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School lunch menus in Spain. A review on recommendations and policy☆

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Abstract
Introduction: An appropriate diet in childhood is essential for suitable growth and development, but it is also essential for preventing the development of non-communicable diseases in later stages. The School stage is fundamental. A significant proportion of students in Spain make use of the school lunch. We review the current situation in Spain, as well as public policy on school lunch and a nationwide review of specific legislation on each Autonomous Community.
Material and methods: National public policy and specific considerations in every Autonomous Community were reviewed. Only considerations on the composition of the school menu were considered.
Results: There are relatively recent state regulations but on school lunch menus also specific to each Autonomous Community. In general, and within a certain heterogeneity, they refer to the distribution of the diet and foods to be restricted. They usually provide guidelines, examples of daily menus, and graphic representations. Regarding school menus, there is a trend towards improvement in nutritional adequacy, but there is still room to improve. There are certain aspects related to the best solutions yet to be elucidated: management model, type of supervision, sustainability and local consumption, as well as school lunch schedules.
Conclusions: The nutritional contributions made in the school canteens are qualitatively and quantitatively important. In addition, it must fulfill educational and social equity functions.

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Although these concerns address specific recommendation in every Autonomous Community, there is huge heterogeneity on practical implementations.

PALABRAS CLAVE
Menú escolar;
Comunidad Autónoma;
Legislación;
Sostenibilidad;
Gestión

Comedores preescolares y escolares. Guías, recomendaciones y normativa en España

Resumen
Introducción: Una dieta apropiada en la infancia es fundamental para un crecimiento y desarrollo adecuados, pero también para la prevención del desarrollo de enfermedades no transmisibles. La etapa escolar es transcendental. Una proporción importante de alumnos hacen uso del comedor escolar. Se revisa la situación actual de los comedores escolares, así como la normativa y las guías para los comedores en España y en sus diferentes Comunidades Autónomas.
Material y métodos: Se recoge en esta revisión la normativa estatal así como la de cada Comunidad Autónoma referidas a las características de los menús escolares, dejando de lado las relativas a los aspectos que tienen que ver con las instalaciones o las garantías higiénico-sanitarias.
Resultados: Existe una normativa estatal sobre los comedores escolares relativamente reciente, aunque al ser una competencia transferida es desarrollada por cada Comunidad Autónoma. Dentro de una cierta heterogeneidad, hacen referencia a la distribución de la dieta y a los alimentos a restringir. Suelen dar pautas, ejemplos de menús diarios y representaciones gráficas. En general, se constata una tendencia hacia la mejoría en la adecuación nutricional, pero todavía con bastante por acordar: modelo de gestión, tipo de supervisión, sostenibilidad y consumo de proximidad, así como los horarios.
Conclusiones: Los aportes nutricionales realizados en el comedor escolar son importantes cualitativa y cuantitativamente. Además, el comedor debe cumplir funciones educativas y de equidad social. Aunque en todas las Comunidades Autónomas estas preocupaciones guían el desarrollo de la normativa espcífica, existe gran heterogeneidad en su concreción práctica.

Introduction

Traditionally, concerns and advice regarding nutrition during childhood and adolescence focused on delivering adequate nutrition to achieve optimal growth and development. However, it has been a few years since it became known that an appropriate diet is also important for prevention of disease later in life.[1] The Sustainable Development Goals established by the United Nations in 2015 include the prevention and control of noncommunicable diseases, and obesity in particular, as essential priorities.[2]

From a preventive standpoint, the first 1000 days of life have been highlighted as being of utmost importance.[3] The school-age period (including every stage: kindergarten or preschool and primary and secondary education) is also crucial.[1]

In developed countries, consumption of fruits and vegetables during the school-age period is lower than recommended, while, on the contrary, the intake of sugars, protein and saturated fats exceeds recommended limits.[4,5] In Spain, different studies have confirmed these trends.[6,7] Another aspect deserving consideration is sedentary behaviour and the decrease in the level of physical activity.[2,8]

Eating patterns (meal timing, meal frequency, types of foods) tend to adjust to varying needs throughout the day.[9] In the sociocultural environment of Spain, the main meal takes place after noon. A substantial proportion of schoolchildren, especially those in preschool and primary school, but also secondary school students, use school lunch services.[10,11] Consequently, the food consumed in the school lunch is an important part of the diet from both a quantitative and a qualitative perspective.[10] It is also important from an educational and learning perspective. Different organizations and academic institutions in Spain and abroad consider the school setting as one of the most important settings for acquiring theoretical and practical skills on health and nutrition, in addition to one of the most promising settings for the prevention of obesity, as it allows intervention on inadequate dietary habits and the promotion of healthy nutrition.[2,10,12,13] The school lunchroom, with the involvement of the entire educational community, should be considered a crucial educational component and a vehicle to spread awareness to families and society at large, a key element in the promotion of equality in nutritional education. We should add that school lunchrooms can also contribute to social cohesion, not only through providing access to subsidised meals, but also by improving the quality of the

diet of children from low-income families or disadvantaged groups.[14,15]

In this article, we summarise the current situation and the regulations and recommendations or guidelines for preschool and school lunchrooms in Spain and in each of its autonomous communities (ACs). There is no specific regional or national legislation regarding meals served in child care centres (ages 0–3 years).

We also reflect on the emerging concerns about nutrition in the school setting and the changes in nutritional recommendations in the past decade. Lastly, taking into account the main references reviewed and based on the heterogeneity of the current school meal guidelines in Spain, we highlight the main points that ought to be considered in the development of future guidelines on school food services, as well as new aspects to introduce based on the most recent evidence.

Current situation in school meals in Spain

In recent decades, a significant proportion of children and adolescents in Spain, as occurs in other developed countries, have lunch in school.[10] In the past few years, due to the restructuring of work and school schedules, the intensive morning-only schedule (versus the full-day morning/afternoon split schedule) is becoming more frequent, yet the demand for the school lunch service has been growing at a steady pace. Based on data from the Ministry of Education, and with little variation between the different ACs, in the 2001–2002 academic year, 27% of preschool students, 24% of primary school students and 13% of secondary school students were using school lunch services, with a higher proportion of users in private versus public schools.[11] In the decade that followed, there was a slight decline in the total number of users and of schools offering lunch services, possibly due to the progressive introduction of intensive morning-only schedules. However, in recent years the numbers have rebounded, so that in the 2016–2017 academic year, 34% to 45% of preschool and primary school students and 10% of secondary school students used the school lunch service. The difference between private and public schools remained, with a higher percentage of private school students using school lunch services.[16]

National framework

Although some of the current regulations are still from the late 20th century (Appendix 2), the most important laws and recommendations have been developed in this century. In 2008, the Committee on Nutrition of the AEP published a guideline with recommendations for school food services.[10] The same year, the Ministry of Health and Consumption also published a nutritional guideline in the framework of the Perseo programme.[17] In 2010, the Ministry of Education and the Ministry of Health published a consensus document about food services in schools.[14] Chapter VII of Law 17/2011, of July 5, on Food Safety and Nutrition establishes specific measures for the school setting (quality of the menus, duty to provide information to the legal guardians of the students, availability of suitable meals for students with special needs) and also mentions the ban on advertising and the sale in schools of unhealthy foods and beverages (high in saturated fats, trans fats, salt and sugar).

Regional framework

With the exception of the autonomous cities of Ceuta and Melilla, which are held to national regulations, all ACs have regional competencies and have their own regulations for school meal services (Appendix 2). Nearly all ACs have their own guidelines with nutritional recommendations for school menus and those that do not offer nutritional guidance or educational materials for support in their websites. Taking into account the goal of promoting a healthy diet, nutritional recommendations must address the composition of the diet (types of foods to eat, frequency, proportions, amounts, requirements for age) and specify which foods should be limited or even banned. We would also advise including meal standards and examples of daily menus, as well as specifying which drinks are recommended and addressing specific situations, diseases or other health-related issues.[1,4,10,17–19] To facilitate comprehension of the classification of foods by group (legumes, fruit, vegetables, dairy, etc), basic nutrients and recommended frequency of consumption (daily, weekly, occasional), guidelines often make use of graphic representations, such as the food pyramid or the healthy eating plate,[20,21] or to colour schemes: green, yellow, red.[1] Most guidelines at the AC level touch on these aspects, although they differ in the details (Table 1).

Models for the management of school food services

Order of 24 November 1992 established the possible models for the management of school food services: direct management by the school or indirect management through a contract or agreement with either an independent business or a public agency/city council providing the service. Direct management was the predominant approach at the beginning of this century,[22] but the outsourcing model has become widespread, usually with a cold-chain approach in which private companies provide schools with meals prepared in company sites that are transported in trays and served after minimal handling on the school premises.[23] Although data were not available for every AC, 63.6% of schools used external catering services and 36.4% cooked meals in kitchens in the school premises, with Galicia having the greatest number of schools with kitchens onsite and Andalusia the least.[23]

School lunch menus

In the first years of this century, several studies on school menus warned of their unhealthy nature, as they provided low amounts of vegetables, fruit and fish and excessive amounts of meat, as well as usually hypercaloric desserts (processed dairy products, canned fruit in syrup or even sweets) and with excessive use of unhealthy cooking methods (fried or ultraprocessed foods).[10]

Reports from recent years reflect a trend toward improvement in terms of the number of servings and frequency of consumption of foods relative to current nutri-

Table 1 Regulations on school food services and comparison of nutritional guidelines and recommendations.

	Regulation	Guideline with nutritional recommendations						
		Year	Composition[e]	Classification[f]	Drink[g]	Menus[h]	Restrictions[i]	Special diets[j]
1. Andalusia	Order 17/04/2017	No[a]	–	–	–	–	–	–
2. Aragon	Resolution 16/09/2013	2013	Yes, calories and servings.	Yes. Pyramid	Water	Yes	Salt/saturated fats	Coeliac disease, diabetes. Mentions adaptations for religion.
3. Asturias	Document 2009	2011	Yes. Servings	Yes. Healthy eating plate	–	No*	Salt/sugar/ saturated fats	Mentioned
4. Balearic Islands	Resolution 09/09/2003	Decree 2019	No. Model: Mediterranean diet	Yes.	Water	No	Salt/sugar/ saturated fats**	Mentioned.
5. Canary Islands	Order 25/02/2003	2011[b]	Yes. Servings.	Yes. Pyramid	–	Yes	–	–
6. Cantabria	Order 15/05/2012	No	–	–	–	–	–	–
7. Castilla la Mancha	Decree 11/10/2012	2006	Yes. Calories and servings.	Yes. Pyramid.	Water	Yes	Not explicit	Coeliac disease, diabetes.
8. Castilla and Leon	Decree 13/03//2008	2005	Yes. Calories and servings.	Yes. Pyramid and healthy eating plate	Water	Yes	Not explicit	Yes. Specific recommendations: allergies, coeliac disease, diabetes and metabolic disorders.
9. Catalonia	Decree 160/1996	2016	Yes. Servings	Not explicit	Water	No***	Not explicit	No
10. Autonomous Cities	No	–	–	–	–	–	–	–
11. Extremadura	Decree 12/09/2008	2003	Yes. Calories, servings	Yes. Food groups	Water	Yes. Cooking method	Not explicit	No
12. Galicia	Decree 01/08/2013	2014	Yes, servings, calories	Yes. Food groups	Water	Yes. Detailed	Yes, precooked dishes/sweets	No
13. Madrid	Orden 14/03/2002	2017	Yes, servings, calories.	Yes. Pyramid	Water	Yes. *,***	Avoid unhealthy foods	No
14. Murcia	Orden 17/07/2006	No[c] Decree 2010	–	–	–	–	Hypercaloric foods	Mentioned
15. Navarre	Decree 04/07/1991	No[c] Decree 2019	–	–	–	–	Hypercaloric foods	–
16. Basque Country	Order22/03/2000	2003[d]	Yes, servings	–	–	Yes	No	No
17. La Rioja	Order 28/09/2006	No[a]	–	–	–	–	–	–
18. Valencian Community	Order 28/05/2010	2018	Yes, servings, calories	Yes. Healthy eating plate	Water	Yes	Not explicit	Mentions allergies and intolerances

[a] Andalusia does not have a specific guideline but it does have recommendations and guidance materials available at the website of the Department of Education and Sports. La Rioja also does not have a specific guideline, but has materials for guidance in the regional government website, as well as a parents' guide (2019).

[b] The guideline was not specifically developed for school meals, but in the framework of a programme for the prevention of obesity (PIPO) in the Canary Islands.

[c] In Murcia and Navarre there is no guideline but there are decrees promoting healthy menus and balanced diets, and there is a ban on the sale and consumption of hypercaloric foods in schools. In Navarre, too, there is no guideline but there is a decree promoting healthy nutrition, controlling advertising and banning hypercaloric foods.

[d] The Basque Country guideline mainly focuses on food hygiene and safety. More specific guidance is available through the website of the Department of Education. There are health guidelines for different age groups for parents (2017).

[e] Composition. This refers to whether the guideline specifies the distribution of different foods in the diet and the composition (in calories and/or servings) of the school lunch.

[f] Classification of foods specifying which should be consumed frequently (healthy) and which should not (unhealthy). Graphic representations, such as the food pyramid or the healthy eating plate, are frequently used.

[g] Recommended drink for meals.

[h] Menus. The guideline gives details on the menus to be provided during the week and offers specific standards and examples.

[i] Restrictions/bans.

[j] Special diets. This column considers specific recommendations for students with medical conditions or special circumstances (such as adaptations for to religious reasons).

[*] In Asturias there are no specific standards, but there are general recommendations and there is a Department of Nutritional Guidance. A similar department also offers guidance in the Community of Madrid.

[**] The Decree in the Balearic Islands also incorporates the ban instituted by the Law on Food Safety on the sale and advertising of foods containing high amounts of saturated fats, trans fats, salt and sugars.

[***] The Catalonian guideline includes advice on ''how to eat'' and the attitude of adults accompanying the child. The Madrid guideline also mentions the need to teach how to eat.

tional guidelines.[15,22,24–31] However, all of them found that efforts must still be made to achieve adequate intakes of fruit, vegetables, whole grains, legumes, beans and fish, and to reduce the intake of meat or dairy products and the use of unhealthy cooking methods (precooked means, high-fat meat products, fried foods).

Organizational aspects and controversies

Nutritional interventions in the school setting

To have an impact on dietary habits and promote healthy choices efforts must be made in different areas,[19,32] not only strictly in nutrition (promotion of consumption of healthy foods through school meal guidelines, programmes facilitating the consumption of specific foods) but also in education (inclusion of nutrition education in the school curriculum, with promotion of culinary activities involving the students), society (involvement of families and the larger community) and the physical environment (policies to create a healthy school environment, for instance by placing restrictions and monitoring the products sold in vending machines and in shops near the school, or by banning advertisements within school grounds).

Although it is believed that the school setting is the context in which interventions to improve dietary habits may be most effective (not only on students, but also on the larger community that the school is part of), few studies have analysed evidence on nutritional interventions.[19] For instance, when it comes to interventions aimed at reducing consumption of sugary beverages, school-based interventions are less effective (as their impact is limited to the school setting) compared to interventions based on the use of warning labels (red label, warning that the product is unhealthy) or interventions based on restricting sale of these products.[33] Nevertheless, interventions on schoolchildren have proven effective in improving dietary habits (promoting consumption of fruit and vegetables and reducing consumption of saturated fats and salt), and while their impact on excess weight or metabolic risk factors has not been established, it has been hypothesised that they may contribute to reducing the mortality associated with future cardiovascular disease.[34,35]

School food service management model

In recent years, some studies have analysed whether the food service management model affects the nutritional quality of the meals provided in schools. Some studies on small samples have found that onsite preparation (school kitchens) promotes healthier nutrition compared to catering services,[23] but others with participation of larger samples of schools in specific ACs have not found a clear association, as they observed a temporal trend towards improvement in menu quality despite a concurrent increase in the indirect management or subcontracting model of school meal delivery.[24,25]

School meal guidance/oversight

The aspect in which there is widespread agreement is the benefit of overseeing school lunch services. Many studies in Spain demonstrate that guidance by accredited nutritionists not only improves the nutritional quality of school menus but also the adherence to the Law on Food Safety.[26–30]

Sustainability and consumption of local foods

In recent years, emerging concerns regarding climate change have compounded existing concerns regarding health and the prevention of diseases associated with sedentary lifestyles and unhealthy dietary habits. This situation has given rise to new proposals, such as the consumption of local and sustainable foods. The local food movement seeks to use the resources of the environment that is closest in time and space.[36] This approach has clear advantages, chief of which are the promotion of local cuisine and the use of fresh and healthy foods. An aspect to consider in this regard is the proven benefits associated with the traditional dietary patterns of certain cultures, such as the Mediterranean diet[37] or the Atlantic diet.[38] When it comes to the concern with climate change and sustainable development, dietary patterns are also important, as they not only have an impact on nutrition but also on the environment.[39,40] For instance, the Mediterranean and Atlantic diets have a lower carbon footprint.[40] As for sustainability, a strategy proposed to promote a moderate protein intake is the ''healthy eating plate'' (for instance, an adequate combination of legumes, vegetables, grains with a small serving of meat, fish or eggs), which could replace the 2 courses typically included in the main meal traditionally consumed in Spain a few times a week.[24,42,43]

The impact of timing

Another aspect worth considering is *chrononutrition*, or the influence of circadian rhythms in nutrition and health, so that the timing of meals and fasts or the distribution of foods along this daily cycle can have an impact on health and disease.[9] Along these lines, there are studies that demonstrate that consumption of meals at later times in the day or skipping breakfast are associated with greater weight gain and an increased risk of obesity. The current evidence on the subject suggests that adjusting meal patterns (meal frequency, types of food consumed) to varying needs throughout the day based on the different levels of activity.[9]

Physical activity

Based on the most recent recommendations of different institutions, we also need to highlight the need to increase physical activity to improve health.[2,8] Several reviews of the evidence on interventions on this area have been published recently, as well as recommendations for reducing sedentary behaviour and increasing physical activity in children and adolescents.[43,44]

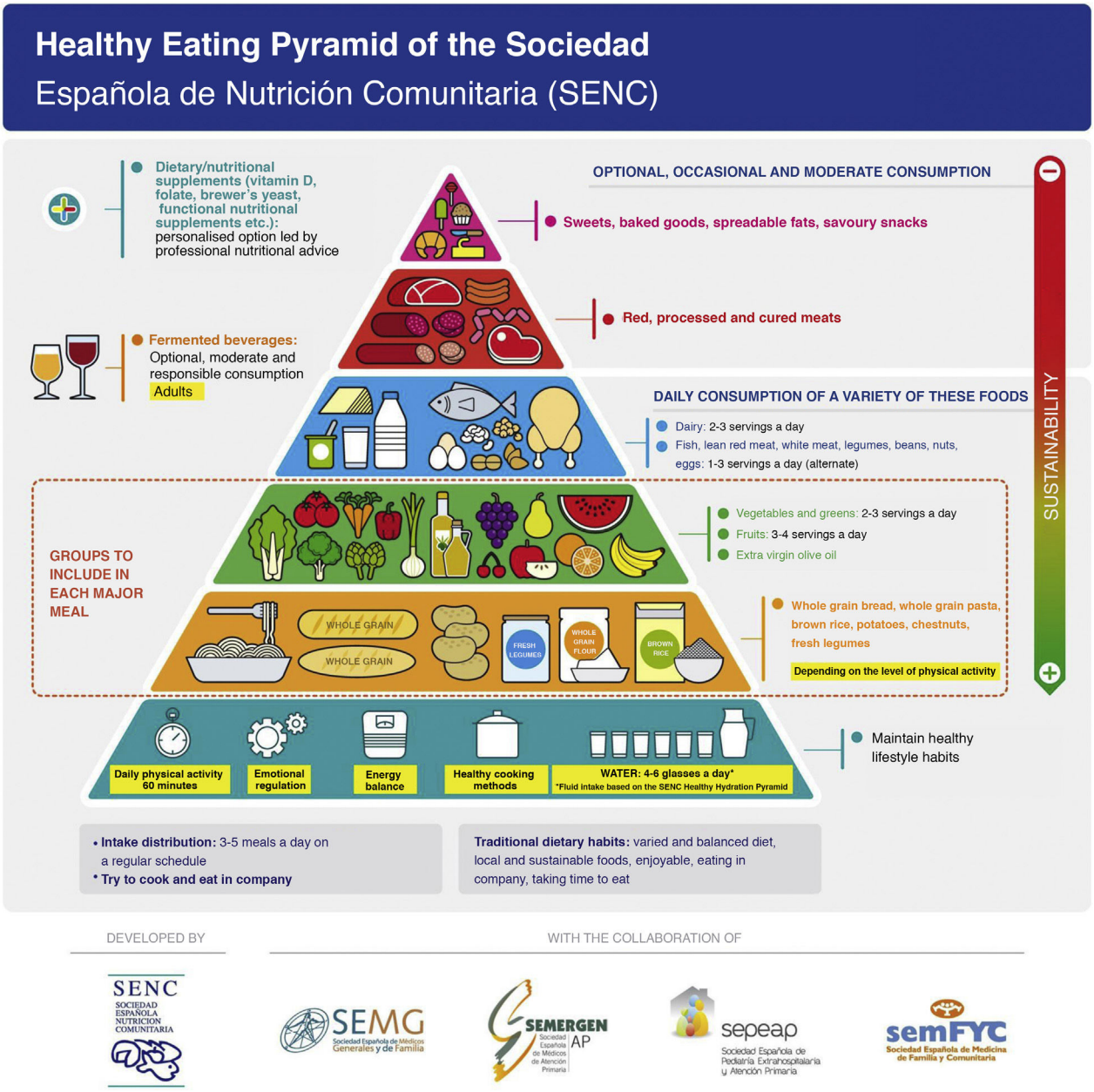

Figure 1 Healthy food pyramid. Source: Arancetra Bartrina et al.[41]

The new food pyramid

Echoing the concerns mentioned above, a large working group representing several public institutions and scientific societies of Spain recently developed a new nutritional guideline for the Spanish population that has been represented graphically in a new healthy eating pyramid.[41] the new recommendations do not refer solely to foods but also to behavioural, emotional and social factors. The way in which its elements are organised has also changed (Fig. 1). At the base of the pyramid, we find recommendations that mainly refer to behavioural aspects, such as physical activity, emotional regulation, energy balance (adjusting intake to match the level of physical activity), healthy cooking methods (such as steaming) and adequate water intake. Emotional regulation refers to the interaction between mood, emotions and eating behaviours. When it comes the paediatric population, there is moderate evidence that parenting styles and the way emotions are managed have an impact on the body weight, food choices and level of physical activity of the child. Subsequent levels of the pyramid, with accompanying recommendations regarding variety, balance and moderation in intake and serving size (appropriate for age), are occupied by the different food groups with the recommended frequency of consumption. Lastly, we ought to highlight that this pyramid also mentions sustainable foods, encouraging consumption of seasonal local foods, and incorporates new recommendations to reduce consumption of free sugars, adhering to the position of organizations like the World Health Organization (WHO) and the European Society

Table 2 General and nutritional recommendations for the school setting.

- A healthy and balanced diet must include the different foods in an appropriate distribution (in variety and amount) for age and individual needs:
  Through the day: distribution of the calories and basic nutrients contained in foods into the different meals of the day (breakfast, lunch, afternoon snack and supper). The approaches useful for this purpose are the servings per age and the healthy eating plate. School food services usually cover the main meal of the day, and therefore should provide 30% to 35% of the daily energy requirements.
  Through time: frequency of consumption (daily, several times a week, occasional, optional/exceptional) based on the food pyramid.
- The menus offered in schools should be consistent with a healthy diet. Essentially, based on current knowledge, consumption of whole grains, fruit, vegetables and legumes in a varied diet is recommended, along with moderation in the consumption of protein and fats. Current guidelines also encourage the use of olive oil and consumption of fish (ensuring variety in the species of fish offered and taking into account the mercury content of some fish*) and limited consumption of free sugars, trans fats and salt.
- Water should be the only drink accepted and promoted in the school setting.
- Specific health conditions should be taken into account to develop special menus for students as required. Other aspects, such as religious beliefs or values affecting lifestyle should be taken into account based on the resources available in the school setting.
- Standards, practical guidance and example of daily and weekly menus should be developed for school meals. The use of healthy cooking methods should also be contemplated (favouring boiling/steaming, avoiding frying and breading, discouraging processed/precooked foods) as well as adherence to food hygiene and safety measures.
- It is important to consider the emotional and behavioural aspects that affect dietary habits. Eating should be a social and pleasant activity. Attention should be paid to the physical environment where food services are offered (space, furniture, etc) to adapt it to the age of the users. The adults in charge of supervising meals should be respectful of the child's pace in eating and the child's appetite (taking age into account and setting appropriate limits).
- Systems for nutritional counselling and oversight of school menus should be set up and staffed by qualified professionals.
- Parents must be informed of the menus that will be offered each month, along with information or recommendations on how to complete the nutritional intake during the rest of the day.
- There should be active policies against unhealthy foods, discouraging or even banning their consumption in school grounds (not only in the lunchroom, but also in school celebrations). Attention must be paid to vending machines, advertising and the environment surrounding the school (''healthy food environment'').
- Encouragement of physical activity and reduction of sedentary behaviours.
- Inclusion in the school curriculum of educational programmes on nutrition and practical activities about food preparation.
- The most recent guidelines recommend promoting local and sustainable foods. Local cuisine (Mediterranean and Atlantic diets) must be a reference in the development of school lunch menus.
- Other potential recommendations that require further investigation and contingent on the results of future studies:
  Determine which is the best model for the management of school lunch services (onsite kitchen versus outsourcing).
  The healthy eating plate approach, to replace the 2 courses usually found in traditional Spanish meals.
  Improved schedules (chrononutrition). The available evidence suggests that it would be better to adjust meal schedules to fit the changing needs throughout the day and avoid late meals.

* For more information, see: AESAN. *Recomendaciones de consumo de pescado por presencia de mercurio. Agencia Española de Seguridad Alimentaria*; 2019. [accessed February 1, 2020]. Available at http://www.aecosan.msssi.gob.es/AECOSAN/web/seguridad_alimentaria/ampliacion/mercurio.htm.

for Paediatric Gastroenterology Hepatology and Nutrition (ESPGHAN).[45,46]

General and nutritional recommendations for the school setting

Nutritional guidelines are developed specifically for a given AC, age group and geographical region. While ensuring adequate growth and development during childhood and adolescence is an essential objective, at present the main concern is the prevention of obesity and noncommunicable diseases associated with excess weight or an unhealthy diet. To this end, new guidelines, as reflected in recent publications of the WHO, must include messages and advice on different areas, not only related to nutrition, but also to education and society.[2,47]

The general objectives pursued by school meal guidelines are the following: the promotion of healthy dietary habits that will contribute to improving the health of schoolchildren and prevent some diseases currently increasing in prevalence in Spain, like excess weight, to help all professionals involved in catering services to develop more appropriate menus for the school setting, and to provide guidance to schools in the selection of the healthiest menus for their food services.

We already mentioned the heterogeneity of the current guidelines for school-based food services in Spain. Considering the information reviewed for the writing of this article and taking as reference the previous docu-

ment published by the Committee on Nutrition of the Asociación Española de Pediatría (Spanish Association of Paediatrics)[10] and the school food service guideline of the Ministry of Health and Consumption of Spain,[17] for practical purposes, Table 2 summarises the basic points to consider in future guidelines for school food services along with new points to introduce based on the most recent evidence.

Conflicts of interest

The authors have no conflicts of interest to declare.

Appendix A.

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