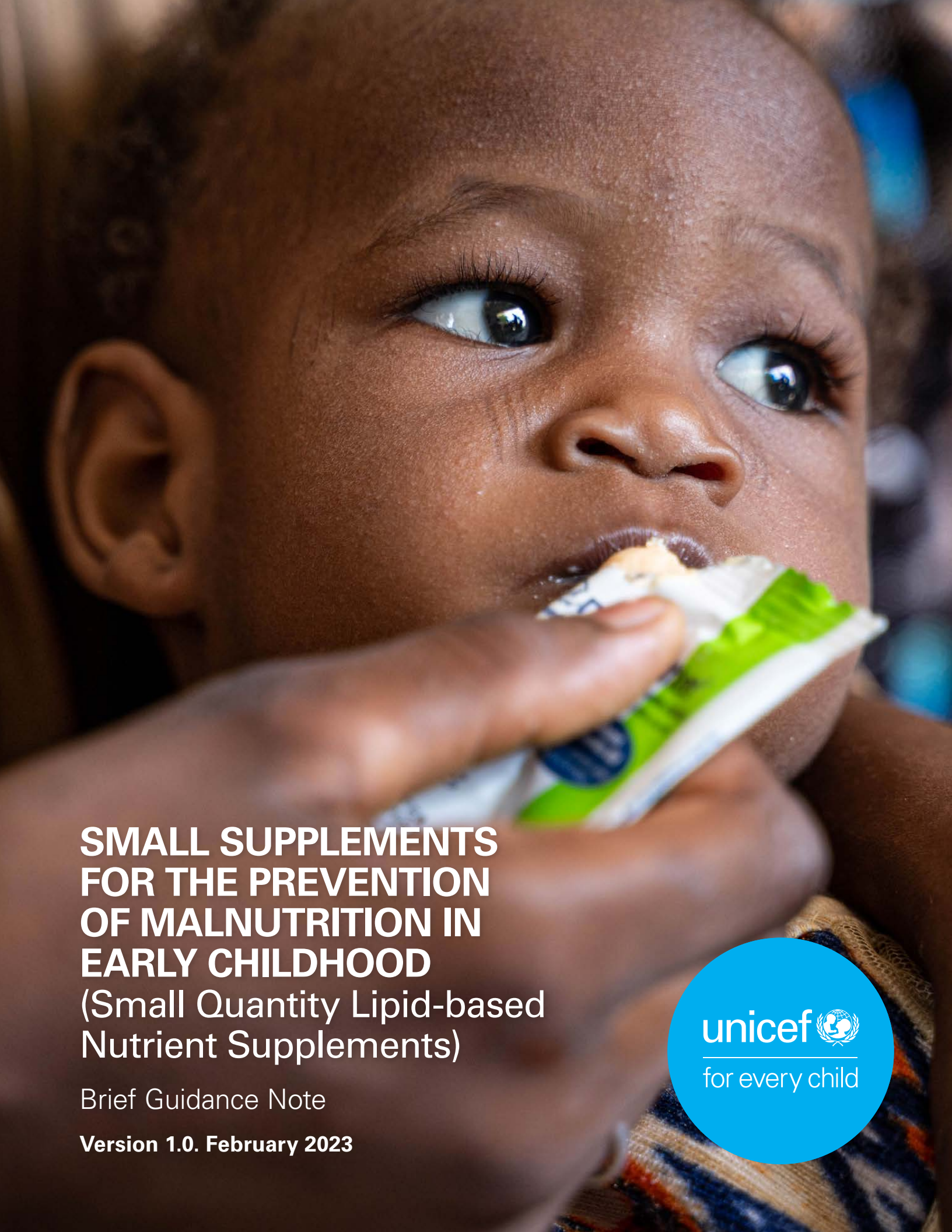

SMALL SUPPLEMENTS FOR THE PREVENTION OF MALNUTRITION IN EARLY CHILDHOOD

(Small Quantity Lipid-based Nutrient Supplements)

Brief Guidance Note

Version 1.0. February 2023

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SMALL SUPPLEMENTS FOR THE PREVENTION OF MALNUTRITION IN EARLY CHILDHOOD
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BRIEF GUIDANCE NOTE

Version 1.0. February 2023

*This document is version 1.0 of guidance on the use of Small Quantity Lipid-based Nutrient Supplements (*SQ-LNS*) in UNICEF nutrition programming. It is intended to be used primarily by UNICEF country office staff, but it can also serve as a tool for governments and agencies responding to the nutritional needs of nutritionally vulnerable children 6–23 months of age. The technical content of the document is based on the latest available evidence; it will be updated as new evidence emerges, including from operational settings.*

Guiding principle: In line with the *Nutrition Strategy 2020–2030*,[1] UNICEF is committed to the prevention of all forms of malnutrition in infants and young children including stunting, wasting, micronutrient deficiencies and overweight. As such, UNICEF maternal and child programmes prioritize context-specific programming that is informed by an analysis of the nutrition situation and the human and financial resources and partnerships available. To improve the diets of young children and prevent malnutrition, UNICEF advocates for and supports policies, strategies and programmes that protect and promote age-appropriate complementary foods and feeding practices in the first two years of life. The use of SQ-LNS in early childhood nutrition should reflect these programming principles, including promoting access to and use of nutritious, safe, diverse, and affordable foods, and improving counselling to caregivers by service providers and community workers.

1. What is SQ-LNS?

SQ-LNS are nutrition supplements embedded in a small amount of food paste (around 20 g per sachet) that provide 24 micronutrients and macronutrients (Annex 1). They are considered a type of home fortification, much like multiple micronutrient powders, because they can be mixed with foods prepared for infants and young children in the home, they can also be eaten straight from the sachet. SQ-LNS are designed to complement the diets of children aged 6 months and older by providing multiple micronutrients with a food base that also provides energy, protein and essential fatty acids.

SQ-LNS are designed mainly to **prevent** undernutrition and **improve** child survival, growth and development. They should be used as part of the toolkit to prevent undernutrition and micronutrient deficiencies in early childhood, with priority of use in settings where vulnerable children are likely to have significant nutrient gaps in their diets and where micronutrient deficiencies are common. SQ-LNS have been found to contribute to decreasing the risk of child mortality, stunting, wasting, anaemia, and iron deficiency[2] among the most vulnerable children. SQ-LNS are highly acceptable by caregivers and children,[3] with high average compliance (70 to 100 per cent).[4] They are easy to use and do not need to be mixed with water before consumption. SQ-LNS are NOT a replacement for breastmilk. See Annex 1 for details on the composition of SQ-LNS.

2. Why is UNICEF prioritizing SQ-LNS as part of the package of preventive actions?

The latest evidence[5] shows that SQ-LNS are effective in the prevention of early childhood malnutrition, particularly in populations with high levels of child stunting, wasting, micronutrient deficiencies and nutrient gaps in the diets of young children. In these populations, SQ-LNS can reduce the prevalence of stunting by 12 to 14 per cent and the prevalence of severe wasting by 31 per cent.[6] SQ-LNS can also lower the prevalence of micronutrient deficiencies, including anaemia (by 16 per cent), iron deficiency (by 56 per cent), and iron deficiency anaemia (by 64 per cent),[7] while supporting cognitive, socio-emotional, and motor development, with gains equivalent to one to five IQ points depending on the nutritional status.[8] Evidence also suggests that between the ages of 6 and 24 months, SQ-LNS can reduce the risk of all-cause child mortality by around 27 per cent.[9] The *Lancet* series on Maternal and Child Undernutrition (2021)[10] noted the strong evidence in support of SQ-LNS among children at risk and included it within the list of recommended interventions. Initial evidence shows that the use of SQ-LNS could be more cost-effective than other interventions in averting child deaths, preventing child malnutrition and supporting child development.[11]

UNICEF is committed to the delivery of proven essential actions for the early prevention, detection and treatment of child wasting and the prevention of stunting and micronutrient deficiencies. The evidence related to SQ-LNS is highly relevant to the prevention of malnutrition, especially in food insecure areas and for nutritionally vulnerable young children.

3. Integrating SQ-LNS into existing preventive programmes for the most vulnerable children aged 6–12 months in fragile settings

As part of the prevention of malnutrition, specifically wasting, agenda, efforts should be made to identify the main drivers of undernutrition including poor infant and young child feeding practices and review existing interventions to address gaps in feeding practices. The provision of SQ-LNS should be part of a larger effort to promote growth and improve the diets of infants and young children, in line with the UNICEF programming guidance on improving diets of young children during the complementary feeding period.[12] The decision to use SQ-LNS as a preventive measure and part of the prevention toolkit should take into consideration the vulnerability of younger children, the level of food insecurity, the fragility of the situation, and the capacity to ensure equity in the response, as described in Table 1.

While programming with SQ-LNS at scale outside of an operational research setting, remains limited to date, UNICEF proposes an integrated approach that targets the youngest children, in settings that are food insecure and with high levels of undernutrition (wasting and stunting) and micronutrient deficiencies. In contexts with limited resources, UNICEF proposes to also consider using household/child level indicators that would be defined at the country level as described in Table 1 on page 4.

4. Considerations for integrating SQ-LNS within existing preventive nutrition interventions

Once the decision is taken to use SQ-LNS based on population criteria (Table 1), the structures and services (entry points) through which SQ-LNS is to be administered will depend on existing platforms and programming. Ideally, the provision of SQ-LNS should be integrated into planned or existing services and structures rather than administered as a stand-alone intervention. This will ensure greater effectiveness and efficiency and increased cost effectiveness.

To support the integration of SQ-LNS into existing programming, consider the following:

- **Identify at-risk children through existing outreach or growth monitoring and promotion channels.** Nutritionally at-risk infants and young children *(criteria described in Table 1)* should be identified using existing growth monitoring and promotion or community outreach screening channels. These channels can include health facilities through which growth monitoring and promotion occurs as well as existing integrated community case management. Children can be identified using different anthropometric measures as specified by the country criteria that identify recent growth faltering,[13] with risk factors, including increasing food insecurity as classified by IPC 3 and above.

- **Provide SQ-LNS through existing nutrition prevention programmes.** Infants identified as having the potential to benefit from SQ-LNS (Table 1) should receive the product as part of an integrated package of preventive interventions. These include facility- and community-based programmes for counseling on infant and young child feeding, monitoring and promoting child growth, care and development, and for the early detection and treatment of child wasting. Efforts to improve the diet quality of infants and young children and promote appropriate feeding practices should be an integral part of the intervention.

- **Explore opportunities for integration with existing nutrition programmes and galvanize support from other sectors, including health, water and sanitation and social protection, and food assistance.**
  - **Health, water and sanitation:** Immunization and child health programmes may serve as a channel for provision of SQ-LNS. Clean drinking water, improved sanitation facilities, and good hygiene practices contribute to a decreased risk of infections and nutrition vulnerability. Also, existing water and sanitation programmes can be used as platforms for delivering SQ-LNS along with nutrition education.
  - **Food assistance and social protection:** Providing SQ-LNS alone is not sufficient to sustain food and energy needs,[14] especially in food insecure contexts. There is a need to ensure that existing social protection and food assistance schemes remain in place. Cash assistance or vouchers for vulnerable families have well established delivery systems that can be leveraged to meet household nutritional needs which can then be optimized through the provision of SQ-LNS.

Table 1: Approach for integrating SQ-LNS in preventive programming

	Criteria	Justification
Which populations?	Areas and contexts with a high burden of child nutritional vulnerability, including stunting, wasting, micronutrient deficiencies, food insecurity, poor complementary feeding indicators (MDD and MAD), and poor growth and development outcomes. Areas and contexts that have limited access to nutritious foods.	SQ-LNS can to be considered as part of a package of interventions for nutritionally at-risk populations (e.g., those with a high prevalence of stunting, wasting and anaemia, with an emphasis on contexts with high wasting and treatment relapse rates, mortality and micronutrient deficiencies). SQ-LNS can also be used during humanitarian emergencies as part of a preventive package of interventions and where housefold food access is supported. SQ-LNS should be considered in contexts facing high levels of acute food insecurity (IPC severity phases 3–5 for acute food insecurity) and limited access to nutritious foods (e.g., prior to lean season). However, SQ-LNS should be part of a programme that already has secured household food access interventions, e.g., through food or cash transfers as it cannot be impactful in their absence.
Which children?	Children at risk of wasting and/or suffering from stunting or micronutrient deficiencies.	SQ-LNS is most effective for young children given they are at high risk of mortality and malnutrition. The criteria for identifying children that would benefit from SQ-LNS is **to be defined at the country level** and may include: • Children who have recently recovered from severe wasting (mid-upper arm circumference of >12.5 cm or WHZ>2.0) • Children showing signs of growth faltering (identified through repeated growth monitoring) • All children within the identified age group that belong to a high-risk community, as described in point 1 of this table.
Age group	6–11 months at a minimum; (can also be effective in children up to 23 months of age, but largest impact is in younger children).	SQ-LNS are designed to be provided during the complementary feeding period (6–23 months of age), when nutrient density requirements are high and diets are likely to be deficient in multiple micronutrients and possibly essential fatty acids. There is evidence that the benefits are greatest when SQ-LNS begins at 6 months of age.[16] In addition, iron requirements are higher for infants 6–11 months of age (compared with young children 12–23 months of age), while the intake of iron-rich foods is likely lower at younger ages. Therefore, UNICEF will prioritize the provision of SQ-LNS during the key age interval of 6–11 months for the prevention of malnutrition, however we recognize their value in children up to 23 months.
Dosage	20 g per day	Providing an additional 110–124 kcal per day.
Duration	At least 6 months	SQ-LNS is to be provided to vulnerable children beginning at 6 months of age until 12 months of age for a minimum of 6 months, however it can be provided for a longer duration up to 12 months. If introduced at a later age, between 6 and 12 months, it should be provided for a minimum period of 6 months but can also be extended for up to 12 months.
Modality	With age-appropriate food or separate	The product is easy to squeeze out of the sachet and presents minimal oil separation. It could be mixed with age-appropriate and adequate complementary food or be eaten or fed directly from the sachet with no prior cooking, dilution or preparation. SQ-LNS are intended to fortify and supplement children's diets; they should not replace home-prepared complementary food or breastmilk.

- **Ensure appropriate counselling on nutrition and the use of SQ-LNS.** SQ-LNS should not replace complementary foods, but rather provide a supplement to enrich the diets of young children. Therefore, interventions should ensure that appropriate counseling and promotion programmes coupled with social and behavior change interventions are in place to protect, promote and support breastfeeding and dietary diversity and prevent the perception that SQ-LNS is meant to replace the food the child eats.

- **Consider existing programmes for the treatment of child wasting and access to/availability of, other nutrition products.** To prevent any potential misuse of SQ-LNS (e.g., incorrect use as a treatment of child wasting), ensure that children suffering from severe wasting/acute malnutrition are referred to appropriate treatment. It is also important to consider the role or availability of other existing nutrition products such as multiple micronutrient supplements/powders and LNS-Medium Quantity before introducing SQ-LNS as it may not be required.

- **Monitor and document learning related to integration of SQ-LNS.** Given the limited scale of programming at present, it is important to ensure that the integration of SQ-LNS is closely monitored and that learning is documented to provide feedback and evidence that can guide the future updates of this guidance.

Contact and Feedback

Please contact nutrition@unicef.org for feedback on the use of SQ-LNS at the country level or to request additional support, including opportunities to provide learning / webinars to country teams.

Additional resources

Additional information can be found in these resources:

1. UC Davis page on SQ-LNS
2. SQ-LNS FAQs
3. Fortified Spread, Sachet 20g/CAR-546. supply.unicef.org
4. Technical Specifications for Lipid-Based Nutrient Supplement – Small Quantity SQ-LNS. World Food Programme, 26 Oct. 2020.
5. USAID Advancing Nutrition Program Guidance
6. IFRC/ICRC product catalogue
7. Master Class on Prevention of Malnutrition – Use of SQ-LNS

Small supplements for the prevention of malnutrition in early childhood (Small Quantity Lipid Nutrient Supplement)

ANNEX 1

What is the composition of SQ-LNS?

SQ-LNS usually include omega-3 fatty acid-rich vegetable oil (e.g., canola/rapeseed or soybean oil), legumes (e.g., peanut, chickpea, lentil, and/or soy), milk powder and a small amount of sugar (for palatability). In addition, the formulation is fortified with 23 vitamins and minerals, including micronutrients (e.g., vitamin A, B vitamins, iron, etc.) and macrominerals (e.g., calcium, potassium, phosphorus, and magnesium). SQ-LNS for children generally contain the daily recommended intake of the essential fatty acids (e.g. alpha-linolenic acid) as well as each micronutrient, and lower amounts of the macrominerals.

SQ-LNS for children do not provide more than the recommended daily intake of micronutrients; therefore, there is no risk of excess intake of vitamins or minerals at the recommended dose of one sachet per day. SQ-LNS interventions may be protective against peanut allergy, as the current recommendation for allergy prevention is to introduce peanuts in the first year of life.[15]

Nutrient content per 20 g			
Energy value:	110–124 kcal	Niacin:	4.0–5.76 mg
Proteins:	2.4–3.2 g	Calcium:	280–392 mg
Lipids:	8–10.6 g	Phosphorous:	196.4–275 mg
Omega 6 fatty acids:	0.8–3 mg	Potassium:	200–280 mg
Omega 3 fatty acids:	0.5-0.8 mg	Magnesium:	40–56 mg
Vitamin A:	400–678 µgRE	Zinc:	8–11.2 mg
Vitamin C:	15–33.8 mg	Copper:	0.34–0.44 mg
Vitamin B1:	0.3–0.76 mg	Iron:	6–8.4 mg
Vitamin B2:	0.4–0.6 mg	Iodine:	90–148.4 µg
Vitamin B6:	0.3–0.46 mg	Selenium:	20–32 µg
Vitamin B12:	0.5–0.84 µg	Manganese:	1.2–1.8 mg
Folic acid:	133.4–208.8 µg	Sodium:	<54 mg
Pantothenic acid:	1.8–2.8 mg		

Storage and shelf life

SQ-LNS normally have a minimum shelf life of 24 months when stored at up to 30°C in a cool, dry place and in hygienic conditions, away from direct sunlight. Once a sachet is open, it should be used within 24 hours. If the product is mixed with other food, it should be consumed within 2 hours. Sachets should be stored in a clean, cool place. Throughout the shelf life of the product, there may be slight oil separation.

Cost and volume estimates

The estimated price per sachet is US$0.06–$0.09, with 600 sachets per carton.

Carton size	600 sachets
Sachet size	20 g
Listing name	Fortified spread, sachet 20 g/CAR 600
Price	US$45.70 /carton
Material number	S0000320

See UNICEF catalogue for up to date prices: https://supply.unicef.org/s0000323.html

Endnotes

1 United Nations Children's Funds. (UNICEF). Nutrition, for Every Child: UNICEF Nutrition Strategy 2020-2030. UNICEF, New York. https://www.unicef.org/reports/nutrition-strategy-2020-2030

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4 Dewey, K. G., Wessells, K. R., Arnold, C. D., Prado, E. L., Abbeddou, S., Adu-Afarwuah, S., ... & Stewart, C. P. (2021). "Characteristics that modify the effect of small-quantity lipid-based nutrient supplementation on child growth: an individual participant data meta-analysis of randomized controlled trials." *The American journal of clinical nutrition,* 114(Supplement_1), 15S-42S.

5 An individual participant data analysis of 14 randomized controlled trials of SQ-LNS provided to children 6–24 months of age (n>37,000 children) conducted in low- and middle-income countries in Asia, sub-Saharan Africa and Latin America and the Caribbean (Dewey, Stewart et al. 2021).

6 Dewey, K. G., Arnold, C. D., Wessells, K. R., Prado, E. L., Abbeddou, S., Adu-Afarwuah, S., ... & Stewart, C. P. (2022). Preventive small-quantity lipid-based nutrient supplements reduce severe wasting and severe stunting among young children: an individual participant data meta-analysis of randomized controlled trials. *The American Journal of Clinical Nutrition,* 116(5), 1314-1333.

7 Wessells, K. R., Arnold, C. D., Stewart, C. P., Prado, E. L., Abbeddou, S., Adu-Afarwuah, S., ... & Dewey, K. G. (2021). "Characteristics that modify the effect of small-quantity lipid-based nutrient supplementation on child anemia and micronutrient status: an individual participant data meta-analysis of randomized controlled trials." The American journal of clinical nutrition, 114(Supplement_1), 68S-94S.

8 Prado, E. L., Arnold, C. D., Wessells, K. R., Stewart, C. P., Abbeddou, S., Adu-Afarwuah, S., ... & Dewey, K. G. (2021). "Small-quantity lipid-based nutrient supplements for children age 6–24 months: a systematic review and individual participant data meta-analysis of effects on developmental outcomes and effect modifiers." *The American journal of clinical nutrition,* 114(Supplement_1), 43S-67S.

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13 Victora, C. G., De Onis, M., Hallal, P. C., Blössner, M., & Shrimpton, R. (2010). "Worldwide timing of growth faltering: revisiting implications for interventions." *Pediatrics*, 125(3), e473-e480.

14 Fenn, B., Myatt, M., Mates, E., Black, R. E., Wilkinson, C., & Khara, T. (2021). "Effects on child growth of a reduction in the general food distribution ration and provision of small-quantity lipid-based nutrient supplements in refugee camps in eastern Chad." *BMJ Nutrition, Prevention & Health,* 4(1), 235.

15 Togias, A., Cooper, S. F., Acebal, M. L., Assa'ad, A., Baker, J. R., Beck, L. A., ... & Boyce, J. A. (2017). Addendum guidelines for the prevention of peanut allergy in the United States: report of the National Institute of Allergy and Infectious Diseases–sponsored expert panel. *World Allergy Organization Journal,* 10, 1-18.

16 For example, in the MAHAY (Madagascar) trial, children were enrolled and began consuming SQ-LNS between 6–11 months of age. The investigators reported significant effects on stunting only among children who started SQ-LNS at the age of 6 months (Galasso 2019).

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