



Clinical considerations in the management of obesity in children and adolescents

Whitney Herring^a, Carina Kugelmas^b, Evan P. Nadler^c, Marsha Novick^d, Melissa Santos^e, Rachana Shah^f, Gitanjali Srivastava^{g,*}, Stephanie Walsh^c

^a Mississippi Center for Advanced Medicine, 7730 Old Canton Road Building A, Madison, MS, 39110, USA

^b Denver Health, 501 28th Street, Denver, CO, 80205, USA

^c ProCare Consultants, District of Columbia, Washington, USA

^d Weight Management & Wellness Online, Harrisburg, PA, USA

^e Connecticut Children's, 282 Washington Street, Hartford, CT 06106, USA

^f Children's Hospital of Philadelphia, 3401 Civic Center Boulevard, Philadelphia, PA 19104, USA

^g Vanderbilt University Medical Center, 719 Thompson Lane Suite 22200, Nashville, TN, 37232, USA

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ABSTRACT

Background: Obesity is a complex, chronic disease affecting more than one-fifth of adolescent children aged 12–19 years in the United States. Recent guidelines have recommended optimization of diagnosis and treatment approaches to help improve the immediate and long-term health of people with obesity.

Methods: Here, we describe the insights and recommendations of 9 nationally recognized experts in pediatric obesity, summarized from a virtual advisory board discussion.

Results: Advisors described their background, experiences, and patient populations, conveyed the journey experienced by many pediatric patients with obesity, discussed the recent landscape for pharmacotherapy in adolescents, and provided their perspectives on updated American Academy of Pediatrics Clinical Practice Guidelines.

Conclusion: Overall, the advisors agreed that the key to addressing the growing prevalence of obesity in children and adolescents depends on increased education in the medical field and community-wide initiatives to promote early intervention. Collaboration among all parties (e.g., physicians, policymakers, insurance companies, academic institutions, and researchers) to address barriers to treatment and reduce the social stigma surrounding obesity is also essential.

1. Introduction

Obesity is a chronic disease that results in an increase in cardiometabolic risk factors and, for children and adolescents, an increased risk of obesity in adulthood [1–4]. The prevalence of obesity in US adolescents, aged 12–19 years, was estimated to exceed 21 % in 2017–2018 [5]. The etiology of obesity in children and adolescents is complex and multifactorial, with underlying biological predisposition [6] and socioeconomic, behavioral, and geographic factors [7–9]. Risk of childhood obesity is associated with racial or ethnic identity [10] and social drivers of health, which can be understood as part of an obesogenic environment [11].

The American Academy of Pediatrics (AAP) Clinical Practice

Guidelines for the evaluation and treatment of children and adolescents with obesity highlight the need to address the growing prevalence of obesity in pediatric patients through optimization of evaluation and treatment practices [11]. Barriers to the care of pediatric patients with obesity have made addressing unmet needs difficult [12,13]. Clinicians experience many challenges, including weight bias and stigma against patients and their families by payers leading to poor insurance coverage and limited access to treatment, and knowledge gaps related to obesity and its treatment options [12,13].

In addition to these known barriers to care, limitations in utilization of treatment for adult patients with obesity highlight the difficulties that pediatric patients may also face. Data from US electronic health records from 2010 to 2019 show that of nearly 11.2 million adults with obesity,

* Corresponding author. Vanderbilt University Medical Center, 719 Thompson Lane Suite 22200, Nashville, TN, 37232, USA.

E-mail address: gitanjali.srivastava@vumc.org (G. Srivastava).

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only 2.4 % were prescribed an antiobesity medication (AOM) [14]. The utilization of bariatric surgery in eligible US adults in 2018 was ~0.6 % [15], while a study of adolescent patients with class II/III obesity found that ~0.2 % received bariatric surgery between 2015 and 2018 [16].

To address these unmet needs, nationally recognized specialists with expertise in pediatric obesity convened for a virtual advisory board (VAB). Their goal was to describe their experiences and perspectives on the care of children and adolescents with obesity. In developing this publication, the authors aimed to summarize their perspectives in order to provide guidance to clinicians and improve the care of children and adolescents with obesity.

2. Methods

Nine nationally recognized experts (advisors) in the field of pediatric obesity were selected based on their professional qualifications. Most advisors were either ABOM certified (n = 5) or received formal training in the management of obesity (n = 3). The advisors had between 6 and 22 years of experience working with children and/or adolescents with obesity. Of the 9 advisors, 7 (78 %) were female and 2 (22 %) were male. The age range of the advisors at the time of the VAB was 41–56 years.

The advisors were asked questions regarding the patient journey and experiences of children and adolescents with obesity. The asynchronous, virtual discussion was conducted over 2 weeks, beginning in April 2023. Three moderators were designated by the funding sponsor. The virtual discussion was conducted through a messaging platform and all components of the discussion were saved. In compliance with patient privacy laws, no identifying patient information was used during this discussion.

The objectives of this VAB were: 1) To provide insights into the patient journey – from the initial health care visit to the initiation and intensification of treatment – and explore the clinician’s perspective on treatment in this population, considering guidelines, personal philosophy, and clinical practice. 2) To share real-world experiences of children and adolescents with obesity from the clinician’s viewpoint.

The advisors answered questions grouped by key insight topic (KIT). The moderators asked follow-up questions when necessary. Questions often included multiple parts, and advisors were not obligated to respond to all components.

3. Results

3.1. KIT 1: advisor background and experience

1. Describe your clinical practice setting and patient population.

At the time of the VAB, 7 advisors practiced in multidisciplinary weight management centers, 4 of which focus on the care of pediatric patients (Table 1). One advisor, a pediatric surgeon, worked in an academic tertiary care children’s hospital and co-directed the multidisciplinary weight management program. Another worked in a private practice in a single-specialty pediatric organization. Most advisors (n = 6) noted that their patients continued to utilize a primary care practitioner (PCP) for wellness visits.

Most advisors (n = 7) worked with children and adolescents, aged 2–21 years. Some advisors (n = 5) indicated they had no minimum age requirement and/or worked with patients into adulthood. Some advisors (n = 5) indicated that most of their patients self-identify as Black. One advisor indicated that most of their patients were Hispanic, 2 indicated that most of their patients were non-Hispanic White, and one advisor did not answer the question. Four advisors noted that a significant majority (≥60 %) of their patient population was female. Seven advisors indicated that most of their patients had Medicaid and 1 advisor reported that most of their patients had commercial insurance.

Most advisors (n = 5) indicated that their patients were most commonly diagnosed as having the disease of Class 1 or Class 2/3 obesity. Other common diagnoses included prediabetes (n = 4), type 2 diabetes (n = 2), dyslipidemia (n = 2), obstructive sleep apnea (n = 3), metabolic dysfunction-associated steatotic liver disease (n = 3), polycystic ovary syndrome (n = 2), mental health disorders (n = 2), and attention-deficit hyperactivity disorder (n = 1). Two advisors indicated working with children with special health needs, developmental disabilities, and rare disorders.

2. Do you consider yourself a primary care provider or a specialist? What are the rewards and challenges of that role?

Most advisors (n = 8) indicated that they consider themselves to be specialists in pediatric obesity; one advisor considered himself to be a primary care pediatrician rather than a specialist, as his propensity to

Table 1
KIT 1: advisor background and experience.

Topic	Summary of advisor responses
Advisor background and experience summary	Specialize in pediatric obesity Characteristics of the advisor’s patient populations <ul style="list-style-type: none">• Aged 2–21 years• Primarily Black or Hispanic• Primarily using Medicaid insurance Advisor description of roles: <ul style="list-style-type: none">• Rewarding• Challenging• Advocates, educators, and reformers
Advisor definition of obesity	Complex, chronic medical disease characterized by excess adiposity; influenced by genetic, epigenetic, socioeconomic, and environmental factors Growth charts for diagnosis and risk assessment: <ul style="list-style-type: none">• BMI >95th percentile• Used to determine the suitability of certain treatments and monitor weight trajectories• Some flexibility for younger age groups
Concerns with excess weight	BMI can be limiting; it is not a direct measurement of excess adiposity Mental health or mental illness (as a cause, effect, or exacerbating factor) <ul style="list-style-type: none">• Referrals made to psychiatrists for ORC medication management• Need for greater education/intervention regarding body dysmorphic disorder Rapid weight gain or BMI trajectory Metabolic complications Limitations to activity

BMI, body mass index; KIT, key insight topic; ORC, obesity-related comorbidity.

treat pediatric patients with obesity is due to the lack of specialists in his area.

The advisors described poor insurance coverage for obesity treatments and lack of financial support for pediatric care by both hospital systems and insurance companies as challenges they face. The barriers to care that children and adolescents with obesity face may further impact the clinician (see KIT 2). The advisors described the fulfillment of working in the context of a multidisciplinary team to improve the lives of patients and described their roles – advocates, educators, reformers, and transformers – as the most rewarding aspect of their position.

3. How do you define obesity?

Advisors described obesity as a complex, chronic disease characterized by excess adiposity and influenced by genetic, epigenetic, socioeconomic, and environmental factors, which aligns with the AAP Clinical Practice Guidelines [11]. Regarding diagnosis, advisors suggested that it is important to consider not only anthropometrics, but also other clinical components (e.g., quality of life, psychosocial effects of excess weight), and mental and physical comorbidities. BMI is an imperfect tool in assessing obesity. Many patients, such as those of Asian descent, demonstrate obesity-related comorbidities (ORCs) before reaching a BMI ≥95th percentile [17–19]. When discussing concerns related to obesity with pediatric patients and their families, advisors recommended focusing on teaching healthy habits and conveying how choices can affect the health of the patient, rather than focusing on BMI or weight.

4. What factors cause concern about a patient’s excess weight?

Advisors listed several causes for concern, including rapid or sustained ongoing weight gain, the development of ORCs, a family history of obesity or its related comorbidities, or a history of trauma or mental illness, or more generally, when the patient’s weight gain is adversely impacting their physical or mental health. However, the advisors noted that for a health care provider to act on their concerns, they must first confirm that the patient and family are ready for change. In the advisors’ experience, negative social drivers of health and adverse childhood experiences are also likely to have an impact on the treatment of obesity. These factors reinforce the need for holistic treatment, either through a multidisciplinary team or through referrals to experts that can address the patient’s needs. Notably, fear of treatment or mistrust of the care team can lead to difficulties enacting a care plan. Advisors suggested that education and the use of motivational interviewing with patients and families can be integral in building trust.

Advisors additionally noted that the development of mental health conditions is often related to weight trajectory, either as contributory to weight gain or in response to it. Susceptibility to weight gain can be related to medication use (e.g., antipsychotics or antidepressants), and must be considered when assessing a patient’s health.

3.2. KIT 2: the adolescent patient journey

5. Describe how obesity in adolescents is managed within your health system.

Advisors relayed that this process may vary, and PCPs are primarily responsible for conducting initial weight assessments and ordering blood tests (Table 2). Patients in need of treatment are provided dietary and/or exercise recommendations. If the patient continues to gain weight, the PCP will refer them to a weight management program.

For most advisors, PCP referrals account for 60%–70 % of all referrals. Alternatively, specialists who treat children and adolescents for ORCs may refer patients to weight management programs. Most advisors agreed that few patients are self-referred; however, one advisor (the pediatric surgeon) often had self-referred patients.

Table 2
KIT 2: the adolescent patient journey.

Topic	Summary of advisor responses
Management of obesity in adolescents	Patients often referred to weight management programs from PCPs Multidisciplinary teams: pediatricians, endocrinologists, family physicians, nurse practitioners, physician assistants, advanced practice clinicians, dietitians, health coaches, exercise physiologists, psychologists, social workers, and behavioral health providers
Management goals	Holistic health improvement Behavior modification: nutrition, activity, sleep, screen time, social interactions, mental health Quality of life improvement: self-confidence, self-esteem, empowering self-care Reduction of complications Weight stabilization or weight loss depending on syndromic or genetic obesity considerations and other factors Helping kids understand the chronicity of their disease: <ul style="list-style-type: none">•Treatment and prevention habits should become innate, “like brushing your teeth”•Conveying that they will always have increased susceptibility to weight gain Promotion and empowerment of family-centered care Physician and patient goal alignment
Programs for patients	Collaborations with organizations to promote health and wellness: <ul style="list-style-type: none">•Family-centered gyms•Insurance programs•Weight management companies•Medical clinics (bariatric surgery program, lifestyle, or weight management program)
Management challenges	Barriers to the management of obesity in adolescents: <ul style="list-style-type: none">•Social drivers of health•Limited resources•Lack of insurance coverage•Lack of public health investment•Continued stigma and bias•Independent adolescent decision-making Need for collaboration, advocacy, team-based approaching, and education to overcome barriers
Family involvement	Involvement of the family is key to successful change
Patient factors influencing approach to treatment	No specific treatment approaches based on sex or gender identity, but these may impact patient goals or be a source of trauma
Transition care	Starting age ranges from 18 to 22 years

KIT, key insight topic; PCP, primary care practitioner.

6. What are your goals for obesity management in adolescents?

Advisors agreed that the primary goal is to improve health in a manner that aligns with the goals of the patient and family. The advisors acknowledged that health improvement differs for every patient but may be related to preventing or improving ORCs, teaching lifelong tools for healthy living, improving mental health, and reducing the stigma surrounding obesity.

7. What are key challenges of obesity management in adolescents?

Negative social drivers of health may limit access to nutritious food and exercise resources. Poor insurance coverage (which may also be related to weight bias in the payer system) can limit access to treatment options. Stigma and bias regarding obesity care, which is pervasive in the general population and clinicians alike, may prevent children and adolescents or their families from seeking treatment. Finally, older adolescents have a level of autonomy that may complicate implementation of treatment plans. For example, independence in daily routines may

Table 3
KIT 3: pharmacotherapy for obesity in adolescents.

Topic	Summary of advisor responses
AOMs for adolescents	Advisor comfort levels for AOMs use in adolescents: <ul style="list-style-type: none">•Very comfortable (n = 4)•Comfortable (n = 4)•Uncomfortable (n = 1) Regarding the duration of treatment with AOMs: <ul style="list-style-type: none">•More information is needed on starting at younger ages<ul style="list-style-type: none">o Long-term safety, efficacy, and duration of treatmentoQuality of life•Payers require data on duration and cost:<ul style="list-style-type: none">oAOMsoBariatric surgeryoAOMs and bariatric surgery in conjunction

AOM, antiobesity medication; KIT, key insight topic.

result in purchase of unhealthy meals, resistance to exercise, or irregular eating and sleeping patterns.

The advisors posited that lack of education for clinicians may also play a role in restricting treatment for children and adolescents with obesity. Poor understanding of the science of obesity along with a rapidly changing treatment landscape may lead clinicians to believe that patients with Class 2 or 3 obesity may be treated with behavioral and dietary intervention alone. Alternatively, clinicians who fear triggering an eating disorder in patients with obesity may limit referrals to the appropriate weight management programs.

The advisors believe that overcoming these barriers may involve empowering patients and their families to make changes that will result in a healthier life, improved education among clinicians, collaboration among clinicians and weight management teams, and advocacy on behalf of the patients. Additionally, advocating for improved compensation by payers for obesity treatment may help PCPs and specialists meet the AAP recommendations for intensive lifestyle intervention.

8. Are there programs to which adolescents with obesity can be referred?

The advisors discussed programs that provide education and tools for people with obesity, which may prove beneficial to improving health. Fitness centers may offer reduced cost or free memberships to

adolescents. Commercial weight management companies such as WeightWatchers®, and food delivery services may aid patients and families in learning how to cook culturally sensitive, well-balanced meals. Insurance companies may offer fitness tools, such as food tracking or fitness apps, a smart scale, or a fitness coach and/or dietitian counseling. Finally, medical clinics offer comprehensive treatment for patients with obesity, including lifestyle, behavioral, weight management, and/or bariatric surgery programs.

9. How is the family involved in the care of adolescent patients?

Advisors agreed that involvement by family members, particularly those involved in meal times, is integral to the improvement of child and adolescent health. The advisors have observed a relationship between the viewpoint of the family and the patient’s progress. The advisors cautioned that children and adolescents need stability, structure, and accountability to make improvements, and families are in a unique position to provide this support. The highest chance of success, they reported, occurs when the whole family makes changes.

10. How do the patient’s sex, gender identity, and culture affect how you approach treatment?

The advisors reiterated that patients must be treated holistically, including taking into consideration cultural factors that may influence their choices, such as food choices, meal timing, and exercise opportunities. Sex and gender identity and experiences of bullying, weight bias and stigma, or traumatic events should also be taken into consideration in the management of a patient.

11. At what age do you start transitioning care to adult providers? How?

The advisors discussed their experiences regarding the transition to adult care and agreed that this generally occurs between the ages of 18–22 years. Some advisors noted that their programs have an official transition pathway. Others simply refer their patients to adult physicians with whom they are familiar. Conversations regarding the transition typically begin around the age of 18 years.

Table 4
KIT 4: perspectives on the 2023 American Academy of pediatrics clinical practice guidelines.

Topic	Summary of advisor responses
Advisors’ key takeaways from the AAP Clinical Practice Guidelines	Obesity is a chronic, complex, and relapsing disease Recommended to diagnose and treat early Treat the patient holistically; consider: <ul style="list-style-type: none">•Medical comorbidities•Psychological conditions•Socioeconomic conditions•Cultural influences•Developmental age Multidisciplinary team should assist with lifestyle and behavior interventions AOMs: <ul style="list-style-type: none">•Patients aged 12 years and older with a BMI >95th percentile•With lifestyle and behavior intervention Metabolic and bariatric surgery: <ul style="list-style-type: none">•Patients aged 13 years and older with a BMI >120th percentile Adolescents already feel weight-related stigma from their clinicians and others May be a decrease in disordered eating when obesity is addressed appropriately Age cut-offs may be used by insurance companies to deny care in children younger than the ages specified, which will increase stigma in younger patients Clinical practice guidelines can help clinicians change their messaging to alleviate shame and guilt
Thoughts around risk of stigma sparked by clinical practice guidelines	

AOM, antiobesity medication; BMI, body mass index; KIT, key insight topic.

3.3. KIT 3: pharmacotherapy for obesity in adolescents

12. What is your comfort level with using AOMs in adolescents?

Most advisors ($n = 8$) indicated some level of comfort (Table 3). Advisors recommended that prescribing physicians have comprehensive training and experience with AOMs. The advisors noted that for many PCPs, hesitation regarding GLP-1 agonist prescription in adolescents is related to limitations imposed by payers, who may deny coverage for several reasons.

13. How do you think about the duration of AOM use in adolescents?

Advisors agreed that due to the chronic nature of obesity, most patients will need to take AOMs long-term. However, AOMs lack long-term safety and efficacy data in children. The advisors believe that this is especially important when considering developmental plasticity in children and adolescents. In the absence of a long-term study, most advisors agreed that a study to examine durability may suffice. One advisor posited that, within long-term studies, it is important to determine if AOM use at an early age aids in long-term quality-of-life maintenance. Advisors agreed that these data would be beneficial in supporting payer coverage.

3.4. KIT 4: perspectives on the 2023 AAP Clinical Practice Guidelines

14. What are the major take-home messages of the 2023 AAP Clinical Practice Guidelines [11]?

Although these guidelines are a key subject of discussion for this publication, the advisors were not involved in guideline development. This publication is completely independent of the AAP guidelines.

Advisors agreed on the following messages (Table 4). Obesity is a complex, chronic disease requiring prompt, intensive, and comprehensive action through early diagnosis and treatment, preferably under the guidance of a multidisciplinary team. The advisors agreed that this definition of obesity will help reduce the stigma surrounding obesity, including the mistaken belief that obesity is a lifestyle choice, rather than a chronic disease. Previously, physicians have been predisposed to monitoring the patient's condition and responding to complications, rather than taking decisive action with the underlying disease. Early intervention is critical to the long-term health of the patient.

Overall, the advisors believe that these updated guidelines are one positive step in the process of engaging families, motivating clinicians to treat obesity, and enabling advocacy to secure better funding and insurance coverage for people with obesity. However, one advisor noted that AAP guidelines are flawed due to the recommendations regarding age limitation for AOMs/bariatric surgery treatment, which will likely increase the difficulty of treating children aged <12 years.

15. A criticism of the AAP Guidelines is the risk of increased stigma, weight-related distress and eating-disordered thoughts/behavior associated with the recommendation to initiate active treatment in adolescents with BMI \geq 95th percentile. What are your thoughts?

The advisors agreed that this risk does not outweigh the need for treatment. Due to current societal bias surrounding obesity, adolescents are already significantly impacted by stigma, and disordered thoughts or behaviors are already a risk and apparent at initial visits. Advisors agreed that improvements in messaging regarding obesity may aid in reducing risk of disordered eating; this should therefore be a priority for clinicians. The advisors suggested that the AAP guidelines may act as a tool for clinicians to optimize their messaging surrounding obesity.

4. Discussion

Given the social and medical limitations imposed on obesity treatment in pediatric patients, it is crucial for clinicians to adhere to best practices to facilitate the holistic treatment of this growing population. The insights provided here reflect the unique experiences of the advisors and highlight the need for more programs focusing on the holistic treatment of obesity and its comorbidities at a community, state, and national level.

Weight or BMI alone may raise concerns and should prompt lifestyle counseling, but treatment intensification is often initiated when the physical or mental health of the patient is adversely affected. Outside of pediatric obesity experts, comfort with pharmacotherapy is limited by lack of education/experience, uncertainty about long-term effects, and failure of insurance companies to authorize the medication. Concerns about stimulating eating disorders by treating obesity are inconsistent with available group-level data but cannot be dismissed at the individual level. Everyone should be assessed for risk and treated or referred appropriately.

It is important to note that since the completion of the VAB, advancements have been made in treatment options for obesity, which may induce a change of opinion regarding topics surrounding treatment of children and adolescents with obesity. Four-year data on treatment of obesity with injectable semaglutide 2.4 mg in adults demonstrated a sustained average weight loss of $\sim 10\%$ [20]. Additionally, ORC improvements have been demonstrated in adults with both semaglutide 2.4 mg [21] and tirzepatide [22].

Despite the challenges, the advisors believe that the key to addressing obesity in pediatric patients lies in the following: 1) increased investment in education for the medical community regarding treatment of pediatric obesity to reduce stigma and bias; 2) harnessing the family as a key driver for successful change; 3) early intervention, including lifestyle/behavioral modifications at an early age and before exceeding the overweight category; 4) ensuring clinicians understand how sex, gender, and culture can affect treatment approach; 5) recognizing that weight/BMI alone may raise concerns, but treatment intensification is often prompted when the physical or mental health of the patient is adversely affected; and 6) collaboration with policy makers, insurance companies, the food industry, researchers, educators, and clinicians to reduce barriers to treatment.

Future efforts to address the challenges posed by the management of children and adolescents with obesity should focus on filling knowledge gaps that cannot be addressed by this panel of experts alone. For example, a follow-up VAB can be conducted with patients, or patients and providers, to elicit the patient perspectives surrounding the challenges outlined here. Additionally, a VAB comprised of non-clinician advisors (i.e., nurses or other health care professionals) may offer alternative clinical insights. Finally, increased attention should be given to finding viable solutions to the pervasive social stigma surrounding obesity.

4.1. Limitations

The insights shared here are based on the unique perspectives of experts in pediatric obesity. However, these may not encompass the full range of experiences and treatment algorithms for children and adolescents with obesity. While the advisors are from different geographical areas and treat different populations, their experiences and recommendations may not apply to all populations.

5. Conclusion

In conclusion, the management of pediatric obesity requires a comprehensive, empathetic, and child- and family-centered approach that considers the unique challenges and needs of this population. The advisors hope the insights and recommendations provided here serve as

a supplement to the AAP guidelines to help address this complex and pervasive issue.

- The management of pediatric patients with obesity requires consideration of the sex, gender, and culture of the patient and their family
- To effectively address the growing prevalence of obesity in pediatric patients, increased focus should be placed on medical education surrounding treatment guidelines and options, as well as community-wide initiatives to promote early intervention and awareness
- Collaboration between the medical community, policy makers, insurance companies, food industry, researchers, educators, and clinicians may help reduce barriers to the care of obesity

Author contributions

All authors participated in the virtual advisory board. All authors revised the manuscript content and approved the final version.

Disclosures

All authors participated in the virtual advisory board reported here. Whitney Herring acted as site principal investigator for Rhythm Pharmaceuticals (NCT05093634). Evan Nadler participated in an advisory board with Novo Nordisk and Rhythm Pharmaceuticals. Gitanjali Srivastava participated in advisory boards with Rhythm and Eli Lilly; acted as site principal investigator for Eli Lilly; and in a Speaker's Bureau for Novo Nordisk and Rhythm.

Ethical review

As this is a commentary on expert insights and recommendations through a virtual advisory board, ethical review was not required.

Declaration of artificial intelligence (ai) and ai-assisted technologies

During the preparation of this work, the authors did not use Artificial Intelligence technology.

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