



# Behavioral Health & Wellness Program

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## **Weight Management Strategies for Adults and Youth with Behavioral Health Conditions**



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## Table of Contents

Introduction	4
Methodology	4
Literature Review	4
Introduction	4
Defining Excess Weight	5
Causes and Correlates of Excess Weight	6
Medical and Psychological Sequelae	9
Weight Control Strategies	10
Public Health Policy	13
Conclusion	15
References	16

## **I. INTRODUCTION**

Created by the Behavioral Health & Wellness Program, this report focuses on the weight control issues seen in both adults and youth with behavioral health conditions (i.e., persons with mental illnesses and/or addictions). While our main aim was to report on weight management prevention and intervention strategies for persons with behavioral health conditions, we found it necessary to also review the evidence base for the general population due to the limited study of weight management for this specific population.

## **II. METHODOLOGY**

A literature review was conducted to: (1) Identify the factors associated with weight control issues among adults and youth with behavioral health disorders; (2) Summarize the existing evidence base for weight control prevention and intervention strategies with this population; (3) Report on evidence-based practices for the general population to supplement the limited study of persons with behavioral health conditions. The review included literature published from January 1990 through December 2011. The search was conducted using Web of Science, PsychInfo, and the U.S. National Library of Medicine PubMed databases. Key search terms used in the search were: “obesity,” “overweight,” “weight management interventions,” “mental illness and obesity,” “weight maintenance,” “exercise,” “youth,” “adults,” “BMI,” “obesity prevalence,” “poverty and obesity,” “food desert,” “barriers to weight loss,” “prevention,” “policy related to weight control,” and “public health interventions for weight control.” The search included only articles in English.

## **III. LITERATURE REVIEW**

Obesity in individuals from infancy to adulthood is a critical public health concern in the U.S. and worldwide. Approximately 300,000 U.S. deaths each year were associated with obesity and overweight (U.S. DHHS, 2007). In the general population, the rates of obesity within the U.S. continue to grow at epidemic rates (CDC, 2011a). With more than 300 million individuals estimated to be obese worldwide, approximately 74% of adults in the U.S. are either overweight or obese according to the National Health and Nutrition Survey (Ogden & Carroll, 2010; CDC, 2011a). The total costs attributed to overweight and obesity in the general population amounted to \$117 billion in 2000 alone (U.S. DHHS, 2001).

The prevalence and severity of obesity among children in the U.S. have likewise been steadily increasing over the past several decades, with the prevalence among 6-11 year olds doubling and among 12-17 year olds tripling between 1980 and 2000 (Levine, Ringham, Kalarchian, Wisniewski, & Marcus, 2001; National Center for Health Statistics, 2007). Presently, approximately 48% of adolescents ages 2-19 are

obese (CDC, 2011a). The prevalence of overweight and obesity among adolescents is higher in the U.S. than in any other developed country (Speiser et al., 2005).

In comparison to the general population, the problem of overweight and obesity is significantly more prevalent among persons with behavioral health conditions (Allison et al. 2009; NASMHPD, 2008). Among the 1 in 5 individuals in the U.S. having a diagnosable behavioral health disorder during the course of any given year, overweight and obesity represents an “epidemic within an epidemic.” (NASMHPD, 2008). Excess weight is directly and indirectly linked to persons with behavioral health disorders living up to 25 years less than others (NASMHPD, 2008). One prevalence study conducted on obesity and people with severe mental illnesses found 29% of men and 60% of women with severe mental illnesses were overweight or obese, compared to 18% of men and 28% of women in the general population (Daumit et al., 2003). Another study of 276 persons with mental illnesses found 22% to be overweight and 59% to be obese (Strassnig et al. 2003 as cited in NASMHPD, 2008). This health disparity is also found with youth. A study of children and adolescents who were obese found that 34% of the obese participants had psychiatric diagnoses, compared to the 20% of obese children and adolescents who had no such diagnoses (Janicke, Harman, Kelleher, & Zhang, 2008).

### **Defining Excess Weight**

In reviewing weight issues and potential interventions, it is important to first define excess weight. In adults, there is general consensus that excess weight is measured using standard categories of Body Mass Index (BMI). BMI is a direct calculation using height and weight, and is a practical indicator for adults of body fat. In the U.S., adults whose BMI measures 25.0-29.9 kg/m<sup>2</sup> are categorized as overweight, 30.0-34.9 kg/m<sup>2</sup> as mildly obese, 35.0-39.9 kg/m<sup>2</sup> as moderately obese, and >40.0 kg/m<sup>2</sup> as extremely obese (NASMHPD, 2008).

The measurement of excess weight in children and adolescents is complex and there has not been consensus regarding standard definitions. Adult standards are not applicable to children, who experience significant variability in BMI as they move through developmental stages. Measurement of BMI may actually underestimate the prevalence of obesity in young people (Bloomgarden, 2004). Several leading institutes in child and adolescent health, including the American Academy of Pediatrics, the National Heart, Lung, and Blood Institute, and the Center for Disease Control and Prevention (CDC), have adopted the standard of measuring overweight and obesity in children and adolescents based upon BMI percentiles. Sex-specific growth charts published by CDC provide norm-referenced age growth data for children and adolescents ages 2-19 years. Utilizing these charts, “overweight” is defined as having a BMI above the 85<sup>th</sup> percentile and “obese” as having a BMI above the 95<sup>th</sup> percentile for same-aged and same-gender peers. For infants, overweight is defined in the U.S. as greater than the 95<sup>th</sup> percentile of the weight for length.

## **Causes and Correlates of Excess Weight**

Weight control issues arise when there is an energy imbalance. An energy imbalance develops when an individual takes in more calories than they utilize through physical activity. Most Americans do not get enough physical exercise, eat out frequently, and eat large meals (National Institute of Health [NIH], 2011a). Several factors play a role in obesity and overweight, including biological, behavioral, social, environmental, and medical illnesses (Stein & Colditz, 2004). For persons with behavioral health issues, psychiatric symptoms and pharmacotherapy also contribute to weight management challenges.

### ***Biological Factors***

Genetics play a role in obesity and overweight, though the extent which genetics affects weight is still unclear. Five genetic mutations that cause human obesity have been identified, as well as additional genetic risk factors (Challis et al., 2000). Predisposition to obesity appears to be caused by an interaction between at least 250 obesity-associated genes and perinatal factors (Eggerling, Pawlak, & Ludwig, 2002). Overall, although genetic markers have been associated with obesity, genetic causes account for less than 5% of obese individuals (Speiser et al., 2005).

Impaired brain function may also contribute to difficulties with weight management. Signaling pathways in the brain tell the body when to eat and when to stop eating (Zheng, Lenard, Shin, & Berthoud, 2009). Even the slightest chemical imbalance in the brain can disrupt healthy signaling and result in significant weight gain. For example, the hormone leptin regulates energy intake and energy expenditure by telling the brain when the body has reached satiation. Defects in the receptor for leptin produces severe obesity syndrome. Also, persons with behavioral health conditions are prescribed medications which alter satiation signal pathways, often leading to weight gain.

### ***Behavioral Factors***

Lack of physical activity, as well as diet, are important causal factors related to obesity and overweight. Time spent viewing television and intake of sugar-sweetened soft drinks are both directly and positively correlated with obesity in both children and adults (Otten, Jones, Littenberg, & Harvey-Berino, 2009; Hancox, Milne, & Poulton, 2004). When individuals watch television and/or play video games, they are likely to be immobile for lengthy periods of time, as well as to snack and drink soft drinks in greater excess than they would if they were engaged in a less passive activity (Otten, Jones, Littenberg, & Harvey-Berino, 2009; Hancox, Milne, & Poulton, 2004). Numerous studies report that the high prevalence of overweight and obesity in people with behavioral health issues is largely due to sedentary lifestyles and high-caloric diets.

Psychiatric symptoms related to behavioral health conditions, such as avolition, social isolation, and loss of energy, also play a role in excess weight. Approximately 90% of the people who suffer from major depressive disorder experience a significant loss of energy and engage in less physical activity (i.e., energy expenditure) compared to the general population (National Institute of Mental Health [NIMH], 2009). People with schizophrenia may avoid taking walks or exercising at a gym due to positive symptoms they may experience, such as paranoia and/or hallucinations. Additionally, people with bipolar disorder report less physical activity compared to the general population, which may be due to loss of energy and a loss of interest in daily activities (Compton, Daumit, & Druss, 2006).

### ***Social and Environmental Factors***

Social factors, including poverty and a lower level of education, have been linked to obesity. Individuals with little money tend to buy less expensive, high-calorie, processed foods rather than fruits and vegetables (Drewnowski & Specter, 2004; NASMHPD, 2008). For persons with behavioral health issues, limited income and reliance on food stamps is common. One study found people with schizophrenia consumed as much food per day as people in general population; however, the quality of the diet was poor (Henderson et al., 2006). Even though poor nutrition is common among lower socioeconomic status, it is noteworthy that obesity levels are also climbing among high-income groups (NIH, 2008).

Environmental factors also place individuals at risk for overweight and obesity. There are more fast food restaurants in low-income neighborhoods (CDC, 2010). These areas are referred to as “food deserts”. Food deserts are neighborhoods or cities lacking access to affordable fruits, vegetables, whole grains, low-fat milk, and other foods that make up the full range of a healthy diet (U.S. Department of Agriculture, 2009). Individuals who live in food deserts have less healthy diets and experience more health problems related to being overweight or obese (CDC, 2010; U.S. Department of Agriculture, 2009).

For persons with behavioral health issues, residential treatment facilities may choose less expensive and less nutritious meal options in order to cut costs (NASMHPD, 2008). Residential care, inpatient care and group homes often lack the facilities or space to allow for an active lifestyle, and are often unable to provide meals supporting healthy weight (NASMHPD, 2008). Additionally, treatment settings have been found to lack counseling or resources focused on the importance of nutrition and physical activity (Compton, Daumit, & Druss, 2006; NASMHPD, 2008). Other factors may include lack of access to recreation facilities or affordable gym memberships, which limit opportunities for individuals to engage in physical activity (U.S. DHHS, 2011a). Individuals living in low-income neighborhoods also often lack access to walking trails, sidewalks, and parks (Brownson, Baker, Housemann, Brennan, & Bacak, 2001).

## **Medical**

Illnesses such as hypothyroidism and Cushing's disease are associated with weight gain or obesity. Hypothyroidism is a medical condition in which the thyroid gland does not produce enough thyroid hormone, resulting in a slowed metabolism and loss of energy, which can lead to weight gain (NIH, 2008). Cushing's syndrome is a disorder caused by prolonged exposure of the body's tissues to cortisol. Symptoms vary, but most people have upper body obesity, rounded face, increased fat around the neck, and thinning arms and legs (NIH, 2008). These and other physical health problems such as pain and arthritis may prevent individuals from being as active as they want.

## **Pharmacotherapy**

Weight gain is frequently associated with psychiatric medications and results in poor medication compliance (Klein, Cottingham, Sorter, Barton, & Morrison, 2006). To avoid weight gain caused by medications, many people choose not to take their medications, which can lead to worsening of symptoms and increased hospitalization (Bean, Stewart, & Olbrisch, 2008). Many antipsychotic medications are associated with a high prevalence of overweight and obesity. Individuals who begin psychiatric medications at an early age (patients age  $\leq$  24 years) and remain on the medications for at least 5 years are more likely to be obese (Susce, Villanueva, Diaz, & Leon, 2005). Medications which cause the greatest weight gain were olanzapine (average weight gain of 37 lbs.), risperidone (average weight gain of 28 lbs), and haloperidol (average weight gain of 9 lbs) (Strassnig, Miewald, Keshavan, and Ganguli, 2007). The mechanisms by which this effect occurs are unclear. It appears atypical antipsychotics may directly affect hypothalamic appetite centers, alter satiety signals originating in adipose tissue, or create hormonal resistance to satiety control (NASMHPD, 2008).

Second-generation, or atypical, antipsychotic medications such as clozapine, olanzapine, sulpiride, and risperidone have been used increasingly in children and adolescents for treatment of psychiatric illnesses (Ratzoni et al., 2002). While these medications are frequently successful in reducing psychiatric symptomatology in young people, they are also associated with substantial weight gain. And children and adolescents who are prescribed atypical antipsychotics experience a significantly greater weight increase than do adults (Ratzoni et al., 2002).

Antidepressant use in adolescents and adults has also been associated with weight gain. Selective Serotonin Reuptake Inhibitors (SSRI's) are frequently associated with weight loss upon initiation but with weight gain after several months of use (Fava, 2000). Older tricyclic antidepressants and Monoamine Oxidase Inhibitors (MAOI's) result in more weight gain than SSRI's, but are infrequently used in children and adolescents due to their relatively negative side-effect profiles and increased risk of iatrogenic effects (Ratzoni et al., 2002).



## **Medical and Psychological Sequelae**

Excess weight causes or leads to worsening of serious medical and psychological illnesses. Difficulties with weight management can lead to type 2 diabetes, heart disease, hypertension, stroke, gastroesophageal reflux (acid reflux), gout, osteoarthritis, breathing difficulties such as sleep apnea, and premature death (CDC, 2011b; NASMHPD, 2008). Furthermore, certain types of cancers have been linked to obesity. Men who are obese are more likely develop cancer of the colon, rectum, or prostate compared to non-obese men (NIH, 2011a), while women who are obese are more likely to develop cancer of the gallbladder, uterus, cervix, or ovaries (NIH, 2011a). Epidemiological studies on obese individuals show that they have decreased physical functioning, health perceptions, and vitality (Karlsson, Taft, Sjostrom, Torgerson, & Sullivan, 2003).

Adolescence is a critical period for the development and expression of obesity-related comorbidities, and the risk of becoming overweight during adolescence appears to be higher among girls (Daniels et al., 2005). The incidence of Type 2 diabetes, historically rare in young people, is steadily increasing among children and adolescents primarily due to excess body weight (Bloomgarden, 2004). Childhood obesity is related to multiple other medical complications, including hypertension, dyslipidemia, chronic inflammation, increased blood clotting, endothelial dysfunction, hyperinsulinemia, sleep apnea, asthma, and exercise intolerance, as well as hepatic, renal, musculoskeletal, and neurological complications (Eggerling et al., 2002). And these comorbidities will continue into adulthood, with 50% - 80% of obese school-aged children becoming obese adults (Levine et al., 2001; Daniels et al., 2005). Because overweight adolescents tend to remain overweight as adults, they experience increased long-term risk of chronic health problems such as coronary heart disease, high blood pressure, diabetes, and cancer.

For individuals who struggle with behavioral health disorders, the psychological effects of overweight and obesity can be just as debilitating as the medical effects. People suffering from weight control issues face greater stigma and prejudice in the job market, in school, and in social settings- exacerbating the stigma that people with behavioral health disorders generally already face. Individuals who are overweight or obese can be viewed as being “stupid, less competent, and lacking in self-discipline and motivation” (Bean et al., 2008). As a result, people with behavioral health conditions that are overweight or obese, tend to isolate more, and may experience a related worsening of symptoms, such as suicidal ideation and increased depression (Karlsson et al., 2003; NASMHPD, 2008).

For youth, peer relationships are a primary mediator of the relationship between obesity and psychopathology (Daniels et al., 2005). Research has shown that overweight children have fewer friends and more limited social networking abilities. They also tend to experience more relational aggression such as teasing. Having

fewer friends and being teased about weight are mediate psychosocial distress. Experiencing teasing has been shown to be associated with an increase in suicidal ideation and suicide attempts in overweight youth (Daniels et al., 2005).

Overall, the epidemic increase of overweight and obesity, and related health risks underscore the importance of effective prevention and intervention strategies for people across the lifespan. Because individuals with behavioral health issues are at increased risk for developing overweight and obesity, and because the medical and psychosocial comorbidities are potentially exacerbated in this group, targeted prevention and intervention strategies for this population are necessary.

## **Weight Control Strategies**

### ***Prevention***

Prevention refers not only to prevention of initial weight gain but prevention of further weight increases for those who are already overweight. Guidance on weight prevention is found in Healthy People 2020, a national initiative which provides resources for weight control (U.S. DHHS, 2011a). Healthy People 2020 provides information on calorie intake, recommendations for daily activity levels based on age, weight, and height, and tools individuals can employ to promote weight control such as food diaries and healthy recipes. Utilizing the objectives outlined in Healthy People 2020, the American Medical Association (AMA) has developed a series of case-based publications for health professionals titled *Roadmaps for Clinical Practice: Case Studies in Disease Prevention and Health Promotion* to aid health professionals in addressing the overweight and obesity epidemic (Kushner, 2003). The AMA guides healthcare providers to discuss the health risks associated with initial or added weight gain, and then to talk with their clients about the importance of maintaining a healthy diet and engaging in at least 30 minutes of physical activity daily (Kushner, 2003).

Given the significant weight increases within the first year of treatment with many psychiatric medications, behavioral health treatment should routinely include weight management counseling (Allison et al., 2009; Centorrino et al., 2006; Strassnig, Miewald, Keshavan, & Ganguli., 2007; Susce et al., 2005). Behavioral healthcare providers should screen their clients for overweight and obesity during intake, and educate them on the importance of maintaining a healthy diet and daily exercise routine throughout. Providing such counseling at the onset of and throughout behavioral health treatment may aid in prevention of weight gain due to pharmacotherapy and symptoms (Strassnig et al., 2007).

In 2005, the American Medical Association, the Health Resources and Service Administration, and the Centers for Disease Control and Prevention convened a multidisciplinary expert committee to develop recommendations related to the problem of childhood obesity. In the area of prevention, the group concluded that

prevention efforts should target all children, beginning at birth, and obesity prevention should be a focus of public health. The expert committee recommended that lifestyle-based prevention efforts should be aimed at children with healthy BMI's as well as children with BMI's in the overweight range. Lifestyle-based prevention strategies include the following:

- 1) Limiting consumption of sugar-sweetened beverages,
- 2) Encouraging consumption of U.S. Department of Agriculture (USDA)-recommended quantities of fruits and vegetables,
- 3) Limiting television and other “screen time” (e.g. computer and video games) to a maximum of two hours per day and to non-sleeping areas,
- 4) Eating breakfast every day,
- 5) Limiting eating at restaurants,
- 6) Encouraging family meals,
- 7) Following USDA recommendations on portion sizes at meals,
- 8) Encouraging a calcium-rich, high-fiber diet with balanced macronutrients and limited energy-dense foods,
- 9) Encouraging exclusive breast-feeding for the first 6 months of life and continued breast-feeding combined with solid foods through at least the first 12 months of life,
- 10) Promoting moderate to vigorous exercise for at least one hour per day.

The committee further stated that these targeted behavioral strategies will rarely be effective if they are used simply as a prescriptive approach; rather, they should be incorporated into a process by which families, providers, schools, and communities work together to promote a healthy lifestyle (Barlow et al., 2007).

### ***Behavioral Interventions***

Weight control interventions for adults vary depending on the level of obesity and overall physical health of the individual (NIH, 2011a). A person who is moderately overweight can successfully reach a healthy weight by making healthy choices, such as eating a balanced diet and getting physical exercise. Those who are morbidly obese may benefit by pharmacotherapy treatments or surgical procedures. Regardless of the method, people who are overweight and obese should obtain treatment to lose weight as even moderate weight loss can reduce health risks in the short term (Devlin, Yanovski, & Wilson, 2000).

Generally for adults, the most effective interventions are long-term behavioral change strategies, not diets. Dieting alone is ineffective in achieving sustainable weight loss over time (Devlin et al., 2000; NASMHPD, 2008). Effective behavioral

weight control programs combine healthy eating habits, increased exercise, and lifestyle changes such as decreasing television viewing times, meal planning, and making time for healthy lunches rather than going to fast food restaurants. Such programs have resulted in a mean weight loss of 15 to 20 pounds within five months, and are associated with decreased depression, improved self-image, and increased self-esteem and self-efficacy (Devlin et al., 2000). Utilization of behavioral therapy, cognitive behavioral therapy, and interpersonal therapy has also proven effective among some individuals, not only aiding in weight loss but also improving overall health (Bean et al., 2008).

For persons with mental illnesses, behavioral modification techniques, such as reward systems for improvements in behaviors or weight maintenance, have been successful (Loh, Meyer, & Leckband, 2006). Adopting a daily exercise routine can help individuals with behavioral health disorders prevent weight gain and/or lose weight, and may also alleviate comorbid psychological symptoms, such as depression or anxiety (Richardson, et al., 2005; Ellis, Crone, Davey, & Grogan, 2007). Individuals may experience more behavioral change in group settings which offer greater instruction on how to overcome barriers towards weight loss/maintenance goals (McDevitt & Wilbur, 2006; Shiner, Whitley, Van Citters, Pratt, & Bartels, 2008).

When intervening generally with youth, interventions emphasizing positive coping strategies are particularly useful. A study of high school students, about half of whom were overweight or at risk for overweight, found that low self-esteem and avoidant coping strategies were related to unhealthy eating behavior (Martyn-Nemeth, Penckofer, Gulanick, Velsor-Friedrich, & Bryant, 2008). Other studies have found low self-esteem, depression, and increased stress to be associated with adolescent overweight and overeating (Ackard, Neumark-Sztainer, Story, & Perry, 2003). Teaching adolescents how to utilize more adaptive coping strategies may decrease their unhealthy behaviors overall and, specifically, reduce unhealthy eating behaviors.

While few treatment studies have targeted severely obese children, the efficacy of family-based behavioral weight control interventions has been well-established for treating moderate pediatric obesity. Weight loss achieved through family-based interventions has been shown to be maintained over 10-years or more (Epstein, Myers, Raynor, & Saelens, 1998; Epstein, Valoski, Wing, & McCurley, 1994). Evidence additionally suggests that parents be key participants in obesity interventions, with children achieving greater weight loss when only parents are targeted for weight loss intervention (Speiser, et al., 2005).

### ***Medical Interventions***

Prescription medication is available for people who are considered obese or those who are overweight and have a co-occurring physical condition, such as type 2

diabetes, hypertension, obstructive sleep apnea or metabolic syndrome. Orlistat is the only FDA-approved medication for weight loss, available with a prescription (NIH, 2011b). Orlistat is not an appetite suppressant; it works by blocking 30% of dietary fat from being absorbed by the body. Potential side effects include liver damage, kidney stones, vitamin malabsorption, severe stomach pain, gallbladder disease, anxiety, and problems with digestion. There may be drug interactions when taken with some common anti-anxiety and anti-depression medications, although this has not been substantiated through research.

Individuals experiencing weight gain associated with psychotropic medications have several options. They can work with their prescribing provider to adjust the medication dosage, change to another medication with lower associated weight gain, or potentially add a psychostimulant which could minimize weight gain (Devlin et al., 2000).

Gastrointestinal surgery, is recommended for individuals with severe obesity (BMI of  $\geq 40$  kg/m<sup>2</sup>) or with individuals who have a BMI of 35-39.9 kg/m<sup>2</sup> and a serious co-occurring physical condition (Bean, et al., 2008). Most surgical procedures do result in weight loss; however, there are possible risks associated with any surgical procedure. Some individuals can experience short-term difficulties such as anastomotic leaks as well as long-term complications such as vitamin and mineral deficiencies (Devlin, et al., 2000).

Surgical interventions may be considered for young people when lifestyle interventions alone have failed and obesity becomes severe and/or includes serious comorbidities. Surgeries for youth should be limited to those who have a BMI greater than 40 kg/m<sup>2</sup>, have reached physical maturity (typically 13 years of age for girls and at least 15 years of age for boys), demonstrate emotional and cognitive maturity, and have attempted to lose weight for at least six months in a behaviorally-based treatment program (Inge et al., 2004). Whether for adults or youth, medical interventions must be paired with behavioral change intervention; otherwise neither medications nor surgical intervention will be effective long-term (Bean et al., 2008).

### **Public Health Policy**

Although workplace wellness initiatives are increasingly popular, research suggests that worksite interventions are often not effective in achieving primary aims of behavioral change, weight loss or increased physical activity (Katz et al., 2005; Schmitz & Jeffery, 2000). In part this may be due to the fact that many weight management programs are not tailored to the individualized needs of participants (Schmitz & Jeffery, 2000). Regardless of the reason, the growing prevalence of overweight adults and youth suggests that direct care interventions are insufficient to manage this public health crisis. Direct weight management services, whether in the workplace or other settings, will need to be balanced by population-based public

health interventions for at-risk individuals across the lifespan (Stanford Prevention Research Center, 2009).

To date, there have been several attempts to address the weight control epidemic through public health interventions, such as Healthy People 2020, urban redesign projects geared to enhance physical activity in neighborhoods, and school healthy meal programs. However, current research on public health is limited (CDC, 2005). While some workplace interventions were successful in reducing weight and increasing physical activity, the long-term effectiveness of these interventions has yet to be studied (CDC, 2005). As another example, researchers are exploring the effectiveness of web-based interventions, with initial findings that the program leads to an average weight loss of 7.6kg after several weeks (Arem & Irwin, 2011). But overall more rigorous research focused on public health interventions and greater accessibility to weight control strategies is warranted (CDC, 2005; Arem & Irwin, 2011)

Recent U.S. legislation, policies, and federal guidance emphasize the need to address the overweight and obesity epidemic. While new policies present a growing opportunity, these policies are often limited in scope and do not directly mention weight management for persons with behavioral health conditions. Healthy People 2020, a gold standard for public health stakeholders and the health care industry, has two topic areas, “Nutrition and Weight Status” and “Mental Health and Mental Disorders,” with objectives that serve to inform policy makers, providers, and consumers (U.S. DHSS, 2011a). However, public and professional comments raise concern that the objectives are too modest given that no state was able to meet a satisfactory grade on the earlier Healthy People 2010 targets (U.S. DHHS, 2009). There is also concern about the lack of specific weight status objectives for health disparate populations such as persons with behavioral health conditions.

Considering the dearth of health care policy regarding excess weight, the recently enacted Affordable Care Act (ACA) aims to bring significant reforms by giving Americans new rights and benefits such as improved access to recommended services and best practices. Yet, questions and concerns remain about whether the ACA will provide for a needed range of mental health and addictions treatment, while also addressing extremely high rates of co-morbid chronic conditions among persons with behavioral health disorders. Many services needed by individuals with mental illnesses or addictions fall outside the scope of benefits currently covered by a typical private insurance plan (Garfield et al., 2010). While Medicaid currently covers a broader range of behavioral health services, individuals moving into Medicaid under the new ACA eligibility pathways will receive “benchmark” or “benchmark-equivalent” coverage rather than full Medicaid benefits. If behavioral health benefits are aligned with current “benchmark” coverage, many newly insured individuals with behavioral health conditions will face significant gaps in covered services.

## IV. CONCLUSIONS

The causes, correlates, and health effects of excess weight in the U.S. are complex, and demand a multi-faceted solution. Effective prevention and intervention strategies have been identified for both adults and youth in the general population, with approaches focusing on lifestyle, behavior, psychological processes, medication management, surgical procedures and public policy. Given the high prevalence of excess weight among persons with behavioral health disorders and consequent mortality and morbidity, continued development of weight control prevention and intervention programs is a public health priority. For these individuals, the limited existing research suggests that developing a healthier lifestyle, which includes daily physical exercise, may not only prevent weight gain or lead to weight loss, but also improve comorbid psychological disorders such as anxiety and depression (NASMHPD, 2008; McDevitt & Wilbur, 2006; Shiner et al., 2008).

Healthcare policy will be essential to creating a greater range of prevention and wellness options for persons with behavioral health conditions. State and federal policy makers need to address the substantial gaps in healthcare guidance (Garfield et al., 2010; Druss & Mauer, 2010). It is unclear whether essential health benefit packages will include preventive and wellness services, including weight management. Moreover, public and private plans should insure that formularies for psychotropic medications include appropriate options for individuals that need a medication change or combination psychopharmacology to control weight gain.

New legislation and policy also has implications for translational research. In addition to Medicaid and Medicare demonstration projects for the Patient-Centered Medical Home (PCMH) and SAMHSA's funding of programs to co-locate primary care in community mental health centers (CMHCs), opportunities are emerging to gauge the organizational effectiveness of implementing wellness policies. New policies might support expanding interest in prevention and wellness through innovative services such peer-to-peer wellness programming and multidisciplinary training in health behavior change.

Community behavioral health centers' ability to treat and monitor symptoms through pharmacotherapy and psychosocial interventions makes these settings a logical place to also address patients' excess weight. Though initial steps have been taken toward developing weight control programs for individuals with behavioral health disorders, there is little conclusive data on what prevention and intervention programs for this population are most effective. Much more study is needed to determine if evidence-based programs and policies for the general population can be appropriately generalized to persons with behavioral health conditions or if programming tailored specifically to this population is necessary.

## V. REFERENCES

- Ackard, D. M., Neumark-Sztainer, D., Story, M., & Perry, C. (2003). Overeating among adolescents: prevalence and associations with weight-related characteristics and psychological health. *Pediatrics*, *111*(1), 67-74.
- Allison, D. B., Newcomer, J. W., Dunn, A. L., Blumenthal, J. A., Fabricatore, A. N., Daumit, G. L.,...Alpert, J. E. (2009). Obesity among those with mental disorders: A National Institute of Mental Health meeting report. *American Journal of Preventive Medicine*, *36*(4), 341-350.
- Arem, H. & Irwin, M. (2010). A review of web-based weight loss interventions in adults. *Obesity Management*, *12*(5), e236-e234.
- Barlow, S. E., and the Expert Committee. (2007). Expert committee recommendations regarding the prevention, assessment, and treatment of child and adolescent overweight and obesity: Summary and report. *Pediatrics*, *120*, S164-S192. doi: 10.1542/peds.2007-2329C
- Bean, M.K., Stewart, K., & Olbrisch, M. E. (2008). Obesity in America: Implications for clinical and health psychologists. *Journal of Clinical Psychological Medical Settings*, *15*: 214-224.
- Bloomgarden, Z. T. (2004). Type 2 diabetes in the young: the evolving epidemic. *Diabetes Care* *27*, 998–1010.
- Brownson, R. C., Baker, E. A., Housemann, R. A., Brennan, L. K., & Bacak, S. J. (2001). Environmental and policy determinants of physical activity in the United States. *American Journal of Public Health*, *91*(12), 1995-2003.
- Center for Disease Control and Prevention [CDC]. (2005). Recommendations and reports. *Public health strategies for preventing and controlling overweight and obesity in school and worksite settings*. Retrieved from <http://www.cdc.gov/mmWR/preview/mmwrhtml/rr5410a1.htm>
- Center for Disease Control and Prevention [CDC]. (2010). CDC features: *Food Deserts*. Retrieved from <http://www.cdc.gov/features/fooddeserts/>
- Center for Disease Control and Prevention (2011a). *Overweight and Obesity: U.S. Obesity Trends*. Retrieved from <http://www.cdc.gov/obesity/data/trends.html>
- Center for Disease Control and Prevention (2011b). *Overweight and obesity: Causes and consequences*. Retrieved from <http://www.cdc.gov/obesity/causes/index.html>
- Centorrino, F., Wurtman, J. J., Duca, K. A., Fellman, V. H., Fogarty, K. V., Berry, J. M., Guay, D. M...Baldessarini, R. J. (2006). Weight loss in overweight patients



- maintained on atypical antipsychotic agents. *International Journal of Obesity*, 30, 1011-1016.
- Challis, B. G., Yeo, G. S. H., Farooqi, I. S., Luan, J., Aminian, S., Halsall, D. J., Keogh, J. M., Wareham, N. J. & O'Rahilly, S. (2000). Brief genetics report: The CART gene and human obesity: Mutational analysis and population genetics. *Diabetes*, 49, 872-875.
- Colton, C. W. & Manderscheid, R. W. (2006). Congruencies in increased mortality rates, years of potential life lost, and causes of death among public mental health clients in eight states. *Preventing Chronic Disease: Public Health Research, Practice, and Policy*, 3(2), 1-14. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1563985/pdf/PCD32A42.pdf>
- Compton, M. T., Daumit, G. L., & Druss, B. G. (2006). Cigarette smoking and overweight/obesity among individuals with serious mental illnesses: A preventive perspective. *Harvard Review of Psychiatry*, 14(4), 212-222.
- Daniels, S. R., Amett, D. K., Eckel, R. H., Gidding, S. S., Hayman, L. L., Kumanyika, S., Robinson, T. N., Scott, B., J...Williams, C. L. (2005). Overweight in children and adolescents: Pathophysiology, consequences, prevention, and treatment. *Circulation*, 111, p. 1999-2012. doi: 10.1161/01.CIR.0000161369.71722.10
- Daumit, G. L., Clark, J. M., Steinwachs, D. M., Graham, C. M., Lehman, A., & Ford, D. E. (2003). Prevalence and correlates of obesity in a community sample of individuals with severe and persistent mental illness. *Journal of Nervous Mental Disorders*, 191(12), 799-805
- Devlin, M.J., Yanovski, S. Z., Wilson, G. T. (2000). Obesity: What Mental Health professionals need to know. *American Journal of Psychiatry* 157:6, 854-866.
- Drewnoski, A. & Specter, S. E. (2004). Poverty and obesity: the role of energy density and energy cost. *American Journal of Clinical Nutrition*, 79(1), 6-16.
- Druss, B.G. & Mauer, B.J. (2010). Health care reform and care at the behavioral health – primary care interface. *Psychiatric Services*, 61, 1087-1092.
- Ebberling, C. B., Pawlak, D. B., & Ludwig, D. S. (2002). Childhood obesity: public-health crisis, common sense cure. *The Lancet*, 360, 473-482.
- Ellis, N., Crone, D., Davey, R., & Grogan, S. (2007). Exercise interventions as an adjunct therapy for psychosis: A critical review. *British Journal of Clinical Psychology*, 46, 95-111.
- Epstein, L. H., Myers, M. D., Raynor, H. A., & Saelens, B. E. (1998). Treatment of pediatric obesity. *Pediatrics*, 101(3), S554-S570.

- Epstein, L H., Valoski, A., Wing, R. R., & McCurley, J. (1994). Ten-year outcomes of behavioral family-based treatment for childhood obesity. *Health Psychology, 13*(5), 373-383.
- Fava, M. (2000). Weight gain and antidepressants. *The Journal of Clinical Psychiatry, 61*(11), 37-41.
- Garfield, R. L., Lave, J. R., & Donohue, J. M. (2010). Health reform and the scope of benefits for mental health and substance use disorder services. *Psychiatric Services, 61*, 1081-1086.
- Hancox, R. J., Milne, B. J., & Poulton, R. (2004). Association between child and adolescent television viewing and adult health: a longitudinal birth cohort study. *The Lancet, 364*(9430), 257-262.
- Henderson, D., Borba, C., Daley, T., Boxill, R., Nguyen, D., Culhane, M., Louie, P., Corinne, C.,...Donald, G. (2006). Dietary intake profile of patients with schizophrenia. *Annals of Clinical Psychiatry, 18*(2), 99-105.
- Inge, T. H., Krebs, N. F., Garcia, V. F., Skelton, J. A., Guice, K. S., Strauss, R. S., Albanese, C. T., Brandt, M. L., ...Daniels, S. R. (2004). Bariatric surgery for severely overweight adolescents: Concerns and recommendations. *Pediatrics, 114*(1), 217-223.
- Janicke, D. M., Harman, J.S., Kellher, K. J., & Zhang, J. (2008). Psychiatric diagnosis in children and adolescents with obesity-related health conditions. *Journal of Developmental Behavioral Pediatrics, 29*(4), 276-284. doi: 10.1097/DBP.0b013e31817102f8
- Karlsson, J., Taft C., Sjostrom L., Torgerson J. S., & Sullivan M. (2003) Psychosocial functioning in the obese before and after weight reduction: construct validity and responsiveness of the obesity-related problems scale. *International Journal of Obesity, 27*, 617-630.
- Katz, D. L., O'Connell, M., Yeh, M-C., Nawaz, H., Njike, V., Anderson, L. M., Cory, S., & Dietz, W. (2005) Public health strategies for preventing and controlling overweight and obesity in school and worksite settings: A report on recommendations of the task force on community prevention services. *MMWR Recommendations and Reports, 54*(RR10), 1-12. Retrieved from <http://www.cdc.gov/mmWR/preview/mmwrhtml/rr5410a1.htm>
- Klein, D. J., Cottingham, E. M., Sorter, M., Barton, B. A., & Morrison, J. A. (2006). A randomized, double-blind, placebo-controlled trial of metformin treatment of weight gain associated with initiation of atypical antipsychotic therapy in children and adolescents. *American Journal of Psychiatry, 163*, 2072-2079.

- Kushner, R. F. (2003). Roadmaps for clinical practice: Case studies in disease prevention and health promotion—Assessment and management of adult obesity: A primer for physicians. *American Medical Association*. Retrieved June 1, 2009 from:  
[http://www.healthywv.com/shared/content/page\\_objects/content\\_objects/pdf\\_documents/journal\\_articles/asst\\_mgt\\_of\\_adult\\_obesity.pdf](http://www.healthywv.com/shared/content/page_objects/content_objects/pdf_documents/journal_articles/asst_mgt_of_adult_obesity.pdf)
- Levine, M., Ringham, R., Kalarchian, M., Wisniewski, L., and Marcus, M. (2001). Is Family-Based Behavioral Weight Control Appropriate for Severe Pediatric Obesity? *International Journal of Eating Disorders*, 30, 318-328.
- Loh, C., Meyer, J. M., & Leckband, S. G. (2006). A comprehensive review of behavioral interventions for weight management in schizophrenia. *Annals of Clinical Psychiatry*, 18(1), 23-31.
- Martyn-Nemeth, P., Penckofer, S., Gulanick, M., Velsor-Friedrich, B., & Bryant, F. B. (2008). Self-esteem, stress, coping, eating behavior, and depressive mood in adolescents. *Research in Nursing & Health*, 32, 96-109.
- McDevitt, J. & Wilbur, J. (2006). Exercise and people with serious, persistent mental illness. *American Journal of Nursing*, 106(4), 50-54.
- National Association of State Mental Health Program Directors [NASMHPD]. (2008). Obesity reduction & prevention strategies for individuals with serious mental illness. Retrieved from [http://www.nasmhpd.org/general\\_files/Obesity%2010-8-08.pdf](http://www.nasmhpd.org/general_files/Obesity%2010-8-08.pdf)
- National Center for Health Statistics. (2007). *Summary health statistics for U.S. adults: National health interview survey*. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/19645319>
- National Institute of Health. (2008). *Cushing's syndrome*. Retrieved from <http://endocrine.niddk.nih.gov/pubs/cushings/cushings.aspx#what>
- National Institute of Health. (2011a). *Overweight and obesity statistics*. Retrieved from <http://win.niddk.nih.gov/statistics/index.htm>
- National Institute of Health. (2011b). *Prescription medications for the treatment of obesity*. Retrieved from <http://win.niddk.nih.gov/publications/prescription.htm#fdameds>
- National Institute of Mental Health. (2009). *Depression*. Retrieved from <http://www.nimh.nih.gov/health/publications/depression/index.shtml>
- Ogden, C. L. & Carroll, M. D. (2010, June). Prevalence of overweight, obesity, and extreme obesity among adults: United States, trends 1960-1962 through 2007-2008. Retrieved from

[http://www.cdc.gov/NCHS/data/hestat/obesity\\_adult\\_07\\_08/obesity\\_adult\\_07\\_08.pdf](http://www.cdc.gov/NCHS/data/hestat/obesity_adult_07_08/obesity_adult_07_08.pdf)

- Otten, J. J., Jones, K. E., Littenberg, B., & Harvey-Berino, J. (2009). Effects of television viewing reduction on energy intake and expenditure in overweight and obese adults. *Archives of Internal Medicine*, 169(22), 2109-2115.
- Ratzoni, G., Gothelf, D., Brand-Gothelf, A., Reidman, J., Kikinzon, L., Gal, G., Phillip, M., Apter, A., & Weizman, R. (2002). Weight gain associated with olanzapine and risperidone in adolescent patients: A comparative prospective study. *Journal of the American Academy of Child & Adolescent Psychiatry*, 41(3), 337-343.
- Richardson, C. R., Faulkner, G., McDevitt, J., Skrinar, G. S., Hutchinson, D. S., & Piette, J. D. (2005). Integrating physical activity into mental health services for persons with serious mental illness. *Psychiatric Services*, 56(3), 324-331.
- Schmitz, M. & Jeffery, R. (2000). Public health interventions for the prevention and treatment of obesity. *Medical Clinics of North America*, 84(2), 491-512.
- Shiner, B., Whitley, R., Van Citters, A.D., Pratt, S. I., & Bartels, S. J. (2008). Learning what matters for patients: qualitative evaluation of a health promotion program for those with serious mental illness. *Health Promotion International*, 23(3), 275-282.
- Speiser, P. W., Rudolf, M. C. J, Anhalt, H., Camacho-Hubner, C., Chiarelli, F., Eliakim, A., ...Hochberg, Z. (2005). Consensus Statement: Childhood Obesity. *The Journal of Clinical Endocrinology & Metabolism*, 90(3), 1871-1887.
- Stanford Prevention Research Center. (2009). *Childhood obesity: A growing problem*. Retrieved from <http://prevention.stanford.edu/word-pdf/youth.pdf>
- Stein, C.J., & Colditz, G.A. (2004). The epidemic of obesity. *The Journal of Clinical Endocrinology & Metabolism*, 89(6), 2522-2525.
- Strassnig, M., Miewald, J., Keshavan, M., & Ganguli, R. (2007). Weight gain in newly diagnosed first-episode psychosis patients and health comparisons: one year analysis. *Schizophrenia Research*, 93(1-3), 90-98.
- Susce, M. .T., Villanueva, N., Diaz, F. J., de Leon J. (2005). Obesity and Associated complications in patients with severe mental illnesses: a cross-sectional survey. *Journal of Clinical Psychiatry*, 2005, 66:167-173.
- United States Department of Agriculture. (2009). *Access to affordable and nutritious food: Measuring and understanding food deserts and their consequences*. Retrieved from <http://www.ers.usda.gov/Publications/AP/AP036/AP036fm.pdf>
- United States Department of Health & Human Services [U.S. DHHS]. (2001). The Surgeon General's call to action to prevent and decrease overweight and

- obesity. Retrieved on August 4, 2009 from <http://www.surgeongeneral.gov/topics/obesity/>.
- U.S. DHHS. (2007). *Overweight and obesity: Health consequences*. Retrieved from [http://www.surgeongeneral.gov/topics/obesity/calltoaction/fact\\_consequences.htm](http://www.surgeongeneral.gov/topics/obesity/calltoaction/fact_consequences.htm)
- U.S. DHHS. (2009). Physical activity guidelines for Americans. *Healthy people 2020 and solstice: Glimmers of hope*. Retrieved from <http://www.health.gov/paguidelines/blog/post/Healthy-People-2020-and-Solstice-Glimmers-of-Hope.aspx>
- U.S. DHHS. (2011a). *Healthy People.gov: About healthy people*. Retrieved from <http://www.healthypeople.gov/2020/about/default.aspx>
- Zheng, H., Lenard, N., Shin, A., & Berthoud, H-R. (2009). Appetite control and energy balance regulation in the modern world: reward-driven brain overrides repletion signals. *International Journal of Obesity*, 33(2), S8-S13. doi: 10.1038/ijo.2009.65