What are healthy diets?

Joint statement by the Food and Agriculture Organization of the United Nations and the World Health Organization

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Page IV, Table 1, line 10

Delete: [10% or less]

Insert: [Less than 10%]

This correction has been incorporated into the electronic file.

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Healthy diets promote health, growth and development, support active lifestyles, prevent nutrient deficiencies and excesses, communicable and noncommunicable diseases (NCDs), foodborne diseases and promote wellbeing.

The critical role of diets in the prevention of all forms of malnutrition, for disease prevention and health promotion, as well as the interconnections between food production, diets and the environment, have never been more evident.

With such prominence in the scientific literature and public media has come a range of definitions and perspectives about what constitute healthy diets, and how these can be achieved, while protecting the environment. Heads have turned to the agrifood system and the ways in which it can and must be transformed to contribute to the commitments of ending hunger and all forms of malnutrition, elevating levels of human health, and protecting and restoring the environment. But lack of consensus of what constitute healthy diets can undermine progress and continuity of efforts to achieve them.

To accelerate progress towards the achievement of these interconnected commitments, the Food and Agriculture Organization of the United Nations (FAO) and the World Health Organization (WHO) have formulated principles of what constitute healthy diets. These principles, set out below, and recognized by the scientific literature *(1, 2),* are underpinned by guidelines and other normative elements developed by the two Organizations. Multiple dietary patterns that meet these principles, and in which foods are safe, can therefore be defined as healthy dietary patterns.

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1. Principles of healthy diets

Healthy diets need to meet four core principles, universal in their application, based on human biology and underpinned by evidence. To be healthy, diets need to be:

Adequate

Providing enough essential nutrients to prevent deficiencies and promote health, without excess.

Balanced

In energy intake, and energy sources (i.e., fats, carbohydrates and proteins) to promote healthy weight, growth and disease prevention.

Moderate

In consumption of foods, nutrients or other compounds associated with detrimental health effects.

Diverse

Including a wide variety of nutritious foods within and across food groups to favour nutrient adequacy and consumption of other health promoting substances.

In addition, **diets can only be healthy if foods and beverages are safe**. In other words, as Codex Alimentarius clarifies, if they will not cause adverse health effects to the consumers when they are prepared and/or eaten. This will require that all conditions and measures necessary to ensure the safety and suitability of food at all stages of the food chain are implemented *(3)*. Food safety ensures the prevention of foodborne diseases and the efficient utilization of nutrients. The consequences of consuming unsafe food disproportionately affect vulnerable groups, such as children and older adults.

The following sections provide a brief description of the principles, along with the current evidence and FAO and WHO guidance to substantiate each principle. FAO and WHO guidelines and recommendations are based on the current state of evidence and evolve as new evidence emerges.

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1.1 Adequate

An adequate diet is one that meets, without exceeding, nutrient requirements, specific for age, gender, body size and body composition, levels of physical activity, physiological states (e.g., pregnancy) and disease conditions.

The body is unable to synthesize most essential nutrients, and therefore they must be obtained from the diet. These include essential amino acids, essential fatty acids and most vitamins and minerals. Essential nutrients are involved in all bodily functions from growth and brain development in the fetus and young infant, to organ and muscle functioning throughout life. Inadequate intake of essential nutrients can lead to specific deficiency syndromes for single nutrients (such as scurvy for vitamin C deficiency, rickets for vitamin D deficiency, goiter for iodine deficiency), many of which are now uncommon in most parts of the world. However, many other conditions – such as, among others, impaired growth, brain development and immune system function – are affected by several causes, including multiple nutrient deficiencies.

Meeting nutrient requirements for children aged 0 to 23 months is particularly important given growth and development and the small total quantity of foods consumed. For infants 0 to 6 months of age, nutrient needs should be met through exclusive breastfeeding. As of 6 months of age, animal source foods are a good source of high quality protein and bioavailable key vitamins and minerals. Therefore, WHO recommends, in addition to continued breastfeeding, the daily consumption of animal source foods, including unprocessed meat, fish or eggs, for children in this age group *(4)*.

Dietary requirements have been defined by FAO and WHO for energy *(5)*, proteins and amino acids *(6)*, fats and fatty acids *(7)*, vitamins and minerals *(8)*, and many countries have established values for their populations. These requirements include the intake levels which are likely to prevent risk of deficiency and the levels that will limit the risk of excess. For further information, including definitions of these terms, see Annex 1 *(8)*.

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1.2 Balanced

In healthy diets, energy intake is balanced with energy requirements which vary with age, sex, levels of physical activity and during pregnancy and lactation *(5)*. Healthy diets require an adequate balance across the three primary sources of energy, that is protein, fats and carbohydrates (Table 1)[1]. Absolute requirements for the amount of protein, fat and carbohydrates in the diet vary with total energy intake, and thus are expressed as a proportion of energy intake from each. WHO recommendations for fats and carbohydrates are among those provided in Annex 2.

Table 1. Recommended intakes of protein, fat and carbohydrates as a proportion of dietary energy intake

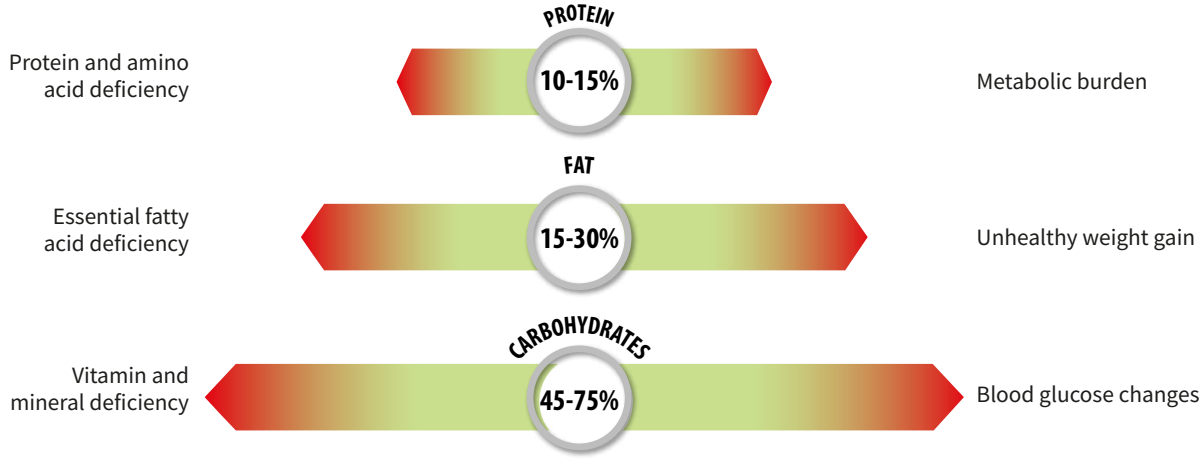
Nutrient	Recommended intakes (% of daily energy intake)		References
	Adults	Children and adolescents (2-19 years of age)	
Protein	10-15%		*(6)*
Fat	15-30%[a]	15-35%[a]	*(7,9)*
Saturated	10% or less		*(10)*
Trans	1% or less		*(10)*
Polyunsaturated	6-10%		*(10,11)*
Monounsaturated	Varies[b]		*(10,11)*
Carbohydrates	45-75%		*(12)*
Free sugars	10% or less		*(13)*

[a] Higher intakes are acceptable provided energy balance is maintained and saturated fat limits are not exceeded.

[b] Based on the amount of polyunsaturated, saturated and *trans*-fatty acids in the diet.

Consuming higher or lower proportions of energy from protein, fat and carbohydrates can have negative health consequences (**Fig. 1**).

Fig. 1. The macronutrient distribution of healthy diets



Note: The values in the centre of this schematic represent optimal ranges of macronutrient intake for adults (as a percentage of total daily calories consumed). The conditions on either side may result from consuming diets that contain macronutrient intakes outside these ranges. For references, please see Table 1.

[1] Alcohol, although a source of calories, is not considered part of a healthy diet.

Proteins provide the building blocks for much of the structural elements of the body, such as muscle, as well as functional molecules such as hormones and enzymes. To meet the body's needs, 10–15% of calories consumed per day should be from protein *(6)*. This might be slightly more during adolescence, and for athletes, body builders and others actively building and/or maintaining significant amounts of muscle mass. Consuming excessive amounts of protein however can place a metabolic burden on the body, particularly the kidneys *(14)*. Protein can come from a mix of animal and plant sources, and digestibility and quality should also be considered, particularly in childhood and adolescence. For adults, in some contexts, switching to more plant-based sources of protein may be preferable to decrease risk of cardiometabolic diseases *(15)*. In other contexts, consumption of animal source foods is still important to favour nutrient intakes.

Fat is an essential nutrient for proper functioning of cells in the body, and two fatty acids – linoleic acid and α-linolenic acid – can only be obtained from the diet. Therefore, in adults, a minimum of 15–30% of calories consumed per day should be from fat *(7)*. High intakes of fat may lead to excess energy intake and limiting intake to 30% or less may help to reduce the risk of unhealthy weight gain *(9)*. Because a likely mechanism by which fat intake impacts body weight is through an increased intake of calories, intakes of fat higher than 30% of calories consumed per day are possible, provided that energy balance is maintained and fat quality recommendations are also met. Fat consumed should be primarily unsaturated fatty acids, with 6–10% of total energy intake coming from polyunsaturated fats including linoleic acid, α-linolenic acid and long chain polyunsaturated fatty acids *(10)*. Monounsaturated fatty acids from plant sources should make up the remainder of fat intake, after taking into consideration the amounts of polyunsaturated, saturated and trans-fat consumed (see 1.3 Moderate).

Carbohydrates provide the primary energy source for the body. The amount of carbohydrate in the diet can vary and should represent the remainder of diet after taking protein and fat into account. The amount should, therefore, be 75% or less of total daily calories but generally at least 45% *(12)*. Carbohydrates should come primarily from whole grains, vegetables, fruits and pulses, and adults should aim for at least 400 grams of fruits and vegetables and 25 grams or more of naturally occurring dietary fibre from foods every day *(12)*. Amounts for children and adolescents are scaled down from adult values based on energy intake at different ages (see Annex 2).

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1.3 Moderate

As reflected by the upper limit (see 1.1 Adequate), some nutrients are essential, but in higher amounts may lead to negative health effects. Other non-essential nutrients are associated with negative health effects and therefore should be consumed in moderation or excluded from the diet.

Sodium is an essential mineral but at high intakes is associated with increased blood pressure *(16)* which can lead to cardiovascular disease. Sodium intake should be restricted to 2 grams per day (corresponding to 5 grams of table salt, i.e., sodium chloride) in adults and proportionately lower for children and adolescents based on energy intake *(17)*. Maintaining sodium intake within this limit would help maintain systolic and diastolic blood pressure of adults and children in healthy ranges, with a resulting decrease in the risk of stroke and cardiovascular events and related mortality.

Free sugars[1] are not essential nutrients and intake should be restricted to less than 10% of daily energy intake, with less than 5% associated with additional health benefits *(13)*. Reduction of free sugar consumption should be achieved without the use of non-sugar sweeteners, as evidence suggests that they do not help with long-term weight control or reducing the risk of diet-related NCDs *(18)*.

No more than 10% of daily energy should come from saturated fat and no more than 1% from trans-fat *(10)*. Industrially produced trans-fat (e.g., partially hydrogenated oils) should not be used, and therefore any trans-fat should come exclusively from meat and dairy from ruminant animals. See further details on WHO recommendations in Annex 2.

Moderation refers also to the avoidance of, or moderation in the consumption of, foods that may have negative health effects, particularly if consumed in high quantities. This relationship may be because they are sources of nutrients to limit, such as saturated fat and free sugars, or because they contain other compounds that may be detrimental to health. Two key considerations in this regard are red and processed meats and highly processed or "ultra-processed" foods.

In adults, high intakes of red meat are associated with increased risk of several diseases *(19)* and evolving evidence suggests that consumption of processed red meat, even at low levels, may have negative health consequences *(20, 21, 22)*.

A large and growing body of evidence suggests that consumption of highly processed foods described as "ultra-processed" foods (UPF) by the NOVA classification scheme (NOVA classification group 4) *(23)* is associated with negative health outcomes. These include risk of premature mortality, cancer, cardiovascular diseases, overweight, obesity and type 2 diabetes, as well as impaired mental, respiratory and gastrointestinal health *(24)*. The term UPF refers to a wide range of foods and beverages with a variety of characteristics.

[1] Monosaccharides and disaccharides added to foods and beverages by the manufacturer, cook or consumer, or naturally present in honey, syrups, fruit juices and fruit juice concentrates *(13)*.

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Many UPF are high in fats, sugar or artificial sweeteners, sodium or food additives, and many have undergone processing that alters the structure of the original food ingredients through a variety of processes. Evidence suggests that the associations with negative health effects go beyond their fat, sodium and sugar content *(24)*. An acceptable level of UPF consumption has not yet been defined, and further research is needed to understand the relationships between UPF intakes and disease outcomes.

1.4 Diverse

Diverse diets, based on a wide variety of foods, between and within food groups, are associated with a greater likelihood of meeting vitamin and mineral requirements *(25–32)*. The only exception to this is during the first six months of life when infants should receive only breastmilk.

Distinct food groups and foods within them differ in the content and density of essential nutrients and many other bioactive components *(33–36)*. Several prospective studies have reported lower mortality and diet-related NCD rates among participants with higher food group diversity *(37, 38)*, greater diversity within specific food groups (e.g., fruit and vegetables) *(39)* and higher species diversity of whole dietary patterns *(40)*.

Dietary diversity is, therefore, a fundamental element of healthy diets and a long-standing public health principle widely accepted and advocated for in food-based dietary guidelines *(41)*, FAO and WHO's guiding principles for sustainable healthy diets *(42)*, WHO recommendations for children aged 6–23 months *(4)* and the technical report on healthy diet metrics from WHO, FAO and UNICEF *(43)*. It is possible for people to have a sufficiently diverse diet across different ages, food environments, seasons, dietary restrictions (e.g., vegetarian) or cultural preferences (see In conclusion: celebrating healthy dietary patterns).

Dietary diversity is conventionally measured by a count of food groups consumed over a given reference period, with or without minimum food group intake criteria *(25, 44, 45)*. The variety of possible dietary patterns is often reflected in the questionnaire. For example, Minimum Dietary Diversity for Women (MDD-W) is one indicator that uses intake of food groups to reflect dietary diversity. While the 10 food groups used for MDD-W are universal (e.g., "milk and milk products"), when the questionnaire is administered at a local level, the food groups are populated with examples of locally available, commonly consumed foods that best represent the food group (e.g., kefir in one context, camel milk in another) *(27)*. This consistent structure allows for the capture of locally relevant dietary diversity data that is generalizable and comparable across contexts – essential for national and global monitoring of diets.

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In conclusion: celebrating healthy dietary patterns

While the principles of healthy diets are universal, dietary patterns – the combinations of foods and beverages consumed over time – are highly contextual. Dietary patterns are determined by a wide variety of social, economic and environmental factors including individual preferences and beliefs, culture, traditions, religion, income and the availability and affordability of foods.

Many dietary patterns can be healthy, as long as they meet the four core principles outlined above and are made up of safe foods. Recommended healthy dietary patterns in context are articulated in national dietary guidelines that are based on local considerations and evidence and that provide recommendations for combinations of food groups, their proportionality and sometimes frequency.

Dietary patterns also have important implications for the environment through their impact on agrifood systems, including greenhouse gas emissions and use of natural resources (land and water, biodiversity and deforestation). Dietary patterns are also impacted and shaped by agrifood systems that, in many contexts, are constrained to provide enough nutritious food for all because of the overuse of natural resources compounded by antimicrobial resistance, zoonoses, biodiversity loss, greenhouse gas emissions, air and water pollution and other issues. Shifts to healthy dietary patterns must therefore be an important pillar of agrifood systems' transformation and can contribute to overcoming the current inequities in access to healthy diets.

Food-based dietary guidelines have long been used by countries to characterize healthy diets in context, and to inform consumer education. Such guidelines have the potential for utilization far beyond consumer education, and to bring the environmental, socio-cultural and economic considerations needed to enable healthy diets for all to the forefront in characterizing healthy diets from sustainable agrifood systems in context. Taking these aspects into consideration, a new methodology for the development of dietary guidelines with an agrifood systems' lens will soon be published by FAO *(46)*.

With this statement we urge consistency in framing of healthy diets based on the four core principles outlined here, and comprised of safe foods and water. We also encourage everyone, everywhere, to recognize and celebrate the diversity of healthy dietary patterns and the sustainable agrifood systems that can promote and protect human and planetary health. We urge all governments to develop (or update) and use dietary guidelines developed with an agrifood systems' lens to inform policies and programmes that promote and enable healthy dietary patterns from sustainable agrifood systems for all.

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ANNEX 1

Definition of terms related to dietary requirements and associated terminology used by various agencies and organizations

As of now, several methodological approaches are used to set dietary requirements leading to some variability in both values and assumptions that underpin them. The need to harmonize these methodological approaches has been recognized, especially concepts such as an estimated average requirement for setting recommended intake ranges, upper tolerable nutrient intake levels, extrapolation and functional outcomes, and research tools and resources.

	Definition	WHO/FAO[a]	IOM[b]	EFSA[c]	NASEM 2018[d,e]
Average Nutrient Requirement	The average daily nutrient intake level that meets the needs of 50% of the "healthy" individuals in a particular age and gender group	EAR	AR	AR	AR
Recommended Nutrient Intake	The average daily nutrient intake that is sufficient to meet the nutrient requirements of nearly all (97–98%) apparently healthy individuals in a particular life stage and gender group	RNI	RDA	PRI	RI
Tolerable Upper Intake Level	The highest average daily nutrient intake that is likely to pose no risk of adverse health effects to almost all (97.5%) healthy individuals in an age- and sex-specific population group	UL	UL	UL	UL
Adequate Intake	The recommended average daily intake based on observed or experimentally determined approximations or estimates of nutrient intake by a group (or groups) of apparently healthy people that are assumed to be adequate. It is used when a recommended intake cannot be determined	AI	AI	AI	AI

AI: adequate intake; AR: average requirement; EAR: estimated average requirement; EFSA: European Food Safety Authority; IOM: Institute of Medicine; NASEM: National Academies of Sciences, Engineering and Medicine; PRI: population reference intake; RI: recommended intake; RNI: reference nutrient intake; RDA: recommended daily allowance; UL: upper tolerable intake level (FAO/WHO); safe upper intake level (NASEM); tolerable upper intake level (IOM and EFSA).

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[b] Institute of Medicine (US) Standing Committee on the Scientific Evaluation of Dietary Reference Intakes. Dietary Reference Intakes for Calcium, Phosphorus, Magnesium, Vitamin D, and Fluoride. Washington (DC): National Academies Press (US); 1997. PMID: 23115811.

[c] European Food Safety Authority. Dietary reference values for nutrients. [Internet] Summary report EFSA Supporting Publication; 2017;2017:e15121 (http://onlinelibrary.wiley.com/doi/10.2903/sp.efsa.2017.e15121/epdf).

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[e] National Academies of Sciences, Engineering, and Medicine. Harmonization of approaches to nutrient reference values: applications to young children and women of reproductive age. Washington (DC): National Academies Press; 2018. 10.17226/25148.

Source: Adapted from Allen LH, Carriquiry AL, Murphy SP. Perspective: Proposed Harmonized Nutrient Reference Values for Populations. Adv Nutr. 2020 May 1;11(3):469-483. doi:10.1093/advances/nmz096.

ANNEX 2

WHO recommendations on selected nutrients (and links to the guidelines)

Fat

1. **To reduce the risk of unhealthy weight gain, WHO suggests that adults limit total fat intake to 30% of total energy intake or less** (*conditional recommendation*)[1].
2. **WHO recommends that adults and children reduce saturated fatty acid intake to 10% of total energy intake** (*strong recommendation*).
3. **WHO suggests further reducing saturated fatty acid intake to less than 10% of total energy intake** (*conditional recommendation*).
4. **WHO recommends replacing saturated fatty acids in the diet with polyunsaturated fatty acids** (*strong recommendation*), **monounsaturated fatty acids from plant sources** (*conditional recommendation*), **or carbohydrates from whole grains, vegetables, fruits and pulses** (*conditional recommendation*).
5. **WHO recommends that adults and children reduce trans-fatty acid intake to 1% of total energy intake** (*strong recommendation*).
6. **WHO suggests further reducing trans-fatty acid intake to less than 1% of total energy intake** (*conditional recommendation*).
7. **WHO recommends replacing trans-fatty acids in the diet with polyunsaturated fatty acids or monounsaturated fatty acids primarily from plant sources** (*conditional recommendation*).

Carbohydrate

1. **WHO recommends that carbohydrate intake should come primarily from whole grains, vegetables, fruits and pulses** (*strong recommendation*).
2. **In adults, WHO recommends an intake of at least 400 grams of vegetables and fruits per day** (*strong recommendation*).
3. **In children and adolescents, WHO suggests the following intakes of vegetables and fruits:** (*conditional recommendation*)
   - 2–5 years old, at least 250 grams per day
   - 6–9 years old, at least 350 grams per day
   - 10 years or older, at least 400 grams per day.
4. **In adults, WHO recommends an intake of at least 25 grams per day of naturally-occurring dietary fibre as consumed in foods** (*strong recommendation*).
5. **In children and adolescents, WHO suggests the following intakes of naturally-occurring**

[1] WHO recommendations can either be strong or conditional, based on a number of factors. Strong recommendations are those recommendations for which the WHO guideline development group is confident that the desirable consequences of implementing the recommendation outweigh the undesirable consequences. Strong recommendations can be adopted as policy in most situations. Conditional recommendations are those recommendations for which the WHO guideline development group is less certain that the desirable consequences of implementing the recommendation outweigh the undesirable consequences or when the anticipated net benefits are very small. Therefore, substantive discussion amongst policy-makers may be required before a conditional recommendation can be adopted as policy. For more information see WHO Handbook for guideline development, 2nd edition. Geneva: WHO; 2014.

dietary fibre as consumed in foods (*conditional recommendation*)

- 2–5 years old, at least 15 grams per day
- 6–9 years old, at least 22 grams per day
- 10 years or older, at least 25 grams per day.

6. **WHO recommends a reduced intake of free sugars throughout the life course** (*strong recommendation*).
7. **WHO recommends reducing the intake of free sugars to less than 10% of total energy intake** (*strong recommendation*).
8. **WHO suggests a further reduction of the intake of free sugars to below 5% of total energy intake** (*conditional recommendation*).

Sodium, potassium and non-sugar sweeteners

1. **WHO suggests that non-sugar sweeteners not be used as a means of achieving weight control or reducing the risk of noncommunicable diseases** (*conditional recommendation*).
2. **WHO recommends a reduction in sodium intake to reduce blood pressure and risk of cardiovascular disease, stroke and coronary heart disease in adults** (strong recommendation). **WHO recommends a reduction to <2 g/day sodium (5 g/day salt) in adults** (*strong recommendation*).
3. **WHO recommends a reduction in sodium intake to control blood pressure in children** (*strong recommendation*). The recommended maximum level of intake of 2 g/day sodium in adults should be adjusted downward based on the energy requirements of children relative to those of adults.
4. **WHO recommends an increase in potassium intake from food to reduce blood pressure and risk of cardiovascular disease, stroke and coronary heart disease in adults** (*strong recommendation*). WHO suggests a potassium intake of at least 90 mmol/day (3510 mg/day).

For more information, please contact:

World Health Organization

Avenue Appia 20, CH-1211 Geneva 27, Switzerland

E-mail: nfs@who.int

https://www.who.int/teams/nutrition-and-food-safety/overview

Food and Agriculture Organization of the United Nations

Food and Nutrition Division

Viale delle Terme di Caracalla, 00153 Rome, Italy

E-mail: nutrition@fao.org

www.fao.org/nutrition

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