

Hanover Wellness News - February 2006

We are pleased to provide the following information and research in the area of wellness.

What is Healthy Eating?

In education we ask our students essential questions to help our learners understand what matters most in our curricula. Our essential question for nutrition is, What is healthy eating? While considering this question our students are led to another question, What is a junk food? In our first issue of the Hanover wellness news we attempt to identify foods of minimal nutritional value. We will try to do this by taking twelve dubious foods (plus two drinks) and seven whole foods and scoring them against five nutrients that we should limit and five nutrients that we should try to get enough of in our diets. We used the USDA's 2005 dietary guidelines for Americans (the blueprint for the food pyramid), The National Academy of Sciences Dietary reference intakes (Institute of Medicine, 2004) and the Food and Drug Administration's food label guidelines for direction in order to identify healthy foods. We applied the nutritional needs of an active 14-18-year-old girl to our food rating system. The facts about our ten nutrients in the text below are from the Harvard Medical School's guide to health eating (Willett, 2003).

NUTRIENTS THAT AMERICANS SHOULD LIMIT:

We have chosen five nutrients that we should limit: saturated fat, trans fat, cholesterol, salt/sodium and sugar. The United States Food and Drug Administration (FDA, 2005) states in its guidelines to help Americans understand nutrition facts labels that saturated fat, trans fat, cholesterol and sodium consumption should be limited.

1. The USDA states in the 2005 dietary guidelines for Americans that we should consume less than 300 mg of **cholesterol** per day (as does the American Heart Association). Cholesterol is a sterol present in all animal tissues that is necessary to make cell membranes and a building block from which the body makes hormones. Whole grains, fruit and vegetables do not contain cholesterol. When LDL (bad cholesterol) levels increase, cholesterol is deposited on the walls of arteries and forms a hard substance called plaque. This plaque buildup causes arteries to narrow thus decreasing blood flow (atherosclerosis).
2. Saturated fat raises blood cholesterol levels. The saturated fats in butter and dairy products most strongly increase LDL (bad cholesterol). The dietary guidelines recommend that Americans consume less than 10% of calories from **saturated fat** (20 grams per day for a 2,000 calorie diet).
3. Nutrition experts could not provide a reference value for **trans fat** (known as the stealth fat) nor sufficient evidence to establish a daily recommendation. The Harvard medical school reports that trans fats are strongly associated with coronary heart disease. The USDA's 2005 dietary guidelines sets the trans fat bar at less than 2 grams per day for a 2,000 calorie diet. They also report that 40% of the trans fats Americans consume can be found in commercially prepared cakes, cookies, crackers, pies and breads.
4. We have used the National Institute of Medicine adequate intake recommendation of 1,500 mg of **salt** per day. It is important to keep track of salt intake since one of every three Americans over the age of twenty has high blood pressure (CDC, 2005). Maintaining a healthy weight, being physically active and reducing salt/sodium consumption can help prevent high blood pressure. The USDA dietary guidelines for Americans recommend that adults consume less than 2,300 grams (upper level intake) of salt/sodium each day.

5. There is no official daily recommendation for **sugars**. A food label will include all forms of sugar together in its sugar total. Look for the following names for added sugars on food labels: high fructose corn syrup, dextrose, corn syrup, glucose, honey, malt syrup, sucrose, lactose, fructose, fruit juice concentrates, raw sugar, molasses, invert sugar, brown sugar, corn sweetener and syrup. The USDA dietary guidelines allow Americans to consume “discretionary calories” that include added sugars. These added sugars are the sugars and syrups added to foods and beverages in processing or preparation, not the naturally occurring sugars in fruits, vegetables, whole grains and other whole foods. These added sugars are not meant to be specific recommendations for amounts of sugars to consume. They allow Americans to consume *some* sweetened foods and or beverages without exceeding energy needs or neglecting a health enhancing diet. The Center for Science in the Public Interest (CSPI, 1999) recommends 40 grams of sugar or less for a daily value for a 2,000 calorie diet. We have scored whole foods against the 32 gram USDA recommendation for added sugars for our 14-18-year-old girl in order to compare whole foods against “other” foods (many of which contain added sugars).

NUTRIENTS THAT AMERICANS SHOULD GET ENOUGH OF:

The FDA (2005) identifies fiber, vitamin A, vitamin C, calcium and iron as “get enough of these nutrients” since most Americans do not consume enough of them (the USDA identifies potassium, magnesium and vitamin E in addition to calcium and fiber as nutrients that Americans don’t get enough of).

1. **Fiber** (soluble and insoluble) is the indigestible portion of plant foods that helps move foods through the digestive system. The USDA fiber recommendation is based on 14 grams of total fiber per 1,000 calories consumed.
2. **Calcium** is the key nutrient in the development and maintenance of bones and also aids in blood clotting and muscle and nerve functioning. Spinach and broccoli are good calcium sources and lower in unhealthy fat than most dairy products.
3. Inadequate **Iron** consumption makes it difficult for red blood cells to move oxygen from lungs to tissues. Green vegetables, beans and poultry are good sources of Iron. Red meat is high in Iron and saturated fat and cholesterol.
4. **Vitamin A** helps boost the production and activity of white blood cells. Vitamin A also plays a role in vision, gene expression, cellular differentiation, growth, immune function and maintenance of healthy bones, teeth and hair. Carrots, yellow squash, red and green peppers, spinach, kale and other green leafy vegetables are good sources.
5. **Vitamin C** (also referred to as ascorbic acid) plays a role in infection control and is involved in making several hormones and chemical messengers used in the brain and nerves. It is also aids in iron absorption and is a powerful antioxidant capable of neutralizing many free radicals and oxidants in the body. Quality sources include guava, red peppers, citrus fruits, berries, tomatoes, broccoli and spinach.

The chart below shows the USDA dietary guidelines for Americans (2005) nutrient recommendations as well as the daily nutrient recommendations from the National Institute of Medicine for a 14-18-year-old female. The USDA states in the 2005 dietary guidelines for Americans that a moderately active 14-18 female should consume 2,000 calories per day. Additionally, the average 14-18-year-old girl should consume 2.3 liters of water per day.

HANOVER FOOD SCORING SYSTEM

In its guidelines for interpreting a food label (nutrient facts panel), the FDA informs us that 5% or less is considered low for all nutrients (those that you want to limit e.g., fat, cholesterol and sodium and those that are encouraged fiber, calcium, etc) and 20% or greater is considered high for all nutrients. With these percentages and our ten nutrients in mind we offer you the following Hanover food scoring system.

We used this system (to spur critical thinking and discussion about healthy eating among learners) to score a variety of foods (in the two tables below) in order to identify foods of questionable nutritional value and foods that are health enhancing.

Scoring for each of the nutrients that we want to limit:

- -1 point when one of these nutrients exceeded 5% of its daily value.
- +1 point when the nutrient was 5% of its daily value or less.
- -2 points for nutrients that were 20% or greater than its daily value.

Scoring for each of the nutrients we want to get enough of:

- +1 point when one of these nutrients exceeded 5% of its daily value.
- -1 point when the nutrient was 5% of its daily value or less.
- +2 points when the nutrient was 20% or greater than its daily value.

The **daily value** is the section of a nutrients fact panel (food label) that highlights how several nutrients: vitamin A, vitamin C, fiber, fats and so forth in one serving of food contribute to the daily requirements set by the food and nutrition board of the National academy of sciences. It is based on a 2,000 calorie per day diet. **We encourage our students and you to continually examine the contents of these and other nutrients on food labels in order to make health enhancing food choices.**

NUTRITIONAL REQUIREMENTS OF AN ACTIVE 14-18-YEAR-OLD-GIRL

Nutrients we want to limit	Daily intake <	5% of the daily value	20% of the daily value
Saturated fat (SF)	20 g/d* (less than)	1 g	4 g
Trans fat (TF)	2 g/d * (less than)	0.1 g	.4 g
Cholesterol (Chol)	300* mg/d (less than)	15 mg	60 mg
Salt/sodium (Salt)	1.5 g/d (less than)	75 mg	300 mg
Sugars (Sug)	32 g/d (less than)	2 g	8 g
Get enough of these	Daily intake >	5% of the daily value	20% of the daily value
Total fiber (Fib)	28 g/d	1.3 g	5.2 g
Calcium (Ca)	1,300 mg/d	65 mg	260 mg
Iron	15 mg/d (RDA)	.75 mg	3 mg
Vitamin A (Vit A)	700 ug/d	35 ug	140 ug
Vitamin C (Vit C)	65 mg/d	3.25 mg	13 mg

*USDA 2005 dietary guidelines for Americans recommendation

Scores for 14 foods of questionable nutritional value measured against nutritional requirements of a 14-18-year-old girl

Food	SF	TF	Chol	Salt	Sug	Fib	Ca	Iron	Vit A	Vit C	Score
French Fries	4%	25%	0%	25%	1%	1%	1%	4%	0%	22%	-3
Hot dog	7%	0%	10%	43%	4%	0%	1%	6%	0%	0%	-5
Doughnut	8%	200%	7%	19%	35%	3%	0%	4%	0%	0%	-12
Pizza	25%	0%	6%	53%	8%	5%	10%	15%	8%	0%	-2
Cola	0%	0%	0%	2%	68%	0%	1%	2%	0%	0%	-3
Potato Chips	15%	150%	0%	12%	0%	4%	1%	3%	0%	10%	-6
Ice cream	22%	0%	7%	3%	42%	3%	5%	0%	5%	1%	-8

Frozen yogurt	17%	0%	0%	4%	60%	0%	1%	1%	3%	1%	-5
Cupcake	20%	150%	5%	11%	63%	3%	2%	5%	0%	0%	-13
Cookie	15%	20%	5%	7%	80%	0%	0%	2%	2%	2%	-10
Sports Drink	0%	0%	0%	7%	35%	0%	0%	3%	0%	0%	-5
Fruit drink	0%	0%	0%	1%	63%	0%	0%	1%	0%	4%	-4
Gelatin	0%	0%	0%	7%	46%	0%	0%	0%	0%	0%	-5
Chicken Nuggets	20%	0%	18%	37%	3%	3%	0%	5%	2%	1%	-8

French fries, frozen, baked, salt added, 100 grams

Hot dog, 1 five inch long x 7/8 inch diameter, 57 grams

Doughnut, yeast leavened, jelly filled, 3.5 x 2.5", 85 grams

Cheese pizza, 7 ounce slice, commercially prepared, 106 grams

Carbonated cola, 12 ounce, contains caffeine (soft drink, soda, pop), 173 grams

Potato chips, plain, made with partially hydrogenated soybean oil, salted, 28.35 grams

Ice cream, chocolate, 4 ounces, 66 grams

Frozen yogurt, vanilla, one half cup, soft serve, 72 grams

Cupcake, Cake, snack cake, chocolate, with frosting, commercially prepared, 43 grams

Chocolate chip cookie, commercially prepared, soft style, 1 cookie, 25 grams

Sports drink, 8 ounces

Fruit drink, punch, ready to drink, with high fructose corn syrup, 210 grams

Gelatin, dry mix, prepared with water, one half cup, 135 grams

Chicken nuggets, breaded, boneless, plain, six pieces, 96 grams

Scores for seven whole foods measured against nutritional requirements of a 14-18-year-old girl

Food	SF	TF	Chol	Salt	Sug	Fib	Ca	Iron	Vit A	Vit C	Score
Carrot	0%	0%	0%	3%	6%	7%	2%	2%	430%	6%	+5
Spinach	0%	0%	0%	2%	0%	3%	2%	5%	400%	13%	+5
Grapefruit	0%	0%	0%	0%	15%	5%	1%	1%	46%	72%	+4
Watermelon	1%	0%	0%	0%	43%	4%	2%	5%	232%	36%	+3
Pinto beans	1%	0%	0%	3%	10%	115%	1%	5%	0%	19%	+3
Quinoa	5%	0%	0%	2%	4%	38%	8%	105%	0%	0%	+8
Whole grain bread	2%	0%	0%	9%	3%	12%	5%	6%	0%	0%	+2

Carrot, raw, 61 grams

Spinach, raw, 30 grams

Grapefruit, red or pink, one half, 123 grams

Watermelon, one wedge, 122 grams

Pinto beans, boiled, drained, no salt added, 100 grams

Quinoa (Keen-wah), – this complete protein, nutritional powerhouse is a south American grain, 170 grams

Whole grain bread, 1 slice, 40 grams

RDA represents recommended daily allowance. RDA's meet the needs of 97-98% of individuals within a group.

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What is Your Nutritional IQ?

1. Beta carotene is the pigment that gives carrots and sweet potatoes their characteristic orange color.
TRUE FALSE
2. Whole grains, fruits and vegetables do not contain cholesterol
TRUE FALSE
3. The glycemic index is a protein ranking system
TRUE FALSE
4. A carbohydrate gram and a protein gram each contain four calories
TRUE FALSE
5. If a serving of a given food has 4 grams of fat then it contains 36 calories of fat per serving.
TRUE FALSE
6. The legume family (leguminosae) includes beans, peas and tomatoes
TRUE FALSE
7. Legumes contain much fiber, folate and substances called protease inhibitors, all of which offer protection against heart disease and cancer
TRUE FALSE
8. Plant sources that are rich in monounsaturated fatty acids include olive oil and canola oil
TRUE FALSE
9. A food label that reads 0 trans fats could contain .49 grams of trans fats
TRUE FALSE
10. If a food is identified on a food label as organic then it is 100% organic
TRUE FALSE
11. 40% of the trans fats that Americans consume are commercially prepared cakes, cookies, crackers, pies and breads
TRUE FALSE
12. Consuming trans fats are strongly associated with heart disease
TRUE FALSE
13. Consuming whole grains offers protection against diabetes, heart disease, cancer and gastrointestinal problems
TRUE FALSE
14. To be considered a whole grain a commercially prepared food item would list a 100% whole grain as the last ingredient on the nutrition facts panel
TRUE FALSE
15. Spinach and broccoli are good sources of calcium
TRUE FALSE
16. More than 200 studies have shown that consuming fruits and vegetables decrease the likelihood of heart attack and stroke as well as a variety of cancers, as well as suffering from digestive problems. The same body of evidence shows that potatoes do NOT contribute to these benefits.

TRUE FALSE

17. The fiber in whole grains delays the absorption of glucose, eases the workload for insulin making cells in the pancreas and lowers cholesterol levels in the blood

TRUE FALSE

18. In 1893 the U.S. Supreme court ruled that tomatoes, cucumbers, squashes, beans and peas are vegetables.

TRUE FALSE

19. Most botanists believe that a vegetable is a plant that contains seeds.

TRUE FALSE

20. There is little evidence to support the notion that increasing calcium intake will prevent bone fractures

TRUE FALSE

21. The average person needs two grams of sodium per day to keep their body systems in good working order

TRUE FALSE

22. 65% of Americans age 20 and over are either overweight or obese

TRUE FALSE

23. There is only a 2% chance a school aged child will consume the number of daily servings of food recommended by the USDA food pyramid

TRUE FALSE

24. 33% of boys and 39% of girls born in 2000 will develop diabetes at some point during their lifetime

TRUE FALSE

25. One of every two American adults age twenty and over has high blood pressure

TRUE FALSE

Questions 3 , 6, 10, 14, 19, 21 and 25 are false

3. the glycemic index (also glycemic load) is a carbohydrate ranking system

6. tomatoes are not legumes

10. if a food is labeled as organic it is 95% organic. 100% organic foods are labeled as such

14. whole grains list a 100% whole grain as the first ingredient

19. most botanists maintain that fruits contain seeds

21. the average person needs less than 1 gram of sodium per day to keep body systems in order

25. one of every three Americans age twenty and over has high blood pressure

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The contents of this web page are NOT intended to offer personal medical advice, which should be obtained from your health care provider.

Hanover Wellness News - March 2006

FOOD FIGHT!

“All foods and beverages sold or served to students in school should be healthful and meet an accepted nutritional content standard.” Institute of Medicine, Preventing childhood obesity: health in the balance,

“Young children may lack the maturity to make healthy and safe food choices.” (Wechsler, et al, 2001, School health programs and policy study)

Prior to the 2004-2005 school year, Texas agriculture Commissioner Susan Combs created rules to eliminate junk foods in all lone star state public schools (USA Today, 2005). These rules included forbidding cupcakes to be brought to school as part of student birthday celebrations. In March of 2005, the Texas state legislature unanimously passed the “cupcake amendment” reinstating the cupcake (with sprinkles on top) in schools.

This story illustrates the “food fight” going on in school districts across the U.S. as they try to reach consensus on wellness policies. In 2004, President Bush signed the Child nutrition and WIC reauthorization act (PL 108-265). Section 204 of this law requires that all schools participating in the national school breakfast or school lunch program (SBP, NSLP) create a local wellness policy. At minimum, this policy must include goals for nutrition education, physical activity, and other school based activities that are designed to promote student wellness in a manner that the local educational agency determines is appropriate. Further, this policy should include guidelines for all foods available on each school campus with the objectives of reducing childhood obesity and promoting student health.

Many significant dilemmas come with creating and implementing such a policy. There are many age old customs and practices that are associated with food that Americans will have to consider in order to create a better environment for learning in schools and healthier children. Before developing a wellness policy one must assess the current school wellness environment.

American schools are places of contradictions (MASCD, 2005). On one hand we promote high expectations for learning and achievement, but on the other hand we allow and sometimes encourage our learners to: consume foods of questionable nutritional value in cafeterias; consume beverages high in sugar, and foods high in sodium, sugar and calories during classroom celebrations; accept junk food as a reward or incentive for learning; sell candy and other dubious foods to raise funds for schools; buy and consume liquid sugar from vending machines; and eat snacks loaded with sodium, saturated and trans fats. Many believe that these practices do not prepare our students to learn and achieve in school nor do they enhance health.

The positive relationship between a learner’s nutritional status and level of physical activity and academic achievement is clear.

What we eat is fundamental to how we think and feel.

The brain is like a furnace, consuming 25% of the glucose and oxygen we take in. It burns glucose as its sole fuel, but has not storage place for it. The brain also needs a wide range of nutrients. Poor diet is common to people who suffer from depression and other mental disorders. Even small nutritional deficiencies promote personality, mood changes, and impaired reasoning and judgment. Eating nutrient rich foods may also increase intelligence (Ratey, 2002).

GOOD NUTRITION IS DIRECTLY RELATED TO LEARNING AND ACHIEVEMENT

- Carbohydrate rich and protein poor meals have a sedating effect on children (Gibson & Green, 2002)
- Meals high in protein are associated with an increase in reaction time in children (Gibson & Green, 2002)
- Meals high in fat are associated with a decline in alertness in children (Gibson & Green, 2002).

- Those having the lowest amount of protein in their diet had the lowest achievement scores (ASFSA, 1989)
- Children who suffer from poor nutrition during the brain's most formative years score much lower on tests of vocabulary, reading comprehension, arithmetic, and general knowledge (Brown and Pollitt, 1996)
- Improved nutrition in early childhood has important long term effects in the adolescent and adult (Martorell, 1995)
- Even moderate under nutrition can have lasting effects and compromise cognitive development or school performance (Tufts University, 1995)
- The American dietetic association (Stang & Bayerl, 2003) states that malnutrition has been linked to delayed physical, psychosocial and cognitive development and is now recognized as a major contributor to the growing problem of overweight and obesity in the child and adolescent population.

Numerous studies have been done on the effects of breakfast. A healthy breakfast is the meal that is most often associated with an improvement in cognitive performance during school hours (Kanarek, 1997).

- Skipping breakfast interferes with cognition and learning (Pollitt & Mathews, 1998)
- The consequences of skipping breakfast include: slower reaction time, increased errors on academic tasks and slower recall from memory (Pollitt et al, 1998)
- Children who consumed <50% of the recommended daily allowance of nutrients had poor attendance, lower grades and had more behavior problems (Kleinman, 2002)

MOVEMENT IS A MAJOR PLAYER IN LEARNING AND STANDARDIZED TEST SCORES

- Academic achievement increases when physical education time increases (Shepherd et al 1984; NASPE, 2001). The CDC school health index and the National Association for Sport and Physical Education recommend 150 minutes of physical education per week for elementary students and 225 minutes of physical education per week for middle and high school learners.
- Students who are physically fit scored higher on standardized tests than their peers of lesser fitness levels (CDE, 2004)
- Vigorous physical activity has positive effects on academic achievement including: increased concentration; improved mathematics, reading, and writing scores and reduced disruptive behavior (Symons et al, 1997)
- Physical activity has a positive influence on concentration, memory, academic performance (including grade point average, scores on standardized tests, and grades in specific courses) and classroom behavior (Strong et al, 2005)
- Successful participation in physical activity brings increases in academic ability, memory retrieval and cognitive abilities (Ratey, 2002)
- When we learn a new physical activity the brain produces a greater number of connections between neurons, which creates a brain that is better able to process more information (Ratey, 2002)
- As we age physical inactivity can hasten the decline in how quickly we learn and recall information (Ratey, 2002)

Move to learn and learn to move

Many decision makers in education believe that movement has nothing to do with learning and achievement (a belief in the separation of mind and body). It is the basis of much educational theory and practice. For example, the average American 13-19-year-old spends 9.5 hours each day sitting (Harris, 2003). 20% of U.S. elementary schools do not allow their students to have recess (Tyre, 2004). Only 28% of Massachusetts high school students attended daily physical education class in 2003 (MASCD, 2005). The scientific evidence shows that these beliefs and practices are fallacies. Physical activity has a positive influence on all measures of learning and achievement.

CARROT STICKS OR CUPCAKES?

The school wellness dilemma has many strong voices. Some have stated that healthy nutrition and physical activity habits and behaviors are established early in life. Since Americans spend a considerable part of their lives in public education, our schools can assist in forming healthy habits. Many in the medical community believe schools are compromising learning and achievement through poor nutrition and lack of physical activity. Insufficient physical activity and poor nutrition can lead to overweight, obesity, high blood pressure, coronary artery disease, type 2 diabetes, absenteeism, anxiety, stress and decreases in academic achievement. They have stated that we should provide more opportunities for physical activity and offer healthier food in schools. Others on the same side believe that foods high in sugar, salt and fat and low in vitamins and minerals are much more than just the occasional treat.

On the other side of the tug or war are those who remind us that we live in a democracy and people should be able to choose what they want to eat. They believe further that the occasional treat is part of a normal childhood. They do not want the food police telling them what to eat. Making this healthy school environment dilemma more complicated is the fact that increasing numbers of children have food allergies (sometimes life threatening) and food intolerances.

We are living in the era of overweight, obesity and sedentary living

- 32% of 2-5-year-old children in Massachusetts are overweight or at risk for overweight (WIC, 2001)
- 24% of Massachusetts high school students are overweight or at risk for becoming overweight (CDC, 2005)
- 16% of children age 6-19 are considered overweight (CDC, 2005 overweight and obesity)
- 55% of Massachusetts adults are overweight or obese (CDC, 2005)
- 2% of American children consume the recommended number of daily servings from the USDA food pyramid on any given day (USDA, 1996)
- 1.8 billion dollars was attributed to Massachusetts in obesity related medical costs from 1998-2000 (CDC, 2005, economic consequences)
- Only 28% of Massachusetts high school students will attend a physical education class on any given day (MASCD, 2005)
- Only 2% of youth meet all the recommendations of the food guide pyramid (USDA, 2002)

How do we establish a healthy learning environment?

Healthy eating and physical activity patterns do not just happen. They are developed through a lifetime of education, healthy choices and exposure to healthy foods, healthy eating patterns and developmentally appropriate physical activity opportunities. Providing environments that support healthy choices from policies to role modeling is a challenge for all schools. Schools must reinforce the message that making healthy choices means not only a healthy body, but a student who is better prepared to learn and achieve.

Opportunities to eat in schools

The typical American school offers many opportunities for its learners to eat. The national school lunch program (NSLP) often has accompanying a la carte foods which may not comply with federal nutrition guidelines. These a la carte foods include some healthy choices such as salads and some questionable foods like cookies, ice cream and soda. Most middle and high schools have vending machines filled with more dubious foods high in saturated and trans fats, sugar and sodium. Fundraisers often see students selling candy, while classroom celebrations often contain more foods of minimal nutritional value. Many in schools reward students with questionable foods. Even more food is available since most schools have local convenience stores, doughnut shops and fast food restaurants.

Food in the National School Lunch Program (NSLP)

The NSLP is a federally assisted meal program, administered by the USDA, operating in almost 100,000 public and private schools that provides about 28 million children low cost or free lunches each day (PCRM, 2006). NSLP lunches are supposed to provide one third of the recommended daily allowances for calories, protein, vitamin A, vitamin C, iron and calcium. They should also contain less than 30% of calories from fat and less than 10% of calories from saturated fat. The non profit organization, physicians committee for

responsible medicine (PCRM) believes that these guidelines fall far short of what is needed to plan healthy meals for children.

There are three major obstacles facing healthy eating in the NSLP.

1. On one hand schools want to see students eating healthy foods while at the same time they hope to break even. Food service personnel in schools must consider that creating a healthy environment for children to learn and achieve should supercede the dollar.
2. Popular foods bring in more money. Many schools sell brand name foods to collect extra revenue. Most of the time these brand name foods are also minimally nutritious foods.
3. When unhealthy foods are offered many students will choose them. For many children, healthy foods will be eaten if only healthy foods are available and unhealthy foods are not competing with them.

Food as a reward

To reward or not to reward students in schools is an old dilemma and part of the American food fight. On one side of the debate are those such as Alfie Kohn (1999), who believes that all rewards are counter-productive. On the other side are those who believe rewards should be used for completion of work of sufficient quality and not simply rewarding just getting the job done.

“Rewarding children with unhealthy food undermines our efforts to teach them about good nutrition. It’s like teaching children a lesson on the importance of not smoking, and then handing out ashtrays and lighters to the kids who did the best job of listening.” Marlene Schwartz, PhD, co director, Yale University Center for Eating and Weight disorders.

Children learn preferences for foods that are made available to them, including those food choices that are unhealthy (Birch, 1999). Children also alter their behaviors based on short term anticipated consequences. In American schools, homes and throughout communities children are offered food as a reward for good behavior. Often the reward is a food of minimal nutritional value (high in sugar, fat and or salt) that brings about a short term positive change in behavior (Michigan State University, 2006: CSPI, 2006). There are many disadvantages to this practice:

- it undermines a healthy diet and reinforces unhealthy eating habits
- It contradicts nutrition education concepts taught in schools
- it encourages over-consumption of foods high in sugar, sodium and fat
- increases a preference for foods of minimal nutritional value
- contributes to poor health (such as obesity, type 2 diabetes, hypertension, dental caries)
- it teaches kids to eat when they may not be hungry which contributes to overweight and obesity

Further, providing food based on performance or behavior connects food to mood. This practice can encourage children to eat foods of minimal nutritional value even when they are not hungry which can create a habit of rewarding or comforting oneself with food and be a contributor to unhealthy eating, eating disorders and overweight (Connecticut state department of education, 2006). Americans are contradicting themselves when they say, “You need to eat healthy foods to feel good, be prepared for learning and do your best. When you behave and perform your best, I will reward you with unhealthy food.”

Fast food companies are also involved in the food reward dilemma. Many American schools have incentive programs that support goals such as encouraging children to attend school, read and do homework. The prizes tend to be things like doughnuts and pizza (Brownell and Horgen, 2004)

The Centers for Disease Control and Prevention (CDC, 2006) discourages the use of food as a reward.

Food as part of a celebration

Schools and families can help promote a positive environment by providing healthy celebrations that shift the focus from the food to the child. A variety of physical activities, games and crafts that children enjoy can be used. If food is to be served, whole foods provide a more healthful environment. Children can be

involved in the planning of the events to promote responsibility and a commitment to health enhancing celebrations (Connecticut state department of education, 2006b, Friedman, 2005).

Healthy school celebrations demonstrate a school commitment to promoting healthy behaviors. It supports wellness education instead of contradicting it. This type of celebration enhances learning and achievement instead of diminishing it. In this era of overweight, obesity and sedentary lifestyles children need to receive consistent, reliable health information and many opportunities to apply the lessons they learn. It is also becoming increasingly difficult to ensure the safety of children with food allergies.

At the Laurelhurst elementary school in Seattle (Seattle Times, 2006) students do not bring food in for birthdays. Second grade teacher Ellen Kyono stopped serving sweets about seven years ago. Kyono stated, "In addition to our reluctance to have so much sugar, we could not imagine having treats (every time a student had a birthday) because of the disruption to the regular schedule." Instead, students write the birthday child a letter noting their special talents and traits. Students in the school save their hand written letters from peers. One student stated that a hand written note means more than cupcakes which come and go.

Food as part of fundraising

The CDC (2006) states fundraising that is supportive of student health becomes part of a school's consistent, coordinated and positive health message. It is a public demonstration of the school's commitment to promoting healthy behaviors among students, families and the community. In contrast, selling foods of minimal nutritional value such as candy contributes to unhealthy environments and is contradictory to classroom nutritional education concepts. When questionable foods are sold to raise funds it is often the family of the student selling the food items that buy and eat some or most of the food (Brownell and Horgen, 2004). 76% of U.S. schools that use food to raise funds use chocolate candy (CDC, 2006).

The use of non food rewards supports classroom nutrition education and does not tempt the student to over-consume food, and provides no reason for students to reward themselves with food when they are not hungry. Fundraising supports student health when it involves selling nutritious foods and beverages (fruit, vegetables) or selling non food items. Schools can also raise money and promote health simultaneously by conducting walk-a-thons, fun runs, or other events that involve physical activity. Other fundraisers could include silent auctions, fruit basket raffles or yard sales.

Food in vending machines

"I think we should use our vending machines in the schools – fill them with good food, with fresh vegetables, with milk, and products that are really healthy for the body." California governor, Arnold Schwarzenegger.

74% of middle/junior high schools and 98% of high schools have vending machines (Wechsler, 2001). The most common items sold include questionable foods: soft drinks, sports drinks, imitation fruit drinks, chips, candy, cookies and snack cakes. The sale of foods in schools outside of healthy meals can negatively affect children's diets, since many are high in calories, added sugars, and fat and low in essential vitamins and minerals (USDA, 2001). Some believe that if schools do not sell these dubious foods, then children will go off campus to buy them. However, 89% of middle/junior high schools and 73% of high schools have closed campuses (Wechsler, 2001).

The National Council of State Legislatures (2005) recommends 100% fruit and vegetable juice, skim and 1% milk, soy milk and water for vending machines. At Orono High School in Maine (Down East, 2001) unhealthy items were removed from all vending machines and replaced with healthy items. Principal, Cathryn Knox noted, "Kids are hungry and they will eat what you offer them, and the vending machines empty just as fast as when they had candy and chips."

Without their parent's knowledge, some students spend their lunch money on foods of minimal nutritional value from vending machines and a la carte lines, rather than on balanced meals. This practice is

especially problematic when children have diet related illnesses, such as high cholesterol or diabetes (CSPI, 2006)

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Many states and federal agencies (Washington, Connecticut, Massachusetts, Michigan, The Center for Science and the Public Interest, and The Centers for Disease Control and Prevention) have established healthy alternatives to using foods of minimal nutritional value as rewards, for fundraising, and as part of celebrations. Here are some suggestions.

Healthy alternatives to using food as a reward

- social rewards: sincere words of thanks or praise are often of more value than any toy or food
- photo recognition in a prominent location in school or at home
- a phone call, email or hand written note to parent or guardians
- going first in line
- choosing a class activity
- spending a few extra minutes of recess with a friend
- teaching the class
- making a delivery to the office
- reading school wide announcements
- having extra art, music, library or physical education time
- going to the library to read
- working at the school store
- going for a walk with a teacher or principal
- going for a walk with mom or dad
- bookmark
- water bottle
- magnets
- magnifying glass
- ticket to a sporting event
- pedometer
- sports equipment
- reading outdoors
- reading to younger students
- playing a favorite, game or puzzle
- reading a favorite book
- no homework passes
- reduced homework
- stickers
- a special task assigned by a teacher or parent
- lunch with mom or dad
- lunch with the principal
- book
- subscription to a magazine
- pencil
- eraser
- school supplies
- t-shirt with school logo
- educational field trip

Healthy alternatives for fundraising

- walk-a-thon
- bike-a-thon
- skate-a-thon
- volleyball tournament
- talent show
- family bingo night
- silent auction

- yard sales
- fun run
- selling gift wrap
- selling fruit and vegetable garden seeds
- selling discount coupon books
- raffles of fruit baskets
- selling plants

Healthy alternatives for celebrations including birthday and holidays

- making children, learning and helping others the focus rather than food
- singing the birthday song
- filling a piñata with school supplies, small toys and novelties instead of candy
- decorating pillowcases to give to a homeless shelter
- making holiday cards for senior citizens or visiting a nursing home
- collecting healthy food for a homeless shelter or food pantry
- collecting essential supplies for those in need
- explore the history and legends behind Halloween
- learning an Irish step dance
- pumpkin muffins or bread on Halloween
- writing stories about what we are thankful for on thanksgiving
- writing positive remarks about a classmate and distribute as a valentine
- creating a healthy idea party book and compile ideas for celebrations
- purchasing a birthday book for the library
- allow the birthday boy or girl to wear a sash, crown or festive hat
- Creating a celebrate me book. Classmates can write about why the student is special or draw pictures
- organizing a community service project, invite senior citizens or other special visitors in for lunch.
- Creating “curechiefs” for chemotherapy patients at a local hospital

Healthy food ideas for celebrations

- Fruit salads with: Papaya, mango, kiwi, oranges, apples, bananas, pears, pineapple, peaches, grapes, melons, apricots, peaches, cherries, blueberries, grapefruit, strawberries, blackberries, tangerine, persimmon, carambola, plums, raisins...
- Vegetable trays with: salad, carrots, spinach, broccoli, kale, peppers, pumpkin, tomato, potato, squash, parsnip, beets, corn, cabbage, avocado, brussel sprouts, sweet potato, collard greens, parsley, snow peas, asparagus, cauliflower, green beans, cucumber...
- Whole grains and beans: quinoa, whole wheat pasta, buckwheat pancakes, wild rice, brown rice, black beans, lentils, garbanzo beans, pinto beans, lima beans, navy beans, black eyed peas, pink beans, white beans, kidney beans,
- low fat or nonfat plain yogurt with fruit mentioned above
- Drinks: water, skim milk, soy milk, 100% fruit or vegetable juice
- Whole grain crackers with cheese
- Sandwiches or wraps with whole grain breads, lean meats, vegetables and cheese
- Fruit smoothies with berries, bananas, plain yogurt and honey
- Whole wheat pizza with low fat toppings, vegetables

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“Be always ashamed to catch thyself idle.” Ben Franklin

MOVING TO LEARN and LEARNING TO MOVE

Physical activity is strongly correlated with improvement of concentration, memory, academic performance (this includes grade point average, scores on standardized tests, and grades in specific courses) and classroom behavior (Strong et al, 2005). Yet, the average American 13-19-year-old spends 9.5 hours each day sitting (Harris, 2003). And, 20% of U.S. elementary schools do not allow their students to have recess (Tyre, 2004) and only 28% of high school students in Massachusetts attended daily Physical Education class in 2003 (MASCD, 2005).

Movement cannot be separated from the brain. A lot of brain function is, essentially, movement (Ratey, 2003, Hannaford, 1999). Movement is essential to every brain function, including memory, emotion, language, and learning. So called higher brain functions have evolved from movement and still depend on it. For example, the cerebellum, which coordinates physical activity, also coordinates the movement of thoughts. It orders the movements of the hands and arms in order to catch a ball in much the same way as it sequences the thoughts necessary to make a decision form a coherent argument or create a poem.

MOVEMENT IS A MAJOR PLAYER IN LEARNING.

Harvard Medical School professor Dr. John Ratey (2003) states that our physical movements can directly influence our ability to learn think and remember. It has been shown that certain physical activities that have a strong mental component, such as dance or tennis, enhance social, behavioral and academic abilities. Each person's capacity to master new and remember old information is improved by biological changes in the brain brought on by physical activity.

Exercise can produce chemical alterations that give us stronger, healthier, and happier brains. A better brain is sufficiently equipped to think, remember and learn. While dancing, for example, one must sequence, master and coordinate many movements. These types of physical activities increase academic ability, memory retrieval and cognitive abilities. During these physical activities, we not only exercise our muscles, but we also exercise our brains, particularly our ability to sequence motor actions and information as well as access memory.

Exercises that involve complex movements can affect our brain in other ways. Practicing and performing physical activities that require many coordinated movements such as striking a ball with a bat, dance and gymnastics causes more connections to grow between neurons. When we combine movement with any new learning experience we get extra benefits because new connections form in the brain as a result of learning a new task. As new routines and dance steps are introduced, the brain produces a greater number of connections between neurons, which creates a brain that is better able to process more information.

Exercise that forces us to improve balance and coordination also strengthens neural networks in the cerebellum, which is the area responsible not only for balance and physical coordination but also for coordinating our social interactions. New research is demonstrating that these types of physical activities affect the basal ganglia and corpus callosum, improving memory and increasing the ability to master new information. Conversely, physical inactivity can hasten the decline in how quickly we learn and recall information.

MOVING IS GOOD FOR YOUR BODY AND GOOD FOR YOUR BRAIN.

Finally, motor development has been found to be crucial in the development of learning readiness. It greatly impacts reading and writing skills. Often children don't get the motor stimulation they need because of increased time spent in front of the television.

The positive relationship between a learner's level of physical activity and academic achievement is clear.

MOVEMENT IS A MAJOR PLAYER IN LEARNING AND STANDARDIZED TEST SCORES.

- Academic achievement increases when Physical Education time increases (Shepherd et al 1984; NASPE, 2001).
- Students who are physically fit scored higher on standardized tests than their peers of lesser fitness levels (CDE, 2004)
- Vigorous physical activity has positive effects on academic achievement including: increased concentration; improved mathematics, reading, and writing scores and reduced disruptive behavior (Symons et al, 1997)
- Physical activity has a positive influence on concentration, memory, academic performance (including grade point average, scores on standardized tests, and grades in specific courses) and classroom behavior (Strong et al, 2005)
- Successful participation in physical activity brings increases in academic ability, memory retrieval and cognitive abilities (Ratey, 2002)
- When we learn a new physical activity the brain produces a greater number of connections between neurons, which creates a brain that is better able to process more information (Ratey, 2002)
- As we age physical inactivity can hasten the decline in how quickly we learn and recall information (Ratey, 2002)

Physical Education and Physical Activity in Schools

We are living in the era of overweight, obesity and sedentary living.

- 32% of 2-5-year-old children in Massachusetts are overweight or at risk for overweight (WIC, 2001)
- 24% of Massachusetts high school students are overweight or at risk for becoming overweight (CDC, 2005)
- 16% of children age 6-19 are considered overweight (CDC, 2005 overweight and obesity)
- 55% of Massachusetts adults are overweight or obese (CDC, 2005)
- 2% of American children consume the recommended number of daily servings from the USDA food pyramid on any given day (USDA, 1996)
- 1.8 billion dollars was attributed to Massachusetts in obesity related medical costs from 1998-2000 (CDC, 2005)
- Only 28% of Massachusetts high school students will attend a Physical Education class on any given day (MASCD, 2005)
- Only 2% of youth meet all the recommendations of the food guide pyramid (USDA, 2002)

“A student in motion tends to stay in motion.

A student at rest tends to stay at rest, unless acted upon by an outside source.”

There are many outside forces that are causing youth to remain at rest for increased periods of time. We are living in the era of: overweight and obesity; junk food, super-sizing, over-eating and unbalanced diets; addiction to recreational screen based media – TV, video, video games and computers. All of these factors make significant contributions toward sedentary lifestyles, which in turn increase the likelihood of overweight and obesity. Hanover Physical Education equips learners with the skills, attitudes, understanding and behaviors necessary to adopt and maintain a lifetime of health enhancing physical activity.

The ultimate purpose of Hanover Physical Education is to guide students toward becoming physically educated.

A physically educated person is one who:

1. Demonstrates competency in motor patterns needed to perform a variety of physical activities.
2. Demonstrates understanding of movement concepts, principles, strategies, and tactics as they apply to the learning and performance of physical activities.
3. Participates regularly in physical activity.
4. Achieves and maintains a health enhancing level of physical fitness.
5. Exhibits responsible personal and social behavior that respects self and others in physical activity settings.
6. Values physical activity for health, enjoyment, challenge, self-expression, and or social interaction.

Physical Activity

Physical activity is essential to growth and development and it helps to develop healthy bodies and enjoyment of movement. Physical activity helps students stay alert and attentive, may facilitate improved attention and focus on cognitive tasks, and reduces stress. Physical activity with others provides opportunities for children to be together and to practice life skills such as conflict resolution, cooperation, respect for rules, taking turns, sharing, using language to communicate and problem solving in realistic situations.

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Is Body Weight a Reliable Measurement of Overall Health?

Scientists often define overweight and obesity in terms of the Body Mass Index (BMI), a single number derived from a person's weight for height: body weight in kilograms divided by height in meters, squared (kg/m^2). A healthy weight is defined (by the U.S. government and World Health Organization) as a BMI of between 18.5 to 24.9. Overweight is a BMI range from 25.0 to 29.9. Obesity is a BMI above 30. Overweight and obesity are both labels for ranges of weight that are greater than what is generally considered healthy for a given height. The terms also identify ranges of weight that have been shown to increase the likelihood of certain diseases and other health problems. Overweight and obesity result from an imbalance involving excessive calorie consumption and or inadequate physical activity. For each person, body weight is the result of a combination of genetic, metabolic, behavioral, environmental, cultural and socioeconomic influences (USDHHS, 2006)

How is a healthy weight identified for children and adolescents?

BMI (for-age) is a reliable indicator of body fatness for most children and teens (CDC, 2006). BMI does not measure body fat directly, but research has shown that BMI correlates to direct measures of body fat, such as skinfold measurements, underwater (hydrostatic) weighing, bioelectrical impedance analysis, and dual x-ray absorptiometry (Mei et al, 2002). BMI can be considered as an alternative for direct measures of body fat. Every person should have at least a minimal amount of fat (percent body fat) for good health. This fat is called essential fat and is necessary for temperature regulation, shock absorption, and regulation of essential body nutrients, including vitamin A, D, E, and K. The exact amount of fat that is considered essential to normal body weight has been widely debated. BMI is an inexpensive and easy method of screening for weight categories that may lead to health problems. For children and teens BMI is age and sex specific and is often referred to as BMI-for-age.

It is important to remember that being overfat is more important than overweight in making decisions about health and wellness.

BMI-for-age for children and adolescents

After BMI is calculated the number is plotted on the Centers for Disease Control and Prevention's (CDC) BMI-for-age growth chart to obtain a percentile ranking. The percentile indicates the relative position of the child's BMI number among children of the same age and sex. Figure 1 below shows the weight status categories used with children and teens. Visit <http://apps.nccd.cdc.gov/dnpabmi/Calculator.aspx> to find a BMI-for-age calculator and more information regarding a 2-19-year-old person's BMI-for-age.

Figure 1: CDC growth chart percentile ranges

Weight category	Percentile range
Underweight	<5 th percentile
Normal weight	5 th percentile – <85 th percentile
At risk for overweight	85 th percentile - <95 th percentile
Overweight	95 th percentile and above

(The media and other groups such as the American Obesity Association will often define the "at risk for overweight" group as overweight and the "overweight" group as obese.)

BMI is used as a screening tool to identify possible weight problems for children. The CDC and the American Academy of Pediatrics recommend the use of BMI to screen for overweight in children beginning at 2 years of age. For children and teens, BMI is used to screen for overweight, at risk for overweight, or underweight. BMI is not a diagnostic tool. A child may have a high BMI for age and sex, but to determine if excess fat is a problem, a health care provider would need to perform further assessments. Although the BMI number is calculated the same way for children and adults, the criteria used to interpret the meaning of the number is different for each. For children and teens, the amount of body fat changes with age and the amount of body fat differs between boys and girls. The CDC BMI-for-age growth charts take into account

these differences and allow translation of a BMI number into a percentile for a child's sex and age. Further, normal weight ranges change with each month of age for sex; and normal weight ranges change as height increases.

Many medical experts believe that diet and exercise may be more important than weight itself in health maintenance. Their contribution is difficult to quantify. Physical activity and dietary patterns are often easier to change than body shape since they are based on one's behavior rather than on metabolism and genetics. Finally, BMI is less valuable for making measurements for one specific individual at one particular point in time. If you are concerned about your child or teen's weight consult your health care provider.

Preoccupation with weight

Many believe that placing too much emphasis on the measurement of body weight at the expense of other wellness factors encourages dieting, eating disorders, excessive exercising, and feelings of inadequacy. Health professionals in many countries including the U.S., Canada, France and Australia generally accept the range of 20 to 24.9 as being a healthy height to weight ratio for a person age twenty and over (see figure 2). Canadian Guidelines for Healthy Weights focus on a non-evaluative notion of weight. Some countries have chosen not to use the term overweight. Evaluative and negative attitudes regarding body weight can have lasting effects – especially for children.

Obese children miss four times as many days of school as their normal weight peers and are more likely to experience anxiety, depression and a poor quality of life. A study, published in the Journal of the American Medical Association, stated that obese children experience a quality of life that is no better than that of children undergoing chemotherapy. Further, these obese children have sleep apnea, cannot wear the same clothes as their healthy weight peers and are continually teased, put down and scorned because of a societal misperception that they are lazy, stupid, slow, and have little willpower. (Schwimmer et al, 2003).

Excess body fatness has been a concern for centuries. Hippocrates recommended exercising on an empty stomach, then sitting to eat while you were still breathing rapidly. He stated that fat people were much more likely to die suddenly than thinner people. In the late 19th century scales became popular in doctor's offices. Later, insurance companies began to study the body weight most likely to predict mortality among policy holders. Metropolitan Life Insurance Company defined overweight as an illness. Height-weight charts were created for insurance companies early in the 20th century. Some questioned the merits of these charts by stating that they did not consider a person's body composition. These insurance tables and BMI tables of today may incorrectly identify active people (as overweight) who have a large percentage of muscle mass.

The primary concern of overweight and obesity is one of health and not appearance (USDHHS, 2006)

How does weight affect a person's health?

When people are identified as overweight or obese, they are more likely to develop health problems such as hypertension, dyslipidemia (e.g. high total cholesterol or high levels of triglycerides), type two diabetes, coronary artery disease, stroke, gallbladder disease, osteoarthritis, sleep apnea and respiratory problems, endometrial, breast and colon cancer. Overweight children and teens who are overweight have been found to have risk factors for cardiovascular disease including high cholesterol, elevated insulin levels, elevated blood pressure, type two diabetes, sleep apnea (not breathing for at least ten seconds during sleep), poor self esteem and social discrimination. About one third of obese adults were overweight children (Ferraro, et al, 2003).

Waist size matters.

Fat that accumulates around the waist and chest may contribute more negatively to long term health than fat that accumulates elsewhere. An expert panel brought together by the National Institutes of Health concluded that a waist larger than 40 inches for men and 35 inches for women increases the chances of developing heart disease, cancer or other chronic diseases (NIH, 2002)

Figure 2: Body Mass Index Table for Adults (Age 20 and above)

BMI	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Height	Weight in Pounds																
	Healthy Weight					Overweight					Obese						
4'10"	91	96	100	105	110	115	119	124	129	134	138	143	148	153	158	162	167
4'11"	94	99	104	109	114	119	124	128	133	138	143	148	153	158	163	168	173
5'	97	102	107	112	118	123	128	133	138	143	148	153	158	163	168	173	179
5'1"	100	106	111	116	122	127	132	137	143	148	153	158	164	169	174	180	185
5'2"	104	109	115	120	126	131	136	142	147	153	158	164	169	175	180	186	191
5'3"	107	113	118	124	130	135	141	146	152	158	163	169	175	180	186	191	197
5'4"	110	116	122	128	134	140	145	151	157	163	169	174	180	186	192	197	204
5'5"	114	120	126	132	138	144	150	156	162	168	174	180	186	192	198	204	210
5'6"	118	124	130	136	142	148	155	161	167	173	179	186	192	198	204	210	216
5'7"	121	127	134	140	146	153	159	166	172	178	185	191	198	204	211	217	223
5'8"	125	131	138	144	151	158	164	171	177	184	190	197	203	210	216	223	230
5'9"	128	135	142	149	155	162	169	176	182	189	196	203	209	216	223	230	236
5'10"	132	139	146	153	160	167	174	181	188	195	202	209	216	222	229	236	243
5'11"	136	143	150	157	165	172	179	186	193	200	208	215	222	229	236	243	250
6'	140	147	154	162	169	177	184	191	199	206	213	221	228	235	242	250	258
6'1"	144	151	159	166	174	182	189	197	204	212	219	227	235	242	250	257	265
6'2"	148	155	163	171	179	186	194	202	210	218	225	233	241	249	256	264	272
6'3"	152	160	168	176	184	192	200	208	216	224	232	240	248	256	264	272	279

Key

Underweight	Body mass index	< 18.5
Normal weight	Body mass index	18.5 – 24.9
Overweight	Body mass index	25 – 29.9
Obese	Body mass index	> 30

When considering your BMI it is important for you to remember that although BMI is related to body fat, it does not directly measure body fat. Some people with a high percentage of muscle tissue may be misidentified as overweight even though they may not have an unhealthy amount of body fat. **It is not appropriate to use Table 2 without the use of CDC BMI-for-age growth charts for children and teens.** Visit <http://www.cdc.gov/growthcharts> or <http://apps.nccd.cdc.gov/dnpabmi/Calculator.aspx> for more information

Solely having a BMI in the overweight or obese range does not necessarily indicate that a person is unhealthy. Other risk factors, such as high blood pressure, high cholesterol, smoking, diabetes, and personal and family medical history are important to consider when assessing overall health (USDHHS, 2006). BMI may falsely identify a person who has a large percentage of muscle mass as overweight or obese.

Weight by the numbers

1. 65% of American adults age 20 and over are overweight (CDC, 2005)
2. 30% of American adults are obese (CDC, 2005).
3. 17% of American children age 6-19 years of age are considered overweight (Ogden et al, 2006)
4. 32% of 2-5-year-old children in Massachusetts are overweight or at risk for overweight (WIC, 2001)
5. 24% of Massachusetts high school students are overweight or at risk of becoming overweight (CDC, 2005).
6. 55% of Massachusetts adults are overweight or obese (CDC, 2005)

Definitions

Nonessential fat: Fat above essential fat levels that accumulates when take in more calories than you expend

Essential fat: The minimum amount of fat in the body necessary to maintain healthful living.

Overfat: Too much of the body weight composed of fat

Obesity: When nonessential fat accumulates in excessive amounts, overfatness or even obesity can occur. Obesity is an extreme state of overfatness (Corbin et al, 2004). The CDC defines obesity as an excessively high amount of body fat or adipose tissue in relation to lean body mass (CDC, 2004)

Overweight: Weight in excess of what is considered normal for age, height, sex and or age; not harmful unless it is accompanied by overfatness. Overweight refers to increased body weight in relation to height, when compared to some standard of acceptable or desired weight.

The content of this newsletter is not intended to provide anyone with personal medical advice, which you should obtain from your health care provider.

June Wellness News: How do I achieve and maintain a healthy weight?

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How do I achieve and maintain a healthy weight?

Whether or not your weight changes, depends upon a simple rule: In order to maintain a given weight a person needs to expend an amount of calories equal to the amount of calories one consumes. The body “burns” calories for every day functions such as breathing, digestion and routine daily activities. Many people consume calories in excess of what they need to function each day (and to maintain a given weight). If you burn as many calories as you take in each day, there’s nothing left over for the storage in fat cells and weight remains the same. Eat more than you burn, though, and you end up adding fat and pounds. Many things influence what and when you eat and how many calories you burn. These factors turn what seems to be a straightforward journey to excess weight into a complex trip that may start very early in life. The three major factors include genes, diet, and physical activity.

GENES: some people are genetically predisposed to gain weight more easily than others or to store fat around the abdomen and chest. It’s also possible that humans have a genetic drive to eat more than the need in order to store food for the future. This is referred to as the thrifty gene hypothesis (HSPH, 2006). It suggests that eating extra food whenever possible helped early humans exist during feast and famine conditions. If this theory is true it does not help those living in an environment where food is readily available almost everywhere

DIET: The quantity of food in your diet has a strong impact on weight. The composition of your diet, though, seems to play little role in weight. A calorie is a calorie, regardless of its source.

PHYSICAL ACTIVITY: The calories burned part of the weight equation often gets little attention. When you are more active, burning more calories you will have less energy available for storage as fat. Exercising more also reduces the chances of developing heart disease, some types of cancer, and other chronic diseases. Physical activity is the key component of weight control and health. A good way to burn off extra calories and prevent weight gain is to engage in regular physical activity beyond routine activities. A combination of regular physical activity and an appropriate level of dietary restriction (identified as appropriate by your health care provider) is the most effective means of losing body fat (Corbin et al, 2004; Harvard School of Public Health, 2006)

MAINTAIN A CALORIC BALANCE

The amount of energy you expend each day must be balanced by your energy intake if you are to maintain your body fat and body weight over time (see figure one below). Your energy intake is determined by the calories you eat (caloric intake). Expenditure is determined by a combination of several factors. You expend calories (caloric output) just to exist even when you are inactive. Your basal metabolic rate (BMR) is the indicator of your energy expenditure when you are totally inactive. You also expend calories through bodily functions and in the activities of daily living.

Figure 1: THE ENERGY BALANCE

Caloric output (physical activity) and Caloric intake (diet)

Caloric output > Caloric intake = Weight loss

Caloric output = Caloric intake = Weight management

Caloric output < Caloric intake = Weight gain

(Adapted from Corbin et al, 2004)

BMR is highest during the growing years. The amount of food eaten increases during these years to support this increased energy expenditure. When growing ends, if eating does not decrease or physical activity level does not increase, fatness can result. Basal metabolism also decreases gradually as you grow older. One major reason for this is the gradual loss of muscle mass associated with inactivity. Regular lifetime

physical activity helps keep muscle mass up, resulting in a higher BMR. The increased BMR of an active person helps prevent overfatness, particularly later in life.

A combination of regular physical activity and appropriate dietary restriction is the most effective means of losing body fat. All weight loss programs should combine an appropriate level of caloric intake with physical activity. Good physical activity and dietary habits can be useful in maintaining desirable body composition. Figure 2 shows how fat can be lost through regular physical activity and proper dieting. Not all people want to lose fat. For those who desire to maintain their current body composition, a caloric balance between intake and output is effective.

Figure 2: Losing fat through regular physical activity and diet (Corbin et al, 2004, p. 284)

THRESHOLD OF TRAINING			TARGET ZONES	
	Physical activity	Diet	Physical activity	Diet
Frequency	To be effective, activity must be regular, preferably daily, though fat can be lost over the long term with almost any frequency that results in increased caloric expenditure	It is best to reduce caloric intake consistently and daily. To restrict calories only on certain days is not optimal, though fat can be lost over a period of time by reducing caloric intake at any time.	Daily moderate activity is recommended. For people who do regular vigorous physical activity, three to six days per week may be optimal.	It is best to follow an optimal dietary pattern* consistently and daily
Intensity	To lose one pound of fat, you must expend 3,500 calories more than you normally expend.	To lose one pound of fat, you must eat 3,500 calories less than you normally eat.	Slow, low intensity aerobic exercise that results in no more than 1 to 2 pounds of fat loss per week is best.	Modest caloric restriction resulting in no more than .5 to 2 pounds of fat loss per week is best.
Time	To be effective, exercise must be sustained long enough to expend a considerable number of calories. At least 15 minutes per exercise session are necessary to result in consistent fat loss.	Eating moderate meals is best. Do not skip meals	Exercise durations similar to those for achieving aerobic or cardiovascular fitness seems best. Exercise duration of 30 to 60 minute is recommended.	Eating moderate meals is best. Skipping meals or fasting is not most effective.

* recommended dietary patterns include the Harvard School of Public Health's guide to healthy eating (Willett, 2005; and the USDA 2005 dietary guidelines for Americans)

It is best to combine exercise and diet to achieve 3,500 caloric imbalance to lose a pound of fat. Using both exercise and diet in the target zones can be effective.

Physical Activity is an effective method of controlling body fat

Physical activity or exercise will not result in immediate and large decreases in body fat levels. There is evidence that fat loss resulting from physical activity may have more long term effectiveness than fat loss from dieting alone. Vigorous exercise can increase the resting energy expenditure up to thirteen times (Corbin et al, 2004).

Physical activity that can be sustained for relatively long periods is considered the most effective for losing body fat. All physical activity will result in caloric expenditure. Physical activity that results in increased breathing and heart rates (aerobic) are also important for cardiorespiratory fitness. Physical activities performed for longer periods of time such as brisk walking, jogging, cycling, hiking, and dance can be effective methods to help control body fat.

The amount of energy the body uses to digest food, breathe, pump blood, keep muscles ready for action and other bodily functions is called resting metabolism (or basal metabolic rate). It accounts for about two thirds of your daily energy expenditure. The more you work your muscles, especially through progressive strength training, the more blood sugar they "sponge" from the blood and the more calories they burn even when you are not active (HSPH, 2006).

Figure 3 shows the caloric expenditure for one hour of participation in a variety of physical activities. It is the total calories expended in your activity that counts. If you run for the same period of time that you walk, you will expend more calories running.

Figure 3: Caloric expenditure for a variety of physical activities performed at a recreational level

Physical activity	100 lb person	150 lb person	200 lb person
Walking	204	318	426
Swimming Slow laps	240	320	400
Skating In line/roller	262	350	438
Rope jumping	525	700	875
Golf, walking	187	250	313
Dance, social	174	264	348
Bicycling, Slow speed Flat terrain	157	210	263
Jogging 5.5 mph	487	650	833
Hiking	225	300	375
Running 10 mph	625	900	1125

Even though vigorous physical activity can be effective, it will not work if you do not do it regularly. For this reason vigorous activity may not be as effective as some less vigorous activities for certain people. For example, running at ten miles per hour (a six minute mile) will cause a 150 pound person to expend 900 calories per hour. Jogging at about 5.5 miles per hour (about an eleven minute mile), will result in an expenditure of about 650 calories an hour. The ten minute mile pace may not be appropriate for many. Each mile run at ten miles per hour results in an expenditure of 90 calories, while each mile run at 5.5 mile per hour results in an energy expenditure of 118 calories. Per mile, you burn more calories by running at a slower rate. It takes longer to run the mile but you can persist for a longer time period. Doing less vigorous activity for longer periods is better for fat control than doing very vigorous activities that can be done only for short periods. Nevertheless, vigorous physical activity can be effective for many people (and have added benefits to cardiorespiratory fitness).

Performing progressive resistance training (strength training) to improve muscle fitness can also be effective in maintaining desirable body fat levels. People who regularly participate in strength training can increase their muscle mass (lean body mass). This extra muscle mass expends extra calories at rest resulting in a higher metabolic rate. Also, people with more muscle mass expend more calories when performing physical activity.

The Dietary Guidelines for Americans 2005 reminds us that:

If you consume 100 more calories a day more than you expend (burn), you will gain close to one pound in a month. That is about ten pounds in a year. To lose weight reduce calories and increase physical activity.

DEFENSIVE EATING STRATEGIES

The skinny on fat – Low fat diets are promoted as the pathway to health. Many people have interpreted the term low fat to mean it is OK to eat as much low fat food as you wish. For most of us, eating less fat has meant eating more carbohydrates. To the body, calories from carbohydrates are just as effective for increasing weight as calories from fat.

Tame your blood sugar - Eating foods that make your blood sugar and insulin levels shoot up and then crash may contribute to weight gain. Such foods include white bread, white rice, and other highly processed grain products. As an alternative, choose foods that have a gentler effect on blood sugar. These include whole grains such as whole wheat bread, whole wheat pasta, and beans, nuts, fruit, and vegetables.

Water - When you are thirsty, go for water. Drinking juice (that often include high fructose corn syrup), high sugar sports drinks, and soda (liquid candy) provide many additional and empty calories.

Food is available everywhere – shopping malls, gas stations, stadiums, fast food restaurants, stores and so forth. Super sized meals and all you can eat buffets are the norm and often too good a bargain for many to pass up.

Slow down. Eating too fast short-circuits the signals your digestive system generates to indicate that it is full. Slowing down gives your stomach and intestines time to send these messages to the brain.

Be aware of why you are eating. Many eat when they are bored, anxious or angry. Dealing with these feelings in other ways such as talking to a friend, listening to music, taking a walk, or exercising can help you relieve stress and feel better without consuming too many calories each day.

Slow and steady - If an adult can cut out 100 calories a day, the equivalent of a can of soda or snack, you would weigh ten pounds less after one year. If you also added physical activity during that time such as a brisk 30 minute walk 5 days each week, you could be about twenty pounds lighter.

Suggestions from the U.S. Surgeon General (USDHHS, 2006)

- Children should spend an hour each day engaged in moderate to vigorous physical activity
- Avoid the use of food as a reward
- Children are encouraged to drink water and to limit dubious drinks such as soda, fruit juice drinks and sports drinks
- Limit recreational use of screen based media (TV, video games) to less than 2 hours per day
- Aim for five servings of fruits and vegetables each day
- Discourage eating meals or snacks while watching television
- Start each day with a nutritious breakfast
- **All weight management programs for children and adolescents must be supervised by a physician**

Definitions

Basal metabolic rate – Your energy expenditure in a basic or rested state.

Caloric balance – Consuming calories in amounts equal to the number of calories expended

Calorie – A unit of energy supplied by food.

The content of this newsletter is not intended to provide anyone with personal medical advice, which you should obtain from your health care provider.

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A BMI-for-age calculator for persons 2-19 years of age can be found at

<http://apps.nccd.cdc.gov/dnpabmi/Calculator.aspx>

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What should we drink?

Drinking recommendations from the beverage guidance panel (Popkin, 2006)

- Beverages are less satiating than solid foods. When you consume calories from beverages, you don't compensate by eating less food later on. Liquid calories don't register with our appetite controls.
- Schools are dropping soft drinks from vending machines and adding sports drinks, fruit drinks, and sweetened milk drinks. Children will not benefit from these dubious drinks since they are foods of minimal nutritional value.
- The average American gets about 21% of his or her calories from beverages.
- We were built to have separate thirst and hunger mechanisms because the body needs both fluids and calories from food.
- Water is all we need if we have a healthy, balanced diet. An ideal diet would include no beverages other than water.
- We did not get as many calories from beverages until the last century, when more sweetened teas and coffees, and then soft drinks, came in after World War II.
- 100% fruit juice is somewhat processed, so they lose fiber and some of the vitamins and minerals that you get in fruit. A serving of juice has more calories than a piece of fruit, and we don't compensate for the calories in juices. Vegetable juices like tomato juice have fewer calories and more nutrients than fruit juice. Vegetable juices are often high in sodium. The panel recommends no more than a cup of any fruit juice per day

The Beverage Guidance Panel is made up of Barry M. Popkin, division of nutrition epidemiology, school of public health, University of North Carolina; Lawrence Armstrong, human performance laboratory, University of Connecticut; George Bray, Louisiana State Medical Center; Benjamin Caballero, Johns Hopkins University; Balz Frei, Linus Pauling Institute, Oregon State University; Walter Willett, Harvard Medical School.

How much water should children and adolescents drink?

	Age	Total water Liters per day
Children	4-8	1.7
Male	9-13	2.4
	14-18	3.3
Female	9-13	2.1
	14-18	2.3

Food and nutrition board (2005), Institute of Medicine, National academies

These numbers represent adequate intakes. Total water includes all water contained in food, beverages and drinking water. Environment and physical activity may require increased water intake.

Are sports drinks appropriate for children and adolescents?

“Not only are you not getting any benefit (from sports drinks), you’re also getting increased calories and sugar.” Dr. David Katz, Yale University School of Medicine.

Nancy Clark of SportsMedicine Associates in Brookline (2003) states that sports drinks provide fluid and carbohydrates and few if any vitamins or minerals. Unless you are working out vigorously and nonstop for a long period of time, water is more convenient, well tolerated by the body and less expensive than a sports drink.

Clark notes that electrolytes (minerals in your blood that affect the amount of water in your body, blood pH, muscle action and other important bodily actions) lost during exercise include potassium and sodium. During extreme physical exertion such as participating in 2 to 3 hours of intense exercise we can expend 1,200 to 1,800 or more calories resulting in the loss of 300 to 800 mg of potassium and 250 – 500 mg of sodium per hour. Here, you may become sodium depleted (and muscle cramping may occur).

To recover from these losses you need to replace fluids and electrolytes. A 150 pound person should drink about 8 ounces of water for every 15-20 minutes of intense exercise. A cup of toasted oats cereal will provide you with 220 mg of sodium while a serving of canned soup can provide about 1,000 mg of sodium (one serving of a sports drink provides you with 55-110 mg of sodium). A banana provides 450 mg of potassium and a cup of yogurt provides you with about 520 mg (one serving of a sports drink provides 30 mg of potassium). Sports drinks provide 14-15 grams of added sugars (per serving) that children and adolescents simply do not need (ABC News, 2005).

Finally, young children have poorly developed thirst mechanisms. At the end of a hot day, children can become irritable, which may be caused by inadequate hydration (Clark, 2003). It is important for these children to take regular water drinking breaks. It is also important to remember that the thirst mechanism is not a reliable indicator of fluid needs. You should drink before you are thirsty. By the time your body signals thirst you may have lost one percent of your body weight during intense exercise. Exercise can blunt thirst, and the mind can override it. You may voluntarily replace less than half of sweat losses. To be safe, always drink enough to quench your thirst, and a bit more.

Definitions

Juice 100%: undiluted liquid fraction of whole vegetable, fruit or fruit blends without added sweeteners

Juice drink: diluted, sweetened (often with high fructose corn syrup) fruit or vegetable juice or fruit or vegetable juice blend.

Juice from concentrate: Water is removed from whole juice to make concentrate; then water is added back to reconstitute to 100% juice or to diluted juice such as lemonade.

High fructose corn syrup (HFCS): A corn sweetener derived from the wet milling of corn. Cornstarch is converted to a syrup that is nearly all dextrose. HFCS is found in numerous foods and beverages.

GOOD SPORTS

The U.S. is the only country in the sporting world that does not have a national coaching education program. The National Federation of State High School Associations reports that of 750,000 high school athletic coaches less than 8% have received any specific education to prepare them to coach. NASPE and the NCACE have issued national standards for athletic coaches. The standards provide direction for administrators, coaches, athletes and the public regarding the skills and knowledge that

coaches should possess. The national standards can assist school districts in hiring and evaluating coaches as well as providing professional development for coaches

Coaches, parents and educators from Maine with the help of the University of Maine have taken a leadership role in improving youth sport (youth, sub-varsity and varsity sports). They offer the following list of coaching behaviors that a quality coach of children and adolescents should demonstrate.

Sport and Coaching Education Initiative – University of Maine

A good coach:

1. is more interested in helping students develop than in winning
2. knows about physical development and capability of children and adolescents
3. knows that student athletes have different needs and learning styles; what works for one might not be right for another
4. understands that kids develop and mature physically and emotionally at different rates and ages. The most talented during one year may fall behind others the next year
5. knows the sport and teaches fundamental skills well
6. is sensitive to the needs of children from various social, economic, and racial backgrounds
7. understands and practices proper motivational techniques
8. treats student athletes fairly
9. teaches respect and models good behavior
10. is positive and keeps the fun in sport

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- One of every three Americans (over the age of 20) has high blood pressure. 30% of those do not know they have high blood pressure. Maintaining a healthy weight, being physically active and reducing salt and sodium consumption (less than 1,500 mg per day) can help prevent high blood pressure (CDC, 2005, high blood pressure)
- Americans consume an average of 4,000 mg of sodium each day (CSPI, 2005)

What is high blood pressure?

Blood is carried from the heart to all parts of your body in vessels called arteries. Blood pressure is the force of the blood pushing against the walls of the arteries. Each time the heart beats (about 60-70 times a minute at rest) it pumps blood into arteries. Your blood pressure is at its highest when the heart beats, pumping the blood. This is called systolic pressure. When the heart is at rest, between beats, your blood pressure falls. This is called diastolic pressure.

Blood pressure is always given as these two numbers, the systolic and diastolic pressures. Both are important. Usually they are written one above or before the other, such as 120/80 mmHg. The top or first number is the systolic and the bottom or second number is the diastolic.

A blood pressure of 140/90 or higher is considered high blood pressure. Both numbers are important. If one or both numbers are usually high, you have high blood pressure. If you are being treated for high blood pressure, you still have high blood pressure even if you have repeated readings in the normal range.

There are two levels of high blood pressure: Stage 1 and Stage 2 (see chart below)
Categories for blood pressure levels in adults* (age 18 and over).
(in mmHg, millimeters of mercury)

Category	Systolic (first or top number)	Diastolic (second or bottom number)
Normal	Less than 120	Less than 80
Pre-hypertension	120-139	80-89
High blood pressure	140 or higher	90 or higher
Stage 1	140-159	90-99
Stage 2	160 or higher	100 or higher

*for adults 18 and older who:

- Are not on medicine for high blood pressure
- Are not having a short term serious illness
- Do not have other conditions such as diabetes and kidney disease

Note: when systolic and diastolic blood pressures fall into different categories, the higher category should be used to classify high blood pressure level. For example 160/80 would be stage 2 high blood pressure. There is an exception to the above definition of high blood pressure. A blood pressure of 130/80 or higher is considered high blood pressure in persons with diabetes and chronic disease.
(NHLBI, 2005)

High blood pressure (also known as hypertension) often sets the stage for stroke, heart attack and other kinds of circulatory problems. Americans tend to rely on pills to control blood pressure. Two of the best ways to control it are losing weight (if you are overweight) and increasing daily physical activity. Eating more fruits and vegetables can also lower blood pressure without the side effects and costs of medications. Of all these factors weight control is the most important (Willett, 2005). For those who are overweight a 5% weight loss has clear benefits. Fruits and vegetables provide potassium which assists in blood pressure control. The Dietary Guidelines for Americans recommends adults consume about 4,700 mg of potassium each day. See the list below for quality sources of potassium. Five servings a day should be considered a minimum to aim for. Potatoes do not count within this total. Limiting salt will also help with blood pressure control.

Dietary Approaches to Stop Hypertension (DASH).

Visit the National Heart, Lung and Blood Institute (NHLBI) at http://www.nhlbi.nih.gov/health/public/heart/hbp/dash/how_plan.html for more information on the DASH eating plan.

Potassium Content of selected whole foods

Food	Serving	Potassium (milligrams)
Beet greens, cooked	½ cup	654
Baked beans	½ cup	551
Lima beans	½ cup	478
Yogurt	8 ounces	475
Spaghetti sauce	½ cup	470
Winter squash	½ cup	448
Cantaloupe	1 cup	427
Banana	1 medium	422
Spinach, cooked	½ cup	419
Tomato juice	6 ounces	417

Source: U.S. Department of Agriculture, Research Service, National Nutrient Database for standard reference, <http://www.nal.usda.gov/fnic/foodcomp>

Definitions (Willett, 2005)

Atherosclerosis: A buildup of plaque on the walls of arteries that causes arteries to narrow thus decreasing blood flow. This is also called hardening of the arteries. When atherosclerosis affects coronary arteries the condition is called coronary artery disease and can increase the likelihood of a heart attack.

Sodium: Although the daily value for sodium listed on nutrient facts panels put sodium at 2,300 mg, the average person needs about 1 gram of sodium per day to keep their body in good

working order. That is less than ½ teaspoon of salt. Prepared foods are loaded with sodium. A cup of boxed macaroni and cheese, canned soup, frozen pizza or an order of fast food French fries often contain well over 1 gram of sodium. Excess sodium mainly pulls water from cells increasing blood pressure.

Sodium free a product that makes this claim contains less than 5 mg of sodium per serving

Sodium (very low): a product that makes this claim contains 35 mg of sodium or less per serving

The content of this news is NOT intended to provide anyone with personal medical advice, which you should obtain from your health care provider.

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What is intelligence?

“Educating a small part of intelligence is like training for a race by exercising only one leg while leaving the muscles of the other leg to atrophy.” James Hemmings.

Wellness is the integration of many dimensions (social/emotional, intellectual, physical, spiritual, environmental and occupational). We globally define the intellectual dimension as the ability to use information for optimal functioning. Reflecting on this dimension leads us to an essential question – What is intelligence?

What do Americans want from education?

Americans have high expectations for education (Robinson, 2001, 2006). Parents assume that education will help their children find work and become economically independent. They also want schools to develop their children's abilities and help them to lead healthy lives that have purpose and enjoyment. Businesses need people who: are literate; numerate; analyze information and ideas accurately; generate new, useful ideas; help to implement them; communicate clearly and work well with other people.

Education is vital to the success of our working lives, to our children's futures and to long term economic development. It stamps children with a deep impression of themselves that is hard to remove. Success or failure in education can affect the image children have of themselves for a lifetime. Those who don't show “academic ability” in school are often branded as less able and non academic. Schools are under pressure to prioritize subjects that decision makers believe are relevant to our economy. We associate a narrow slice of academic ability with intelligence. Many highly intelligent people have passed through education feeling they aren't. Some of these adults may never discover their strengths nor realize their potential (Csikszentmihalyi, 1996; Robinson, 2001, 2006; Sternberg, 1989, 1997; Howard, 2006).

What is intelligence?

We offer the following definition: Intelligence is the aggregate or global capacity of the individual to act purposefully, to think rationally, and to deal effectively with their environment (adapted from Wechsler, 1958). The great scholar of education Benjamin Bloom (1956) identified three domains of learning: the cognitive (reasoning, processing information), affective (emotions and feelings) and psychomotor (movement).

There is no agreed upon definition of intelligence but there is a general conception of intelligence that's obvious in public education policy and our culture. We falsely believe that the higher a person's IQ, the more intelligent she/he is; and that the more academic qualifications people have the brighter they are (Robinson, 2001, 2006; Sternberg, 1989, 1997).

How is intelligence measured?

Traditional views of intelligence and what schools usually identify as “giftedness” are made up of the following abilities: verbal, numerical, spatial reasoning and short term memory. They are usually associated with such school subjects as English/language arts, math and the sciences. These subjects are considered “academic” and other subjects are considered “non academic” (hard and soft subjects). Schools use intelligence tests to predict a person's ability to use verbal, numerical and spatial reasoning to solve problems in school. The results are used for educational planning and to identify a general level of intelligence. One's ability to solve verbal, numerical and spatial problems is referred to as an intelligence quotient (IQ). IQ measures convergent thinking – the ability to solve well defined problems that have one correct answer (Howard, 2006; Csikszentmihalyi, 1996).

Traditional intelligence tests (e.g. the Wonderlic personnel test, the Stanford-Binet IQ test, the Wechsler Intelligence Test for Children) explain less than 10% of what society considers success (Sternberg 1997; Howard, 2006). The academic predictor tests: SAT, GRE, LSAT, GMAT, ACT and MAT have been shown to predict only the first year of school grades following the test, when rote learning dominates (recall,

recognition of information and comprehension). Experts have not associated their results with success in life or work beyond school (Sternberg, 1997; Howard 2006; Robinson, 2001, 2006).

Alternative views of intelligence recognize that knowledge can be generated in many ways other than through words and numbers. We have built a hierarchy of subjects in education that some believe is a fallacy. For example, a person who writes about the arts may be thought of as intellectually superior to the artist who produces the work. An analysis of a Leonardo da Vinci work – but not the creator of the Mona Lisa – could earn a PhD (Robinson, 2001). Some believe that the narrowing focus of education is resulting in students who do not become engaged to the best of their abilities. They argue that intelligence is much more than verbal, numerical and spatial reasoning. Successful intelligence (Sternberg, 1989, 1997) requires a profound ability to sense the needs of a given situation and to arrive at an effective solution.

Yale psychologist Robert Stenberg (1989) identifies three aspects of intelligence: analytic, creative and practical.

- **Analytic intelligence** involves reasoning and processing information to solve problems; evaluating, judging and comparing.
- **Creative intelligence** involves using past experience to achieve insight and deal with new situations
- **Practical intelligence** is adapting, selecting and shaping the real world environment and succeeding in real settings (also known as street smarts)

Sternberg believes that intelligent people are aware of their strengths and weaknesses; capitalize on their strengths; compensate for their weaknesses and continually develop their abilities to succeed. This requires creativity, imagination and innovation.

Creativity and innovation is what has made America great

Creativity is possible in any activity that engages the mind (art, movement, technology, management, science and so forth). It is essential to many industries: advertising, architecture, art, design, fashion, film, sport, gaming software, music, performing arts, publishing, computer software, television, and the intellectual property sectors. Economists estimate that these sectors are worth \$360 billion a year, making them more valuable than the automobile, agriculture and aerospace industries combined. They are growing at twice the rate of the economy as a whole and are generating jobs three times as fast. Many experts believe (Robinson, 2001, 2006; Csikszentmihalyi, 1996) there is a gap between supply and demand for creative and innovative people in America. Further, they believe that educational institutions are doing little to promote the creative and imaginative thinking that our society needs.

What is creativity?

One of the great scholars of creativity and innovation in education and business, Sir Ken Robinson (2006) of Great Britain offers the following definitions.

- **Imagination** – the capacity to bring about alternative possibilities.
- **Creativity** - the application of imagination for the solution of a problem or to conceive of an alternative solution; the process of having original ideas that have value.
- **Innovation** - the ability to employ useful, new ideas in the real world.

Creativity is possible in all areas of human activity and it draws from all areas of intelligence (intuitions, feelings, knowledge and skill). It is stimulated by the work, ideas and achievements of other people. In music, design, fashion science, technology and business we stand on the shoulders of others to see further.

Creative environments in schools

Creativity is more likely to come from the interaction of subjects rather than segregation of subjects common to American schools. Integrating two areas of thought are common to creative environments. Leonardo da Vinci combined art and science to produce innovations in anatomy/physiology, sculpture, painting, architecture and engineering. Johannes Gutenberg combined two ideas to produce a new idea (Bisociation). It is believed that he combined the ideas for the grape press and the coin stamp to produce the printing press (Howard, 2006). Artists and scientists routinely work in creative teams at companies

such as Microsoft, Boeing, Amgen and AT&T. Harvard Business School professor Teresa Amabile believes we all have the potential to be creative. Amabile (1983) states that in order to develop creativity we must: ask students open ended questions; ask learners to solve real world problems; see children as unique individuals with different strengths and weaknesses; model enthusiasm for learning and creative behavior; expect excellence from children; and recognize, respect and value their strengths whatever they may be.

Creativity is more likely to occur after an individual possesses the skills and understanding relevant to the domain he or she is working in. Creativity requires that one must: sustain long periods of concentration, be willing to abandon non productive approaches; persist during difficulty; be willing to take risks; be able to delay gratification; and be intrinsically (from within) motivated. For most students it is the creative process itself that is rewarding. They must choose enjoyable domains of learning that they will eagerly return to. Interestingly, creative episodes are most productive when they are preceded by physical exercise (Howard, 2006).

Mihaly Csikszentmihalyi (1996), a psychologist from the University of Chicago offers five steps to creativity (as cited in Wallas, 1926): **preparation** (becoming engaged and curious doing research, gathering facts, materials), **incubation** (idea development response generation; searching memory and immediate environment to generate responses), **insight** (discovery), **evaluation** (assessing the value of an idea, testing the response against criteria, facts or knowledge); and **elaboration** (establishing supporting elements/details). It is essential to remember that these five stages typically overlap and recur several times before the process is completed.

Multiple intelligences theory

No discussion of intelligence would be complete without mentioning the multiple intelligences theory. Harvard's Howard Gardner (1983) was primarily interested in helping educators appreciate students with diverse learning styles and potentials when he identified eight domains of intelligence:

Linguistic – performs primary operations of semantics, grammar, phonology, and rhetoric. example. T.S. Eliot

Musical – performs primary operations of pitch, volume, rhythm, and timbre. example. Yo Yo Ma

Logical/mathematical - performs sustained reasoning; abstract thought and calculation. example: Albert Einstein

Spatial – performs the primary operations of correct perception of objects and the ability to transform and rotate objects in the mind. example: Michelangelo

Bodily-kinesthetic – controlling the body and manipulating objects. example: Michael Jordan

Intrapersonal – intrapersonal understanding or knowing one's own feelings. example: Sigmund Freud

Interpersonal – interpersonal understanding or knowing the moods, feelings, traits, abilities and needs of others. example: Mahatma Ghandi

Naturalist – skill in observing, understanding and organizing patterns in the natural environment as in recognition and classification of plants and animals. example: Charles Darwin

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WHY LEARNING IS NOT ALL IN YOUR HEAD

“If we can better understand movement, we can better understand thoughts, words, and deeds.”

Dr. John Ratey, Harvard Medical School

This month we conclude our look at the intellectual aspect of wellness. We will explore the role movement plays in cognitive development and emotional intelligence.

Learning depends on movement

Many of us falsely believe that the functions of the body such as exercise and movement are “lower” brain functions and the functions of the mind - cognition are “higher” brain functions. We believe the “motor brain” simply reacts to stimuli and performs motor functions. This belief in separation of mind and body is evident in the practices of many American schools that routinely eliminate physical education (and recess) in order to make time for “academic learning”. Unfortunately, this is happening to the current generation of children who are not expected to outlive their parents (Klish, 2006) in this era of overeating, obesity and sedentary living.

Movement is a major player in learning.

Cognition and learning depends on movement. Dr. John Ratey, professor of psychiatry at Harvard Medical School (2002) and Pierce J. Howard, Ph.D (2006) and others have compiled a growing body of scientific literature (highlighted in the following paragraphs) from brain research (much of it from the past ten years) that demonstrates that popular beliefs and practices about learning, the brain and movement are misguided. The result of the research shows that we must move to learn and learn to move.

The fact that there is constant activity in our brain and throughout our bodies tells us that movement is the ongoing life force without which we could not survive. Interestingly, only organisms that move have a brain. Whether the activity is maintaining your body’s temperature, ballroom dancing or learning to read, movement cannot be separated from other brain systems. A lot of brain function is essentially movement.

We are physical beings who learn by behaving and performing.

Researchers have concluded that movement is essential to every brain function, including attention, perception, thinking, memory, emotion, language and learning. Movement also greatly impacts reading and writing skills. We are always modifying and learning through movement. The cognitive process you use to think and solve problems is carried out by the same region of the brain responsible for your body’s movements.

When we make a decision we get input from various functions of the brain: facts, opinions, thoughts, memories, predictions of consequences and so forth. You sequence these pieces, add logic, test their outcomes, and then create a response. The steps in this process are all grounded in motor functions: sequencing, adding, testing, directing; and the neural networks that fire during the process are the same ones that fire for a motor act (Howard, 2006; Ratey, 2002; Hannaford, 2005)

The primary motor cortex and premotor cortex are both located in the frontal lobe, one of the most advanced parts of the brain. It is responsible for thinking and planning. It allows you to ponder, judge and make decisions about consequences and alternative responses before taking action. What we once thought of as “higher” brain functions evolved from movement and still depend on it. The cerebellum, for example, coordinates the movement of our thoughts just as it orders the movements required to kick a ball, run, form an argument or create the melody to a song. The cerebellum (Latin for “little brain”) is primarily responsible for balance, posture and coordination (Ratey, 2002).

When Hanover students learn a new skill in physical education such as a dance or a serve in tennis they use the entire front half of their brain. As they master movement, the activity becomes automatic, and responsibility for it is shifted to neurons in lower parts of the brain, freeing up neurons in their cortex for new learning. The firing patterns become established and no longer require conscious attention. This is why you can ride a bike after a long absence from it. The same happens with cognitive acts. Children use the frontal part of the brain to learn to solve a math problem or to formulate a grammatically correct sentence. As learners master these tasks they are shunted to lower parts of the brain and become automatic.

The more that motor skills and cognition are practiced the more automatic they become. When first established, these routines require mental strain and “stretching” – the formation of new and different synapses and connections to neural assemblies. Once the routine is mastered, the mental process becomes more automatic. Neurons initially recruited for the learning process are allowed to go to other assignments. This is the fundamental nature of learning in the brain (Ratey, 2002).

We need more movement in schools, not less

Our physical movements directly influence our ability to learn, think and remember. It has been shown that physical activities that have a strong mental component such as learning a dance, learning a new motor skill or creating a gymnastics sequence enhance social, emotional, cognitive and motor abilities (Howard, 2006; Ratey, 2002; Hannaford, 2005).

Each person’s capacity to master new and remember old information is improved by the biological changes in the brain brought on by physical activity. Exercise can produce chemical alterations that produce stronger, healthier and happier brains. This brain is better suited to think, remember and learn. Studies have shown that meaningful physical activity increases school performance, memory retrieval, and cognitive ability. When we exercise and move our bodies, we also exercise our brains, particular our ability to sequence actions and information as well as access our memory. Conversely, inactivity can speed the decline of our mental abilities. Exercise increases the amount of blood that gets to the brain. Finally, it has been shown that exercise increases the number and density of blood vessels in the areas of the brain that need them most – the motor cortex and cerebellum (Ratey, 2002; Hannaford, 2005).

More findings on movement and learning:

- Vigorous physical activity has positive effects on academic achievement including: increased concentration; improved mathematics, reading, and writing test scores; and reduced disruptive behavior (Symons et al, 1997).
- Regular moderate to vigorous physical activity improves memory and enhances greater connections between neurons (CSPI, 2005)
- Physical activity has a positive influence on concentration, memory, academic performance (including grade point average, scores on standardized tests and grades in specific courses) and classroom behavior (Strong et al, 2005)

Young children spend much time engaged in screen based media (recreational use of computers, video gaming, watching television, movies and the like) and do not get the motor stimulation or exercise they need. Those who study such trends refer to teens as “**screenagers**”

- Children six and under spend an average of two hours a day using screen (TV, VCR, DVD, computer, video games) media (KFF, 2003).
- A study of 1,000 fifth, eighth and eleventh graders found that eighth grade boys average 23 hours a week playing video games (MSU, 2004)
- The U.S. census bureau projected that the average American adult (age 18 and over) watched 1,669 hours of television in 2004 (2004). This is the equivalent of about 4.5 hours of television viewing per day and 70 full days of television watching over the course of one year. If someone watched television for an average of 4.5 hours per day over the course of 65 years they would have watched television for a total of about 12.5 years.
- A study by the Kaiser Foundation (2005) and Stanford University found that children 8-18-years-old averaged: 3:51 hours of television viewing per day; 1:02 hours using a computer per day; and 49

minutes playing video games per day. 68% of these children reported having a television in their bedroom. 49% of these children reported having a video game player in their bedroom.

The learning chemical

Dopamine has been called the “learning neurotransmitter”. Neurotransmitters transmit information within and from the brain to all parts of the body. Dopamine modulates the brain’s reward system and movement control. It is believed to control the flow of information from other areas of the brain and is essential to the formation of long term memories. It also helps us connect new information to previously learned information. Problems with short term (working) memory correspond highly with dopamine deficiency. High levels of dopamine are associated with creativity. Long term regular aerobic activity is believed to raise dopamine levels.

Emotional intelligence “Feelings are essential to thought, thought to feeling.” Daniel Goleman

Why do we need social and emotional learning? Is it the school’s job to do this?

Children spend much time in school. This requires sustained concentration, impulse control, and emotional regulation. Work settings now require teamwork, participative leadership, and quality customer service. People’s capacity to establish effective relationships with others weighs heavily in hiring and promotion decisions. All this demands the development of social and emotional skills. Children need these skills that were not once considered part of a school’s curriculum.

In a society undergoing rapid change, young people no longer learn a trade for life. They must constantly learn new skills, and adapt to changing technology and market demands. The freedom they enjoy to make career and lifestyle decisions also requires that they plan ahead and actively manage their lives. All this puts a premium on initiative, motivation, adaptability and self management.

Increasingly our children are coming to school unprepared to learn. Sometimes they may be dealing with sadness from a death or loss, anger with a friend, or anxiety over an upcoming test. Recall and recognition of information are ineffective and unreliable during these stressful episodes (Howard, 2006). Students need to be able to manage stress in order to achieve short and long term goals.

What is emotional intelligence?

Emotional intelligence was first “mapped” by Yale psychologist Peter Salovey and John Mayer (1990). Later, Daniel Goleman (1995) of Harvard University brought wider attention to the subject. They have outlined many essential competencies in five areas of social and emotional learning (SEL) that we have outlined below. Experts recommend that schools take a coordinated, comprehensive and continuing approach to SEL implementation by blending it into all learning experiences. Physical education settings are an ideal social/emotional learning “laboratory” where students can learn to become more self-responsible.

Self-awareness – the ability to monitor one’s feelings; accurately identify and express a feeling appropriately. Those who are self aware are more likely to be self directed and self-responsible.

Self-management – the ability to handle one’s own feelings in such a way that they do not disrupt one’s life; cope with anxiety, anger, and depression; manage stress; demonstrate self control and control impulsivity; show respect for self, others, environment; express needs in a respectful and civil manner; become actively involved; be willing to try new things; follow instructions and know when to ask for help

Self motivation – manage emotions in order to reach a goal; be able to defer a goal or gratification; identify needs and interests; be capable of integrating new information into one’s life; monitor progress toward goals; focus on task at hand; set and work toward meaningful and realistic short and long term goals; modify performance in light of feedback; put motivation into action;

Recognizing emotions in others - understand others verbal and non verbal communication; understand that individual and group differences complement each other; recognize, identify and understand the thoughts and feelings of others; know what kind of behaviors are expected in a variety of social situations

Relationship management – use verbal and nonverbal skills to express oneself; work productively as part of a group and balance needs with those of a group; achieve mutually satisfactory and respectful resolutions to conflict by addressing the needs of all concerned; resist negative peer pressure and

pressure from media; refuse appropriately and assertively; verbally exchange ideas, feelings, and concepts with others; choose friends wisely; give and receive help, feedback and criticism appropriately; demonstrate effective leadership; demonstrate empathy, concern, support and responsiveness toward others

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Achieving and Maintaining Healthy Sleep Patterns

Every living creature needs to sleep. It is the primary activity of the brain during early development. Circadian rhythms (daily biological clock), or the sleep-wake cycle, are regulated by light and dark and these rhythms take time to develop, resulting in the irregular sleep schedules of newborns. The rhythms begin to develop at about six weeks, and by three to six months most infants have a regular sleep-wake cycle (National Sleep Foundation, 2006).

By the age of two, most children have spent more time asleep than awake and overall, a child will spend 40 percent of his or her childhood asleep. Sleep is especially important for children as it directly impacts mental and physical development.

The infant averages 14 hours of sleep, the mature adult 7.5 hours, the senior adult (over 75) averages 6. The need for sleep doesn't decline with age (although the ability to get it all at one time may be reduced). Prior to the invention of electric lights, typical adults slept for about 10 hours a night. When all cues to time of day are removed a typical adult will sleep for an average of about 10 hours and 20 minutes. Three out of five Americans get less than seven hours of sleep nightly and have trouble sleeping during several nights of the week. A typical good night's sleep for most people is about 8 hours (Howard, 2006).

There are two alternating types or states of sleep (National Sleep Foundation, 2006):

Non-Rapid Eye Movement (NREM) or "quiet" sleep. During the deep states of NREM sleep, blood supply to the muscles is increased, energy is restored, tissue growth and repair occur, and important hormones are released for growth and development.

Rapid Eye Movement (REM) or "active" sleep. During REM sleep, our brains are active and dreaming occurs. Our bodies become immobile, breathing and heart rates are irregular.

Research has shown that the length of sleep is not what causes us to be refreshed when we wake up. It is the number of sleep cycles we enjoy each night. Each sleep cycle contains five distinct phases which exhibit different brain wave patterns (Howard, 2006).

Pre-sleep: normal alertness

Phase 1 sleep: the mind at rest, eyes closed, breathing slowed, images beginning to appear; these images can be voluntarily controlled – you are still conscious at this point.

Phase 2 sleep: light sleep

Phase 3 sleep: deep sleep

Phase 4 sleep: rapid eye movement (REM) sleep or dreaming

Phase 5 sleep: light sleep signaling the end of a cycle

The first three phases of sleep average about 65 minutes, followed by an average of 20 minutes for REM sleep, with phase 5 lasting for an average of about 5 minutes. The average cycle lasts about 90 minutes

If we were to sleep completely naturally, with no alarm clocks or other sleep disturbances, we would wake up, on average, after a multiple of 90 minutes – after 4.5 hours, 6 hours, 7.5 hours or 9 hours. In the period between cycles we are not sleeping. If you are not disturbed at this time you simply move into another cycle. A person who sleeps only four cycles (6 hours) will feel more rested than someone who has slept for 8 to 10 hours but who has not been allowed to complete any one cycle because of being awakened before it was completed.

Sleep, Teens and School Performance

Getting less than a normal night's sleep negatively affects energy, activity, safety, health, longevity and quality of life. Without REM sleep, we lose what we have learned the day preceding sleep. We transform experience into long term memory during REM sleep. Researchers have concluded that adolescents and children, who **sleep less, achieve less** in school. Getting adequate sleep is positively correlated with school attendance and all measures of school performance. Most sleep researchers believe that the best time for teenagers to start school is 8:30 or later (Howard, 2006). Experts believe that adolescents go through different sleep cycles than the rest of us. They need to go to sleep later and wake later. Teenagers need approximately 9 to 9 ½ hours of sleep each night. Most teenagers get only 7 hours (Martin, 1999). Teenagers need the extra sleep in order to produce the hormones necessary for growth and come to school prepared to learn and achieve.

Sleep and School-aged Children (5-12 years) Sleep experts such as Dr. Mary A. Carskadon (Brown University), and Dr. Jodi A. Mindell (University of Pennsylvania), (National Sleep Foundation, 2006) recommend that children ages five to twelve need 10-11 hours of sleep (the average 5-12-year-old gets about 9.5 hours of sleep). At the same time, there is an increasing demand on their time from school (e.g., homework), sports and other extracurricular and social activities. In addition, school-aged children are more interested in TV, computers, the media and Internet as well as caffeine (soda and so called energy drinks) products – all of which can lead to difficulty falling asleep, nightmares and disruptions to their sleep. In particular, watching TV close to bedtime has been associated with bedtime resistance, difficulty falling asleep, anxiety around sleep and sleeping fewer hours.

Sleep problems and disorders are prevalent at this age. Poor or inadequate sleep can lead to mood swings, behavioral problems such as hyperactivity and cognitive problems that impact on their ability to learn in school (National Sleep Foundation, 2006).

Sleep Tips for School-aged Children

- Teach school-aged children about healthy sleep habits.
- Continue to emphasize need for regular and consistent sleep schedule and bedtime routine.
- Make child's bedroom conducive to sleep – dark, cool and quiet.
- Keep TV and computers out of the bedroom.
- Avoid caffeine.

Morning People

Someone who could be described as an early riser or a morning person are said to have “morningness”. This is one who wakes as much as two hours before the “non morning person” or night owl. There can be a downside to being a morning person. Experts believe that the time between 4:00 to 6:00 am is the period of the body's lowest efficiency (Howard, 2006).

Sleep Debt

Dr. William C. Dement (Stanford University) is a leading authority on sleep. One of his interests is sleep debt. He explained, "Having defined sleep need and individual daily sleep requirements, sleep debt is therefore the accumulated amount of lost sleep. For example, if the average daily amount of sleep needed by an individual is eight hours, sleeping six hours a night for one week will create a sleep debt of fourteen hours. The larger the sleep debt, the stronger the tendency to fall asleep at any particular moment while we are awake (National Sleep Foundation, 2006)."

Getting an insufficient amount of sleep can mean: a weaker immune system; possible harm to brain cells; acceleration of the aging process; memory impairment; and an increasing risk of depression; and the growth of fat rather than muscle tissue.

Thomas Roth, head of the Sleep Disorders and Research Center at Detroit's Henry Ford Hospital suggests a test to determine if you have sleep debt (Howard, 2006). If you fall asleep in less than six minutes you may be sleep deprived. People typically take between 6 and about 15 minutes to fall asleep (with exceptions).

The effects of long term sleep deprivation can be: heart disease, weight control hormones going out of sync (causing fat storage and less efficient burning of fat), depression, anxiety, insulin resistance, and increased risk for accidents.

Suggestions for achieving and maintaining adequate sleep patterns

- Diet. Simple sugars and fats decrease the oxygen supply to the brain, which decreases alertness and makes you sleepy. Eating a large meal in the evening interferes with sleep as do food additives and artificial sweeteners.
- Keep to a regular bedtime
- Do aerobic exercise regularly but avoid exercise within four hours of bedtime
- Sleep in absolute darkness and maintain quiet
- Do not take naps after 3 pm
- Avoid alcohol, nicotine and caffeine
- Achieve and maintain a healthy weight

What Is Sleep Apnea? Answer from the National Heart, Lung and Blood Institute, (NHLBI, 2006)

Sleep apnea is a common disorder that can be very serious. In sleep apnea, your breathing stops or gets very shallow while you are sleeping. Each pause in breathing typically lasts 10 to 20 seconds or more. These pauses can occur 20 to 30 times or more an hour.

The most common type of sleep apnea is obstructive sleep apnea. During sleep, enough air cannot flow into your lungs through your mouth and nose even though you try to breathe. When this happens, the amount of oxygen in your blood may drop. Normal breaths then start again with a loud snort or choking sound.

When your sleep is upset throughout the night, you can be very sleepy during the day. With sleep apnea, your sleep is not restful because:

- These brief episodes of increased airway resistance (and breathing pauses) occur many times.

- You may have many brief drops in the oxygen levels in your blood.
- You move out of deep sleep and into light sleep several times during the night, resulting in poor sleep quality.

People with sleep apnea often have loud snoring. However, not everyone who snores has sleep apnea. Some people with sleep apnea don't know they snore.

- Sleep apnea happens more often in people who are overweight, but even thin people can have it.
- Most people don't know they have sleep apnea. They don't know that they are having problems breathing while they are sleeping.
- A family member and/or bed partner may notice the signs of sleep apnea first.

Untreated sleep apnea can increase the chance of having high blood pressure and even a heart attack or stroke. Untreated sleep apnea can also increase the risk of diabetes and the risk for work-related accidents and driving accidents.

What is Narcolepsy (NINDS, 2006)?

Narcolepsy is a chronic neurological disorder caused by the brain's inability to regulate sleep-wake cycles normally. At various times throughout the day, people with narcolepsy experience fleeting urges to sleep. If the urge becomes overwhelming, patients fall asleep for periods lasting from a few seconds to several minutes. In rare cases, some people may remain asleep for an hour or longer.

The content of this web page and this newsletter is NOT meant to provide anyone with personal medical advice, which you should obtain from your health care provider and/or physician.

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