overweight and obesity among US children, adolescents, and adults, 1999-2002*. *JAMA*, 2004. **291**(23): p. 2847-50.
4. CDC, *Public Enemy Number One: Tobacco or Obesity?*, in *Science*, 2004. p. 804.
5. Manson, J.E., P.J. Skerrett, P. Greenland, et al., *The escalating pandemics of obesity and sedentary lifestyle. A call to action for clinicians*. *Arch Intern Med*, 2004. **164**(3): p. 249-58.
6. Williams, D.P., S.B. Going, M.P. Massett, et al., *Aqueous and mineral fractions of the fat-free body and their relation to body fat estimates in men and women aged 49-82 years*, in *Human Body Composition: In vivo methods, models and assessment*, K.J. Ellis and J.D. Eastman, Editors. 1993, Plenum: New York. p. 109-113.
7. Lohman, T.G., *Advances in body composition assessment*. 1992, Champaign, IL: Human Kinetics Publishers.
8. Lobstein, T., L. Baur, and R. Uauy, *For the IASO International Obesity TaskForce. Obesity in children and young people: A crisis in public health*. *Obes Rev*, 2004. **5** (1 Suppl): p. 4-85.
9. Rashad, I. and M. Grossman, *The economics of obesity*. Copyright of The Public Interest, Issue #156 (Summer 2004), National Affairs, Inc., 2004: p. 104-112.
10. Epstein, L.H., A. Valoski, R.R. Wing, et al., *Ten-year outcomes of behavioral family-based treatment for childhood obesity*. *Health Psychol*, 1994. **13**(5): p. 373-83.
11. Nuutinen, O. and M. Knip, *Long-term weight control in obese children: Persistence of treatment outcome and metabolic changes*. *Int J Obes*, 1992. **16**: p. 279-287.
12. Hill, J.O., H.R. Wyatt, G.W. Reed, et al., *Obesity and the environment: Where do we go from here?* *Science*, 2003. **299**: p. 853-855.
13. Harris Interactive - Hilton Leisure Time Advocacy Study. www.myleisuretrip.com. 2003.
14. Gleick, J., *Faster: The acceleration of just about everything*, ed. Pantheon. 1999, New York.
15. Eisenmann, J.C., R.T. Bartee, and M.Q. Wang, *Physical activity, TV viewing, and weight in U.W. Youth: 1999 youth risk behavior survey*. *Obes Res*, 2002. **10**(5): p. 379-385.
16. Wing, R.R. and J.O. Hill, *Successful weight loss maintenance*. *Annu Rev Nutr*, 2001. **21**: p. 323-41.
17. Haapanen, N., S. Miilunpalo, M. Pasanen, et al., *Association between leisure time physical activity and 10-year body mass change among working-aged men and women*. *International Journal Obesity*, 1997. **21**: p. 288-296.
18. Pate, R.R., M. Pratt, S.N. Blair, et al., *Physical activity and public health. A recommendation from the Centers for Disease Control and Prevention and the American College of Sports Medicine*. *JAMA*, 1995. **273**(5): p. 402-7.
19. USDHHS, *Physical activity and health: A report of the surgeon general*. 1996, USDHHS, Centers for Disease Control and Prevention: Atlanta, GA.
20. NIH, *Consensus development panel on physical activity and cardiovascular health. Physical activity and cardiovascular health*. *JAMA*, 1996. **276**: p. 241-246.
21. Fletcher, G.F., G. Balady, S.N. Blair, et al., *Statement on exercise: Benefits and recommendations for physical activity programs for all Americans. A statement for health professionals by the Committee on Exercise and Cardiac Rehabilitation of the Council on Clinical Cardiology, American Heart Association*. *Circulation*, 1996. **94**(4): p. 857-62.
22. (IOM), *Dietary reference intakes: Energy, carbohydrate, fiber, fat, fatty acids, cholesterol, protein, and amino acids*. National Academy Press, Washington, D.C., 2002.
23. *American College of Sports Medicine Position Stand. Appropriate intervention strategies for weight loss and prevention of weight regain for adults*. *Med Sci Sports Exerc*, 2001. **33**: p. 2145-2156.
24. Perri, M.G. and J.A. Corsica, *Improving the maintenance of weight lost in behavioral treatment of obesity*, in *Handbook of obesity treatment*, T.A. Wadden and A.J. Stunkard, Editors. 2002, Guilford Press: New York, NY. p. 357-379.
25. Kahn, E.B., L.T. Ramsey, R.C. Brownson, et al., *The effectiveness of interventions to increase physical activity. A systematic review*. *Am J Prev Med*, 2002. **22**(4 Suppl): p. 73-107.
26. Briss, P.A., S. Zaza, M. Pappaioanou, et al., *Developing an evidence-based Guide to Community Preventive Services—methods. The Task Force on Community Preventive Services*. *Am J Prev Med*, 2000. **18**(1 Suppl): p. 35-43.
27. Dunn, A.L. and S.N. Blair, *Translating evidenced-based physical activity interventions into practice. The 2010 challenge*. *Am J Prev Med*, 2002. **22**(4 Suppl): p. 8-9.
28. Lohman, T.G. and J. Wright, *Maintenance of long-term weight loss: Future directions*. *Quest*, 2004. **56**: p. 105-119.