

### **III. THE PROBLEM**

#### **Negative Individual Health Outcomes**

##### **Overweight and Obesity**

Improving one or multiple current negative adolescent health outcomes is the ultimate goal for social marketers like the author. Overweight and obesity are two such outcomes. Presently an estimated 11% of Maine high school students are overweight, and an additional 14% are at risk for becoming overweight (Eaton 2005). Among middle school students, Swallen et al (2005) measured a “significant deleterious effect” between overweight/obesity and depression, self-esteem, and social functioning. Both middle and high school students classified by body mass index (BMI) as overweight or obese reported significantly poorer overall physical health compared to normal weight students.

A primary concern with adolescent overweight and obesity are associated diseases that can develop concurrently or later on. Beilin and Huang (2007) report that both of these conditions are major risk factors for Type 2 diabetes as well as cardiovascular disease. McCarthy et al (2008) measured a significant association between obesity and hypertension among a group of 11-to-13-year olds. In at least some cases, this effect could be mediated by sleep problems related to sleep-disordered breathing in overweight children and adolescents (Verhulst 2007). Meanwhile, Pastucha et al (2007) measured significantly greater insulin resistance among obese compared to healthy adolescents in a recent pair-matched study.

Inflammation-related diseases like asthma and certain cancers are additional possible problematic outcomes. Based on research involving matched cohorts of asthmatic and normal adolescents, Abramson et al (2008) characterize obesity and asthma as “problematic comorbid conditions.” Davis et al (2007) measured a direct association between BMI and asthma incidents in a cross-sectional survey of 471,969 adolescents, both for boys and girls and across ethnic groups, beginning with BMI percentiles as low as the 45<sup>th</sup>. Other researchers have consistently measured significant associations between obesity and certain forms of cancer, including endometrial (in women) and colon (in men) (Vainio 2002). As with asthma (Jones 2006), inflammation is a hypothesized mediator for both of these types of cancer (Erlinger 2004, Modugno 2005).

## **Other Negative Individual Health Outcomes**

Adolescents can be at risk for negative individual health outcomes other than those specifically related to overweight and obesity. Some of these include suicide, self-injury, physical injuries caused by others, social isolation, depression, and poor cognitive function (National Center/CDC 2008). Though not the primary subject of this literature review, recognizing the occurrence of these outcomes is necessary for developing practical holistic perspectives of adolescent health and resultant educational messages and approaches.

## **Mediators of Negative Individual Health Outcomes**

### **Introduction**

Individual health outcomes are subject to numerous direct and indirect influences. Dangerous individual health behaviors are among the most direct. As depicted in Figure 1, levels of knowledge/awareness, beliefs, and attitudes are expected to strongly influence behaviors, and thus outcomes indirectly. Community and environmental outcomes/conditions can also influence individual health outcomes directly. In addition, they can influence behaviors indirectly by acting on knowledge, beliefs, and attitudes.

### **Lack of Activity and Proper Nutrition**

Problematic food behaviors among American adolescents appear a major limiting factor for health among middle and high school students. Energy-dense, nutrient-poor diets, especially when combined with low physical activity (see below), are primary contributors to overweight and obesity (American Dietetic Association 2002). According to the Centers for Disease Control and Prevention (CDC), 81% of Maine youth consume fruits and vegetables fewer than 5 times per day (Eaton 2005). This finding mirrors others for American high school students of varied ethnicities in both rural and urban environments (Brener 2005), as well as for a sample of Florida middle school students (Zapata 2008). In addition, a group of San Diego County 11-to-15-year-olds with slightly lower adherence to recommendations averaged 3.1 servings per day of fruits and vegetables (Sanchez 2007). Among the Florida middle school students, 26% reportedly drank 2 or more sodas per day, and only 52% of boys and 41% of girls ate breakfast daily (Zapata 2008). Another recently surveyed group of middle and high school students consumed nutrient-poor foods from the “Fats,

Oils, and Sweets” category of the old Food Guide Pyramid 50% more frequently than healthier foods from other categories (George 2008). The most popular nutrient-poor foods included salty snacks, candy, and soft drinks, while the most popular healthier foods were bottled water, fruit juice, and fruit (George 2008).

Rates and trends for physical activity among American high school students are also discouraging. Nearly 10% of Maine students engage in little or no moderate or intense physical activity, just 26% attend physical education (PE) classes, and only 7% attend PE daily (Eaton 2005). Nationally, just 15% of children walk or bike to school (U.S. DOT 2003). Meanwhile, researchers have associated lack of physical activity with social isolation, depression, anger, stress, and anxiety (Sallis 2000), as well as overall life dissatisfaction (Valois 2004).

In general, physical activity tends to decrease markedly during adolescence (CDC 1997). These losses may be at the expense of increased amounts of “screen time.” Based on 2005 Youth Risk Behavior Surveillance data, 35% of high school students watch 3 or more hours of television per day, and 18% use a computer for non-school-related activities for 3 or more hours per day (Brener 2005).

Adolescent dieting behaviors may pose additional short- and long-term health risks. The CDC (2006) reports that 46% of American high school students tried to lose weight in 2005 (62% of girls and 30% of boys). Researchers have measured significant associations between adolescents’ self-perceptions of being overweight with a number of imprudent weight-loss strategies such as breakfast skipping (Zullig 2006). Based on recent Youth Risk Behavior Surveillance (YRBS) data, Brener et al (2005) report that 10% of high school students fasted for longer than 24 hours during the month prior to the survey in order to lose weight or to keep from getting fat. In addition, 6% reportedly took diet pills, powders, or liquids without a doctor’s advice, and 4% vomited or took laxatives.

### **Irresponsible Sexual Behavior**

Being sexually active poses additional hazards to adolescents. Within a recently-surveyed sample of 580 ethnically diverse 9<sup>th</sup>-graders, 20% reported having engaged in oral sex and 13.5% in vaginal sex (Halpern 2005). Meanwhile, 44% of 15-to-19-year-olds reported having received oral sex in 1988, compared to 50% in 1995 (Gates 2000). Among the reported 34% of American high school students who had “sexual intercourse” in 2005, an average of 63% reported using condoms during their most recent encounter (Eaton

2005). The average was just 59% in Maine (Eaton 2005). Not using or inconsistently using condoms for oral or vaginal sex is among the risk factors for contracting sexually-transmitted diseases (STDs) (Moore 1996). Furthermore, STDs can lead to long-term effects including infertility, liver cancer, or cervical cancer (Institute of Medicine 1997).

Sexual activity among middle school students may be an especially serious health risk. Early sexual activity is positively associated with at-risk sexual behaviors, including inconsistent condom use and increased number of partners (Capaldi 2002). Based on surveys administered in 3 successive years to a cohort of 1,175 students from a small northeastern U.S. city beginning in the 6<sup>th</sup> grade, 11% were sexually active by 6<sup>th</sup> grade and 21% by 8<sup>th</sup> grade (Caminis 2007). Caminis et al also measured significant positive associations between early sexual activity and socio-economic status (SES) risk, substance use, and “violent delinquency.”

### **Lack of Sufficient Sleep**

Insufficient sleep may be another limiting factor for health among many adolescents. In surveys of over 3000 high school students living in rural, suburban, and urban areas, 26% of respondents reported sleeping less than 6.5 hours average on weeknights, with over 40% reporting typically going to bed after 11 o'clock (Wolfson 1998). Those sleeping less were significantly more likely to report daytime sleepiness, depressed mood, and “sleep/wake behavior problems” (Wolfson 1998). Smaldone et al (2007) also associated parent-reported lack of sleep by children and adolescents with frequency of symptoms of depression among both age groups. In multiple studies, researchers have measured significant associations between sleep amounts and cognitive function. Wolfson and Carskadon (1998) found that students earning mostly A and B grades also went to bed significantly earlier and slept 25 minutes longer per night compared to those earning mostly Cs, Ds, or Fs. Likewise, Sadeh et al (2003) found that slight truncation (1 hour) of sleep the previous night significantly impaired daytime cognitive and behavioral function. Other research has focused on links between sleep and body fat. Snell et al (2007) found a significant inverse association between children's sleep amount in 1997 and BMI 6 years later.

## **Smoking, Alcohol, and Drug Use**

Additional prevalent adolescent health behaviors associated with negative health outcomes include cigarette smoking as well as intake of alcohol and other drugs. Based on YRBS data, an average of 17% of high school students reported cigarette smoking during the month prior to the survey (Brener 2005). Meanwhile, 19% of 12-to-20-year-olds reportedly engaged in binge drinking in 2000, and 10% used illicit drugs (Adolescent 2008). In addition to direct effects on body tissues of consuming certain toxic drugs, researchers have associated substance use or abuse with unprotected sex, accidents related to driving while intoxicated, and self-injurious behaviors (Leslie 2008).

## **Levels of Knowledge/Awareness, Beliefs, and Attitudes**

### **Introduction**

Knowledge/awareness, beliefs, and attitudes can be important indirect mediators of behaviors that can in turn influence individual, community, or environmental health. Certain types of knowledge or awareness alone are at times poor predictors of behaviors (Robinson 2002, Jones NR 2006). At other times, they can strongly influence beliefs and attitudes, increasing the likelihood of also influencing behavior. Beliefs include perceived behavioral norms, health benefits and risks, and self-efficacy. Attitudes are defined herein as feelings or emotions related to something, including liking, acceptance, and concerns. These beliefs and attitudes are all variables regularly targeted or assessed in interventions and evaluation research.

### **Food**

Prevalent beliefs and attitudes related to food can help to explain certain poor adolescent nutritional practices. Campbell et al (2008) measured significant correlations between low self-efficacy as well as knowledge with marginal fruit and vegetable intake for five large ethnically diverse groups of adults. In addition, relative liking of such foods may be limited. According to Paul Rozin (1989), liking strongly influences preference, which (assuming availability) in turn strongly influences food choices. Among a group of middle and high school students in Philadelphia, characteristics such as taste, appetizing quality, and familiarity were reportedly the most important in determining lunch food choices (George 2008). Taste was a significantly more important factor compared to all others among both boys and girls. In addition,

Neumark-Sztainer et al (2003) correlated taste preferences with attitudes about health and nutrition in a large sample of middle and high school students in Minnesota. That children and adolescents commonly prefer the taste of energy-dense nutrient-poor foods over others, especially vegetables (Russell 2007), creates challenges for those interested in altering relative intakes.

### **Physical Activity**

Low levels of comprehension about benefits of physical activity, low perceived abilities to engage in healthy behaviors, and negative attitudes toward them all likely contribute to sedentary living among adolescents. In a 2003 survey of 4452 students in grades 6 through 8, 29% were “not sure” of any benefits of physical activity (Zapata 2008). In a 2002 review, Lewis et al (2002) assert that low levels of self-efficacy and physical activity are frequently related, albeit with time point, gender, and outcome variations. Meanwhile, Deforche et al (2003) surveyed a group of mostly female middle school students and measured a significant correlation between overweight or obese status with low levels of physical activity. Students with low participation rates had significantly more negative attitudes about physical activity, including insecurity about their appearance and “not being good at it,” but most of all just “not liking it.” Among a group of 10-to-13-year-old summer sports camp participants, Newton et al (2006) found an “ego-involving climate” to exert negative effects on enjoyment, future expectation of participation, and sport interest. This climate was based on an attitude about success being more about defeating an opponent rather than trying one’s best. Similarly, Vierling et al (2007) significantly correlated lack of “autonomous motivation” with higher BMI as well as relatively low amounts of physical activity and negative attitudes towards it among 237 mostly Hispanic middle school students of low SES.

### **Body Composition, Body Image, and Self-Esteem**

Adolescents’ awareness, perceptions, and attitudes about their bodies can also mediate unhealthy eating behaviors. In a study by Skinner et al (2008), a group of diabetic adolescents (along with their parents) regularly underestimated their overweight status (Skinner 2008). The researchers associated such perceptions with “poorer” diet behaviors than those of normal-weight peers. In other cases, adolescents may have difficulty estimating their weight status or be unaware of associated health risks. While 30% of a group of high school students described themselves as overweight, only 12% were actually in or above the 95<sup>th</sup>

percentile for BMI (Brenner 2005). Despite this overestimation (or likely use of a subjective standard), only 9% perceived their health as “fair” or “poor.” The researchers did not compare those with this perception with those who met the clinical criteria for being overweight to determine the extent of overlap. Meanwhile, other researchers have measured associations between self-esteem and amount of affect for oneself (Harter 1999, McCabe 2003). Self-esteem can be a protective factor against pathological body dissatisfaction, which in turn can precipitate disordered eating behaviors (Fernández 2004). Low self-esteem may also lead adolescents to perceive pressure from either media images or comments made about their or others’ bodies (Ata 2007).

### **Sexual Activity**

Although relatively infrequently assessed by health researchers, adolescent awareness levels, beliefs, and attitudes about sexual activity can mediate other risky behaviors. Among a group of 294 English 16-to-24-year-olds surveyed in 2004, fewer than half knew that STDs could be spread through intimate contact other than intercourse (Jones 2006). Halpern et al (2005) surveyed 580 ethnically diverse 9<sup>th</sup>-graders from California public high schools. The students perceived STD transmission risk as much lower for oral compared to vaginal sex, with 14% and 13% perceiving oral sex as conferring a 0% risk of contracting Chlamydia and AIDS, respectively. They also perceived lower emotional risks (e.g., likelihood of guilt, feeling bad about oneself, or acquiring a bad reputation) for oral compared to vaginal sex. Finally, they perceived a much higher percentage of their peers as having had vaginal (41%) or oral (47%) sex compared to the actual reported rates (13% and 20%, respectively).

Specific attitudes appear to influence sexual behavior directly or through decisions about substance use. Some girls reportedly perceive and prefer fellatio to vaginal sex based on the former affording them control as well as a means to avoid pregnancy or infection risk (Remez 2000). Certain adolescents also reportedly consider oral sex as something other than sex or an activity that can involve someone about whom one is not serious. Meanwhile, among a group of incoming freshmen at a “large middle-south university,” Slicker et al (2004) measured a significant correlation between both low academic aspiration and self-esteem with increased substance abuse, which in turn appeared to exert a positive effect on early initiation of sexual activity.

## **Smoking**

Attitudes related to other adolescent behaviors such as smoking have been the subject of additional investigation. Herbert and Schiaffino (2007) surveyed a group of suburban high school students using the Adolescent Attitudes Toward Smoking Survey (AATSS). One of their findings was that positive attitudes about smoking were significantly associated with the presence of smoking behaviors. In general adolescents and others engaging in hazardous behaviors not limited to smoking may initially focus on fun and exciting prospects rather than weighing the risks (Slovic 2002). Habitual users may also develop a false sense of security by comparing themselves to others with many risk-increasing characteristics (Weinstein 2002). They may further or alternatively focus on their risk-reducing attributes more than their risk-increasing ones (Weinstein 2002).

## **Holistic Health**

In light of findings indicating at-times widespread confusion, misperceptions, and negative attitudes about individual health among adolescents, it is unsurprising that consciousness also appears limited for factors associated with community and environmental health (e.g., local food production) (Bissonnette 2001). For instance, members of modern society tend to view “agriculture as something conducted somewhere else by others” (Bonney 2006). Such perspectives likely discourage consumer behaviors intended to promote health on a large scale.

## **Community Influences on Individual Health**

### **Friends and Family**

Interaction with obese family or friends can also adversely impact individual health. Christakis et al (2007) recently published research using data from the Framingham Heart Study on what they term the “social transmission of obesity.” Among the over 5000 “key subjects” tracked between 1971 and 2003, obesity risk increased 57% for individuals with a friend who became obese during that time. Meanwhile, risk increased 171% for the other if one of two mutual friends became obese. Within families, risk increased 40% for an individual with a sibling who became obese, with the relationship tending to be stronger when

siblings were the same sex. Finally, risk increased 37% across married couples. The authors implicated the spread of obesogenic norms or behaviors as the likely mediator of these risk increases.

Other problematic family conditions can directly or indirectly impact younger members' health in various adverse ways. They are important to acknowledge and account for as factors in the overall adolescent health equation. For example, Michael et al (2007) measured a significant association between exposure to interparental conflict (and the expected resulting stress) with decreased sleep, self-concept, and overall well-being among 17-to-19-year-olds. Meanwhile, in research by Sanchez et al (2007), 11-to-15-year-old girls with a parent who consumed fewer than 5 servings per day of fruits and vegetables were significantly less likely to consume at least 5 themselves.

### **Local Role Models**

Deficient role modeling is another likely contributor to the development and persistence of adolescent behaviors associated with poor health. Behavioral modeling is expected to influence knowledge, beliefs (e.g., about norms), and attitudes. Meanwhile, only 30% of physicians engage in regular physical activity, negating modeling of recommended behaviors for their patients (Gaertner 1991). Observations of health professionals, parents, and teachers engaging in behaviors associated with negative health outcomes are likely to undermine their effectiveness in promoting health. In one recent study, high school students whose mothers smoked perceived maternal anti-smoking messages as significantly less credible compared to peers whose mothers provided similar messages but did not smoke (Herbert 2007).

## **Environmental Influences on Individual Health**

### **Physical Environmental Factors**

As with family factors, adverse environmental conditions can both directly and indirectly promote poor health among people living in them. In an apparent example of direct influence, researchers identified agricultural nitrate pollution as the likely cause of a spate of spontaneous abortions in Indiana among pregnant women drinking from a contaminated water source in the early 1990s (CDC 1996). In epidemiological research conducted in California, McConnell et al (2003) significantly associated NO<sub>2</sub> from car exhaust emissions with increased chronic bronchitic symptoms in young asthmatics. In addition, Lee et

al (2006) measured significant positive associations for several of persistent organic pesticides (POPs) with BMI in the U.S., along with a strong association between serum POP levels and diabetes. Their proposed explanation of these findings was that recent sharp increases in total diabetes cases may relate to the accumulation of POPs in body fat among people regularly exposed to them.

Indirect physical and nonphysical environmental factors can meanwhile promote behaviors likely to lead to negative individual health outcomes. “Crowded roads and hectic intersections” can act as barriers to physical activity by discouraging biking or walking (Brown 2007). In addition, recent reviews of conditions at schools in resource-limited areas indicate fewer physical activity opportunities and “healthy” snack and à la carte items compared to schools in wealthier areas (Sallis 2007).

## **Media**

Depending on levels of recipient savvy, media messages can influence health outcomes indirectly as well, largely by acting on knowledge, beliefs, and attitudes. In a recent review, Powell et al (2007) assert that the balance of such influence appears to be in a direction of promoting unhealthy behaviors. These researchers note the prevalence of strategically-placed television and other advertisements of nutrient-poor foods and video games. Indeed, other researchers have reported significant associations between both general television viewing as well as exposure to television advertisements with low levels of fruit and vegetable consumption (Blanchette 2005).

Media also perpetuates beauty ideals. Susceptibility to influence from exposure to these ideals is likely higher among younger adolescents still in the process of developing critical evaluation skills (Rosenblum 1999). For instance, a group of adolescent girls reported increased body dissatisfaction after viewing TV ads with images of the “thin ideal for women” (Hargreaves 2004). These media-driven ideals can also influence girls’ desires to diet and lose weight (Field 2001).

Media also packages national and international sports celebrities. Their exposure among children and adolescents makes these individuals potentially influential role models. Popular athletes are capable of reaffirming cultural values by representing ideals about masculinity, competitiveness, grace under pressure, or sportsmanship (Lines 2001). Unfortunately, some of these values may run counter to individual health. Celebrity athletes frequently model consumerism through lavish spending and hedonistic behavior

(Lanfranchi 1996). With the media's penchant for scandal and sensationalism, stories about illegal and unethical activities also abound (Lines 2001). Off the field, some have appeared in commercials for "healthy" products like milk or cereal or in public service announcements, the latter sometimes as part of court-imposed punishment for illegal activities (Clayton 2008). In other cases celebrities pitch diet programs. For instance, retired football quarterback Dan Marino has appeared on NutriSystem® TV commercials (Teeple 2008). Other than helping companies' bottom lines, distinguishing the net effects of such mixed messages is difficult.

Non-sports celebrities are also potential sources of health behavior modeling, much of which runs directly counter to health advocates' recommendations. In a survey of 357 high school girls, Vescio et al (2005) found that reported role models commonly came from "entertainment domains." Meanwhile, rumors and reports about stars' eating disorders (Soriano 2004) or alcohol or drug bingeing episodes (Hollywood 2007), along with paparazzi photos and fashion magazine advertisements featuring emaciated bodies, are the norm in TV and print celebrity news.

## **Conclusions**

Rates and trends of diseases such as Type 2 diabetes, overweight and obesity, and behaviors associated with negative health outcomes among adolescents warrant swift and effective action. For such action to have positive effects, program designers, implementers, and proponents must understand the range of limiting factors for and threats to adolescent health. As depicted in Figure 1, research indicates that personal behaviors are critical mediators of outcomes, as are other direct and indirect factors. The latter include personal awareness levels, beliefs, and attitudes about behaviors and health outcomes. Community and environmental factors also powerfully impact primary (e.g., behavioral) or secondary (e.g., attitudinal) mediators of individual health. They can also directly influence health, such as when they produce immediately hazardous conditions. Whether addressing many or few of the variables involved, those interested in improving the state of adolescent health must be able to conceptualize how their efforts fit into the "Big Picture" in order to plan, implement, and evaluate effectively.

(continued)