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## **TITLE**

# **GLOBAL VARIABILITY IN CHILDREN AND ADOLESCENT METABOLIC BARIATRIC SURGERY GUIDELINES: A WORLDWIDE IFSO SURVEY**

## **Shortened title:**

Children and adolescent MBS indications worldwide.

**Key words:** Bariatric Surgery, Metabolic Surgery, Children, Adolescent, Pediatric, Guidelines, Indications, Coverage, IFSO, ASMBS.

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## **ABSTRACT:**

**Introduction:** Children and adolescent (pediatric) obesity is a growing global health challenge, with traditional weight-loss strategies often proving ineffective. Metabolic and bariatric surgery (MBS) is increasingly considered for pediatric patients with severe obesity. The International Federation for the Surgery of Obesity and Metabolic Disorders (IFSO) published its latest recommendations on pediatric MBS in 2022. However, their adoption may vary across countries due to differences in healthcare systems, cultural norms, and resources.

**Aim:** To assess global variability in indications, practices, and healthcare coverage for pediatric MBS among IFSO member countries, and to evaluate adherence to international guidelines.

**Method:** A descriptive survey was conducted among IFSO-affiliated national societies using a 17-item online questionnaire covering indications for pediatric MBS, recommended techniques, referral pathways, and financial coverage.

**Results:** Of 76 societies, 66 (86.8%) responded. Most (75.8%) reported having national guidelines; 46.0% followed IFSO's BMI-based indications' criteria, while 14.0% applied stricter thresholds (BMI>40Kg/m<sup>2</sup>), and 8.0% did not recommend MBS outside clinical trials. Additionally, 31.8% required a minimum level of physical maturity on the basis of age, pubertal stage or bone growth. Sleeve gastrectomy was the most commonly recommended technique (69.2%). Pediatricians and parents were the most frequent referrers (35.0% and 33.0%, respectively). Some form of financial coverage was reported in 59.1% of countries, with significant disparities between regions.

**Conclusion:** Despite international recommendations, significant variability persists in pediatric MBS practices worldwide. Standardizing criteria and improving access to care are essential to ensure equitable and evidence-based treatment for children and adolescents with severe obesity.

**Shortened title:**

Children and adolescent MBS indications worldwide.

**Key words:** Bariatric Surgery, Metabolic Surgery, Children, Adolescent, Pediatric, Guidelines, Indications, Coverage, IFSO, ASMBS.

**Key Points**

- Global practice of pediatric MBS shows wide variability in indications, maturity requirements, and coverage.

- Less than half of countries adhere to IFSO/ASMBS pediatric MBS recommendations.
- Sleeve gastrectomy is the most recommended MBS procedure for children and adolescents; malabsorptive techniques are discouraged.
- Substantial regional disparities in financial coverage limit equitable access to surgery.

## INTRODUCTION

Pediatric and adolescent obesity represents a serious global challenge, with a universal estimate of 8.5% and a steadily increasing prevalence in many parts of the world [1, 2]. Its serious consequences include a growing number of pediatric patients at high risk of development of obesity-associated medical problems and social stigmatization [3-7]. Traditional weight management strategies, including dietary interventions, physical activity, and behavioral therapy, often fail to achieve substantial or sustained weight loss. Recently, incretin-based therapies, particularly GLP-1 receptor agonists such as liraglutide and semaglutide, have emerged as potential adjunctive options in adolescents; however, current evidence in the pediatric population remains limited, with relatively short follow-up and a lack of long-term outcome data. When conservative and/or pharmacological management alone fails to achieve adequate and sustained outcomes, a growing body of evidence supports the early use of metabolic and bariatric surgery (MBS) [8–14].

From 2018 to 2022, several of the largest professional societies in the field — including the American Society for Metabolic and Bariatric Surgery (ASMBS), the American Academy of Pediatrics (AAP), and the International Federation for the Surgery of Obesity and Metabolic Disorders (IFSO) — published their most recent recommendations regarding pediatric MBS, recommending MBS in

children/adolescents who do not respond to conservative treatments if they have a body mass index (BMI)  $\geq 35 \text{ Kg/m}^2$  or  $\geq 120\%$  of the 95<sup>th</sup> percentile (class II obesity) and major co-morbidity, or a BMI  $\geq 40 \text{ Kg/m}^2$  or  $\geq 140\%$  of the 95<sup>th</sup> percentile (class III obesity) [15-17].

However, these international recommendations may not be fully followed worldwide and could have some variations across countries due to differences in healthcare systems, cultural attitudes, socio-economic status, and the availability of specialized centers.

## **AIM OF THE STUDY**

The aim of this study is to explore the indications for, and the economic coverage of, MBS in the pediatric population across the countries represented within IFSO. It examines the extent to which these countries adhere to the most recent international recommendations, identifying areas of alignment and divergence, and looking for the factors influencing clinical decision-making and potential disparities in access to care. By providing an international perspective, this study aims to enhance understanding of the current global landscape of pediatric MBS and to offer insights toward establishing more consistent and equitable practices worldwide.

## **METHODS:**

IFSO is a federation composed of 76 national societies, each representing a specific country. These national societies are grouped into regional chapters according to their geographic area (Asia-Pacific, Middle East and North Africa, Europe, Latin America, and North America). This is a descriptive study based on a specifically designed questionnaire, focused on the surgical indications for MBS in children and adolescents, that was sent to representatives of these 76 national societies affiliated to IFSO.

For the purpose of this study, the term 'pediatric' refers to individuals under 18 years of age, encompassing 'children' (defined as individuals 12 years and under) and 'adolescents' (individuals from 13 to 18 years old).

### **Questionnaire**

The questionnaire consisting of 17 questions was designed using an online platform for questionnaires and surveys (Survey Monkey Inc.®, San Mateo, CA, USA). These questions aimed at obtaining information on national MBS indications for pediatric patients and type of financial coverage. Eleven of the questions were closed: seven dichotomous, two multiple-choice and two numerical. Six questions were to be answered with free text. Conditional branching was used to create a customized path based on the respondents' answers; six of the questions were independent or primary and eleven were branching or conditional ones (Figure 1).

Date:  
Surname:  
First Name:  
Country:  
Name of your country's national society for metabolic and bariatric surgery:  
Your position/role within the Society:

**1- Does your metabolic and bariatric surgery (MBS) National society follow any local recommendations/guidelines regarding indications/candidates for metabolic and bariatric surgery in children/adolescents (age <18 years)?**  
a- YES  
b- NO

**2- If you answered "YES" to question 1, in which cases do recommendations/guidelines recommend MBS in patients <18 years old?**  
Open answer.

**3- If you answered "YES" to question 1, are there any recommendations/restrictions in the national guidelines regarding the technique to be used for MBS in children/adolescents?**  
a- YES  
b- NO

**4- If you answered "YES" to question 3, please specify.**  
Open answer.

**5- Who is the main referrer of metabolic/bariatric surgery for children/adolescents in your country? (More than one answer is possible)**  
a- Pediatricians.  
b- General practitioners.  
c- Endocrinologists.  
d- Parents directly.  
e- Other MBS.  
f- Other.

**6- If you answered 'other' to question 5, please specify.**  
Open answer

**7- Who provides the MBS intervention for children/adolescents in your country? (You can give more than one answer)**  
a- The bariatric/GI surgeon.  
b- The pediatric surgeon.  
c- Other.

**8- If you answered 'other' in question 7, could you please specify?**  
Open answer

**9- Does your national/public health system cover adult MBS?**  
a- YES  
b- NO

**10- Does your national/public health system cover MBS in children/adolescents (aged <18 years)?**  
a- YES  
b- NO

**11- If you answered YES to question 10, could you please explain in which cases your national/public health system covers MBS in children/adolescents (aged <18 years)?**  
Open answer.

**12- If you answered YES to question 10, is there a lower age limit for publicly funded MBS for children/adolescents?**  
a- YES  
b- NO

**13- If you answered "YES" to question 12, what is the lower age limit for publicly covered MBS?**  
Number

**14- Does your country's private health insurance system cover MBS in children/adolescents (aged <18 years)?**  
a- YES  
b- NO

**15- If you answered YES to question 14, could you please explain in which cases your private health insurance system covers MBS in children/adolescents (aged <18 years)?**  
Open answer.

**16- If you answered YES to question 14, is there a lower age limit for privately funded MBS for children/adolescents?**  
a- YES  
b- NO

**17- If you answered "YES" to question 16, what is the lower age limit for privately funded MBS?**  
Number.

**Fig. 1: The emailed survey questionnaire.**

This questionnaire was distributed by the IFSO Secretariat via email to the sitting presidents of each of the IFSO-affiliated national metabolic and bariatric surgical societies between August and November 2024. In cases of non-response, seven co-authors of the study (JPR, DMF, NZ, ChP, AA, CC, and PO) followed up directly with the respective presidents or, alternatively, contacted a representative surgeon from the country (most commonly a member of the national society's executive board) to facilitate completion of the survey. Responses received from 1<sup>st</sup> August 2024 up to the 14<sup>th</sup> of December 2024 were eligible for the final analysis. Only one response was received from each country.

The results of the study were analyzed globally and also grouped according to the 5 different geographical chapters of IFSO.

### **Data Analysis**

All the collected responses were incorporated into the final analysis, which was conducted using a descriptive approach. Categorical variables are reported as event counts and corresponding percentages. Statistical evaluation was done using the chi-squared test. A p-value of less than 0.05 was considered indicative of statistical significance.

## **RESULTS:**

### **Response rate**

Sixty-six of the 76 IFSO national societies completed the survey, representing a response rate of 86.8%. Partial responses were received from China, Kazakhstan, and Slovenia; these instances are explicitly noted in the text where data were unavailable. Ten countries —Costa Rica, Hungary, Indonesia, Iraq, Pakistan, Paraguay, Peru, the Philippines, Sri Lanka, and Uruguay— did not respond and were excluded from the data analysis. Notably, 74.2% of the respondents were presidents

or former presidents of their respective societies, and 13.6% were board members. Participation in each of the five IFSO chapters exceeded 76.0%. Figure 2 presents the IFSO respondent societies categorized by chapters.

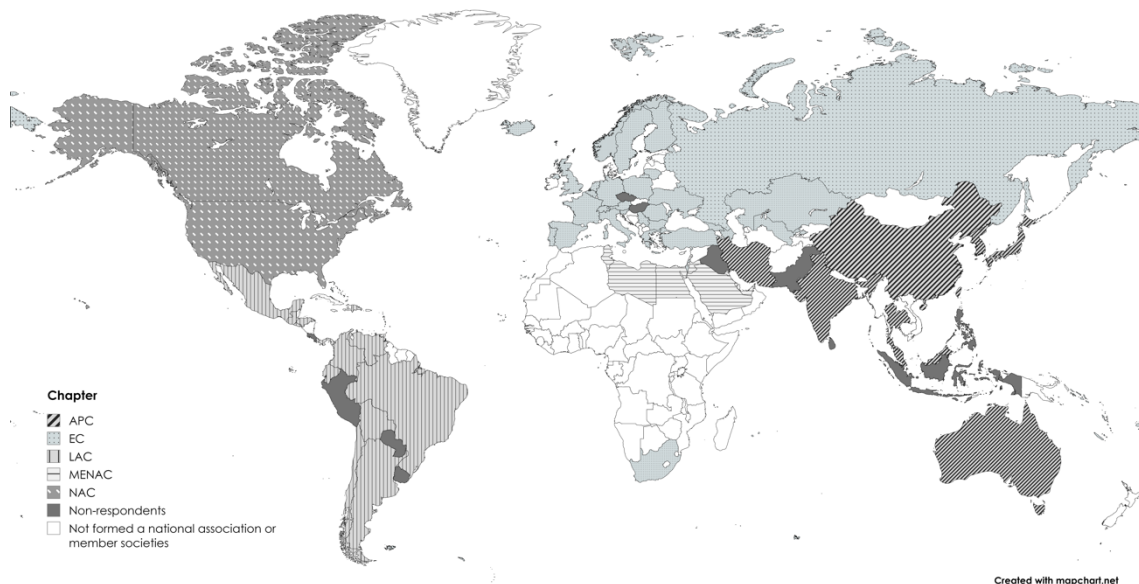


**Figure 2. Distribution of responding IFSO societies around the world by chapters.**

Abbreviations: APC Asian Pacific Chapter, EC European Chapter, LAC Latin American Chapter, MENAC Middle East and North African Chapter, NAC North American Chapter.

### **Adherence to MBS Guidelines**

The survey's initial question explored whether national societies adhere to or have developed any national guidelines or recommendations about MBS in children and adolescent populations (Figure 3). Globally, 75.8% of respondents (50 out of 66) reported following some national guidelines or recommendations for MBS in children or adolescents: 63.6% (7 out of 11 national societies) in the Asian-Pacific Chapter (APC), 80.6% (25 of 31) in the European Chapter (EC), 69.2% (9 out of 13) in the Latin American Chapter (LAC), and 77.8% (7 of 9) in the Middle East and North Africa Chapter (MENAC). Lastly, the two national societies representing the North American Chapter (NAC); Canada and the United States, also reported following local guidelines

regarding indications for pediatric MBS (100%). There were no statistical differences in guideline's adhesion between chapters.

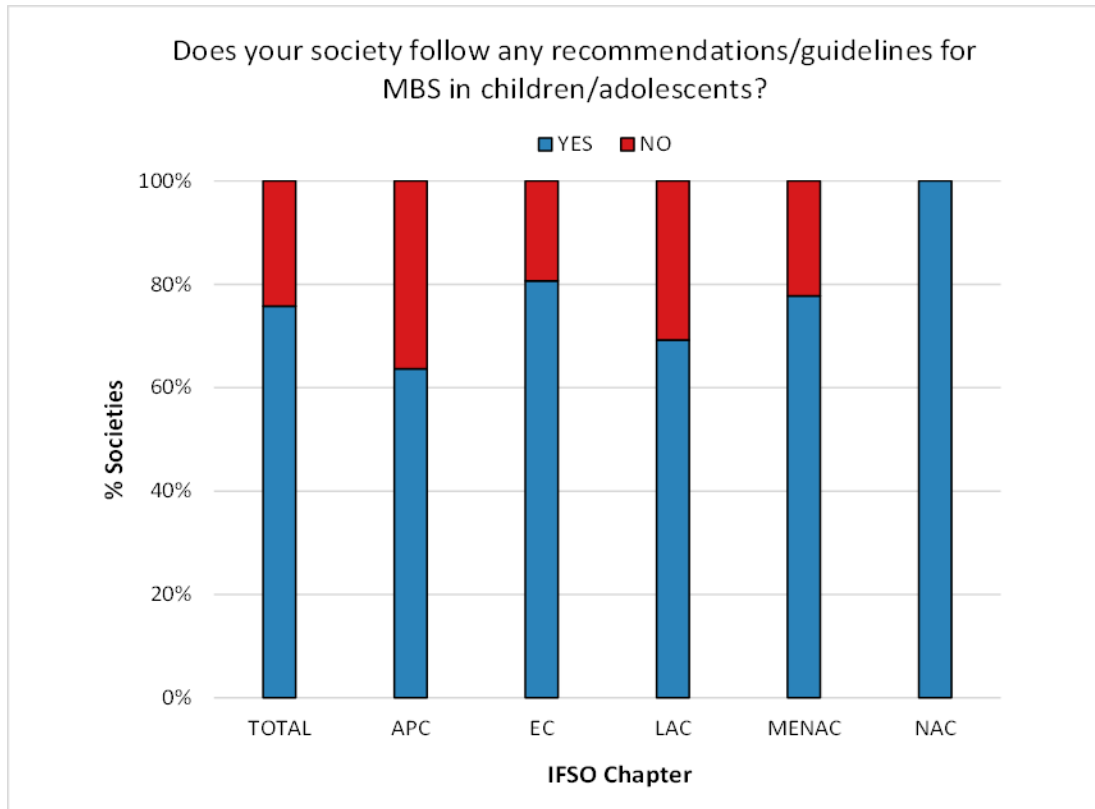


**Figure 3. Reported following of recommendations or guidelines by IFSO chapters.** Abbreviations: APC, Asian Pacific Chapter; EC, European Chapter; LAC, Latin American Chapter; MENAC, Middle East – North African Chapter; NAC, North American Chapter.

### Criteria for indicating MBS in children and adolescents

Most of the national MBS societies still recommend the use of BMI for indicating pediatric MBS, typically serving as a threshold criterion for eligibility. Table 1 summarizes the BMI-based criteria for indicating pediatric MBS across the 50 national guidelines.

| Country                    | Chapter | BMI criteria for MBS in children and adolescents                                                                                                                                                                                        | Percentage of countries following the criterion. |
|----------------------------|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|
| Argentina                  | LAC     | <p>BMI <math>\geq 40</math>, or <math>\geq 140\%</math> of the 95th percentile for age and sex</p> <p>or</p> <p>BMI <math>\geq 35</math>, or <math>\geq 120\%</math> of the 95th percentile for age and sex if comorbidities exist.</p> | 46.0                                             |
| Australia                  | APC     |                                                                                                                                                                                                                                         |                                                  |
| Bahrain                    | MENAC   |                                                                                                                                                                                                                                         |                                                  |
| Bolivia                    | LAC     |                                                                                                                                                                                                                                         |                                                  |
| Brazil                     | LAC     |                                                                                                                                                                                                                                         |                                                  |
| Canada                     | NAC     |                                                                                                                                                                                                                                         |                                                  |
| Chile                      | LAC     |                                                                                                                                                                                                                                         |                                                  |
| El Salvador                | LAC     |                                                                                                                                                                                                                                         |                                                  |
| Finland                    | EC      |                                                                                                                                                                                                                                         |                                                  |
| France                     | EC      |                                                                                                                                                                                                                                         |                                                  |
| Honduras                   | LAC     |                                                                                                                                                                                                                                         |                                                  |
| Jordan                     | MENAC   |                                                                                                                                                                                                                                         |                                                  |
| Lithuania                  | EC      |                                                                                                                                                                                                                                         |                                                  |
| Poland                     | EC      |                                                                                                                                                                                                                                         |                                                  |
| Portugal                   | EC      |                                                                                                                                                                                                                                         |                                                  |
| Romania                    | EC      |                                                                                                                                                                                                                                         |                                                  |
| Russia                     | EC      |                                                                                                                                                                                                                                         |                                                  |
| Saudi Arabia               | MENAC   |                                                                                                                                                                                                                                         |                                                  |
| Slovenia                   | EC      |                                                                                                                                                                                                                                         |                                                  |
| Spain                      | EC      |                                                                                                                                                                                                                                         |                                                  |
| Turkey                     | EC      |                                                                                                                                                                                                                                         |                                                  |
| UAE (United Arab Emirates) | MENAC   |                                                                                                                                                                                                                                         |                                                  |
| US (United States)         | NAC     |                                                                                                                                                                                                                                         |                                                  |
| Lebanon                    | MENAC   | BMI $\geq 35 \text{ kg/m}^2$ or BMI $\geq 32,5 \text{ kg/m}^2$ with comorbidities                                                                                                                                                       | 2.0                                              |
| Georgia                    | EC      | BMI $\geq 35 \text{ kg/m}^2$                                                                                                                                                                                                            | 12.0                                             |
| Greece                     | EC      |                                                                                                                                                                                                                                         |                                                  |
| Kazakhstan                 | EC      |                                                                                                                                                                                                                                         |                                                  |
| Sweden                     | EC      |                                                                                                                                                                                                                                         |                                                  |

|                    |       |                                                                                        |      |
|--------------------|-------|----------------------------------------------------------------------------------------|------|
| Switzerland        | EC    |                                                                                        |      |
| Tunisia            | MENAC |                                                                                        |      |
| India              | LAC   | BMI $\geq$ 40 kg/m <sup>2</sup>                                                        | 4.0  |
| Uzbekistan         | APC   |                                                                                        |      |
| Ecuador            | EC    | BMI $\geq$ 50 kg/m <sup>2</sup> or BMI $\geq$ 40 kg/m <sup>2</sup> with comorbidities. | 10.0 |
| Germany            | EC    |                                                                                        |      |
| Israel             | EC    |                                                                                        |      |
| Kuwait             | MENAC |                                                                                        |      |
| Singapore          | APC   |                                                                                        |      |
| Italy              | EC    | Pediatric MBS not recommended.                                                         | 8.0  |
| Netherlands        | EC    |                                                                                        |      |
| South Korea        | APC   |                                                                                        |      |
| United Kingdom     | EC    |                                                                                        |      |
| Austria            | EC    | Specific BMI threshold for children or adolescent MBS not reported.                    | 18.0 |
| Azerbaijan         | EC    |                                                                                        |      |
| Czech Republic     | EC    |                                                                                        |      |
| China              | APC   |                                                                                        |      |
| Colombia           | LAC   |                                                                                        |      |
| Dominican Republic | LAC   |                                                                                        |      |
| Japan              | APC   |                                                                                        |      |
| Serbia             | EC    |                                                                                        |      |
| Thailand           | APC   |                                                                                        |      |

**Table 1. BMI-based criteria for MBS in subjects  $\leq$  18 years old across IFSO societies following guidelines.**

Abbreviations: APC, Asian Pacific Chapter; EC, European Chapter; LAC Latin American Chapter; MBS, Metabolic and Bariatric Surgery; MENAC, Middle East – North African Chapter; NAC, North American Chapter.

According to the results of the present survey, not all the national societies follow the same BMI criteria when indicating surgical treatment in the pediatric population. Almost half of them (46.0%) recommend considering MBS if the patient has a BMI  $\geq 40 \text{ kg/m}^2$  or  $\geq 140\%$  of the 95th percentile for age and sex, regardless of the presence of comorbidities; or BMI  $\geq 35 \text{ kg/m}^2$  or  $\geq 120\%$  of the 95th percentile in the presence of at least one comorbidity, therefore following the latest IFSO guidelines. However, some others recommend surgery based on different BMI parameters; to note, 14.0% recommend considering pediatric MBS only when their BMI is over  $40 \text{ kg/m}^2$  or even  $50 \text{ kg/m}^2$ ; and finally in 8% of the countries MBS is not performed in pediatric patients under any circumstances or only in exceptional cases, such as within clinical trials. Finally, 18.0% of countries did not report any BMI-criterion for MBS.

In addition to BMI criteria, a total of 21 countries (31.8% of respondents) also include maturity-related requirements for indicating pediatric MBS, defined by age, pubertal stage, or skeletal maturity. Table 2 summarizes the specific minimum age and/or maturity degree reported across countries, whether stated in their clinical guidelines or implemented as conditions for access to public or private healthcare coverage.

There were no statistically significant differences in the proportion of countries reporting maturity criteria among the IFSO regional chapters ( $p = \text{n.s.}$ ).

| Country                                   | Age or maturity degree |
|-------------------------------------------|------------------------|
| Kuwait, UAE                               | $\geq 12 \text{ y.o.}$ |
| Egypt, Finland, Greece, Israel, Japan, US | $\geq 13 \text{ y.o.}$ |
| Australia, Austria, Turkey                | $\geq 14 \text{ y.o.}$ |
| Azerbaijan, Sweden                        | $\geq 15 \text{ y.o.}$ |
| Brazil, Lithuania, Singapore              | $\geq 16 \text{ y.o.}$ |

|                                                |                                                           |
|------------------------------------------------|-----------------------------------------------------------|
| Chile, Finland, Russia, Singapore, Switzerland | Tanner stage IV-V                                         |
| Czech Republic, Israel, Slovenia               | Physical development, skeletal maturity or after puberty. |

**Table 2. Age and maturity degree criteria for MBS by countries.**

Abbreviations: MBS, Metabolic and Bariatric Surgery; y.o., years old; UAE, United Arab Emirates; US, United States.

### **Recommended surgical techniques in Pediatric MBS**

In response to question 3, 20 of the 50 countries with local guidelines (40%) reported the presence of some technical restrictions regarding the use of MBS in children or adolescents. Of these, 13 countries provided the specific recommendations (as addressed in question 4). Most of them (9 out of 13, 69.2%) recommend Sleeve gastrectomy (SG), while the remaining 30.8% suggesting to perform either SG or Roux-en-Y gastric bypass (RYGB). Of these, only the Swedish guidelines prioritize RYGB over SG. Notably, none of the countries recommend performing hypoabsorptive techniques. In fact, one (Colombia) explicitly state that malabsorptive procedures should not be performed in pediatric patients.

### **Referrers in Pediatric MBS**

Another objective of the survey was to identify the primary referral partner for children and adolescents with severe obesity to the MBS unit. Figure 4 shows the relative frequency of each referrer. Among the 64 respondent countries, pediatricians and parents were the most frequently cited referrers, reported in 38 and 36 countries, respectively, corresponding to 35.0% and 33.0% of the total responses. They were followed by endocrinologists (21.0%), general practitioners (7%), and, less commonly, MBS surgeons not specialized on pediatrics (3.0%).

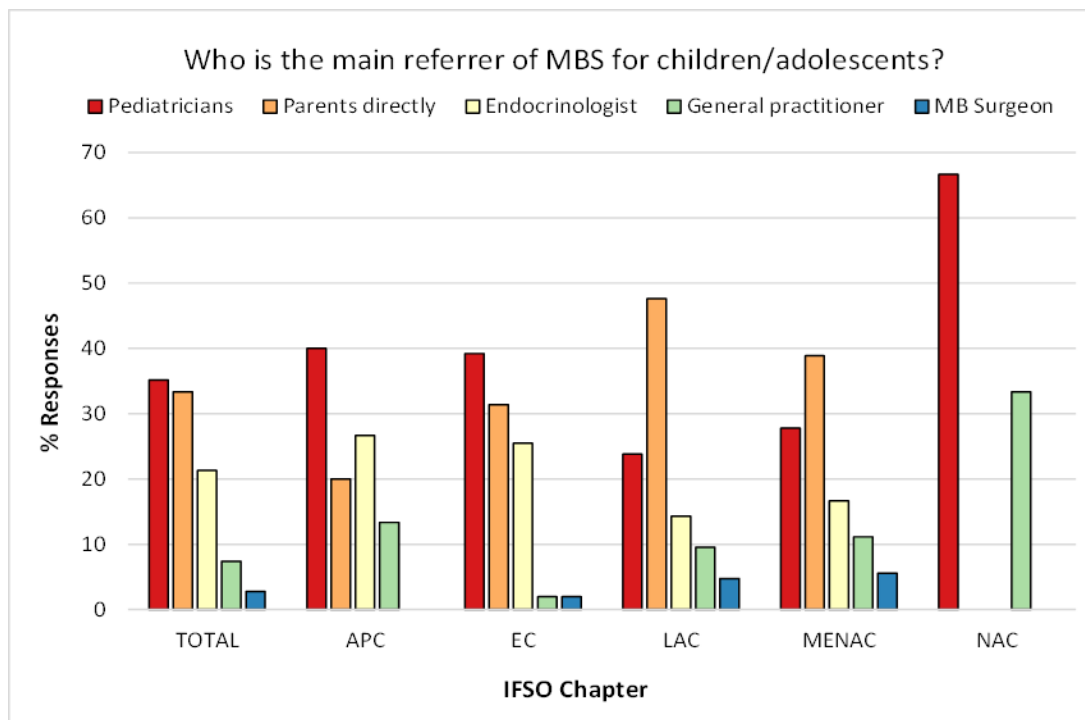


**Figure 4. Referrers for pediatric MBS globally and by chapters.**

Abbreviations: APC, Asian Pacific Chapter; EC, European Chapter; LAC Latin American Chapter; MBS, Metabolic and Bariatric Surgery; MENAC, Middle East – North African Chapter; NAC, North American Chapter.

The current study also examined which is the specialist responsible for performing the procedure in each country. In most countries (84.0% of the respondents), only bariatric-gastrointestinal surgeons carry out the surgery. In the remaining 16.0%, both bariatric or pediatric surgeons may perform the procedure. In no country was the pediatric surgeon identified as the sole specialist responsible for carrying out these procedures.

### **Coverage of pediatric MBS in healthcare systems**

When assessing if MBS is financially covered for pediatric patients, we found that some form of financial coverage is available in 59.1% of the countries (39 out of

66), whether through the public health service, local private insurance companies, or a combination of both systems.

Specifically, 25 countries (37.9%) stated that only the National Health System (NHS) covers these procedures and six countries (9.1%) reported that coverage is available exclusively through private insurers, with no support from the NHS. Additionally, there are eight countries (12.1%) that benefit from a dual coverage model, where both public and private healthcare systems can support pediatric MBS.

Finally, 25 countries (37.9%) reported providing no coverage at all for these procedures. Two countries did not respond this question (3.0%) (Figure 5).

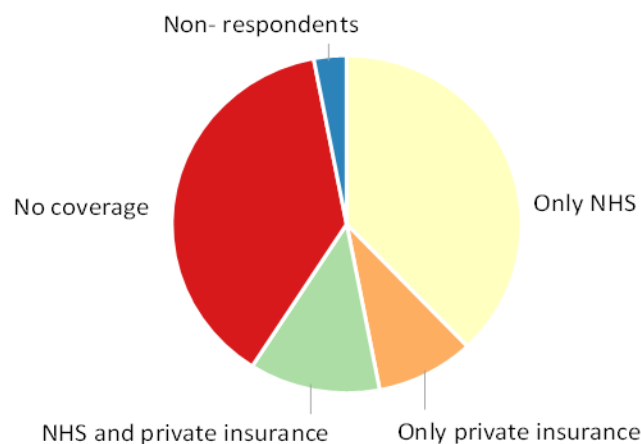


**Figure 5: Healthcare systems' coverage of pediatric MBS.**

Abbreviations: MBS, Metabolic Bariatric Surgery; NHS, National Health System.

There were statistical differences in the coverage between geographical areas ( $p$  value = 0.0313). Chapters with more countries offering financial coverage for pediatric MBS are those located in north America, Asia-Pacific and Europe (>70.0% of countries with coverage). Whereas the lowest percent of countries with MBS coverage was found in Latin-America (where pediatric MBS is covered only in 23.1% of the

countries) (Figure 6). Interestingly, it is precisely in Latin America where pediatric patients are brought directly to MBS consultations by their parents.

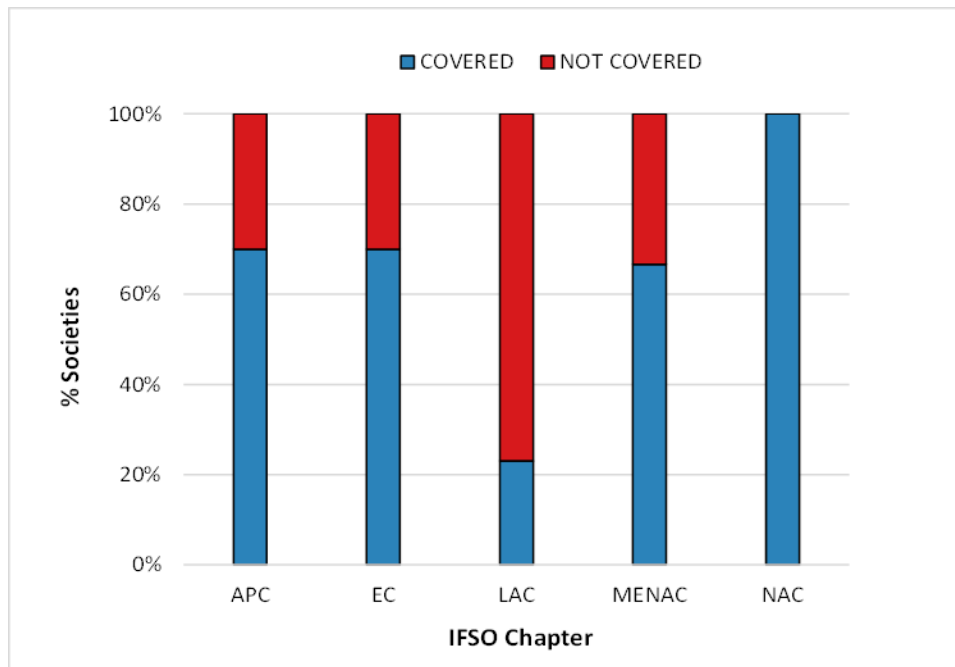


**Figure 6: Healthcare systems' coverage of pediatric MBS by chapters.**

Abbreviations: APC, Asian Pacific Chapter; EC, European Chapter; LAC, Latin American Chapter; MBS, Metabolic Bariatric Surgery; MENAC, Middle East – North African Chapter; NAC, North American Chapter.

## **DISCUSSION:**

The present study analyzes the extent to which the 2022 ASMBS and IFSO recommendations for pediatric MBS have been adopted across the 76 countries affiliated with IFSO.

Our findings indicate that the majority (75.8%) adhere to some form of national or regional guidelines and, although the role of BMI in diagnosing obesity remains controversial—with several recent studies questioning its predominance [5, 18–22]—

it continues to be widely used as a key parameter for recommending MBS, typically serving as a threshold for eligibility. Nearly half of the countries (46.0%) follow the most recent BMI criteria recommended by IFSO and ASMBS —BMI  $\geq 35$  kg/m<sup>2</sup> or  $\geq 120\%$  of the 95th percentile with clinically significant co-morbid conditions or BMI  $\geq 40$  kg/m<sup>2</sup> or  $\geq 140\%$  of the 95th percentile—. However, the remaining 53% do not fully follow these guidelines; a substantial number of countries report stricter BMI thresholds or even do not recommend performing MBS in pediatric patients in any case outside clinical trials, reflecting still ongoing debates about the appropriateness of surgical indications in this population.

Beyond BMI, a significant 31.8% of countries still advise surgery only for those whose pubertal development is close to completion. This approach reflects concerns about the potential impact of surgery on growth and pubertal development, yet it contradicts not only IFSO's recommendations but also some long-term studies indicating that MBS does not impair pubertal development and that normal linear growth continues after the procedure [10, 23, 24]. This lack of uniformity across different IFSO-members' national societies in defining the appropriate patient's maturity level to be considered for MBS underscores the need for greater consensus-building among pediatric MBS experts. The latest ASMBS/IFSO recommendations likely require further reinforcement through high-quality scientific evidence, especially for children MBS, as to date, the mean age of patients' cohorts in most available studies—which serve as the basis for many clinical guidelines—tends to fall in late adolescence or early adulthood [8, 10-12, 25] and registries data indicate that, in real-world practice, the average age of pediatric patients undergoing bariatric surgery falls between 17 and 19 years, with procedures in those under 13 remaining exceptionally rare [26-31].

The present study also reveals that SG is the most commonly recommended surgical technique for children and adolescents. Notably, no national guidelines recommend performing hypoabsorptive procedures; in fact, some of them explicitly advise against

using these techniques in pediatric patients, highlighting a more cautious and conservative approach as, due to their longer life-expectancy, the risk of nutritional deficiencies could have more serious consequences. This is also consistent with real-world trends [32]. One analysis of a cohort of 4,447 pediatric operated patients from the 2021-to-2023 MBSAQIP database reveals that laparoscopic SG was the technique performed in most of the cases (>86.0%), followed by RYGB (9.3% to 10.8% of the times). Other surgical options accounted for  $\leq 3\%$  [30].

Another important finding is the role that healthcare professionals and parents have in referring children and adolescents to bariatric surgery programs. Pediatricians emerged as the most common professional referrers, reflecting their critical role in the multidisciplinary management of childhood obesity. However, some studies suggest that many pediatricians are reluctant to refer pediatric patients with obesity for MBS. Iqbal et al. sent a survey to 61 pediatricians and 88.5% would be unlikely or would never refer a child for a bariatric procedure, and only 44.3% would be somewhat or very likely to refer an adolescent [33]. Similarly, Vanguri surveyed 109 pediatricians; 27.1% of them did not know that MBS was a treatment option for adolescents and less than 10% had ever referred patients for surgery, citing cost, risks, or “not indicated in pediatrics” as reasons [34]. Simultaneously, the significant involvement of parents as direct referrers underscores the importance of family-based decision-making. Unfortunately, based on the study by Geelen et al., many parents underestimate the severity and risks of their child’s obesity, viewing it primarily as a pedagogical or psychological issue that they—or their child—can control, and therefore dismiss surgery as a therapeutic option [35].

Educating healthcare professionals and parents about the complexity of obesity and its various treatment options for children and adolescents, as well as involving them in a multidisciplinary team, may help reduce concerns, foster greater engagement, and build confidence in the surgical approach for pediatric patients.

Although surgery today has been demonstrated to be safe and effective [8-14], performing it correctly requires complex infrastructure and costly materials. Many people cannot afford it. As important as widen the recommendations, should be to facilitate some kind of financial coverage for those people in need.

Our analysis of financial coverage reveals notable disparities across geographical regions. While the NAC, APC, and EC report the highest rates of countries offering some form of coverage —either public or through private insurance, others — particularly the Latin American Chapter— show limited coverage. These findings align with data from the adult population [36] and reflect broad inequalities in healthcare coverage within regions, which may impact accessibility to this therapeutic option for children and adolescents with severe obesity in certain parts of the world.

The limitations of our study must be acknowledged. As a survey-based, descriptive study, it relies on self-reported data, which may be subject to bias or variability in interpretation by national representatives. However, the fact that 74.2% of respondents were presidents or former presidents of their respective societies, and 13.6% were other board members, lends greater credibility to their responses. Additionally, the absence of responses from some countries may limit the generalizability of our findings. However, only 10 countries did not respond, likely reflecting very low annual bariatric procedure volumes and representing only a small fraction of the global total [37].

Although MBS in children and adolescents may be formally covered, such coverage can, in practice, be constrained by stringent eligibility criteria and administrative barriers. Inge et al. collected administrative and clinical data from five specialized adolescent bariatric centers, showing that less than half of pediatric cases were approved at the initial request, compared with 80%–85% of adults meeting similar criteria. Age under 18 years was the most common reason for denial [38]. Coverage may also vary within a country depending on the patient's place of residence; for

example, in the United States, public coverage—primarily through state-administered Medicaid programs—is determined at the state level, with near-universal coverage for adults but markedly heterogeneous and more restricted access for adolescents.

Finally, this study does not consider the advent of the new obesity-management medications. In 2022, semaglutide —a second-generation GLP-1 receptor agonist—was the first one to be approved for the treatment of obesity in adolescents [39]. Shortly thereafter, the AAP released its Clinical Practice Guidelines, endorsing the use of both MBS but also the new obesity-management medications as part of weight management strategies for the pediatric population [40]. Most probably the advent of incretin analog drugs will play an important role in the coming years and will likely be incorporated into many obesity-treatment protocols, alone or as an adjuvant therapy to surgery [41, 42].

Despite these limitations, the high response rate (86.8%) and broad geographic coverage strengthen the relevance of our findings and provide meaningful insights into the global state of pediatric MBS today.

## **CONCLUSION:**

In conclusion, this study reveals significant variability among countries in surgical indications, and financial coverage for MBS in children and adolescents, with national criteria often diverging from —or even contradicting— international guidelines. Efforts to standardize practices and expand equitable access should be crucial to ensuring that all children and adolescents who could benefit from MBS have the opportunity to do so in a safe, evidence-based, and ethically responsible manner. IFSO should play a proactive role in generating evidence about safety of MBS in this age group of patients.

## **COMPLIANCE WITH ETHICAL STANDARDS:**

**Conflict of Interest:** The authors declare that they have no conflicts of interest.

**Ethical Approval:** This article does not contain any studies with human participants or animals performed by any of the authors.

**Informed Consent Statement:** Informed Consent does not apply.

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