

Child Obesity and Mental Health: A Complex Interaction



Leigh Small, PhD, RN, CPNP-PC^{a,*}, Alexis Aplasca, MD^b

KEYWORDS

- Childhood obesity • Internalizing • Externalizing • Depression • Anxiety
- Body image • Self-esteem • Weight bias

KEY POINTS

- Both mental health and weight-based challenges are pervasive in America's youth.
- Child obesity and mental health treatment strategies share many common elements.
- A wide variety of intervention strategies is needed to make an impact on the comorbid problems of child obesity and psychosocial disturbances.
- Addressing both mental wellness and obesity from a healthy-lifestyle approach appears to be both feasible and effective and requires interprofessional collaboration.
- Broad-based conceptualization of these issues is necessary for strategically aligned intervention that should occur at the individual, family, organizational, community, and policy levels.

The upsurge in the US national prevalence and incidence rates of childhood obesity (≥ 95 th age- and gender-specific body mass index [BMI] percentile) over the last 3 decades has led to childhood obesity being considered a health epidemic.^{1,2} The increased prevalence of child and adolescent obesity is unfortunately not a uniquely American phenomenon because its effects have been noted in many countries.³⁻⁵ As a result of the increased frequency with which child obesity presents clinically and the focused worldwide attention, associated health conditions have become more evident, one of which is the coexistence of obesity and mental health problems. A survey of the literature dating back to 1995 reveals an increasing number of research publications related to comorbid psychiatric and psychological conditions and

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^a Family and Community Health Nursing Department, Virginia Commonwealth University School of Nursing, 1100 East Leigh Street, PO Box 980567, Richmond, VA 23298, USA;

^b Pediatrics and Psychiatry, Children's Hospital of Richmond/Virginia Treatment Center for Children, Virginia Commonwealth University School of Medicine, 515 North 10th Street, Richmond, VA 23298, USA

* Corresponding author.

E-mail address: LSmall2@VCU.edu

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childhood obesity. Much of the research has focused on the temporal connection of obesity and mental health problems in children as well as developing and rigorously testing interventions that are both developmentally informed and condition-specific.

The mental health aspects of obesity are broad with respect to specific psychiatric diagnoses and the psychological and psychosocial effects and include body image disturbances, low self-esteem, social stigma/impaired social relationships, weight-based victimization, low health-related quality of life, depressive symptoms, risk for disordered eating (binge eating, loss of control eating, eating in the absence of hunger), high levels of anxiety and internalizing (depression and anxiety), and externalizing behavioral problems (hyperactivity and aggressiveness).^{6–10}

PREDICTORS OF LATER LIFE OBESITY

The predictive relationship of obesity and psychosocial disturbances and vice versa has been widely disputed in the research literature, although several psychological variables have been found to significantly predict later obesity or a worsening of obesity in children. For example, studies have independently identified internalizing (ie, depression) and externalizing (ie, hyperactivity, aggression) behaviors at ages 5 and 8 years, respectively, as predictors of obesity in older teens and young adults (18–23 years)^{11,12} and later adulthood (30 and 34 years).¹³ A secondary data analysis of the large British Cohort Study dataset replicated these findings.¹⁴ In this study, teacher- and parent-reported child psychological functioning at 5 and 10 years of age was tested as predictors of obesity at 30 and 34 years of age. The findings suggest childhood hyperactivity and inattention place a person at increased risk for obesity later in life.¹⁴

Several researchers have investigated the predictive association of depression to later obesity.¹³ Many study findings support the hypothesis that depression is an independent predictor of obesity^{15,16}; however, this finding has been disputed by other researchers recently.^{17,18} Thus, it appears that the predictive contribution of depression (an internalizing behavior) in early childhood to later life obesity is yet unclear; however, young child externalizing behaviors (eg, hyperactivity, aggressiveness, and inattentiveness) seem to have predictive relevance.

CHILDHOOD OBESITY AS A PREDICTOR OF IMPAIRED PSYCHOSOCIAL HEALTH

Impairment in psychosocial functioning is much broader in scope than psychiatric impairment. Despite not meeting the threshold for specific psychiatric diagnoses, psychological consequences of child obesity are significant. Negative self-body image, bullying and weight-biased peer interactions, negative school experiences, medical comorbidities, aberrant or promiscuous sexual behavior, substance abuse, and other negative health-related behaviors disrupt the psychosocial development of a child.

Childhood obesity is associated with behavior problems when girls start school. At this early age, there already appears to be gender differences because obese boys are not similarly affected.⁶ In contrast to some commonly held beliefs, excess body weight status in early childhood does not predict the onset of new internalizing or externalizing behavior problems during the first 2 years of school.¹⁹ However, as children mature and experience increased peer and adult interactions, perception of their personal weight status and the reaction to their weight status influence their self-perceptions. Wang and colleagues²⁰ conducted a cross-sectional secondary data analysis, which found that obesity in 10- and 11-year-old children independently predicted self-esteem 2 and 4 years later with obese children significantly more likely than

normal-weight children to report low self-esteem 4 years later (odds ratio = 1.82; 95% confidence interval: 1.01–3.78).

A child's development of self-image and self-perception is difficult to study. Collectively, the studies of young obese children aged 5 to 13 years raise the following questions:

- a. Do very young children have a limited perception of their own weight status in relation to the weight of other similarly aged children?
- b. Do young children have limited insight regarding how one's weight status may influence the attitudes and behaviors of others (peers and adults)?
- c. Do young children have the ability for abstract thinking to self-reflect or have a self-perception related to their weight and articulate this to others?; or
- d. Do researchers have the capability to measure these complex variables across children in this age range?

Whether the collective research findings appropriately represent the development of psychosocial sequelae obese children experience over time or if there is inherent measurement error related to young children's limited abilities to express complex thoughts (ie, self-esteem, body image), it should be noted that many of these studies are cross-sectional in design or are secondary analyses of existing datasets. Overall, there is a low level of evidence on the subject.

Children who are larger than average have been found to be at elevated risk for interpersonal and intrapersonal problems.^{16,21} The research team of Cui et al²² reported that BMI significantly predicted lower health-related quality of life, a finding confirmed by other researchers,^{23–26} particularly in the case of prepubertal children and those in early adolescence. Obesity in preadolescent youth has been found to be predictive of bullying or weight-based victimization.^{27,28} Although victimization is not a psychological sequelae of obesity per se, it is associated with many psychological consequences.

The developmental stage of adolescence is associated with increased risk-taking behavior, impulsivity, and other environmental factors, coinciding with the top 3 causes of teen death in the United States, which are consistently reported to be accidents, homicide, and suicide. The Youth Risk Behavior Survey conducted by the US Centers of Disease Control and Prevention provides epidemiologic data regarding high school-aged children throughout the country, reporting on several known high-risk behaviors, such as substance use, sexual activity, and suicidality.²⁹ These high-risk behaviors have also been extrapolated to predict maladaptive health behaviors, such as those linked with obesity and other medical and psychiatric conditions in adulthood.

Studies looking at the developmental trajectory of obese adolescents have suggested an increased likelihood of repeating a grade and less expectation of going to college. Loneliness, increased peer pressure to use substances, engagement in delinquent activities, low quality of life, and higher age at dating initiation have also been reported.³⁰ Increased rates of completed suicide in obese adolescents appear to occur at similar rates to their age-matched normal-weight peers,³¹ although being obese or extremely obese has been associated with engagement in suicidal ideation and behavior.³² Chronic suicidal thoughts and behaviors are risk factors for future completed suicide, but studies drawing this conclusion in obese children are not yet available.

Childhood obesity is linked with several chronic physical health conditions, such as metabolic syndrome, type 2 diabetes, hypertension, dyslipidemia, disordered sleep, and orthopedic problems.^{2,5,6,33} Although studies have shown a relationship between

psychosocial distress in young people with obesity, those who experience obesity-related physical health conditions have additional risk factors for the development of psychopathology due in part to disease chronicity. Understanding these associations is an important public health issue, as higher rates of psychiatric diagnoses are associated with poorer adherence to medical treatment of both psychiatric and physical health problems.³⁴

The interrelationships that exist between child obesity and psychosocial disturbances are complex and appear to differ by child age; however, the importance of recognizing the psychosocial risks that obese children of all ages face has important implications. In a retrospective study by Janicke and colleagues,³⁵ one-third of children and adolescents with an obesity-related health condition had a comorbid internalizing or externalizing disorder, compared with the 1 in 5 children in the general population. These and similar findings underscore the need to treat a child's obesity to reduce risk for other physical health sequelae, to regularly conduct screenings for psychosocial and mental health difficulties, and initiate interventions that address all aspects early on as a comprehensive approach to treatment.

PSYCHIATRIC COMORBIDITIES OF OBESITY

Psychiatric comorbidity related to obesity includes a range of mood, anxiety, substance use, somatoform, and eating disorders (EDs). In a study by Britz and colleagues³⁶ of obese adolescents seeking treatment of weight management, greater than 40% of the study population met Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) criteria for a psychiatric illness. Elevated lifetime rates for mood (42.6%), anxiety (40.4%), substance use (36.2%), somatoform (14.9%), and EDs (17.0%) were reported compared with the general population. These elevated rates of psychopathology are similar to studies of adults, suggesting that mental health conditions presenting in childhood have augmenting effects on obesity.

Of the psychiatric conditions related to obesity, the most consistently reported association is that between depression and obesity. Weight gain, disordered eating, overweight, and obesity frequently occur in the context of mood disorders. Studies reflect the bidirectional relationship between obesity and depression without conclusive evidence of a causal relationship. Multiple factors, including iatrogenic causes such as psychotropic medications used to treat medical conditions, may induce mood symptoms.³⁷ Psychiatric illness and obesity have been established to be polygenic, heterogeneous conditions, impacted by factors such as family and social history, and environment. Prospective studies suggest that the onset of mood disorders may precede the development of overweight or obesity, perhaps in those individuals who are genetically predisposed.³⁸ It is important to note that most individuals who are obese or overweight do not have a mood disorder, but certain mood disorders, particularly atypical major depression, can be associated with weight gain and/or obesity.³⁸

EDs have been specifically studied in relation to obesity, and the DSM-V changes in ED diagnoses aims to be more inclusive of the clinically relevant range of disordered eating. Weight preoccupation, binge eating, dieting, and purging are all weight-related problems that may co-occur or are behaviors that individuals transition between leading to EDs.³⁹ Recent research has demonstrated a significant association between the prevalence of EDs and weight status using criteria from the DSM-V. For example, prevalence of full or subthreshold bulimia nervosa increased from the normal-weight to the obese group, with an increased risk of 7.86 in men and 3.27 in women.⁴⁰ Contrary to what has been hypothesized and reported in adults,⁴¹ binge eating disorder

(BED) is often associated with obesity, but no associations have been found between BED and particular BMI categories as of yet.^{37,40}

COMBINED PREVENTION AND TREATMENT STRATEGIES

Continued investigations and discussions regarding the cause or consequence of obesity and mental health difficulties in children highlight the question of whether these problems are behavioral or psychiatric in origin. Although the origins of the combined health challenges may point to the provider type or treatment strategy best suited to manage the problem, another suggestion may be that these comorbid health difficulties are so interconnected and recalcitrant that a variety of treatment strategies is needed to effectively address both issues.

Approaches found to have the greatest impact in child overweight and obesity treatment include individual-level interventions that are multifaceted, which include motivational interviewing, effective problem-solving, and aspects of cognitive-behavior approaches.^{8,33,42} The health effects of lifestyle modification approaches have been found to be sustained for longer periods of time,⁴³ and thus, it is recommended that overweight and obesity interventions with children emphasize a healthy lifestyle strategy over restrictive dieting or excessive physical activity. This approach places emphasis on health rather than weight or physical appearance.

Specific guidelines for treatment of childhood overweight and obesity have been outlined by the American Academy of Pediatrics⁴⁴ in which brief motivational interviewing strategies were included. Recommendations for a comprehensive review of systems include gaining information about psychiatric disorders (eg, anxiety, school avoidance, social isolation); this revision to the 1998 recommendations includes a significant focus on behavioral change strategies. Treatment interventions to improve child psychosocial health include a wide range of therapies, which are similar to the healthy lifestyle approach demonstrated to be effective with child obesity. These individualized treatment strategies often focus on a strengths-based approach such as promoting resilience and can be used as a treatment or a prevention strategy.

Multiple systematic reviews have been conducted with respect to child obesity in an effort to identify the most effective intervention elements.^{45–52} Family involvement is frequently cited as a critical component to effective intervention. Similarly, approaches designed to enhance child psychosocial function and emotional wellness include family-focused intervention strategies. Although the need to include family seems essential and apparent when working with children, this represents a broader treatment strategy that shifts the perspective of addressing obesity and psychosocial wellness from an individual level concept to a more relational understanding of well-being embedded in a social-ecological framework. To date, limited intervention trials grounded by such a comprehensive framework have been conducted.^{53–55}

A PARADIGM SHIFT FROM TREATMENT TO PREVENTION

Obesity is the result of people responding normally to the obesogenic environments they live in.³ Environmental determinants of childhood obesity in the United States include modifications in food consumption, physical activity, screen time, and direct marketing of food to children.⁵⁶ Although implementation strategies exist for the adult population, prevention and early intervention strategies differ for children because the environment greatly influences children's food or activity choices. As a result, there is more opportunity for prevention efforts at a variety of different levels (ie, school, child-care, community, state and national policies). Behaviors that lead to obesity can be

more easily modified in childhood and facilitated by environmental modifications (ie, safe areas for recreation, walking).

In an effort to accelerate the national progress to prevent and address childhood obesity, an Institute of Medicine committee published a set of recommendations in 2012.⁵⁷ This groundbreaking publication took a systems approach to the problem and outlined a comprehensive and integrated public health approach to preventing child obesity. The strategies outlined include health messaging and policy approaches in communities where children live and play. This community-based, whole-system approach to the obesity epidemic uses social change strategies and features 10 primary elements: (1) recognition of the public health problem, (2) capacity building around the health problem, (3) local creativity in intervention development, (4) strong relationships between organizations and with community, (5) wide-ranging and rich community engagement, (6) clear communications between community members and organizations, (7) embeddedness of action and policies for social/environmental change, (8) focus on robustness and sustainability of interventions, (9) facilitative leadership, and (10) articulated methods for outcome monitoring and evaluation. Such population-wide efforts are focused on strategies with a strong evidence base to achieve maximal impact in the environment and communities.

Single behavioral interventions, although effective strategies to improve individual wellness and reduce risk of comorbidities, are unlikely to have a substantial impact on the population health of our nation's children; therefore, a population focus is needed to address obesity.^{58–60} There are several examples of effective community-based obesity prevention interventions with a public health focus that can be found in *Local Government Actions to Prevent Childhood Obesity* authored by the Institute of Medicine and National Research Council of the National Academies.⁶¹ Identified studies include *Shape up Summerville* by Economos and colleagues^{62,63}; *The Early Childhood Obesity Prevention Program (ECHO)* by Cloutier and colleagues⁵³; and the *Health Eating and Active Communities Program (HEAC)*.^{64,65} These and similar community-based, multilevel studies focus on evaluating the effects of multilevel approaches on the weight and health of child residents but do not consistently evaluate the intervention effects on the mental wellness of its child constituents.

The more conceptual and broad approaches to addressing child and adolescent obesity have been described in the literature ([Table 1](#)), each having their own strengths and limitations. High upfront costs have limited the universality of implementing prevention programs.⁶⁶ Sustained outcomes are an additional challenge particularly pertaining to obesity. However, when looking at prevention interventions for mental health, the converse is true. Although there are high upfront costs, the effects of interventions in mental health are often not recognized immediately, resulting in similar challenges of sustainability; stakeholders must recognize that effectiveness of interventions will only be realized in the long term and may be why there is a paucity of research that includes public health approaches to promote child mental wellness.

An example of a public health prevention intervention with impact on both mental wellness and obesity would include breast-feeding. Breast-feeding has been shown to have health benefits for children at risk for childhood obesity.⁶⁷ In addition, child development and mental health are impacted as a result of breast-feeding, including higher IQ and promotion of attachment and bonding, again with longitudinal benefits.⁶⁸ Thus, national campaigns that encourage breast-feeding, programs that support the initiation of breast-feeding (ie, the Baby Friendly Hospital designation), and policy changes aimed to reduce social stigma that may dissuade mothers from breast-feeding (ie, elimination of national and state policies that forbid or restrict public

Table 1**Approach to prevention in child and adolescent obesity**

Approach	Description	Examples	Strengths	Limitations
Clinical	Screening of at-risk individuals and applying evidence-based treatment intervention to reduce burden of disease	Identification of children with BMI percentiles in the overweight/obese range to provide targeted intervention	Application of evidence-based treatment for a target population	High-cost, time-limited benefit (except for bariatric surgery)
Public health	Health promotion strategies	School-based health programs; implementation of policies protecting children from direct food marketing	Prevention-based, minimizing number of children developing obesity	High upfront cost with long-term benefits, which are not immediately seen and may have varied results
"Free" market	Individual choices are emphasized with limited governmental intervention based on a well-informed consumer	Market shifts to provide better options based on parent/child demand for healthier choices	Individuals satisfy their own preferences	Overconsumption profits are too great and drive the overall economy
Human rights	Based on the Convention of the Rights of a Child (World Health Organization) for basic rights to adequate food and health; society is responsible to provide these to children	Societies assume responsibility to provide a healthy environment and food to children	Obesity would be greatly reduced if this was universally accepted	Ideal framework but implementation is challenging at the societal level
Risks/benefits	Balance the health risks associated with the economic profitability of promoting high-energy foods and sedentary lifestyle	Profit margins on obesogenic products are limited due to marketing restrictions based on known risks in promoting obesity	Increased transparency with risk analysis of consumer marketing impacting obesity	Controversial outcomes; least effective strategy to minimize childhood obesity as they have limited means to make changes to the market

Data from Swinburn B. Obesity prevention in children and adolescents. Child Adolesc Psychiatric Clin 2008;18(1):209–23.

breast-feeding) have been found to be an important element of a comprehensive approach to addressing child obesity and mental wellness.

There are several psychosocial factors contributing to the obesity epidemic. It is reported that today's children are engaged in screen time activities an average of 7 hours a day.⁶⁹ The American Academy of Pediatrics recommends that screen time be limited to 2 hours per day. Without addressing media content, the overall lack of physical activity and sensory stimulation related to excess screen time has been shown to lead to attention problems, school difficulties, sleep disorders, EDs, and obesity.⁷⁰ The advertisements of unhealthy dietary options that proliferate TV programming and target children and adolescent viewers additionally should be targeted as a public health issue.

The pressing need to decrease screen time for children and adolescents is being addressed in multiple ways. Many afterschool care organizations and childcare organizations have enacted rules that limit the use and availability of screen time for the children in their care. In addition, many organizations are increasing and/or strengthening the type and number of non-screen-time activities and programs available for all children to participate in. In some instances, unique funding sources have been sought (ie, angel donor programs, insurance company support) to make safe supervised recreational activities available for children at high risk for obesity. Increasing the availability of safe, adult-supervised, physical and recreational activities impacts the mental wellness of children as well.

Evidence on the mental health benefits of exercise in children and adolescents is increasing. A study by Pontifex and colleagues⁷¹ assessed the effect of exercise in children with attention deficit hyperactivity disorder. In this study, children 8 to 10 years of age showed greater accuracy on attention control tasks and academic performance. Studies looking at the impact of exercise on adolescent depression have noted that youth who engage in 60 minutes of physical activity per day are less likely to have depressive symptoms.⁷² There is a growing body of evidence regarding the long-term benefits of children engaged in physical and recreational activities. Multi-level intervention strategies need to be supported and promoted by the systems surrounding children because their influence helps to provide safe environments and allows youth to explore active opportunities.

SUMMARY AND DISCUSSION: THE FUTURE OF CHILD MENTAL AND PHYSICAL HEALTH RESEARCH AND PRACTICE EFFORTS

Epigenetic Influences

Not only the scope and level of intervention strategies should be considered when addressing obesity and mental wellness, but also understanding the generational impact of this dyadic health challenge is a focus of some contemporary investigations. Just as genetic and familial linkages have been implicated with regard to obesity and mental health issues,⁷³⁻⁷⁵ the relationships between potential epigenetic changes, toxic stress, and allostatic load as a result of obesity, chronic inflammation, chronic stress, and comorbid psychosocial challenges within and across generations are being explored.⁷⁶⁻⁷⁹

The overlap of epigenetic factors contributing to both obesity and mental disorders (ie, chronic toxic stress) is pronounced, and prevention strategies for either can have dual influence. Looking at these common epigenetic factors, parallels are sought to implement single strategic interventions using a socioecological approach (Table 2). For child health, these efforts have a common root starting in infancy, and promotion of health should be emphasized rather than dichotomizing physical and mental health. Examples of factors that contribute to these successes include prenatal care, healthy

Table 2
Parallels in the socioecological approach to prevention in childhood obesity and mental health disorders in consideration of common epigenetic influences

Socioecological Aspect	Obesity	Influences	Mental Health
Individual	<ul style="list-style-type: none"> • Encourage behavioral activation • Promote healthy lifestyle decision-making over appearance focus • Include problem-solving 	<ul style="list-style-type: none"> • Gender • Physical activity • Self-esteem • Emotional/cognitive maturity • Physical health 	<ul style="list-style-type: none"> • Promotion of resilience • Enhance individual skills • Encourage academic achievement • Assessment of genetic risk factors • Minimize/avoid substance use
Family	<ul style="list-style-type: none"> • Provide parenting coaching/education about health • Encourage health promotion/prevention for families • Encourage role modeling healthy behaviors • Establish clear boundaries regarding family eating and screen time rules 	<ul style="list-style-type: none"> • Breast-feeding • Attachment/bonding • Maternal depression • Caregiver education • Abuse/neglect • Economic security • Family physical or mental illness 	<ul style="list-style-type: none"> • Address caregiver wellness • Promote family strengths • Implement evidence-based parenting programs • Use home visiting programs to improve pregnancy outcomes and reduce abuse and neglect
Community	<ul style="list-style-type: none"> • Advocate for school nutritional and physical activity programs • Provide safe environments to promote outdoor activity • Discourage weight-based victimization and bullying 	<ul style="list-style-type: none"> • Exposure to violence • Access to health care • School environment • Public safety • Access to health-promoting activities 	<ul style="list-style-type: none"> • Provide safe environment to decrease community violence • Implement policies for school bullying/peer victimization • Increase school mental health services • Increase equitable access to health care
Societal	<ul style="list-style-type: none"> • Implement restrictions on direct marketing to children • Strengthen healthy nutrition policies • Enhance and encourage built environment initiatives • Discourage political barriers to health promoting behaviors • Strengthen health-promoting food and beverage retailing and distribution policies • Support federal programs that support healthy nutrition 	<ul style="list-style-type: none"> • Policy/legislation • Adherence to health standards • Stigma • Discrimination • Allocation of resources • Research-driven initiatives 	<ul style="list-style-type: none"> • Advocate for equal access to various levels of mental health care • Minimize societal stigma through public education • Allocate resources for childhood mental health prevention • Implement standards for mental health support for children in foster care • Establish parity between medical and mental health needs

Adapted from National Research Council (US), Institute of Medicine (US) Committee on the Prevention of Mental Disorders and Substance Abuse Among Children, Youth, and Young Adults: Research Advances and Promising Interventions, O'Connell ME, Boat T, editors. Preventing mental, emotional, and behavioral disorder among young people: progress and possibilities. Washington DC: National Academies Press; 2009.

birth weight, breast-feeding, positive parent management training, home visitation, school interventions, universal screening, routine well child visits to primary care, and anticipatory guidance.⁸⁰ These factors are specific examples of the basic elements of health care that include prevention, acute care, and chronic care management.⁸¹

Combined Mental and Physical Health Implementation Investigations

As described herein, there is a large and continuously growing foundation of rigorously conducted research that provides the evidence to guide clinical practice regarding the treatment and prevention of obesity and comorbid psychosocial problems. Rigorous research is characterized by a high level of controlled conditions that do not generalize into real-world settings and may result in variable health outcomes in the general population. In addition, there is limited research addressing both aspects of health that has been conducted within community settings, the places where children and families live, work, and play. However, intervention at a community level is more likely to impact the many issues that cause the tightly interconnected coexistence of childhood obesity and psychosocial morbidity.

Implementation research with communities of individuals at high risk is needed to test these recalcitrant health threats. Given the interconnectedness of psychosocial impairments, psychiatric conditions, and obesity in children, a public health approach to preventing and addressing the predictors, comorbidities, and/or sequelae of child obesity with a focus on health and wellness may be an important strategy to embrace. Most effective and innovative strategies to address obesity prevention would require the participation of interprofessional teams of policymakers, health care providers, and organizations that provide care, education, and supervision of children, teens, and families (ie, schools, childcare centers, community centers).

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