The Medical Society of the State of New York

# Weight Management: Promotion of a Healthy Lifestyle

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**DISCLAIMER**

**This paper is intended for general information only and it does not constitute medical advice and treatment. Individuals are encouraged to consult with their personal physician on matters relating to obesity and weight related problems.**

# WEIGHT MANAGEMENT: PROMOTION OF HEALTHY LIFESTYLES

## EXECUTIVE SUMMARY

The Medical Society of the State of New York (MSSNY) has been deeply concerned about the threat that increasing obesity and overweight rates will have on overall health and well being of the citizens of New York State. Significant studies have shown that obesity and overweight leads to other diseases - diseases that cost the United States and New York State billions of dollars to treat. Obesity, overweight and other weight management issues occur in all ethnic populations and occur within all urban, suburban and rural areas of New York State.

At its 2002 House of Delegates, the Medical Society of the State of New York specifically targeted obesity, as one of today's most prominent health issues, urgently focusing our full attention on the diagnosis and aggressive management of this condition. This paper articulates the growing problem concerning overweight, obesity and other conditions related to weight management such as bulimia and anorexia nervosa.

The Medical Society believes firmly that physicians and other health care providers, the educational institutions, the food industry, businesses, employers, the community, parents and other caregivers, must work together to resolve the rising levels of obesity in New York State's young residents and adults. At the same time, the Medical Society also believes attention must be given to those individuals who suffer a distorted body image - leading to a vast array of medical conditions and death.

This paper is intended to help generate discussion within New York State in order to best meet the challenges before us. To that end, the Medical Society will begin to focus on key areas such as physician education, patient and community education, and changes within public policy that would allow individuals to seek the medical interventions addressing weight management. The Medical Society will depend strongly on the enthusiastic partnership of legislative leaders to help us educate, motivate and promote physical education programs for all New Yorkers. We will also need their committed support in effecting these changes in public policies related to weight management and healthy lifestyles.

***Physician Education***

The Medical Society will work towards educating its physician members and will work with its various county medical and specialty societies to bring weight management before them. The Medical Society will educate physicians via its website, through continuing medical education courses, and through other media outlets the Medical Society may have available to them. Additionally, the Medical Society will enter into a discussion with medical schools regarding the training of medical students with great emphasis on nutrition, weight management and healthy lifestyles.

***Community Awareness***

The Medical Society will work with state agencies, particularly the Department of Health, in creating awareness for the general public on weight issues. The Medical Society will also

contact representatives within the business community and will work with the New York State Community Health Partnership to promote physical activity and lifestyles within communities. The Medical Society will also attempt to enlist the support of the fast food industry to "down size" the portions and to increase the availability of nutrition information for food purchase within a fast food restaurant.

***Educational Institutions***

The Medical Society recommends that increased physical activity be incorporated into the daily schedule at all schools in accordance with the recommendations of "Healthy People 2010". (34) Additionally, the Medical Society will seek to preserve "recess" for all schools to help ensure that children receive physical activity. Furthermore, the Medical Society will work towards the goal of advocating proper nutrition within the schools and will support legislative efforts to afford good nutritional choices, especially in vending machines and in the lunchroom or cafeteria.

***Legislative Initiatives***

While some insurance plans and managed care organizations pay for programs related to weight, many in New York State do not. Therefore, the Medical Society will seek legislation requiring insurance and managed care plans for paying for nutritional visits, bariatric programs, and certain medications. The Medical Society will also seek coverage for surgical management, including bariatric surgery and reconstructive surgery, related to weight loss and management. The Medical Society will also support efforts to require the Medicaid program to pay for medications related to weight loss. Furthermore, weight management problems have both medical and psychological disease origins. Serious mental illnesses can exacerbate the obesity condition and the conditions related to bulimia and anorexia nervosa. Therefore, the Medical Society of the State of New York will support legislative efforts to assure that there is coverage for a full continuum of services to treat these illnesses. Additionally, the Medical Society supports legislation that will eliminate the outpatient and inpatient limits and equalize co-payments and deductibles for mental health coverage.

## INTRODUCTION

According to the World Health Organization, obesity has become a global epidemic, affecting an estimated 250 million adults worldwide (1). The Third National Health and Nutrition Examination Survey (NHANES III) which was based on evidence gathered between 1988 and 1994, reports that 54.9% of American adults (approximately 97 million adults), over the age of 20, are either overweight or obese. The NHANES III data also revealed that approximately 13.7% of American children and 11.5% of American adolescents are overweight or obese. (2)

A statistical survey of overweight and obesity rates in New York State, performed in the year 2000, revealed that 64% of New York males and 46% of New York females were either overweight or obese compared with 65% of American males and 46% of American females. (3)

While many epidemiological studies have been done, showing that obesity is more common among lower socio-economic groups and more prevalent among African-American and Hispanic women, (3) Mexican men and women, and Pima Indians, (4) the alarming truth is that obesity can potentially affect people of all ages, ethnic backgrounds and both sexes.

Even more alarming is the significant increase in morbidity and mortality which is directly associated with the overweight or obese condition. All-cause mortality is increased 50-100% in obese individuals (5). An estimated 300,000 deaths occur each year due to obesity (6) and obesity is the second leading cause of preventable death in the U.S. (5) Overweight and obese individuals have a higher likelihood of developing hypertension, cardiovascular disease, dyslipidemia, diabetes, stroke, the metabolic syndrome, cancer of the colon, breast, prostate and uterus as well as gallbladder disease, gastroesophageal reflux disease, and pulmonary diseases including asthma, sleep apnea, diminished lung capacity and heart failure. Additionally, obesity leads to musculoskeletal disorders including hernias, osteoarthritis, and degenerative joint conditions of the knees and carpal tunnel syndrome. Obesity can lead to infertility and can result in greater risks for the pregnant woman as well as for the fetus. The effects upon the fetus exist not only during the in-utero period but extend throughout the life of the individual. (4-13)

This appalling list of invariable health hazards that will affect more than 50% of our current population, who are already diagnosed as overweight or obese, is profoundly disturbing to the physicians of the Medical Society.

More and more young people, including young children, are becoming obese, which increases the risk for cardiovascular diseases and diabetes at even younger ages. As medical technology improves, people survive longer following cardiovascular crises, as well as many cancers and other serious chronic diseases, but the remainder of their lives continues to be complicated by obesity-related pathology. (4)

The national cost of managing the obesity crisis has been estimated at nearly 100 billion dollars. (14). It has long been known that following a healthy diet and pursuing regular physical exercise (at least 30 minutes of sustained activity per day) will result in more successful weight management.

Literally thousands of articles focused on healthy diets have been published over the last several decades both in medical literature and popular publications. Some diets have advocated for the consumption of minimal carbohydrates and greater quantities of protein and fats. Other diets recommend the reverse and advise the avoidance of fats while increasing consumption of complex carbohydrates. There have been limitless "fad" diets including the cabbage soup diet, the grapefruit diet and other trendy programs that promise quick weight loss, but fail to help people achieve long-term weight management.

The problem is that not every diet works for every person and each individual patient requires medical evaluation and specific nutrition advice. Similarly, many different exercise programs and equipment have been marketed over the years, but physical activity needs to be custom-designed for each person to ensure safety. In addition, two critically important factors remain which may influence the success or failure of a life-long weight management program.

The first factor is motivation. Weight maintenance is a process that has "ups" and "downs." Periodic weight loss is usually followed by periodic weight gain. This unsettling fact often destroys the self-confidence and willpower of even the most dedicated person. People need to be taught to seek reasonable goals (even a loss of 5%-10% of starting weight can vastly improve health).(14,15,16) They need to be connected with support groups that can regularly reinforce, encourage and stimulate motivation. Programs such as these can be created through the offices of primary care physicians, schools, and other community organizations. Funding is needed for these vitally important services and legislative support is needed to establish policies that will direct health management organizations to fund medically based weight management programs.

The second factor that influences weight management is an individual's genetic makeup. This may predetermine the effectiveness of his/her metabolism.

Recent research has yielded information about obesity genes and certain neurochemical factors including leptins, neuropeptide-Y, Agouti-related peptide, melanocyte-stimulating hormone, ghrelin and cholecystokinin. Insufficient information currently exists regarding the actual effects of these chemicals. Research is critically needed to help us understand the pathogenesis of obesity. Researchers are beginning to believe that obesity is a chronic disease that may someday be controlled with medications, just like diabetes and hypertension. (4)

## DEFINITION OF OBESITY

Overweight or obesity is a condition which is considered a chronic disease, in which the body has increased stores of fat, either as increased numbers of fat cells or an enlargement of existing fat cells. Fat cells can increase in number during early childhood and adolescence. In later years, the actual number of fat cells (adipocytes) no longer increases but the existing fat cells are able to store fat and thus become larger. Genetic inheritance may also influence the actual number of adipocytes.

Obesity develops from an imbalance between the amount of energy consumed (in calories) and the amount of energy expenditure. When a greater number of calories are consumed in the diet, and fewer calories are expended, the body stores the extra calories in adipose cells. Hormones,

neuropeptides and genetic inheritance may regulate the effectiveness of energy expenditure and/or fat storage.

## DIAGNOSIS OF OBESITY

Obesity can be diagnosed in several ways (4, 8, 9):

1) Body Mass Index (BMI) is calculated by dividing the measured body weight in kilograms by the height in meters squared (alternatively, some calculations for body mass index use pounds and inches) (see Table 1).

a) Underweight - less than 18.5 kg/ $m^2$ (anorexia nervosa – less that 17.5 kg/ $m^2$)
b) Normal BMI range is 18.5-24.9 kg/$m^2$
c) Overweight BMI range is 25.0 – 29.9 kg/$m^2$
d) Obese BMI range is greater or equal to 30.0 kg/$m^2$
e) Extremely obese BMI range is greater or equal to 40 kg/$m^2$

2) Waist circumference greater than 102 centimeters (40.2 inches) in men and greater than 88 centimeters (34.6 inches) in women (see Table 2).

3) Waist-hip ratio greater than 1.0 in men and greater than 0.85 in women.

4) Anthropometry: the measured thickness of a skin-fold (usually measured in the region of the triceps, scapula or shoulder blades, and hips).

Excess fat located in the abdominal area (waist and flank), especially including visceral fat (the fat located within the abdominal cavity), has been shown to have a higher associated risk of developing diabetes mellitus, coronary artery disease, hypertension, stroke and early death, than fat located in the lower part of the body.

It is widely believed that the elderly population may actually require slightly higher BMIs. Because of the fact that they tend to have more brittle bones, they seem to have some degree of protection by having a slightly thicker soft tissue layer.

**Table 1**

| BMI in Terms of Height in Feet and Inches and Weight in Pounds | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **BMI ($kg/m^2$)** | **19** | **20** | **21** | **22** | **23** | **24** | **25** | **26** | **27** | **28** | **29** | **30** | **31** | **32** | **33** | **34** | **35** | **36** | **37** | **38** | **39** | **40** |
| **Height** | **Weight (lb.)** | | | | | | | | | | | | | | | | | | | | | |
| **4' 10"** | 91 | 96 | 100 | 105 | 110 | 115 | 119 | 124 | 129 | 134 | 138 | 143 | 148 | 153 | 158 | 162 | 167 | 172 | 177 | 181 | 186 | 191 |
| **4' 11"** | 94 | 99 | 104 | 109 | 114 | 119 | 124 | 128 | 133 | 138 | 143 | 148 | 153 | 158 | 164 | 169 | 173 | 178 | 183 | 188 | 193 | 198 |
| **5"** | 97 | 102 | 107 | 112 | 118 | 123 | 128 | 133 | 138 | 143 | 148 | 153 | 158 | 164 | 169 | 174 | 179 | 184 | 189 | 194 | 199 | 204 |
| **5' 1"** | 100 | 106 | 111 | 116 | 122 | 127 | 132 | 137 | 143 | 148 | 153 | 158 | 164 | 169 | 174 | 180 | 185 | 190 | 195 | 201 | 206 | 211 |
| **5' 2"** | 104 | 109 | 115 | 120 | 126 | 131 | 136 | 142 | 147 | 153 | 158 | 164 | 169 | 175 | 180 | 186 | 191 | 196 | 202 | 207 | 213 | 218 |
| **5' 3"** | 107 | 113 | 118 | 124 | 130 | 135 | 141 | 146 | 152 | 158 | 163 | 169 | 175 | 180 | 186 | 192 | 197 | 203 | 208 | 214 | 220 | 225 |
| **5' 4"** | 110 | 116 | 122 | 128 | 134 | 140 | 145 | 151 | 157 | 163 | 169 | 174 | 180 | 186 | 192 | 198 | 204 | 209 | 215 | 221 | 227 | 232 |
| **5' 5"** | 114 | 120 | 126 | 132 | 138 | 144 | 150 | 156 | 162 | 168 | 174 | 180 | 186 | 192 | 198 | 204 | 210 | 216 | 222 | 228 | 234 | 240 |
| **5' 6"** | 118 | 124 | 130 | 136 | 142 | 148 | 155 | 161 | 167 | 173 | 179 | 186 | 192 | 198 | 204 | 210 | 216 | 223 | 229 | 235 | 241 | 247 |
| **5' 7"** | 121 | 127 | 134 | 140 | 146 | 153 | 159 | 166 | 172 | 178 | 185 | 191 | 198 | 204 | 210 | 217 | 223 | 229 | 236 | 242 | 248 | 255 |
| **5' 8"** | 125 | 131 | 138 | 144 | 151 | 158 | 164 | 171 | 177 | 184 | 190 | 197 | 203 | 210 | 217 | 223 | 230 | 236 | 243 | 249 | 256 | 262 |
| **5' 9"** | 128 | 135 | 142 | 149 | 155 | 162 | 169 | 176 | 182 | 189 | 196 | 203 | 209 | 216 | 223 | 230 | 236 | 243 | 250 | 257 | 264 | 270 |
| **5' 10"** | 132 | 139 | 146 | 153 | 160 | 167 | 174 | 181 | 188 | 195 | 202 | 207 | 216 | 223 | 230 | 236 | 243 | 250 | 257 | 264 | 271 | 278 |
| **5' 11"** | 136 | 143 | 150 | 157 | 165 | 172 | 179 | 186 | 193 | 200 | 208 | 215 | 222 | 229 | 236 | 243 | 250 | 258 | 265 | 272 | 279 | 286 |
| **6'** | 140 | 147 | 154 | 162 | 169 | 177 | 184 | 191 | 199 | 206 | 213 | 221 | 228 | 235 | 243 | 250 | 258 | 265 | 272 | 280 | 287 | 294 |
| **6' 1"** | 144 | 151 | 159 | 166 | 174 | 182 | 189 | 197 | 204 | 212 | 219 | 227 | 234 | 242 | 250 | 257 | 265 | 272 | 280 | 287 | 295 | 302 |
| **6' 2"** | 148 | 155 | 163 | 171 | 179 | 186 | 194 | 202 | 210 | 218 | 225 | 233 | 241 | 249 | 256 | 264 | 272 | 280 | 288 | 295 | 303 | 311 |
| **6' 3"** | 152 | 160 | 168 | 176 | 184 | 192 | 200 | 208 | 216 | 224 | 232 | 240 | 247 | 255 | 263 | 271 | 279 | 287 | 295 | 303 | 311 | 319 |
| **6' 4"** | 156 | 164 | 172 | 180 | 189 | 197 | 205 | 213 | 221 | 230 | 238 | 246 | 254 | 262 | 271 | 279 | 287 | 295 | 303 | 312 | 320 | 328 |

**Disease Risk* Relative to Normal Weight and Waist Circumference**

Table 2

| | **BMI ($kg/m^2$)** | **Obesity Class** | **Men ≤102 cm (≤ 40 in.)**<br>**Women ≤88 cm (≤ 35 in.)** | **Men >102 cm ( >40 in.)**<br>**Women >88 cm ( >35 in.)** |
|---|---|---|---|---|
| Underweight | 18.5 | | ----- | ----- |
| Normal+ | 18.5 - 24.9 | | ----- | ----- |
| Overweight | 25.0 - 29.9 | | Increased | High |
| Obesity | 30.0 - 34.9 | I | High | Very High |
| | 35.0 - 39.9 | II | Very High | Very High |
| Extreme Obesity | ≥40 | III | Extremely High | Extremely High |

## PEDIATRIC OBESITY

One of the most alarming trends in the obesity epidemic is the effect upon the pediatric population. There has been a 100% increase on the prevalence of obesity among American children between 1980 and 1994. Obesity in children is measured by BMI just as it is in adults. Many pediatricians believe that pediatric obesity is defined as a BMI above the 85$^{th}$ percentile for age and sex (18a) (or above the 95$^{th}$ percentile depending on different research groups) (18b).

A report published in 2001, based on a study of 8,000 children, revealed the rate of overweight African-American and Hispanic children had increased by more than 120% between 1986 and 1998. 22% of these children were diagnosed as overweight. Among Caucasian children, the rate had increased by 50% with 12% being overweight. (4)

According to a study conducted by Johns Hopkins Bayview Medical Center and reported in 1995, children as young as nine who were overweight or physically unfit had higher systolic blood pressure, and higher total and LDL cholesterol, thus already revealing increased risk factors for heart disease. (19) Other recent studies reveal that today's children are more overweight and more sedentary than children were in the 1970s and 1980s. These studies confirm that children who perform better on standardized fitness tests have more favorable body composition and lipid profiles and therefore reveal that fitness levels in childhood correlate with cardiac risk factors in a similar manner to adults (20,21).

In March 2001, the CDC reported that there had been an increase in heart attacks in young adults. They reported that according to death records, the number of young Americans between the ages of 15 and 34, who died suddenly of cardiac problems, had risen 10% between 1989 and 1996. This included a 30% increase in cardiac deaths in young women and 10% increase in cardiac deaths in young men. 21% of the deaths were between ages 15 and 24. In one particular case, an 11 year-old girl, who weighed 300 pounds died on February 21, 2001 "from an enlarged heart caused by the strain of overweight." The increased incidence of cardiac disease in young people has been strongly linked to obesity. (22, 23)Clearly the problem of obesity presents tragic but preventable consequences for children at much earlier ages as well as later on in life.

## FACTORS THAT INFLUENCE PEDIATRIC OBESITY

Factor 1. Soft Drinks

Many researchers believe that the increased daily consumption of sugary beverages (soda, punch, lemonade, and sugar-sweetened fruit juice) may be responsible. A 2-year study conducted in Massachusetts between 1995 and 1997 tracked 548 children age 11-12. The study showed that "just one extra soda per day made them 60% more likely to become obese." It was found that the children did not compensate for the consumption of extra calories by decreasing meal calories, but instead continued to eat regular meals despite consuming sugar-loaded drinks prior to meals. Diet soft drinks and pure fruit juices did not contribute to increased obesity. In the last 10 years, soft drink consumption has practically doubled among American children. (18,24,25)

Factor 2. Poor Diet and the Fast Food Industry

Due to changing lifestyles in the United States, over the last several decades, the frequency at which children have access to unhealthy fast foods has vastly increased. In addition, the fast food industry specifically targets children and their parents by advertisement and promotion that may include offers of free toys, desserts, cookies, or extra fries. The fast food industry has also introduced the trend of "supersize" food items and soft drinks. The concept of "more is better" makes the supersize choices attractive to children, adolescents and adults. Most people do not expend nearly enough energy in physical exercise to burn off those extra unnecessary calories. The majority of such food items are higher in saturated fats and simple carbohydrates (refined sugar, white bread, potatoes) and calories from these food sources will be stored as excess adipose tissue (fat). (24, 26)

Factor 3. Increased snacking

The frequency of snacking between meals has increased in children from 77% in 1977 to 91% in 1996. Preferred snacks among children are usually more energy-dense (contain more calories) than meals. Because of increased snacking, the mean daily caloric intake has increased by 30%. Because snacking is such a common behavior, it is recommended that parents provide and encourage snacks that contain fewer calories. (27)

Factor 4. Portion Control

American families are accustomed to serving large portion meals. Restaurants also tend to serve extremely large portions. Such portions are usually excessive even for average sized adults and are completely inappropriate for children. In addition, most American children and adults lead much more sedentary lives today as compared to 20 years ago. They therefore fail to burn off the extra calories. In 2001, the Surgeon General of the United States Department of Health and Human Services published a "Call to Action to Prevent and Decrease Overweight and Obesity." Regarding the size of portions, two actions were recommended: 1)Encourage the food industry to provide reasonable food and beverage portion sizes; 2)Increase the availability of nutrition information for foods prepared and eaten away from home." (31)

Factor 5. Physical Activity

Children today are more sedentary compared to children in the 1970s and 1980s. Today's children spend more hours absorbed by television (on average 4 hours per day), computer and video games. A recent study reported that the annual distance walked by children has decreased approximately 30% since 1972. Fewer children walk to school because more school buses pick up children directly in front of their homes. Alternatively, their parents drive them to school because of increased concerns about abductions and traffic accidents. (4)

The CDC's Task Force on Community Preventive Services published a report on October 1, 2001 on Recommendations for Increasing Physical Activity. (33) Many of the recommendations are specifically aimed at activities for children and adolescents, in addition to their recommendations for adults. This thorough and excellent work should provide a solid foundation upon which to structure a physical activity program for the children and adults of New York State. It supported recommendations in "Healthy People 2010". (34)

Factor 6. Additional risk factors for childhood obesity

Certain factors, such as low birth weight, may be associated with later obesity and diabetes. A study involving African American mothers showed that maternal obesity during gestation increased the risk for later weight gain in the child. Parental obesity for children under 3 is associated with 30% risk of the child becoming overweight in later years and parental obesity more than doubles the risk for children to develop obesity as adults. (4)

## ILLNESSES ASSOCIATED WITH OBESITY

There are co-morbidities that have been linked to obesity which further increase the risk of early mortality. It is important to remember that even a modest weight loss of 5-10 % can actually reduce risks of morbidity and mortality.

1) Cardiovascular Disease - Death from cardiovascular disease is the number one killer. People who have a BMI of 30 or greater have nearly three times the risk for heart disease than people with a BMI in the range of 20-25. This increase may be due to several factors. Obese people have higher levels of C-reactive protein, which is a serological indicator of inflammation. Increased C-reactive protein levels have been linked with arteriosclerosis (hardening of the arteries). (35, 36) This can lead to blockage in cardiac arteries and subsequent heart attack. Blockages can also occur in carotid arteries and cranial arteries leading to stroke. Obese people also have a high likelihood of having elevated cholesterol and triglycerides which can also result in plaque formation in arteries (arteriosclerosis) with resultant heart attacks and stroke. Obesity has also been linked to respiratory conditions that cause hypoxia (inadequate oxygen in the blood) and this in turn increases the strain on the heart. Obesity has also recently been associated with an increased risk of heart failure, based on the findings of a large study that included 5,881 patients in the Framingham Heart Study in Massachusetts. (37)

2) Hypertension - Commonly referred to as high blood pressure is also one of the most common disorders that affect overweight and obese individuals. Hypertension can lead to enlargement of the heart, and this can also lead to heart attacks. The successful loss of excess weight can actually improve blood pressure to the point where patients no longer need medications for hypertension.

3) Type 2 Diabetes Mellitus - Approximately 14.5 million Americans have type 2 diabetes mellitus. This condition is most often associated with obesity. Basically, the disorder is related to insensitivity to insulin (“insulin-resistance”). Recent research has found that fat cells produce a hormone called “resistin” which may induce the tissues of the body to resist the effects of insulin. “Insulin-resistance” prevents absorption of glucose. The role of insulin is to help “target organs” absorb and metabolize glucose. Thus, excessive levels of glucose circulate in the blood causing “hyperglycemia”. In the hyperglycemic state, hexosamines accumulate in muscle and fat tissue and this worsens glucose transport. Additional hyperglycemia occurs which worsens the situation. Diabetes significantly increases the risk of heart disease and death. Successful weight loss can actually improve type 2 diabetes and correct hyperglycemia without the need for diabetic medications.

4) The Metabolic Syndrome - In 2001, the National Institutes of Health published the Third Report by the National Cholesterol Education Program Expert Panel on Detection, Evaluation and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III) This report provided the first definition of the Metabolic Syndrome. The Metabolic Syndrome includes:
    a. Abdominal obesity: waist circumference >102 cm in men and >88 cm in women.
    b. Hypertriglyceridemia $\geq$ 150 mg/dl
    c. Low HDL cholesterol (high density lipoproteins): < 40 mg/dl in men, <50 mg/dl in women
    d. High blood pressure: $\geq$ 130/85 mm Hg
    e. High Fasting Glucose: $\geq$ 110 mg/dl

It is estimated that 22-24% of U.S. adults have the metabolic syndrome. Insulin resistance is considered a fundamental factor in the syndrome and visceral (intra-abdominal) obesity, genetic predisposition and fetal malnutrition may also be linked to this condition. Patients with the Metabolic Syndrome suffer a markedly increased risk of death from cardiovascular disease, diabetes, and all other causes.

5) Cancer - As stated earlier, obesity is linked to an increased incidence in several cancers including prostate, breast, uterine, gallbladder, colon, esophagus, and possibly pancreas.

6) Osteoporosis - Obesity is also associated with increased risk of osteoporosis (diminished bone density due to decreased calcium in the bones).

7) Respiratory Disorders - Obesity has been linked to adult onset asthma as well as hypoxia, sleep apnea, and narcolepsy. (38)

8) Other systemic diseases - Many other systemic diseases have also been associated with obesity including gum disease, maculopathy, gallstones, and non-alcoholic steato hepatitis (NASH) that are due to fatty liver damage. (39)

## PHYSIOLOGIC FACTORS WHICH INFLUENCE OBESITY

Pathways in the hypothalamic region of the brain control appetite. In addition to the monoamine neurotransmitters (norepinephrine, dopamine and serotonin) that influence hunger and satiety, other natural chemicals participate in a complex and inadequately understood biologic process. Insulin, produced by Beta cells in the pancreas, converts blood sugar (from dietary carbohydrates) to glucose. It also helps mediate the breakdown of dietary protein into amino acids. Insulin subsequently facilitates the absorption of glucose and amino acids into cells of the body to be stored or to be metabolized for energy. In obese patients as well as diabetic patients, insulin-resistance is a significant problem, in which the body is unable to make use of insulin. Resistin is a hormone, recently discovered, which is produced by fat cells and which may result in resistance to insulin. Leptins are hormones also known to be released by fat cells. Essentially, when increased levels of leptins are released, they are believed to suppress hunger and when

their secretion is diminished, the brain signals hunger and motivates the desire to eat. Certain individuals have been found to have genetic deficiencies of leptin. Others have been found to have leptin-resistance (similar to insulin resistance). Agouti-related peptides are proteins that are controlled by leptins and are believed to regulate the number of calories consumed. Inadequate information is known, and additional research is urgently needed to better understand the importance of leptin. Potentially, leptins may be medically useful in managing obesity.

Ghrelin is another hormone that has been recently discovered that is produced in the stomach and believed to trigger appetite. Further research is also urgently needed to see if Ghrelin may be therapeutically useful. Cholecystokinin is produced in the small intestine and may influence satiety. (40) Additional chemical mediators called neuropeptides (brain chemicals) are known and are under investigation including pro-opiomelanocortin, neuropeptide-Y, and melanocyte stimulating hormone.

Various genes have been linked to obesity and appetite. These include several variants of a gene that causes leptin deficiency, and mutations in genes that cause 5% of severely obese people to have an increased response to Agouti-related proteins. Additionally, a gene exists, known as melanocortin-4 receptor, which controls satiety. It has been found to be defective in some individuals with a strong family history of obesity. (4)

From this brief review, it is undeniably clear that extensive research is needed to understand the pathogenesis of obesity, so that we may be able to find successful ways to medically improve the health and quality of life of millions of New Yorkers.

## TREATMENT MODALITIES

A first step in the treatment of obesity is to follow the National Institute of Health guidelines concerning diet. These guidelines recommend that a weight loss of about 10% of the starting weight be achieved over a six month period of time. Additionally, for overweight individuals (BMI 25-29.9 $kg/m^2$), it is expected that a decrease of 300-500 calories per day will result in ½ - 1 lb. weight loss per week and for obese patients (BMI greater or equal to 30), it is expected that a decrease of 500-1000 calories per day will result in 1-2 lbs weight loss per week. (9)

After the initial six-month period, weight loss will “plateau” due to changes that occur in resting metabolic rates. At this time, new approaches may be considered, such as further reduction in caloric consumption, or increased levels of physical activity. Encouragement and reassurance are particularly crucial at this time to ensure adherence to the new diet.

Specially designed diets created for specific cultural, ethnic and age groups as well as for overweight/obese patients who have co-morbidities (diabetes, dyslipidemia, heart disease, gastrointestinal diseases and food allergies) require individual consideration and planning. An excellent source for this is the NIH Clinical Guidelines on the Identification, Evaluation and Treatment of Overweight and Obesity in Adults, Appendix VI.A 1-4 pages 141-164, September 1998. (9)

Merely following a healthy and calorie-restricted diet will not adequately control weight-management. Regular physical activity is absolutely required to burn off calories, to strengthen muscles (including the heart), joints and bones. It has already been well established that regular physical activity reduces the risk of mortality from disease (41, 42, 43) and also reduces the risk of developing cardiovascular disease, diabetes, obesity, various cancers and musculoskeletal conditions (44). However, only 25% of adults in the United States admit to engaging in regular exercise (approximately 30 minutes of moderately intense activity) at least 5 days per week (41). Only 27% of teenagers (grades 9-12) participate in moderately intense physical activity (30 minutes at least 5 days per week). See Table 3.

**TABLE 3 . Selected objectives for increasing physical activity — Healthy People 2010**

| Objective | Population | Percentage of total U.S. population | |
|---|---|---|---|
| | | Baseline* | 2010 objective |
| No leisure time physical activity | Adult | 40% (1997) | Reduce to 20% |
| Moderate physical activity for ≥30 min regularly, preferably daily | Adult | 15% (1997) | Increase to 30% |
| Moderate physical activity for ≥30 min on ≥5 of previous 7 days | Adolescents | 27% (1999) | Increase to 35% |
| Vigorous physical activity that promotes development and maintenance of cardiorespiratory fitness on ≥3 days/week for ≥20 min/occasion | Adult | 23% (1997) | Increase to 30% |
| Vigorous physical activity that promotes development and maintenance of cardiorespiratory fitness on ≥3 days/week for ≥20 min/occasion | Adolescents | 65% (1999) | Increase to 85% |
| Daily school physical education | Adolescents | 29% (1999) | Increase to 50% |
| View television for ≤2 hours on a school day | Adolescents | 57% (1999) | Increase to 75% |
| Trips of ≤1 mile made by walking | Adults | 17% (1995) | Increase to 25% |
| Trips to school of ≤1 mile made by walking | Children and adolescents | 31% (1995) | Increase to 50% |
| Trips of ≤5 miles made by bicycling | Adults | 0.6% (1995) | Increase to 2.0% |
| Trips to school of ≤2 miles made by bicycling | Children and adolescents | 2.4% (1995) | Increase to 5.0% |

**Source:** U.S. Department of Health and Human Services. Healthy people 2010. 2nd ed. With understanding and improving health and objectives for improving health. 2 vol. Washington, DC: U.S. Government Printing Office, 2000.

* Years indicate when the data were analyzed to establish baseline estimates. Certain estimates are age-adjusted to the year 2000 standard population.

In 1996, the United States Preventive Services Task Force recommended that health care providers advise all patients about the importance of daily physical activity. This Task Force in collaboration with the US Department of Health and Human Services (DHHS) and with the Center for Disease Control (CDC), as well as with private and public contributors developed

"The Community Guide." This guide was published in January 2000 in the American Journal of Preventive Medicine under the title "Introducing the Guide to Community Preventive Services: Methods, First Recommendations and Expert Commentary."(45) In the same year, the DHHS presented "Healthy People 2010: Conference Edition." (34) The main objectives of their research were to:

1) Increase the amount of moderate to vigorous physical activity performed by people in all population subgroups and

2) To increase opportunities for physical activity by creating and enhancing access to facilities where people can be more active (41, 45).

The Medical Society of the State of New York would like to emphasize that pursuing a healthy lifestyle, including healthy diet and regular physical activity, is equally important for people with normal body mass index compared with people who have elevated body mass index. People who are of normal weight, but who are physically unfit also suffer from increased risk of cardiovascular disease and, therefore, physical fitness is required for everyone.

Motivation, safety and access are three major factors that are needed to ensure success in raising the activity level of our citizens. This will require education of health care providers in medical schools and CME courses, obtaining support from managed care organizations so that patients can afford to seek their doctor's advice on this subject, and building and furnishing easily accessible, safe community "health clubs" which would be available to people of all age groups and socioeconomic groups. The Medical Society therefore strongly recommends that increased physical activity be incorporated into the daily schedule at all schools and workplaces in New York State in accordance with the recommendations of "Healthy People 2010". (34)

## BEHAVIOR MODIFICATION

The success of weight management will depend upon living a healthy lifestyle including diet and daily physical activity throughout life. People need to be re-educated that weight management is a lifelong responsibility and can only be successful if realistic and achievable goals are sought. The Medical Society also supports the importance of portion control in our food choices and believes that New York State citizens need education that can be conducted not only in the classroom setting but also at home, senior citizen centers and early learning centers. Most importantly, the Medical Society firmly believes that the food industry should attempt to "downsize" its portions. Additionally, there are also important support mechanisms that are needed to help individuals with the lifelong goal of a healthy lifestyle. Therefore, the Medical Society will promote and encourage bariatric programs that will provide regular, ongoing, comprehensive support from doctors, nurses, psychiatrists, psychologists, nutritionists and physical therapists. The Medical Society will also encourage physicians to educate their patients regarding the efficacy of certain support services of such organizations as Weight Watchers, Jenny Craig, TOPS (Take Off Pounds Sensibly) and Overeaters Anonymous.

The Medical Society also understands that certain lifestyle experiences can be powerful triggers to overeating. Some of these triggers include depression, stress, emotional trauma, nighttime

snacking and bingeing. Therefore, the Medical Society will support patient education about these triggers and encourage patients to seek professional support if suffering from such problems. Weight management problems have both medical and psychological disease origins. Moreover, there are serious mental illnesses that can exacerbate the obesity condition and the conditions related to bulimia and anorexia nervosa. Therefore, the Medical Society of the State of New York will support legislative efforts to assure that there is coverage for a full continuum of services to treat these illnesses. Additionally, the Medical Society supports legislation that will eliminate the outpatient and inpatient limits and equalize co-payments and deductibles for mental health coverage.

## MEDICAL MANAGEMENT OF OBESITY

When diet and physical activity fail to correct severe obesity, medications may then be prescribed. Appropriate patients include obese patients with a BMI $\geq$ 30 or patients with a BMI $\geq$ 27 who also have additional "co-morbidities" (such as diabetes, hypertension, or dyslipidemia). Medications are contra-indicated in patients who have a history of bulimia or anorexia nervosa. Medications should also be avoided in children and pregnant women.
Appetite is the body's built-in drive to eat and replace energy stores. Pathways in the hypothalamic region of the brain control this fundamental survival instinct. Neurochemical transmitter substances called monoamines, which include dopamine, norepinephrine, and serotonin are essential factors that regulate this function. Appetite is diminished when increased concentrations of these neurotransmitters accumulate in the synapses (spaces) between nerve cells in the brain. Increased concentrations can result from one of two different mechanisms: 1) increased production or release of the neurotransmitters into the synapse and 2) diminished re-uptake of the neurotransmitters from the space.

A variety of different drugs exist which can cause increased concentrations of these neurotransmitters. Amphetamines were once popular as appetite suppressants because of their action on stimulating the release of dopamine and norepinephrine. Unfortunately, increased dopamine also resulted in euphoria which made the amphetamines extremely addictive. Therefore, they are no longer recommended in the treatment of obesity.

Certain drugs stimulate the release of just norepinephrine and these include phentermine, (Ionamine), diethylpropion (Tenuate Dospan), mazindol (Sanorex), and phenylpropanolamine. Although these agents are effective appetite suppressants, their effectiveness is often limited to just two or three months.

Dexfenfluramine and fenfluramine became quite popular in Europe and the United States during the 1990s. These drugs stimulated the release of serotonin. The combination of a serotonin-releasing agent (fenfluramine) with a norepinephrine-releasing agent (phentermine) was found to be even more effective and the mid-1990s became the notorious era of the Fen-Phen diet success. Unfortunately, the development of cardiac valvular defects in some patients taking fenfluramine or dexfenfluramine occurred and resulted in the withdrawal of these medications from the market. (Phentermine has not been linked with such problems and remains available).

A newer drug, sibutramine (Meridia) has been introduced and approved by the FDA as an anti-obesity drug. It inhibits the re-uptake of serotonin and norepinephrine thereby increasing the concentration of both of these monoamines. Sibutramine may have an additional benefit in increasing energy expenditure but this is still under investigation. This drug can cause hypertension and should be used with great caution in patients with a history of hypertension. All patients on sibutramine should have their blood pressure frequently checked. In addition, when using sibutramine, the patient must be advised to avoid any monoamine oxidase inhibitors and any other serotoninergic drugs. The dangerous "serotonin syndrome" is a possible adverse drug reaction which can be fatal.

Orlistat (Xenical) is another recently approved anti-obesity drug. Its mode of action, however, is not on the neurotransmitters in the hypothalamus. Rather, the drug works in the digestive system to interfere with the absorption of triglycerides in the diet. If the dietary fats cannot be absorbed, they cannot be stored as fat. This drug does have some undesirable side effects such as diarrhea, steatorrhea, and malabsorption of fat-soluble vitamins (A, D, E, and K).

Currently, certain third party payers and Medicaid do not cover anti-obesity drugs. It is important to educate health professionals as well as legislators about the success of using these drugs to correct severe obesity and maintain weight loss. The projected financial savings in medical costs for obesity-related diseases is well worth the cost of these drugs, for appropriately selected patients.

## SURGICAL MANAGEMENT OF OBESITY

Bariatric surgery includes several surgical procedures that can be performed for people with extreme obesity. This treatment modality is reserved for well-motivated patients for whom other modalities have already failed. Usually, patients are only considered as surgical candidates if their BMI $\geq$ 40 or if their BMI $\geq$ 35 and in addition they are also suffering from other life-threatening co-morbidities (associated illnesses such as diabetes type II, hypertension, cardiovascular diseases and several other dangerous illnesses).

The two most common surgical procedures for obesity include:
1. The Roux-en-Y Gastric Bypass Procedure (GBP): This procedure decreases the size of the stomach and connects the surgically reduced stomach pouch directly to the intestine. People who have undergone this procedure experience early satiety and thus eat less food. (4, 46 ,47, 48)
2. Vertical Banded Gastroplasty. (VBG): This procedure narrows the stomach to create a funnel effect by placing staples in the walls of the stomach. This procedure also leads to early satiety. (4, 46)

In addition to these two commonly performed procedures, a new procedure has been developed which can be done laparoscopically. It is called the Lap-Band. A silicone band is place around the upper segment of the stomach that reduces the quantity of food that the stomach can accommodate. This procedure therefore also leads to early satiety. The Lap-Band can be removed if desired and this procedure has fewer complications than the other procedures. (4)

According to the NIH, "a recent retrospective study of overweight patients with non-insulin – dependent diabetes, who were referred for consideration of a gastric bypass procedure, allowed for a comparison of those who opted for the surgical procedure versus those who did not undergo the procedure because of personal preferences for or refusal of insurance payment. Patients undergoing the surgical procedure had a decrease in mortality rate for each year of follow-up."(46, 48)

## RECONSTRUCTIVE SURGERY FOLLOWING MAJOR WEIGHT LOSS

In most cases, after a patient has lost a substantial amount of weight, the skin fails to shrink down to the same size as the underlying musculoskeletal tissue. People then find that they have large, floppy "aprons" of skin folds hanging over regions such as the abdomen. They often develop painful and persistent bacterial or fungal infections under these skin folds. These abnormal skin folds continue to place undue tension upon the underlying musculoskeletal support systems. These heavy skin folds may interfere with physical activities such as exercising and even simple walking. Reconstructive procedures such as abdominoplasty, thigh lifts, and breast lifts or breast reduction should available options for patients who have successfully lost tremendous amounts of weight. Most managed health organizations do not reimburse for such procedures because they consider them "cosmetic", not reconstructive. Similarly, managed health organizations also do not cover bariatric surgery for the same reason. Legislative support is necessary to help motivate HMOs to cover the cost of obesity-related surgeries. This concept makes sense because these surgeries result in successful outcomes either for people who have failed all other attempts to lose weight, or for those who have successfully lost weight but are still suffering body-distorting complications from previous obesity. These patients will have vastly improved overall health throughout the rest of their lives if they can be helped with their obesity problems. This would save the HMOs billions of dollars in the long run.

## OTHER EATING DISORDERS

### Anorexia Nervosa and Bulimia Nervosa

No serious discussion concerning weight management would be complete without acknowledgement of those patients who suffer from the opposite extreme of obesity. Dangerously underweight people who may suffer from eating disorders such as anorexia nervosa or bulimia nervosa also have increased risks of morbidity and premature mortality. In addition to fatigue, muscle weakness, osteoporosis, infertility, amenorrhea, bradycardia and low blood pressure, these patients often suffer from severe anemia, electrolyte imbalances, and cardiac arrhythmias which can result in cardiac arrest. Many bulimics are actually not underweight, but endanger their health by periodic bingeing (overeating) and purging.

At the present time, eating disorders such as these have been linked to multiple underlying psychiatric etiologies including but not limited to major depression, anxiety disorder, obsessive compulsive disorder, perfectionism, previous physical, sexual or psychological abuse and low self esteem. All of these conditions may play a role in the pathogenesis of anorexia and/or bulimia. These eating disorders are also believed to be due to an excessive attempt to achieve the unrealistic degree of thinness that seems to be highly desirable by the aesthetic preference of today's Western culture. (49)

It is interesting to postulate that the diseases characterized by unhealthy and even life-threatening underweight may actually be caused by abnormalities affecting the same biochemical and neurological pathways that may lead to obesity. The same research projects that eventually expose the patho-physiology of obesity may simultaneously shed light upon the mystery of anorexia nervosa and bulimia.

The Medical Society reiterates that weight management problems have both medical and psychological disease origins. Moreover, there are serious mental illnesses that can exacerbate the obesity condition and the conditions related to bulimia and anorexia nervosa. Therefore, the Medical Society of the State of New York will support legislative efforts to assure that there is coverage for a full continuum of services to treat these illnesses. Additionally, the Medical Society supports legislation that will eliminate the outpatient and inpatient limits and equalize co-payments and deductibles for mental health coverage.

## CONCLUSION

The Medical Society of the State of New York believes that obesity and other weight management issues are a growing threat to the health and well-being of New Yorkers. The Medical Society believes that there must be broad discussion by physicians and other health care professional, the educational systems, the community and the Legislature on weight management issues. The Medical Society will work within this vast arena to help to effectuate changes, both for our patients, and for the general public.

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