SUPER CEREAL PLUS (SC+) AND THE WELL-BEING OF CHILDREN FROM 6 TO 24 MONTHS IN THE CONTEXT OF EL SALVADOR'S NUTRITION TRANSITION

DISCUSSION PAPER

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WORLD BANK GROUP
Health, Nutrition & Population

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Health, Nutrition, and Population (HNP) Discussion Paper

Super Cereal Plus and the Well-Being of Children from 6 to 24 Months in the Context of El Salvador's Nutrition Transition

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Abstract:

El Salvador is in a nutrition transition. In the past 20 years, stunting rates have declined by 25 percent in young children, while overweight and obesity have reached epidemic proportions, affecting about 60 percent of reproductive-age (15 to 49 years) women and increasing among children under five. To accelerate the progress in reducing stunting, anemia, and other micronutrient deficiencies, the government launched several interventions over the last three decades. This included mandatory fortification of staple foods, distribution of micronutrient supplements to all children, and distribution of fortified-blended foods (FBFs) in most municipalities. The implementation of programs such as these should be considered only after an analysis has been made of the target population's nutritional needs; the context surrounding the program; and the availability, affordability, effectiveness, and acceptability of the intervention (de Pee and Bloem 2009; PAHO 2003).

The aim of this paper is to discuss the effect and potential risks of distributing Super Cereal Plus (SC+) to the general population of children under two in the current epidemiological context of El Salvador. Evidence is unclear about the impact of fortified-blended foods, such as SC+, in preventing stunting. In El Salvador, there are concerns about children's energy intake being a contributing factor to obesity. Furthermore, the micronutrient intake of young children through the interventions mentioned above may be excessive and potentially harmful.

Keywords: Nutrition, Super Cereal Plus, stunting, obesity, micronutrient

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PART I – BACKGROUND

Adequate nutrition, including exclusive breastfeeding for the first six months of life followed by the timely addition of wholesome foods, is essential for children to reach their full potential. Complementary feeding begins when breast milk or infant formula alone is no longer sufficient to meet infants' nutritional requirements, and other foods/liquids are needed (WHO 2013). While adding food into the infants' diet after a certain developmental stage is recommended, in some cases, it is not enough. A poor diet produces nutritional deficits that are linked to impaired growth and intellectual performance (Nyaradi et al. 2013). Further, poverty and food insecurity limit access to a nutritious diet, which includes foods with high-quality protein and adequate micronutrients, both necessary for early childhood development (Britto et al. 2017). Plant-based diets do not meet these requirements and need to be supplemented by animal-source protein or fortified food products (Neumann, Harris, and Rogers 2002). These include fortified-blended foods (FBFs), which were originally designed for emergency situations where the prevalence of acute malnutrition for children under five was above 5 percent, or when there were aggravating factors, such as epidemics or poor sanitation (de Pee and Bloem 2009; PAHO 2003; WHO 2013; Briend et al. 2015). Supplementary food products should be added to fill the nutritional gaps in an acceptable, feasible, affordable, sustainable, and safe way to complement continued breastfeeding and the local diet—not as a replacement for children under two.

Mass fortification programs and single micronutrient supplements are used worldwide. In Central American countries, vitamin A-fortified sugar, iodized salt, wheat and corn flour fortified with B vitamins and iron, and direct administration of micronutrient supplements are widespread. FBFs (corn or wheat/soy-blended products) have also been provided to a wide range of targeted populations for more than 35 years in response to nutritional emergency situations. However, there is a lack of evidence that fortified-blended foods improved nutritional status (Briend et al. 2015; Pérez-Expósito and Klein 2009). To address some of the nutritional shortcomings of fortified-blended foods—especially in children age from 6 to 23 months—the products were reformulated to improve their nutrient composition. The reformulated FBFs aimed to complement the diet and to be distributed in nonemergency situations to prevent acute malnutrition, stunted linear growth, and micronutrient deficiencies.

However, in the context of an epidemiological transition paired with the simultaneous implementation of multiple interventions to address malnutrition and micronutrient deficiencies (Lassi et al. 2013; Kristjansson 2015; Lazzerini, Rubert, and Pani 2013), the effectiveness of the fortified-blended foods has been questioned and has raised concerns. Further, the prevalence of overweight and obesity in low- and middle-income countries, particularly among the poor in all age groups and in rural areas (Popkin, Adair, and Ng 2013), is a global epidemic, which has, in fact, deepened.

The aim of this paper is to examine the results of Super Cereal Plus (SC+), a fortified-blended food, in El Salvador—which is currently deeply immersed in a nutritional transition. The paper reviews the evidence and health risks associated with fortified-blended foods combined with or simultaneously distributed with iron supplements, multiple micronutrients powder, and the mandatory fortification of staple foods.

PART II – NUTRITIONAL TRANSITION IN EL SALVADOR

El Salvador, a low-middle-income country, is facing an increasing double burden of malnutrition characterized by childhood overweight and micronutrient deficiencies, and rapidly increasing levels of maternal-child obesity.

This pattern has appeared along with improvements in socioeconomic conditions and major demographic changes. The proportion of people living below the national poverty line has decreased from 40.0 percent in 2008 to 29.2 percent in 2016 (World Bank 2017). Further, the extreme poverty rate (based on a US\$1.90 per day) has declined from 20.0 percent in 1998 to 2.2 percent in 2016 (World Bank 2016b). Moreover, economic inequality has narrowed with the Gini steadily decreasing from 54.5 to 40.0 over the same time period (World Bank 2016a), ranking El Salvador as the most equal country in Latin America in 2016 (World Bank 2018). National health surveys show an increase in mothers' mean school years (7.1 years to 7.5 years), and a higher proportion of mothers with seven or more years in school (51.7 percent versus 57.3 percent) from 2002 and 2008 (FESAL 2008). Additionally, El Salvador is on track to achieve the Water, Sanitation and Hygiene (WASH) goal and Sustainable Development Goal (SDG) 6 that ensures the availability and sustainable management of water and sanitation for all (Water Governance Facility 2015; IHME 2018).

Access to health services has also improved. Births occurring in health facilities increased from 69.0 percent in 2002 (FESAL 2008) to 97.5 percent in 2014 (MICS 2014).¹ Furthermore, the prevalence of births attended by skilled health staff rose from 87.2 percent in 2005 to 99.9 percent in 2016 (World Bank 2019).

Immunization rates (based on percentage coverage of fully immunized children) rose as well, from 76 percent in the 1990s to 93 percent in 2016 (World Bank 2018). According to the 2014 Multiple Index Cluster Survey (MICS), 80.2 percent of children age 24 to 35 months were fully immunized.² In addition, acute respiratory infections for children under five decreased from 42.3 percent in 2002–03 to 28.0 percent in 2012 (FESAL 2008), and in 2014, only 7.1 percent of children had acute respiratory infection symptoms in the two weeks prior to the survey (MICS 2014).

Acute diarrheal diseases are among the leading causes of morbidity and mortality in infants and young children in many developing countries. Diarrheal illness is associated with poor growth and development among young children, and has more dramatic observable effects in cases of recurrent illnesses (Guerrant et al. 1992). Early detection and management with oral rehydration salts and zinc supplements can reduce the severity and occurrence of diarrhea episodes (Telmessani 2010). In El Salvador, the prevalence of diarrhea remained unchanged at about 13 percent even when the treatment with oral rehydration salts increased from 51 percent in 2002 to 72 percent in 2014 (FESAL 2008; MICS 2014). The use of zinc supplements for diarrhea treatment

1. Percentage distribution of women in ages 15 to 49 who had a child born alive in the last two years, El Salvador, 2014. In the two years prior to the survey, 1,825 women had a child born alive (MICS 2014).

2. Full immunization includes vaccines recommended in the national immunization scheme. The scheme needs to be complete when children are one year old (measles, two years) (MICS 2014).

has remained the same, 25.0 percent in 2012 and a 25.2 percent in 2014 (FESAL 2008; MICS 2014). While there are no changes in prevalence of diarrhea in El Salvador, there have been improvements in WASH programs; therefore, the negative effects of diarrhea may have been reduced in terms of duration and severity, even though the prevalence remained the same.

As of 2016, it has been estimated that noncommunicable diseases (NCDs) account for 74 percent of all deaths in El Salvador, where cardiovascular diseases account for 23 percent, cancers for 16 percent, and diabetes for 5 percent (WHO 2018). The prevalence of diabetes increased from 5.0 percent in 1980 to 8.8 percent in 2014, with rates being higher among women (9.7 percent) than among men (7.7 percent) (WHO 2016b). The cause of deaths attributed to diabetes has increased by 37.3 percent, and deaths attributed to cardiovascular diseases have increased 15.2 percent from 2007 to 2017 (IHME 2017).

PART III – NUTRITION STATUS OF CHILDREN UNDER FIVE YEARS OF AGE

The target population for this report were children 6 to 24 months old; however, data to explore the nutritional transition for this age group were limited. Therefore, we also report on data collected among children under five. Overall trends in key nutrition indicators for children under five are presented in Figure 1, and the trends for children under two are described in the paragraphs below.

Figure 1. Trends in Key Nutrition Indicators among Children under Five Years, El Salvador 1988–2014

Sources: FESAL 2008; WHO 2018.

Note: HAZ = Height-for-age z-score; WAZ = Weight-for-age z-score; WHZ = Weight-for-height z-score.

Stunting

The most recent data report the public health significance for stunting (height-for-age [HAZ] < -2) among children under five is medium in El Salvador (Figure 1).³ Stunting, an indicator of chronic malnutrition, has been steadily decreasing since 1988, when the prevalence was 36.7 percent, to 13.6 percent in 2014 (World Bank 2014e and 2014g) (Figure 2). Based on available data, and among children 3 to 11 months, stunting reached its highest point in 1998, when the prevalence was 16.1 percent, and decreased to 11.8 percent in 2008 (FESAL 2008). For children 12 to 23 months, stunting decreased from 33.4 percent in 1988 to 19.6 percent in 2008 (FESAL 2008). While the disaggregated age groups from the 2014 MICS were not comparable to previous national surveys, the prevalence of stunting was 7.9 percent among children 6 to 11 months, 13.0 percent among children 12 to 17 months, and 17.7 percent among children 18 to 23 months (MICS 2014).

3. Prevalence cutoff values for public health significance for stunting: < 2.5 percent = Very low; 2.5–10 percent = Low; 10–20 percent = Medium; 20–30 percent = High; ≥ 30 percent = Very high (WHO 2018b).

Despite the national decline in stunting among children under five, there are significant disparities with regard to stunting in certain residential areas (rural and urban) and wealth quintiles (Table 1). The prevalence of stunting is higher in rural than in urban areas (16.6 vs. 11.4 percent), and almost five times higher in children in the lowest wealth quintile than in the highest (23.6 vs. 5.3 percent) (MICS 2014).

Figure 2. Stunting among Children under Five Years, El Salvador 1988–2014

Sources: FESAL 2008; WHO 2018.

Note: 2014 MICS data are not available for 3–11- and 12–23-month age groups; HAZ = Height-for-age z-score; prevalence cutoff values for public health significance for stunting: < 2.5 percent = Very low; 2.5–10 percent = Low; 10–20 percent = Medium; 20–30 percent = High; ≥ 30 percent = Very high (WHO 2018b).

Wasting

The prevalence of wasting (WHZ < -2), in children under five years decreased from 2.8 percent to 1.0 percent from 1988 to 2008 (FESAL 2008; WHO 2016b); however, the 2014 data show a slight increase to 2.0 percent within this age group (MICS 2014) (Figure 1). Among children 12 to 23 months, the public health significance for wasting was medium in 1988, when the prevalence was 6.4 percent,⁴ but has decreased below 5.0 percent since 1993, when it was last reported in 2008 at 1.1 percent. Among children 3 to 11 months, the prevalence of wasting has stayed under 5.0 percent since 1988 (Figure 3). More recent data from 2014 MICs show the prevalence among 6 to 11 months and 12 to 17 months is 2.3 percent, and for 18 to 23 months it is 1.8 percent. In accordance with the World Health Organization (WHO) Expert Committee, this data show that wasting is not a public health problem in El Salvador (WHO 2018b).

Differences by residential areas (urban and rural) and wealth quintiles (Table 1) show that wasting disproportionately affects children in rural and poorer households (FESAL 2008). This population is likely more vulnerable to seasonal outbreaks of acute

4. Prevalence cutoff values for public health significance for wasting: < 2.5 percent = Very low; 2.5- < 5 percent = Low; 5–10 percent = Medium; 10–15 percent = High; ≥ 15 percent = Very high (WHO 2018b).

malnutrition among young children, which are caused in many cases by a loss of crops (associated with droughts and other emergencies), especially in the Dry Corridor in the eastern third of the country (WFP 2017; FAO 2016; WHO 2016a).

Underweight

Underweight (weight-for-age z-score [WAZ] < -2) has decreased from 11.1 percent to 5.0 percent from 1988 to 2014 among children under five (Figure 1) (World Bank 2014f). However, underweight remains a public health concern for children under five years in the lowest wealth quintiles in El Salvador, where the prevalence is 11.6 percent (Table 1) (FESAL 2008).

Figure 3. Wasting among Children under Five Years, El Salvador 1988–2014

Sources: FESAL 2008; WHO 2016.

Note: 2014 MICS data are not available for 3–11- and 12–23-month age groups;

WHZ = Weight-for-height z-score; prevalence cutoff values for public health significance for wasting: < 2.5 percent = Very low; 2.5 – < 5 percent = Low; 5–10 percent = Medium; 10–15 percent = High; ≥ 15 percent = Very high (WHO 2018b).

Table 1. Anthropometric Indicators of Nutritional Status in Children Age 3 to 59 Months in El Salvador, 2008

Indicator	Wealth quintiles				
	1	2	3	4	5
Stunting					
<i>Stunting</i> (HAZ < -2)	23.6	13.2	12.1	9.4	5.3
<i>Severe Stunting</i> (HAZ < -3)	5.5	2.2	2.1	2.2	0.4
Wasting					
<i>Wasting</i> (WHZ < -2)	2.1	2.1	2.5	2.1	1.8
<i>Severe Wasting</i> (WHZ < -3)	0.5	0.5	0.4	0.3	0.2
Overweight					
<i>Overweight</i> (WHZ > +2)	3.9	4.6	8.4	9.4	6.6
Underweight					
<i>Underweight</i> (WAZ < -2)	11.6	4.0	3.1	3.9	0.9

<i>Severe underweight (WAZ <-3)</i>	1.9	0.5	0.4	0.1	0.0
Anemia					
<i>Anemia^a</i>	31.5	24.7	26.2	28.9	14.4

Source: FESAL 2008.

Note: HAZ = Height-for-age z-score; WAZ = Weight-for-age z-score; WHZ = Weight-for-height z-score.

^aAnemia: Hemoglobin levels < 110 g/L for children age 6–59 months (WHO 2011a).

Overweight

Overweight (weight-for-height z-score [WHZ] > +2) in children under five has risen to a medium level of public health significance, where the prevalence has increased from 3.0 percent in 1988 (World Bank 2014a) to 6.4 percent in 2014 (MICS 2014; WHO 2018b) (Figure 1).⁵ Among very young children (3 to 11 months), a remarkable increase in overweight occurred from 0.1 percent in 1993 to 7.1 percent in 2008. For children between 12 to 23 months, the prevalence increased slightly from 4.3 percent in 1998 to 5.4 percent in 2008 (Figure 4). According to MICS 2014, overweight rates were 6.8 percent for children 6 to 11 months, 6.5 percent for 12 to 17 months, and 5.0 percent for 18 to 23 months (MICS 2014). Overall, it has been observed that overweight begins early.

Figure 4. Overweight among Children under Five Years, El Salvador 1988–2014

Sources: FESAL 2008; World Bank 2014e.

Note: ^a 2014 MICS data are not available for 3–11- and 12–23-month age groups;

^b WHZ = Weight-for-height z-score;

^c Prevalence cut-off values for public health significance for overweight: < 2.5 percent = Very low, ; 2.5–< 5 percent = Low, ; 5–10 percent = Medium, ; 10–15 percent = High, ; ≥ 15 percent = Very high (WHO 2018b).

Micronutrient Deficiencies

5. Prevalence cutoff values for public health significance for overweight: < 2.5 percent = Very low, ; 2.5–< 5 percent = Low, ; 5–10 percent = Medium, ; 10–15 percent = High, ; > 15 percent = Very high (WHO 2018b).

Anemia,⁶ an indicator of micronutrient deficiencies, remains a prevalent nutrition concern for children under five years (Figure 5) (WHO 2011a and 2018b; World Bank 2014b) and a public health problem across all quintiles in El Salvador (Table 1) (FESAL 2008; de Benoist et al. 2008).⁷ Among children under five, the prevalence of anemia was 28.9 percent in 1990, decreasing to 20.8 percent in 2000, but rising again to 30.6 percent in 2016 (World Bank 2014b). The FESAL 2008 Survey found 22.9 percent of children 12 to 59 months were anemic. The prevalence of anemia among children 12 to 17 months was 41.6 percent, and 26.2 percent among children 18 to 23 months (FESAL 2008). The MICS 2014 documented an anemia prevalence of 26.1 percent among children 6 to 59 months, 33.5 percent among 6 to 9 months, 35.7 percent among 10 to 11 months, 25.4 percent among 12 to 17 months, and 19.7 percent among children 18 to 23 months.

Anemia, which also increases perinatal and mortality risks for mothers and newborns, is a public health concern among women of reproductive age (15 to 49 years) and pregnant mothers (Figure 5) (World Bank 2014c and 2014d). Among women of reproductive age, anemia affected 30.1 percent of women in 1990, decreased to 17.1 percent in 2003, but increased again to 22.7 percent in 2016 (World Bank 2014d). Similar trends were observed among pregnant women, where the prevalence of anemia was 34.5 percent in 1990, dropped to a low of 23.8 percent in 2002/2004 and rose back up to 29.9 percent in 2016 (World Bank 2014c).

Figure 5. Trends in Anemia among Children under Five Years, Women of Reproductive Age, and Pregnant Women, El Salvador 1988–2014

Sources: WHO 2018b; World Bank 2014b, 2014c, and 2014d.

Note: Anemia: Hemoglobin levels < 110 g/L for children age 6–59 months and pregnant women, and < 120 g/L for nonpregnant women over 15 years (WHO 2011a).

Prevalence cutoff values for public health significance for anemia: < 5.0 percent = None; 5.0–19.9 percent = Mild; 20.0–39.9 percent = Moderate; ≥ 40.0 percent = Severe (WHO 2018b).

6. Anemia: Hemoglobin levels less than 110 g/L for children age 6–59 months and pregnant women, and less than 120 g/L for nonpregnant women over 15 years (WHO 2011a).

7. Prevalence cutoff values for public health significance for anemia: < 5.0 percent = None; 5.0–19.9 percent = Mild; 20.0–39.9 percent = Moderate; ≥ 40 percent = Severe (WHO 2018b).

Zinc is a mineral that is important not only for cellular growth, but, according to data, can also help improve linear growth of children under five years of age (Imdad and Bhutta 2011). Although there is no nationally representative data on zinc deficiency for children under two, estimates show that up to 34.5 percent of the population may be at risk of inadequate zinc intake (Cediel et al. 2015).

Vitamin A supports children's growth and helps fight infections (WHO 2011b). Vitamin A deficiency (serum retinol < 20 µg /dl) does not appear to be a significant public health concern for women of reproductive age as the prevalence was 1.1 percent in 2009; for children 15 to 59 months of age it was 5.3 percent, a decrease from 36.0 percent in 2006 (El Salvador, Ministry of Health 2011b).⁸

Iodine is essential for the cognitive development of children; however, monitoring a population's iodine status is critical for ensuring the population's needs are met but not exceeded (WHO 2019b). As of 2012, the median urinary iodine concentration in school-age children was adequate (206 µg/l) (Cediel et al. 2015; Iodine Global Network 2015).

Maternal Overweight and Obesity

Maternal overweight and obesity increases the risk of pregnancy complications and can increase the risk for obesity and its cardiometabolic complications for infants and children (Godfrey et al. 2017; Pérez-Escamilla and Kac 2013). Based on data from FESAL, maternal overweight and obesity (BMI ≥ 25) rates increased among reproductive-age women with children less than five years from 54.1 percent in 2002–03 to 57.2 percent in 2008 (FESAL 2008) (Figure 6). In the specific case of obesity measured as BMI ≥ 30 for women with children less than five years, there was an increase from 18.4 percent in 2002–03 to 23.2 percent in 2008 (FESAL 2008). Maternal-child obesity is a growing public health concern in El Salvador due to the cyclical nature of maternal-child obesity (Pérez-Escamilla and Kac 2013), immediate and long-term health implications, and compelling evidence that the prevalence of the condition is increasing.

8. Vitamin A deficiency is a public health problem when the prevalence is above or equal to 10 percent (WHO 2019a).

Figure 6. Overweight and obesity in women of reproductive age (15-49 years), El Salvador 2002/03 – 2008

Sources: FESAL 2008; WHO 2018.

Note: BMI = Body Mass Index

Breastfeeding & Dietary Diversity

As of 2016, the prevalence of early initiation breastfeeding within one hour of birth was 42 percent, exclusive breastfeeding was 47 percent, and continued breastfeeding at one year was 57 percent (UNICEF 2017). Exclusive breastfeeding rates for six months, as recommended by the WHO, have steadily increased since 1998, when the prevalence was 16 percent, to 24 percent in 2002–03, and then 47 percent in 2014 (FESAL 2008; MICS 2014). Further, the mean duration of breastfeeding rose from 19.2 months in 2002–03 to 22.8 months in 2008, where it remained in 2014. Currently, optimal breastfeeding practices (i.e., early initiation, exclusive for six months, and continued breastfeeding at two years) are more prevalent among children in the lowest wealth quintile (UNICEF 2017). Early initiation and exclusive breastfeeding are more prevalent among children living in rural areas, whereas continued breastfeeding is more prevalent in urban areas (UNICEF 2017).

Data from 2014 show that 78 percent of all children 6 to 23 months received the minimum dietary diversity, and 67 percent of breastfed children 6 to 23 months achieved a minimum acceptable diet (i.e., the minimum dietary diversity and meal frequency) (El Salvador, Ministry of Health, National Institute of Health, and UNICEF 2015).

Summary of Nutritional Transition

As described above, El Salvador is in the midst of a nutrition transition and experiencing a double burden of malnutrition. As of 2018, progress has been made for children under five toward meeting the Global Nutrition Targets for stunting, wasting, and exclusive breastfeeding; however, there has been no progress or worsening of overweight for

children under five and anemia for children under five and for women of reproductive age (WHO 2014). Although the prevalence of stunting has decreased to the WHO threshold for a low level of national public health concern, the prevalence is still a concern for children in the lowest wealth quintiles and in rural areas. Combined with the growing trends in anemia, this nutrition transition needs continued and strategic support from national development partners.

PART IV – NUTRITION POLICIES AND PROGRAMS IN EL SALVADOR

Different governmental and nongovernmental institutions have participated in nutrition programs and initiatives for over three decades in El Salvador. The governmental institutions on behalf of the different economic sectors (i.e., agriculture, health, education, and social protection) are directly related to providing, distributing, consuming, accessing, or balancing proper food and nutrition. Interventions are tied with their main mandate. For example, the distribution of vitamin A and iron supplements has traditionally been tied to the National Immunization Program. Nongovernmental organizations (NGOs) are mostly linked to Charitable Institutions with initiatives of all sizes and generally providing services that range from educational advice on nutrition or early child stimulation to managing localized community programs of long duration and influence. Over time, these institutions working on nutrition-related issues have created two networks: Red Para la Infancia y la Adolescencia de El Salvador (RIA), which focuses on children and adolescents, and Red de Educación Inicial y Parvularia de El Salvador (REINSAL), which focuses on early education issues. Both networks include governmental institutions and NGOs, which target children under five.

As the networks developed to improve nutrition in El Salvador, so did awareness of nutritional problems nationwide, as noted in the 2011 National Strategy on Nutrition and Development in infants and young children.⁹ The strategy promotes breastfeeding, dietary guidelines for young children, micronutrient supplements, and food fortification initiatives. In addition, the issue of nutrition has been discussed under poverty reduction strategies including those for social protection, such as conditional cash transfers that are meant to indirectly influence nutrition.

Food Fortification Policies and Programs

At present, El Salvador has mandatory fortification policies and programs, along with the distribution of supplemented nutrition cereals. The country has mandatory fortification, also regulated by the law, of the following staple foods:

- Wheat flour (since 2001)
- Wheat pasta (2008)
- Corn flour (i.e., maize) (2003)
- Pasteurized milk (2007)

9. There are strategies since 1995. Starting from “Propuesta de Plan Nacional de Acción Para la Alimentación y Nutrición PNAAN” and “Programa de Suplementación con Micronutrientes” according to the WHO (Government of El Salvador 2008).

- Sugar (1993)
- Iodized salt (1993)

These initiatives are supported with national food fortification guidelines. Nutrients and fortification doses are detailed in Table 2 (UNICEF 2017; El Salvador, Ministry of Health, National Institute of Health and UNICEF 2015; WHO 2014 and 2018b; Government of El Salvador 1993a, 1993b, 2001, 2007, 2008, and 2010).

Table 2. Food Fortification Guidelines in El Salvador

Micronutrient	Wheat flour	Wheat pasta	Corn flour	Pasteurized milk	Sugar	Iodized Salt
Thiamin (mg/kg)	4.0	8.8	6.1	N/A	N/A	N/A
Riboflavin (mg/kg)	2.5	3.7	2.5	N/A	N/A	N/A
Niacin (mg/kg)	45.0	59.5	6.1	N/A	N/A	N/A
Iron (mg/kg)	55.0	28.6	40.0	N/A	N/A	N/A
Folic acid (mg/kg)	1.3	1.9	1.0	N/A	N/A	N/A
Vitamin A (IU/L)	N/A	N/A	N/A	2,000	N/A	N/A
Vitamin D (IU/L)	N/A	N/A	N/A	400	N/A	N/A
Iodine (mg/kg)	N/A	N/A	N/A	N/A	N/A	30
Retinyl palmitate (µg/kg)	N/A	N/A	N/A	N/A	15 (50 IU/g)	N/A

Sources: Cediell et al. 2015; WHO 2011b, WHO 2019a, and WHO 2019b; El Salvador, Ministry of Health 2011b; Iodine Global Network 2015.

Note: Year of the regulation: Iodine in salt, 1993; sugar and vitamin A, 1993; pasteurized milk, 2007; wheat pasta, 2008; corn flour, 2003; wheat flour, 2001.

Food and Nutrition Supplementation Programs

Fortified-blended food supplements are distributed to children from 6 to 23 months as part of Blanket Feeding or Supplementary Feeding Programs to fill nutrients gaps among vulnerable populations and high-risk groups in both emergency and exceptionally difficult circumstances. Other food supplements, such as lipid-based nutrient supplements and micronutrient powders (MNPs), are also provided to infants at risk of stunting, wasting, and micronutrient deficiencies (WHO 2018a). Generally, it is recommended that MNPs are distributed to all children under five; however this can overlap with the distribution of complementary FBF supplements that target children 6 to 23 months (WHO 2016c). Given that the composition of fortified blends includes 100 percent of the RDA (recommended daily allowance) for 15 vitamins and minerals, the overlap of interventions puts children 6 to 23 months at risk of exceeding the tolerable upper intake levels (ULs) for vitamins and minerals. Therefore, fortified-blended food supplements, such as SC+, Nutricereal plus, Nutricereal, and Chispuditos, are distributed to children 6 to 23 months old who live in municipalities that meet the following three criteria:

- (1) Have the highest poverty rates
- (2) Have the highest prevalence of stunting in children from first grade of elementary school (from the Height National Census)

(3) Have a high incidence of severe acute malnutrition (SAM), especially those located in the Dry Corridor or affected by coffee crop losses (a more recent criterion)

These criteria were defined to identify children in high-risk communities. However, despite these, the Ministry of Health planned the distribution of FBFs to all children, even those who are not at risk. Fortified-blended food supplements were distributed in 249 out of 262 municipalities nationwide (Table 3). Although the 2014 MICS reports the national prevalence of wasting is a low public health concern (i.e., below 2 percent), there are geographical areas like the Dry Corridor where prevalence of wasting and severe wasting can be worse. However, there are no specific data for these areas.

Table 3. Ministry of Health Distribution of Nutrition Supplements in Prioritized Municipalities, by Source of Funding

Nutrition Supplement Program	Ration per day (g)	Number of municipalities covered	Funding
Nutricereal	45	136	Social Investment Fund for Local Development (FISDL)
Nutricereal Plus	100	35	World Food Programme
Chispuditos	15	4	Mathile Institute
SC+ ^a	45	37	World Bank–Japan Fund
Micronutrient powders	1	37	

Source: World Bank Safeguarding Human Capital of Urban Poor Children in the context of recurring food crisis in El Salvador, 2016

Note: Nutrition composition of fortified-blended foods available in Appendix 1.

^a SC+ = Super Cereal Plus; SC+ is the only supplement analyzed in this paper for its contribution to children's daily intake (Table 4). The analysis does not consider children who might participate in other programs at the same time.

In addition to fortified blended food supplements, iron supplements (i.e., ferrous sulfate or iron EDTA) and multiple micronutrients powder are distributed through the same national strategy for children under five. There is the potential risk that the same population of children is receiving both interventions at the same time in addition to fortified-blended food supplements. We are unsure of the frequency of distribution of these interventions.

SC+ is a fortified-blended food to fill nutrient gaps in children age 6 to 23 months who (a) are breastfed but have inadequate complementary feeding (i.e., do not meet the minimum meal frequency and the minimum diet diversity), and therefore do not meet the nutrient requirements for their age; or (b) are not breastfed and also have inadequate complementary feeding (de Pee and Bloem 2009). Guidelines from the Ministry of Health recommend that children age 6 to 23 months consume 45 grams of SC+ per day (dry product basis), and pregnant and lactating women consume 60 grams a day (Table 4) (El Salvador, Ministry of Health 2011a; Kominiarek and Rajan 2016). SC+ contains maize (58 percent), de-hulled soya beans (20 percent), dried skimmed milk powder (8 percent), sugar (10 percent), vegetable oil, and a vitamin and mineral premix per 100 grams of dry product. SC+ provides 410 kcal per 100 grams of dry product; its macronutrient composition is 16 percent protein, 9 percent fat, and 75 percent

carbohydrates (WFP 2014); 80 percent of SC+ protein is of vegetal origin, and up to 75 percent of calories are from carbohydrates, mostly from corn. Sugar content is 10 percent of total calories, which is consistent with the upper limit of current WHO recommendations; however, the new WHO recommendation suggests a further reduction of sugar intake to below 5 percent of total calories (WFP 2014).

Table 4. Energy and Protein in One Daily Ration of Super Cereal and Its Estimated Contribution to the Recommended Dietary Allowance of Energy and Micronutrients by Age Group

	Daily Ration	6–8 months	9–11 months	12–23 months	Pregnant and lactating women ^a
RDA	Energy (kcal/day)	620	700	840	+300–500
	Protein (g/day)	10	12	12	60
Full consumption of a daily ration of 45g SC+	Daily ration (g)	45	45	45	60
	Kilocalories/daily portion	185	185	185	230
	Protein (g)/daily portion	8.6	8.6	8.6	11.6
	Estimated contribution (%) to the RDA	Energy	29.8	22.0	11.0
		Protein	86.0	71.1	21.0
		Micronutrients	100	100	100

Sources: Government of El Salvador 2007; NSM 2015.

Note: RDA = Recommended dietary allowance; SC+ = Super Cereal Plus.

^a Caloric intake should increase by approximately 300 kcal/day during pregnancy and 500 kcal/day among those who are breastfeeding (Kominiarek and Rajan 2016).

Consistent with the SC+ contribution and its guidelines for consumption of one daily ration, the recommended 45 grams per day of SC+ would provide 184 kilocalories a day. This would provide 30 percent, 26 percent and 22 percent of the average daily caloric needs for children 6 to 8 months (620 kcal), 9 to 11 months (700 kcal), and 12 to 23 months (840 kcal), respectively, and 100 percent RDA of micronutrients. In addition, 45 grams per day of SC+ would provide over 70 percent of the RDA for protein, 100 percent of the RDA for four vitamins (vitamin K1, vitamin B2, vitamin B6, and vitamin B12), and at least 50 percent of the RDA for eight other vitamins and minerals (vitamin A, vitamin E, vitamin C, folate, niacin, biotin, zinc, and calcium) (WFP 2014).¹⁰ This intake should be considered, in addition to breast milk and consumption of homemade food for children 6 to 23 months old (Table 4).

El Salvador's Ministry of Health (2014) produced micronutrient supplement guidelines for children 6 to 23 months old, which include ferrous sulfate (0.5 ml/day), EDTA-iron (1–2mg/kg/day), vitamin A (100,000 IU per year), zinc (20 mg/day in acute diarrhea), and iodine (one single dose of 200mg at goiter diagnosis). Further, the Ministry of Health distributes micronutrient powder in certain municipalities (Table 3); its composition is described in Table 5 (UNICEF 2019).

The country has 37 municipalities with a potential for overlapping in distribution of SC+ and micronutrient powder (Table 3), which surpasses the RDA for 12 vitamins and minerals for this age group (i.e., vitamin A, vitamin E, Vitamin K1, Vitamin B1, Vitamin

10. SC+ has 19 vitamins and minerals: vitamin A, vitamin D3, vitamin E, vitamin K1, vitamin B1, vitamin B2, vitamin B6, vitamin C, pantothenic acid, folate, niacin, vitamin B12, biotin, iodine, iron, zinc, potassium, calcium, and phosphorous (WFP 2014).

B2, Vitamin B6, Vitamin C, Folate, Niacin, Vitamin B12, iron, and zinc) (Table 6) (WFP 2014; WHO 2019d; NSM 2015). If the consumption of SC+ and MNP is combined with a regular diet, there is risk of an excessive intake of at least two micronutrients (i.e., vitamin A and zinc).¹¹ However, this most likely doesn't exceed the UL, but it is not appropriate to increase nutrient intake beyond the RDAs.

**Table 5. Composition of Micronutrient Powder
(per gram of product)**

Micronutrient	Composition (1 g or 1 sachet)
Vitamin A	300–400 mcg
Vitamin D	5–15 mcg
Vitamin E	5–15 mcg
Vitamin B1	0.5–1.2 mg
Vitamin B2	0.5–1.3 mg
Vitamin B6	0.5–1.7 mg
Vitamin B12	0.5–0.9 mcg
Folic acid	80–160 mcg
Niacin	4–6 mg
Vitamin C	30–60 mg
Iron	9.0–12.5 mg
Zinc	4–5 mg
Copper	0.34–0.56 mg
Selenium	16–17 mcg
Iodine	90–100 mcg

Source: UNICEF 2019.

Food for work and food voucher programs are implemented during emergencies, such as drought, natural disasters, and other circumstances that may increase the risk of food insecurity for vulnerable populations. These programs are usually supported by NGOs or international agencies, such as the World Food Programme.

Conditional Cash Transfers

Since 2005, El Salvador has a social protection system that includes three components: conditional cash transfers, nutrition and health services, and legislation to assure equity and nondiscrimination in access to health and nutrition services. The cash transfers are part of the National Social Investment Fund (FNIS) and include the Urban and Rural Solidarity Communities, a program targeting children and adolescents that provides a cash transfer of US\$30 and US\$40 a month to families with children under five, and to those with children who have not completed the sixth grade, in high priority municipalities. Rural Solidarity Communities covered 100 municipalities and 80,000 families by 2013, and in 2014, another 32,000 children were added to the program.

11. The UL for many vitamins and minerals was not determinable due to lack of data of adverse effects in this age group and concern about lack of ability to handle excess amounts; to prevent high levels of intake, it is recommended that the source of intake should be from food only (NSM 2015).

Urban Solidarity Communities covers 25 municipalities, and 5,000 school-age children receive the education bonus (Government of El Salvador, Technical Secretariat of the Presidency 2014).

PART V – NUTRITION STATUS OF CHILDREN UNDER FIVE YEARS OF AGE

Given that maternal-child overweight and obesity are associated with improved living conditions (Pérez-Escamilla et al. 2018), it is essential to assess whether it is appropriate to continue the blanket distribution of energy-dense nutrient supplements, such as SC+, Nutricereal, or Chispuditos. When nutrition supplements are administered to prevent stunting or micronutrient deficiencies in children age 6 to 23 months, these programs need to be continuously monitored to ensure interventions are meeting the needs of the target population. It is important to evaluate the effectiveness of these nutrition programs and prevent overlap between interventions, which will also inform how to efficiently allocate resources to improve nutrition.

For children 6 to 23 months, preparation of complementary homemade foods should attempt to guarantee the intake of essential nutrients from local ingredients (PAHO 2003). Distribution of additional food supplements is only justified when breast milk and other foods do not meet nutritional requirements (PAHO 2003). As mentioned earlier, fortified-blended food supplements (e.g., SC+, Nutricereal Plus, and Chispuditos) are distributed to fill nutrition gaps in children age 6 to 23 months in El Salvador. In spite of being breastfed and receiving homemade food, some children in that age group are still at risk of impaired growth and micronutrient deficiencies, but they are also at risk of receiving an excess of some micronutrients. The discussion below examines whether SC+ should be continued as part of the national nutrition program for the general population under normal circumstances (i.e., outside the scope of humanitarian emergencies).

SC+ could lead to excess energy intake

Consumption of a daily ration (45g) of SC+ to complement nutrients provided by breast milk and food prepared at home offers about 185 kilocalories per day. This represents 30, 26, and 22 percent of the average daily caloric needs for children age 6 to 8 months (620 kcal), 9 to 11 months (700 kcal), and 12 to 23 months (840 kcal), respectively. The Guiding Principles for Complementary Feeding of the Breastfed Child (PAHO 2003) recommend that in addition to breast milk, children 6 to 8 months should consume 200 kilocalories from two meals a day; children 9 to 11 months, 300 kilocalories from three meals a day; and children 12 to 23 months, 550 kilocalories from three meals a day. One serving of SC+ means children 6 to 8 months will receive almost 100 percent of their calories from SC+ as their complementary food, which will decrease to about 60 percent at 9 to 11 months, and to 30 percent at 12 to 23 months. Thus, the energy intake from SC+ could be excessive when combined with breastfeeding and complementary home feeding and could contribute to childhood overweight.

An analysis of the micronutrient content of SC+ shows a very high proportion of energy from carbohydrates (75 percent). This amount exceeds the recommended intake from

carbohydrates for children age 6 to 23 months,¹² and very likely comprises a caloric density above the recommended 1.0 kilocalories per gram, if they are being breastfed and receiving complementary food (UNHCR 2014).

Inadequate evidence that SC+ could help prevent anemia, iron deficiency anemia, or other micronutrient deficiencies

In El Salvador and elsewhere, anemia is a moderate to severe public health problem in children age 6 to 23 months. Although there is no data on iron deficiency to explain this problem in El Salvador, evidence from Ecuador shows that about 40 percent of anemia in young children is due to iron deficiency. While vitamin A deficiency is no longer a public health problem in El Salvador, and data on other micronutrient deficiencies are not available. However, it is possible that children consume a calorie-dense and low-in-nutrient-value diet, which could account for zinc and vitamin B12 as well as other vitamin and mineral deficiencies.

Although a daily ration (45g) of SC+ provides 100 percent RDA of 14 micronutrients, the research that exists does not support that SC+ prevents anemia, iron deficiency anemia, or other micronutrient deficiencies.

Iannotti et al. (2015) found that the chance of becoming anemic in Haiti was reduced by 28 percent (adjusted OR: 0.72; 95 percent CI: 0.57, 0.91; $P < 0.001$) when children from 3 to 13 years consumed a fortified ready-to-feed supplement rather than an unfortified cereal bar. However, the reduced level of anemia was modest, since this condition has multiple etiologies that go beyond iron intake, such as infectious diseases and parasites (FESAL 2008).

Further, the Operational Guidance on the Use of Fortified Blended Foods in Blanket Supplementary Feeding Programmes of the United Nation High Commission for Refugees (UNHCR) suggests that fortified-blended foods in the absence of stunting or high global acute malnutrition (GAM) are not suitable for tackling anemia, as they provide excessive energy intake (UNHCR 2014). For vulnerable populations receiving fortified-blended foods, direct measurements of the micronutrient status have rarely been conducted, and available evidence is weak and limited (Pérez-Expósito and Klein 2009). Although fortified-blended foods might have an impact on anemia, stunting, and GAM, several other factors might be in play, making it impossible to conclude that the improvements are attributed to fortified-blended foods (Bhutta et al. 2013).

Considering the current lack of epidemiological data and existing nutrition programs in El Salvador, micronutrient interventions should prioritize iron, folic acid, vitamin B12, and zinc, as the country already has vitamin A supplements and iodine-fortification programs.

Inadequate evidence SC+ could prevent stunting

Evidence on the effectiveness of SC+ to prevent stunting and micronutrient deficiencies is limited, except when such supplements are targeted to food-insecure populations (those living on less than US\$1.25 per day) and implemented simultaneously with

12. The daily adequate intake of carbohydrates for children 7 to 12 months is 95 g/day (380 kcal), and the RDA for children one to three years is 130 g/day (520 kcal) including from breast milk or formula (Government of El Salvador, Technical Secretariat of the Presidency 2014).

interventions to improve access to safe water, sanitation, health care, and nutrition education (Bhutta et al. 2013).

A small study in an impoverished community in northeast El Salvador found SC+ had no impact on preventing childhood stunting among children under two (UNHCR 2014). In this study, a convenient sample ($n = 190$) of children living in extreme poverty received SC+ and beans, rice, and vegetable oil for 179 days. Researchers found the nutritional supplement decreased underweight (15.3 percent to 11.0 percent) but had no impact on stunting (36.3 percent to 45.0 percent). The authors hypothesized the nutritional intervention was being shared among family members, which diluted the program's potential impact on chronic malnutrition (Rosales, Gosselin, and Kasper 2015).

Overall, studies have not found SC+ has prevented stunting to a significant extent (Pérez-Expósito and Klein 2009). This is not surprising since these prevention measures require comprehensive plans that address the many determinants of malnutrition, including the social determinants of health, such as socioeconomic status, education, physical environment (e.g., access to clean water and food), employment status, social support, and access to health care (Government of El Salvador 2001 and 2007; Bhutta et al. 2013). Further, the use of SC+ as a supplement for young children may also be detrimental to breastfeeding, as it is consumed as high-volume porridge and may displace breast milk or other nutritious foods (Mangani et al. 2013).

As of 2019, 13 percent of the eastern region of El Salvador, in the Dry Corridor, has been classified as Integrated Phase Classification (IPC) Phase 3 (crisis) (IPC 2019). A systematic review of interventions in developing countries that included education and complementary foods in children age 6 to 24 months found improved linear growth and weight in food-insecure populations when the programs included messages about the importance of including animal-source products in home-prepared foods. The study reviewed evidence from 16 separate studies in countries considered low and middle income, according to the World Bank's classification, where randomized and nonrandomized trials and programs had been developed (Lassi et al. 2013).

Alternative interventions for addressing malnutrition in children age 6 to 23 months in El Salvador

Micronutrient powders are single-dose packages of vitamins and minerals that can be sprinkled on any ready-to-eat, semisolid food consumed at home, school, or elsewhere. The powders are used to increase the micronutrient content of children's diet without changing their usual consumption habits.

Where the prevalence of anemia in children under two or five years is 20 percent or higher, multiple micronutrient powders are recommended to improve iron status and reduce anemia among infants and children age 6 to 23 months. A recent systematic review found that foods fortified at the household level with multiple micronutrient powders reduced anemia by 31 percent (Relative Risk 0.69; 95 percent CI 0.60 to 0.78) and iron deficiency by 51 percent (Relative Risk 0.49; 95 percent CI 0.35 to 0.67) in children 6 to 23 months (De-Regil et al. 2013).

Although there is no evidence of multiple micronutrient deficiencies, El Salvador's Ministry of Health is distributing packages of micronutrient powder containing 15

vitamins and minerals (Table 5), including iron, folic acid, zinc, and vitamin B12. However, this practice could contribute to an excessive intake of vitamins A, D, E, B1, B2, B6, B12, and C, folic acid, niacin, iron, zinc, copper, selenium, and iodine, especially when successful mandatory wheat and corn flour fortification programs also exist. Current evidence shows that micronutrient powders improve iron stores and reduce anemia but have no effect on linear growth. Thus, the Ministry of Health should analyze the effects of these micronutrient powders instead of products that address the documented micronutrient deficiencies.

Due to current multiple interventions to prevent anemia, such as SC+, ferrous sulfate or iron EDTA supplements, micronutrient powders, and mandatory fortification of staple foods, it is important to determine where the programs overlap and expose recipients to overdoses of different nutrients (Table 6).

Table 6. Potential Total Daily Nutrient Intake in Children Six to Eleven Months Who Consume 45 Grams SC+ Porridge and One Package of Micronutrient Powder

Nutrient	RDA for children 6–11 months	Nutrients provided by 45 grams of SC+ porridge	Nutrients provided by one package of micronutrient powder (1 g)	Total potential daily nutrient intake (% RDA)	UL for children 6–11 months ^b
Energy (kcal)	620–700 ^a	185	—	—	—
<i>Macronutrients</i>					
Carbohydrate (g)	95.0	28.5	—	28.5 (30%)	—
Fat (g)	31.0	9.0	—	9.0 (29%)	—
Protein (g)	11.0	7.2	—	7.2 (66%)	—
<i>Micronutrients</i>					
Vitamin A (µg)	500.0	436.0	400.0	836.0 (167%)	600
Vitamin D3 (µg)	10.0	4.7	5.0	9.7 (97%)	38
Vitamin E (mg)	5.0	3.5	5.0	8.5 (170%)	ND
Vitamin K1 (µg)	2.5	12.6	—	12.6 (504%)	ND
Vitamin B1 (mg)	0.3	0.1	0.5	0.6 (200%)	ND
Vitamin B2 (mg)	0.4	0.6	0.5	1.1 (275%)	ND
Vitamin B6 (mg)	0.3	0.5	0.5	1.0 (333%)	ND
Vitamin C (mg)	50.0	40.5	30.0	70.5 (141%)	ND
Pantothenic acid (mg)	1.8	0.7	—	0.7 (39%)	ND
Folate (µg)	80.0	49.5	150	199.5 (249%)	ND
Niacin (mg)	4.0	3.6	6.0	9.6 (240%)	ND
Vitamin B12 (µg)	0.5	0.9	0.5	1.4 (280%)	ND
Biotin (µg)	6.0	3.7	—	3.7 (62%)	ND
Iodine (µg)	130.0	18.0	90.0	108.0 (83%)	ND
Iron (mg)	11.0	1.8	10.0	11.8 (107%)	40
Zinc (mg)	3.0	2.3	4.1	6.4 (213%)	5
Potassium (mg)	700.0	63.0	—	63.0 (9%)	ND
Calcium (mg)	260.0	162.9	—	162.9 (63%)	1,500
Phosphorous (mg)	275.0	126.0	—	126 (45.8%)	ND

Sources: WFP 2014; NSM 2015.

Note: ND = Not determinable; RDA = Recommended Dietary Allowance; SC+ = Super Cereal Plus; UL = Tolerable upper intake level.

^a The average daily caloric needs for children age 6–8 months (620 kcal) and 9–11 months (700 kcal) (PAHO 2003).

^b Vitamins and minerals not determinable (ND) due to lack of data of adverse effects in this age group and concern about lack of ability to handle excess amounts, the recommended source of intake should be food only to prevent high levels of intake (NSM 2015).

The evidence of the impact of SC+ on nutrition is summarized in Table 6. In a context where wasting is not a public health problem, and stunting has been reduced in recent years, different interventions to address malnutrition and micronutrient deficiencies should be limited to vulnerable populations, with clear selection criteria provided through monitoring growth and using weight and height measures to assess nutritional status. Current formulations for fortified-blended foods are designed to manage moderately acute malnutrition (WHO 2012), thus, providing excessive energy that may cause weight gain in healthy children. Further, there is no evidence of the effect on the nutritional status of multiple micronutrients added to SC+ in young children; and, as noted above, no nationally representative micronutrient surveys have been conducted. Thus, nutrition interventions should focus on promoting exclusive breastfeeding for the first six months of life, followed by adequate and timely introduction of complementary foods. Further, previous attempts to reduce child malnutrition emphasize improving families' purchasing power, increasing female education, improving maternal and child health services, expanding water and sanitation, and expanding family farming (Monteiro et al. 2010).

The foods supplementing breastfeeding should be based on diversified high-quality, nutrient-rich types, especially foods that include animal protein. Food supplements should be provided only when there is a clear problem or risk of impaired growth (Pérez-Escamilla and Kac 2013). For example, in rural areas where nutrition and food security are not as stable as in urban areas and in areas that could be affected by periodic weather changes, such as El Niño and La Niña, which can disproportionately affect families that are dependent on agricultural business (Iannotti et al. 2015).

PART VI – CONCLUSIONS AND RECOMMENDATIONS:

This analysis questions the need to distribute SC+ in the national nutrition program—especially to those who are not experiencing humanitarian emergencies, or living in countries or regions where underweight and wasting are not a public health problem. The nutritional status of children under two should continue to be monitored, and further research should be conducted to determine the potential overlap of FBFs and micronutrient powder distribution programs in El Salvador. For example, it is imperative to measure nutrients in traditional home-prepared foods to better estimate the intake and possible upper limits of nutrients. However, if SC+ is needed, criteria should be developed to determine which children to target; if a child reaches the median weight-for-height, the food assistance program should be discontinued (Government of El Salvador 2007). Reasons include the following:

- (1) SC+ is energy-dense and likely to contribute to excessive energy and protein intakes among children age 6 to 12 months.
- (2) It is unclear if SC+ is needed to address micronutrient gaps since there appears to be an abundant micronutrient supply through other sources, such as micronutrient powders, nutrient supplements, and fortified foods.
- (3) It is not evident that FBF supplements such as SC+ and others effectively prevent stunting; also, results about their effectiveness at reducing anemia are quite mixed (Lassi et al. 2013; Rosales, Gosselin, and Kasper 2015; Mangani et al. 2013; Olney et al. 2015; Maleta et al. 2015; Uauy and Kain 2002; WFP 2018).

Thus, this report recommends that the government of El Salvador consider designing a program that responds to young children's nutritional needs during humanitarian emergencies, such as droughts and armed conflicts, and for those with or recovering from acute malnutrition.

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APPENDIX

Appendix 1. Nutrition Composition of Fortified-Blended Foods

Nutrition Supplement Intervention	Ration per day (grams)	Target population	Key Ingredients	Nutrient profile
Nutricereal	18.75	Pregnant and lactating women ^a	Maize, soy, sugar, V&M	70 kcal 4g Protein 1g Fat 12g Carbohydrates
Nutricereal Plus	100.00	Children 6–59 months	Maize, soy, sugar, milk, V&M	400 kcal 16g Protein 9g Fat 60g Carbohydrates
Chispuditos	18.75	Children 6 months–6	Maize, soybeans, maltodextrin, V&M	71 kcal 4g Protein

		years		1g Fat 11g Carbohydrates
SC+	45	Children 6–59 months	Corn/wheat/rice soya, milk powder, sugar, oil, V&M	787 kcal 33g Protein 20g Fat 28.5 Carbohydrates *Contains EFA, meets RNI and PDCAAS
Micronutrients powder	1	Children 6–59 months; School-age children	V&M	Meets RNI No energy, fat, or protein content

Sources: WFP 2014 and 2018.

Note: EFA = Essential fatty acids; PDCAAS = Protein Digestibility-Corrected Amino Acid Score (min. 70 percent); RNI = Recommended nutrient intakes (FAO/WHO); SC+ = Super Cereal Plus; V&M = Vitamins and minerals.

^a Assumed as Super Cereal (SC) is for pregnant and lactating women, and SC+, for children 6–59 months (WFP 2018).

El Salvador is in a nutrition transition. In the past 20 years, stunting rates have declined by 25 percent in young children, while overweight and obesity have reached epidemic proportions, affecting about 60 percent of reproductive-age (15 to 49 years) women and increasing among children under five. To accelerate the progress in reducing stunting, anemia, and other micronutrient deficiencies, the government launched several interventions over the last three decades. This included mandatory fortification of staple foods, distribution of micronutrient supplements to all children, and distribution of fortified-blended foods (FBFs) in most municipalities. The implementation of programs such as these should be considered only after an analysis has been made of the target population's nutritional needs; the context surrounding the program; and the availability, affordability, effectiveness, and acceptability of the intervention (de Pee and Bloem 2009; PAHO 2003).

The aim of this paper is to discuss the effect and potential risks of distributing Super Cereal Plus (SC+) to the general population of children under two in the current epidemiological context of El Salvador. Evidence is unclear about the impact of fortified-blended foods, such as SC+, in preventing stunting. In El Salvador, there are concerns about children's energy intake being a contributing factor to obesity. Furthermore, the micronutrient intake of young children through the interventions mentioned above may be excessive and potentially harmful.

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