

# Research on LNS

*Update of 1 June 2015*

This list is divided into sections. The first section ("Background") includes several reviews/commentaries and papers on formulation of LNS. The second section includes published study designs for on-going trials. The third section, "LNS for prevention", includes studies on the use of LNS for promotion of healthy growth, development, or micronutrient nutrition, prevention of stunting, or prevention of wasting. Studies assessing breast milk intake or intake of complementary food are also included. Finally, "Acceptability, demand, and use of LNS" includes: acceptability studies, studies of demand for LNS and other socioeconomic studies, studies on LNS and infant feeding practices, qualitative studies on mothers' views of LNS, and studies of intra-household distribution/sharing of LNS.

Studies of the use of LNS for treatment of severe or moderate acute malnutrition are not included.

## Background

[Considerations in developing lipid-based nutrient supplements for prevention of undernutrition: experience from the International Lipid-Based Nutrient Supplements \(iLiNS\) Project.](#) *(abstract)*

Arimond M, Zeilani M, Jungjohann S, Brown KH, Ashorn P, Allen LH, Dewey KG. *Matern Child Nutr.* 2013 May 6. doi: 10.1111/mcn.12049. [Epub ahead of print]

[Lipid-based nutrient supplements: How can they combat child malnutrition?](#) *(abstract and free full-text)*

Dewey KG and Arimond M. *PLoS Med* 2012 Sep;9(9): e1001314.

[Iron bioavailability from a lipid-based complementary food fortificant mixed with millet porridge can be optimized by adding phytase and ascorbic acid but not by using a mixture of ferrous sulfate and sodium iron EDTA.](#) *(abstract)*

Cercamondi CI, Egli IM, Mitchikpe E, Tossou F, Hessou J, Zeder C, Hounhouigan JD, Hurrell RF. *J Nutr.* 2013 Aug;143(8):1233-9. doi: 10.3945/jn.113.175075. Epub 2013 Jun 12.

[Use of lipid-based nutrient supplements \(LNS\) to improve the nutrient adequacy of general food distribution rations for vulnerable sub-groups in emergency settings.](#) *(abstract and free full-text)*

Chaparro CM, Dewey KG. *Matern Child Nutr.* 2010 Jan;6 Suppl 1:1-69. doi: 10.1111/j.1740-8709.2009.00224.x.

## Published study designs

[Cluster-randomised controlled trials of individual and combined water, sanitation, hygiene and nutritional interventions in rural Bangladesh and Kenya: the WASH Benefits study design and rationale.](#) *(abstract and free full-text)*

Arnold BF, Null C, Luby SP, Unicomb L, Stewart CP, Dewey KG, Ahmed T, Ashraf S, Christensen G, Clasen T, Dentz HN, Fernald LC, Haque R, Hubbard AE, Kariger P, Leontsini E, Lin A, Njenga SM, Pickering AJ, Ram PK, Tofail F, Winch PJ, Colford JM Jr. *BMJ Open.* 2013 Aug 30;3(8):e003476. doi: 10.1136/bmjopen-2013-003476.

[A randomized trial to investigate the effects of pre-natal and infant nutritional supplementation on infant immune development in rural Gambia: the ENID trial: Early Nutrition and Immune Development.](#) *(abstract and free full-text)*

Moore SE, Fulford AJ, Darboe MK, Jobarteh ML, Jarjou LM, Prentice AM. *BMC Pregnancy Childbirth.* 2012 Oct 11;12:107. doi: 10.1186/1471-2393-12-107.

## **LNS for prevention**

[Randomized comparison of 3 types of micronutrient supplements for home fortification of complementary foods in Ghana: effects on growth and motor development.](#) *(abstract and free full-text)*  
Adu-Afarwuah S, Lartey A, Brown KH, Zlotkin S, Briend A, Dewey KG. Am J Clin Nutr. 2007 Aug;86(2):412-20.

[Home fortification of complementary foods with micronutrient supplements is well accepted and has positive effects on infant iron status in Ghana.](#) *(abstract and free full-text)*  
Adu-Afarwuah S, Lartey A, Brown KH, Zlotkin S, Briend A, Dewey KG. Am J Clin Nutr. 2008 Apr;87(4):929-38.

[Lipid-based nutrient supplement increases the birth size of infants of primiparous women in Ghana.](#) *(abstract)*  
Adu-Afarwuah S, Lartey A, Okronipa H, Ashorn P, Zeilani Z, Peerson JM, Arimond M, Vosti S, Dewey KG. Am J Clin Nutr. 2015 Feb 11. doi:10.3945/ajcn.114.091546. [Epub ahead of print]

[Supplementation of Maternal Diets during Pregnancy and for 6 Months Postpartum and Infant Diets Thereafter with Small-Quantity Lipid-Based Nutrient Supplements Does Not Promote Child Growth by 18 Months of Age in Rural Malawi: A Randomized Controlled Trial.](#) *(abstract)*  
Ashorn P, Alho L, Ashorn U, Cheung YB, Dewey KG, Gondwe A, Harjunmaa U, Lartey A, Phiri N, Phiri TE, Vosti SA, Zeilani M, Maleta K. J Nutr. 2015 Apr 29. pii: jn207225. [Epub ahead of print]

[The impact of lipid-based nutrient supplement provision to pregnant women on newborn size in rural Malawi: a randomized controlled trial.](#) *(abstract)*  
Ashorn P, Alho L, Ashorn U, Cheung YB, Dewey KG, Harjunmaa U, Lartey A, Nkhoma M, Phiri N, Phuka J, Vosti SA, Zeilani M, Maleta K. Am J Clin Nutr. 2015 Feb;101(2):387-97. doi: 10.3945/ajcn.114.088617. Epub 2014 Dec 10.

[Randomized controlled trial of the effectiveness of a soybean-maize-sorghum-based ready-to-use complementary food paste on infant growth in South Kivu, Democratic Republic of Congo.](#) *(abstract and free full-text)*  
Bisimwa G, Owino VO, Bahwere P, Dramaix M, Donnen P, Dibari F, and Collins S. Am J Clin Nutr. 2012 May;95(5):1157-64. Epub 2012 Apr 4.

[The impact of lipid-based nutrient supplementation on anti-malarial antibodies in pregnant women in a randomized controlled trial.](#) *(free full text)*  
Chandrasiri UP, Fowkes FJI, Richards JS, Langer C, Fan YM, Taylor SM, Beeson JG, Dewey KG, Maleta K, Ashorn P, Rogerson SJ. Malaria Journal (2015) 14:193 DOI 10.1186/s12936-015-0707-2

[A large-scale distribution of milk-based fortified spreads: Evidence for a new approach in regions with high burden of acute malnutrition.](#) *(abstract and free full-text)*  
Defourny I, Minetti A, Harczi G, Doyon S, Shepherd S, Tectonidis M, Bradol JH, Golden M. PLoS ONE 4(5): e5455. Doi:10.1371/journal.pone.0005455.

[Use of lipid-based nutrient supplements by HIV-infected Malawian women during lactation has no effect on infant growth from 0 to 24 weeks. \(abstract and free full-text\)](#)

Flax VL, Bentley ME, Chasela CS, Kayira D, Hudgens MG, Knight RJ, Soko A, Jamieson DJ, van der Horst CM, Adair LS. J Nutr. 2012 Jul;142(7):1350-6.

[Lipid-based nutrient supplements are feasible as a breastmilk replacement for HIV-exposed infants from 24 to 48 weeks of age. \(abstract\)](#)

Flax VL, Bentley ME, Chasela CS, Kayira D, Hudgens MG, Kacheche KZ, Chavula C, Kourtis AP, Jamieson DJ, van der Horst CM, Adair LS. J Nutr. Epub 2013 Mar 6.

[Plasma and breast-milk selenium in HIV-infected Malawian mothers are positively associated with infant selenium status but are not associated with maternal supplementation: results of the Breastfeeding, Antiretrovirals, and Nutrition study. \(abstract\)](#)

Flax VL, Bentley ME, Combs GF Jr, Chasela CS, Kayira D, Tegha G, Kamwendo D, Daza EJ, Fokar A, Kourtis AP, Jamieson DJ, van der Horst CM, Adair LS. Am J Clin Nutr. 2014 Apr;99(4):950-6. doi: 10.3945/ajcn.113.073833. Epub 2014 Feb 5.

[Provision of lipid-based nutrient supplements to Honduran children increases their dietary macro- and micronutrient intake without displacing other foods. \(abstract\)](#)

Flax VL, Siega-Riz AM, Reinhart GA, Bentley ME. Matern Child Nutr. 2015 Mar 28. doi: 10.1111/mcn.12182. Epub 2015 Mar 28.

[Breast milk intake is not reduced more by the introduction of energy dense complementary food than by typical infant porridge. \(abstract and free full-text\)](#)

Galpin L, Thakwalakwa C, Phuka J, Ashorn P, Maleta K, Wong WW, Manary MJ. J Nutr. 2007 Jul;137(7):1828-33.

[Effect of mass supplementation with ready-to-use supplementary food during an anticipated nutritional emergency. \(abstract and free full-text\)](#)

Grellety E, Shepherd S, Roederer T, Manzo ML, Doyon S, Ategbo EA, Grais RF. PLoS One. 2012;7(9):e44549.

[Growth in late infancy among HIV-exposed children in urban Haiti is associated with participation in a clinic-based infant feeding support intervention. \(abstract and free full-text\)](#)

Heidkamp RA, Stoltzfus RJ, Fitzgerald DW, Pape JW. J Nutr. 2012 Apr;142(4):774-80. Epub 2012 Feb 29.

[Small-quantity lipid-based nutrient supplements, regardless of their zinc content, increase growth and reduce the prevalence of stunting and wasting in young Burkinabe children: A cluster-randomized trial. \(abstract and free full-text\)](#)

Hess SY, Abbeddou S, Jimenez EY, Somé JW, Vosti SA, Ouédraogo ZP, Guissou RM, Ouédraogo JB, Brown KH. PLoS One. 2015 Mar 27;10(3):e0122242. doi: 10.1371/journal.pone.0122242. eCollection 2015.

[The effect of adding ready-to-use supplementary food to a general food distribution on child nutritional status and morbidity: A cluster-randomized controlled trial. \(abstract and free full-text\)](#)

Huybregts L, Hougbe´ F, Salpéteur C, Brown R, Roberfroid D, Ait-Aissa M, Kolsteren P. PLoS Med 2012 Sep;9(9): e1001313.

[Prenatal lipid-based nutrient supplements increase cord leptin concentration in pregnant women from rural Burkina Faso. \(abstract\)](#)

Huybregts L, Roberfroid D, Lanou H, Meda N, Taes Y, Valea I, D'Alessandro U, Kolsteren P, Van Camp J. J Nutr. 2013 May;143(5):576-83. doi: 10.3945/jn.112.171181. Epub 2013 Mar 27.

[Prenatal food supplementation fortified with multiple micronutrients increases birth length: a randomized controlled trial in rural Burkina Faso. \(abstract and free full-text\)](#)

Huybregts L, Roberfroid D, Lanou H, Menten J, Meda N, Van Camp J, Kosteren P, for the MISAME Study Group. Am J Clin Nutr 2009 Jan; 90: 1593-600.

[Linear growth increased in young children in an urban slum of Haiti: a randomized controlled trial of a lipid-based nutrient supplement. \(abstract\)](#)

Iannotti LL, Dulience SJ, Green J, Joseph S, François J, Anténor ML, Lesorogol C, Mounce J, Nickerson NM. Am J Clin Nutr. 2014 Jan;99(1):198-208. doi: 10.3945/ajcn.113.063883. Epub 2013 Nov 13.

[Ready-to-Use Supplementary Food Increases Fat Mass and BMI in Haitian School-Aged Children. \(abstract\)](#)

Iannotti LL, Henretty NM, Delnatus JR, Previl W, Stehl T, Vorkoper S, Bodden J, Maust A, Smidt R, Nash ML, Tamimie CA, Owen BC, Wolff PB. J Nutr. 2015 Apr;145(4):813-22. doi: 10.3945/jn.114.203182. Epub 2015 Feb 11.

[Impact of lipid-based nutrient supplementation \(LNS\) on children's diet adequacy in Western Uganda. \(abstract\)](#)

Ickes SB, Adair LS, Brahe CA, Thirumurthy H, Charles B, Myhre JA, Bentley ME, Ammerman AS. Matern Child Nutr. 2015 Jan 19. doi: 10.1111/mcn.12164. [Epub ahead of print]

[Effect of preventive supplementation with ready-to-use therapeutic food on the nutritional status, mortality, and morbidity of children aged 6 to 60 months in Niger: a cluster randomized trial. \(abstract and free full-text\)](#)

Isanaka S, Nombela N, Djibo A, Poupard M, Van Beckhoven D, Gaboulaud V, Guerin PJ, Grais RF. JAMA. 2009 Jan 21;301(3):277-85.

[Reducing wasting in young children with preventive supplementation: a cohort study in Niger. \(abstract and free full-text\)](#)

Isanaka S, Roederer T, Djibo A, Luquero FJ, Nombela N, Guerin PJ, Grais RF. Pediatrics. 2010 Aug;126(2):e442-50. Epub 2010 Jul 26.

[Iterative design, implementation and evaluation of a supplemental feeding program for underweight children ages 6-59 months in Western Uganda. \(abstract\)](#)

Jilcott SB, Ickes SB, Ammerman AS, Myhre JA. Matern Child Health J. 2010 Mar;14(2):299-306.

[A lipid-based nutrient supplement mitigates weight loss among HIV-infected women in a factorial randomized trial to prevent mother-to-child transmission during exclusive breastfeeding. \(abstract and free full-text\)](#)

Kayira D, Bentley ME, Wiener J, Mkhomawanthu C, King CC, Chitsulo P, Chigwenembe M, Ellington S, Hosseinipour MC, Kourtis AP, Chasela C, Tembo M, Tohill B, Piwoz EG, Jamieson DJ, van der Horst C, Adair L; for the BAN Study Team. Am J Clin Nutr. 2012 Mar;95(3):759-765. Epub 2012 Jan 18.

[Preventing acute malnutrition in young children: improving the evidence for current and future practice.](#) *(abstract and free full-text)*

Kerac M, Seal A. PLoS Med. 2014 Sep 2;11(9):e1001715. doi: 10.1371/journal.pmed.1001715. eCollection 2014.

[Lipid-based nutrient supplements do not decrease breast milk intake of Malawian infants.](#) *(abstract)*

Kumwenda C, Dewey KG, Hemsworth J, Ashorn P, Maleta K, Haskell MJ. Am J Clin Nutr. 2014 Mar;99(3):617-23. Epub 2013 Dec 24.

[Growth and change in blood haemoglobin concentration among underweight Malawian infants receiving fortified spreads for 12 weeks: a preliminary trial.](#) *(abstract)*

Kuusipalo H, Maleta K, Briend A, Manary M, Ashorn P. J Pediatr Gastroenterol Nutr. 2006 Oct;43(4):525-32.

[Preventing acute malnutrition among young children in crises: a prospective intervention study in Niger.](#) *(abstract and free full-text)*

Langendorf C, Roederer T, de Pee S, Brown D, Doyon S, Mamaty AA, Touré LW, Manzo ML, Grais RF. PLoS Med. 2014 Sep 2;11(9):e1001714. doi: 10.1371/journal.pmed.1001714. eCollection 2014.

[Prenatal Nutrient Supplementation and Postnatal Growth in a Developing Nation: An RCT.](#) *(abstract)*

Lanou H, Huybregts L, Roberfroid D, Nikièma L, Kouanda S, Van Camp J, Kolsteren P. Pediatrics. 2014 Mar 3. [Epub ahead of print]

[An energy-dense complementary food is associated with a modest increase in weight gain when compared with a fortified porridge in Malawian children aged 6-18 months.](#) *(abstract and free full-text)*

Lin CA, Manary MJ, Maleta K, Briend A, Ashorn P. J Nutr. 2008 Mar;138(3):593-8.

[Spread fortified with vitamins and minerals induces catch-up growth and eradicates severe anemia in stunted refugee children aged 3-6 y.](#) *(abstract and free full-text)*

Lopriore C, Guidoum Y, Briend A, Branca F. Am J Clin Nutr. 2004 Oct;80(4):973-81.

[Lipid-based nutrient supplements do not affect the risk of malaria or respiratory morbidity in 6- to 18-month-old Malawian children in a randomized controlled trial.](#) *(abstract)*

Mangani C, Ashorn P, Maleta K, Phuka J, Thakwalakwa C, Dewey K, Manary M, Puumalainen T, Cheung YB. J Nutr. 2014 Nov;144(11):1835-42. doi: 10.3945/jn.114.196139. Epub 2014 Sep 17.

[Providing lipid-based nutrient supplements does not affect developmental milestones among Malawian children.](#) *(abstract and free full-text)*

Mangani C, Cheung YB, Maleta K, Phuka J, Thakwalakwa C, Dewey K, Manary M, Puumalainen T, Ashorn P. Acta Paediatr. 2014 Jan;103(1):e17-26. doi: 10.1111/apa.12443. Epub 2013 Nov 18.

[Effect of complementary feeding with lipid-based nutrient supplements and corn-soy blend on the incidence of stunting and linear growth among 6- to 18-month-old infants and children in rural Malawi.](#) *(abstract)*

Mangani C, Maleta K, Phuka J, Cheung YB, Thakwalakwa C, Dewey K, Manary M, Puumalainen T, Ashorn P. Matern Child Nutr. 2013 Jun 25. doi: 10.1111/mcn.12068. [Epub ahead of print]

[Breast-milk intake of 9-10-mo-old rural infants given a ready-to-use complementary food in South Kivu, Democratic Republic of Congo. \(abstract and free full-text\)](#)

Owino VO, Bahwere P, Bisimwa G, Mwangi CM, Collins S. Am J Clin Nutr. 2011 Jun;93(6):1300-4. Epub 2011 Mar 30.

[Developmental outcomes among 18-month-old Malawians after a year of complementary feeding with lipid-based nutrient supplements or corn-soy flour. \(abstract\)](#)

Phuka JC, Gladstone M, Maleta K, Thakwalakwa C, Cheung YB, Briend A, Manary MJ, Ashorn P. Matern Child Nutr. 2012 Apr;8(2):239-48. doi: 10.1111/j.1740-8709.2011.00294.x. Epub 2011 Feb 22.

[Complementary feeding with fortified spread and incidence of severe stunting in 6- to 18-month-old rural Malawians. \(abstract and free full-text\)](#)

Phuka JC, Maleta K, Thakwalakwa C, Cheung YB, Briend A, Manary MJ, Ashorn P. Arch Pediatr Adolesc Med. 2008 Jul;162(7):619-26. Erratum in: Arch Pediatr Adolesc Med. 2008 Oct;162(10):942.

[Postintervention growth of Malawian children who received 12-mo dietary complementation with a lipid-based nutrient supplement or maize-soy flour. \(abstract and free full-text\)](#)

Phuka JC, Maleta K, Thakwalakwa C, Cheung YB, Briend A, Manary MJ, Ashorn P. Am J Clin Nutr. 2009 Jan;89(1):382-90.

[Supplementary feeding with fortified spread among moderately underweight 6-18-month-old rural Malawian children. \(abstract\)](#)

Phuka J, Thakwalakwa C, Maleta K, Cheung YB, Briend A, Manary M, Ashorn P. Matern Child Nutr. 2009 Apr;5(2):159-70.

[Effect of 12-month intervention with lipid-based nutrient supplements on physical activity of 18-month-old Malawian children: a randomised, controlled trial. \(abstract\)](#)

Pulakka A, Ashorn U, Cheung YB, Dewey KG, Maleta K, Vosti SA, Ashorn P. Eur J Clin Nutr. 2015 Feb;69(2):173-8. doi: 10.1038/ejcn.2014.138. Epub 2014 Jul 16.

[Effect of Supplementation with a Lipid-Based Nutrient Supplement on the Micronutrient Status of Children Aged 6-18 Months Living in the Rural Region of Intibucá, Honduras. \(abstract\)](#)

Siega-Riz AM, Estrada Del Campo Y, Kinlaw A, Reinhart GA, Allen LH, Shahab-Ferdows S, Heck J, Suchindran CM, Bentley ME. Paediatr Perinat Epidemiol. 2014 Mar 13. doi: 10.1111/ppe.12117. [Epub ahead of print].

[Prevention of acute malnutrition during the lean season: Comparison of a lipid-based nutrient supplement and an improved dry ration, South Darfur, Sudan. A quasi-experimental study. \(abstract and free full-text\)](#)

Talley L, Boyd E, el Sharief F, Blanton C, OmerAli M, Rahman M. J Nutr Disorders Ther 2012;2:117.

[An effectiveness trial showed lipid-based nutrient supplementation but not corn-soya blend offered a modest benefit in weight gain among 6- to 18-month-old underweight children in rural Malawi. \(abstract and free full-text\)](#)

Thakwalakwa CM, Ashorn P, Jawati M, Phuka JC, Cheung YB, Maleta KM. Public Health Nutr. 2012 Jun 13:1-8.

[Impact of lipid-based nutrient supplements and corn-soy blend on energy and nutrient intake among moderately underweight 8-18-month-old children participating in a clinical trial. \(abstract\)](#)

Thakwalakwa CM, Ashorn P, Phuka JC, Cheung YB, Briend A, Maleta KM. *Matern Child Nutr.* 2014 Feb 17. doi: 10.1111/mcn.12105. [Epub ahead of print]

[A lipid-based nutrient supplement but not corn-soy blend modestly increases weight gain among 6- to 18-month-old moderately underweight children in rural Malawi. \(abstract and free full-text\)](#)

Thakwalakwa C, Ashorn P, Phuka J, Cheung YB, Briend A, Puumalainen T, Maleta K. *J Nutr.* 2010 Nov;140(11):2008-13. Epub 2010 Sep 22.

[Seasonality Modifies the Effect of a Lipid-Based Nutrient Supplement for Pregnant Rural Women on Birth Length. \(abstract\)](#)

Toe LC, Bouckaert KP, De Beuf K, Roberfroid D, Meda N, Thas O, Van Camp J, Kolsteren PW, Huybregts LF. *J Nutr.* 2015 Mar;145(3):634-9. doi: 10.3945/jn.114.203448. Epub 2015 Jan 14.

### **Acceptability, demand, and use of LNS**

[Comparison of methods to assess adherence to small-quantity lipid-based nutrient supplements \(SQ-LNS\) and dispersible tablets among young Burkinabé children participating in a community-based intervention trial. \(abstract\)](#)

Abbeddou S, Hess SY, Yakes Jimenez E, Somé JW, Vosti SA, Guissou RM, Ouédraogo J, Brown KH. *Matern Child Nutr.* 2014 Dec 17. doi: 10.1111/mcn.12162. [Epub ahead of print]

[Acceptability of lipid-based nutrient supplements \(LNS\) among Ghanaian infants and pregnant or lactating women. \(abstract\)](#)

Adu-Afarwuah S, Lartey A, Zeilani M, Dewey KG. *Matern Child Nutr.* 2011 Oct;7(4):344-56. Epub 2010 Dec 23.

[Development and acceptability testing of ready-to-use supplementary food made from locally available food ingredients in Bangladesh. \(abstract and free full-text\)](#)

Ahmed T, Choudhury N, Hossain MI, Tangsuphoom N, Islam MM, de Pee S, Steiger G, Fuli R, Sarker SA, Parveen M, West KP Jr, Christian P. *BMC Pediatr.* 2014 Jun 27;14:164. doi: 10.1186/1471-2431-14-164.

[Malawian Mothers Consider Lipid-Based Nutrient Supplements Acceptable for Children throughout a 1-Year Intervention, but Deviation from User Recommendations Is Common. \(abstract\)](#)

Ashorn U, Alho L, Arimond M, Dewey KG, Maleta K, Phiri N, Phuka J, Vosti SA, Zeilani M, Ashorn P. *J Nutr.* 2015 May 20. pii: jn209593. [Epub ahead of print]

[Formative assessment to design the packaging of a lipid-based nutrient supplement for a home fortification program to improve the nutritional status of young children in the Democratic Republic of Congo \(DRC\). \(free full-text\)](#)

CDC, UNICEF and Nutriset: Atlanta, 2013.

[Intra-household use and acceptability of Ready-to-Use-Supplementary-Foods distributed in Niger between July and December 2010. \(abstract\)](#)

Cohuet S, Marquer C, Shepherd S, Captier V, Langendorf C, Ale F, Phelan K, Manzo ML, Grais RF. *Appetite.* 2012 Dec;59(3):698-705. doi: 10.1016/j.appet.2012.07.019. Epub 2012 Aug 4.

[Chronic Malnutrition, Breastfeeding, and Ready To Use Supplementary Food in a Guatemalan Maya Town. \(abstract\)](#)

Davis TE, Fischer EF, Rohloff PJ, Heimbürger DC. Human Organization. 2014 73(1): 72-81.

[Feeding patterns of underweight children in rural Malawi given supplementary fortified spread at home. \(abstract\)](#)

Flax VL, Ashorn U, Phuka J, Maleta K, Manary MJ, Ashorn P. Matern Child Nutr. 2008 Jan;4(1):65-73.

[Responsive feeding and child interest in food vary when rural Malawian children are fed lipid-based nutrient supplements or local complementary food. \(abstract\)](#)

Flax VL, Mäkinen S, Ashorn U, Cheung YB, Maleta K, Ashorn P, Bentley ME. Matern Child Nutr. 2011 Nov 24. [Epub ahead of print]

[Intake of lipid-based nutrient supplements during illness and convalescence among moderately-underweight Malawian children. \(abstract and free full-text\)](#)

Flax VL, Maleta K, Ashorn U, Manary MJ, Briend A, Ashorn P. J Health Popul Nutr. 2008 Dec;26(4):468-70.

[Feeding patterns and behaviors during home supplementation of underweight Malawian children with lipid-based nutrient supplements or corn-soy blend. \(abstract\)](#)

Flax VL, Phuka J, Cheung YB, Ashorn U, Maleta K, Ashorn P. Appetite. 2010 Jun; 54(3):504-11. Epub 2010 Feb 11.

[Malawian mother's attitudes towards the use of two supplementary foods for moderately malnourished children. \(abstract\)](#)

Flax VL, Thakwalakwa C, Phuka J, Ashorn U, Cheung YB, Maleta K, Ashorn P. Appetite. 2009 Oct;53(2):195-202. Epub 2009 Jun 21.

[Rang-Din Nutrition Study: Assessment of Participant Adherence to Lipid-Based Nutrient and Iron-Folic Acid Supplements among Pregnant and Lactating Women in the Context of a Study on the Effectiveness of Supplements in Bangladesh. \(free full-text\)](#)

Harding KL, Matias SL, Moniruzzaman M, Stewart CP, Mridha MK, Vosti SA, Dewey KG. Washington, DC: FHI 360/FANTA. September 2014.

[Acceptability of zinc-fortified, lipid-based nutrient supplements \(LNS\) prepared for young children in Burkina Faso. \(abstract\)](#)

Hess SY, Bado L, Aaron GJ, Ouédraogo JB, Zeilani M, Brown KH. Matern Child Nutr. 2011 Oct; 7(4): 357-67. Epub 2010 Dec 15.

[Examination of facilitators and barriers to home-based supplemental feeding with ready-to-use food for underweight children in western Uganda. \(abstract and free full-text\)](#)

Ickes SB, Jilcott SB, Myhre JA, Adair LS, Thirumurthy H, Handa S, Bentley ME, Ammerman AS. Matern Child Nutr. 2012 Jan;8(1):115-29. Epub 2010 Jul 19.

[Acceptability of new formulations of corn-soy blends and lipid-based nutrient supplements in Province du Passoré, Burkina Faso. \(abstract\)](#)

Luel-Brockdorf AS, Dræbel TA, Fabiansen C, Cichon B, Christensen VB, Yameogo C, Ritz C, Frahm Olsen M, Friis H. Appetite. 2015 Apr 23;91:278-286. doi: 10.1016/j.appet.2015.04.058. [Epub ahead of print]



[Preventative lipid-based nutrient supplements \(LNS\) and young child feeding practices: findings from qualitative research in Haiti.](#) *(abstract)*

Lesorogol C, Jean-Louis S, Green J, Iannotti L. *Matern Child Nutr.* 2014 May 1. doi: 10.1111/mcn.12122. [Epub ahead of print]

[Hybrid Public-Private Delivery of Preventative Lipid-Based Nutrient Supplement Products: Key Challenges, Opportunities and Players in an Emerging Product Space.](#) *(free full-text)*

Lybbert, Travis J. 2011. *SCN News*, #39, pp. 32-39.

[Acceptability of a Lipid-Based Nutrient Supplement among Guatemalan Infants and Young Children.](#) *(free full-text)*

Matias SL, Chaparro CM, Perez-Exposito AB, Peerson JM, Dewey KG. FANTA-2 Technical Report; Washington, DC: Aug 2011.

[Heat treatment of expressed breast milk is a feasible option for feeding HIV-exposed, uninfected children after 6 months of age in rural Zimbabwe.](#) *(abstract and free full-text)*

Mbuya MN, Humphrey JH, Majo F, Chasekwa B, Jenkins A, Israel-Ballard K, Muti M, Paul KH, Madzima RC, Moulton LH, Stoltzfus RJ. *J Nutr.* 2010 Aug;140(8):1481-8. Epub 2010 Jun 23.

[Acceptability of Lipid-Based Nutrient Supplements and Micronutrient Powders among Pregnant and Lactating Women and Infants and Young Children in Bangladesh and Their Perceptions about Malnutrition and Nutrient Supplements.](#) *(free full-text)*

Mridha MK, Chaparro CM, Matias SL, Hussain S, Munira S, Saha S, Day LT, Dewey KG. FANTA-2 Bridge Technical Report; Washington, DC: Feb 2012.

[Complementary feeding messages that target cultural barriers enhance both the use of lipid-based nutrient supplements and underlying feeding practices to improve infant diets in rural Zimbabwe.](#) *(abstract)*

Paul KH, Muti M, Chasekwa B, Mbuya MN, Madzima RC, Humphrey JH, Stoltzfus RJ. *Matern Child Nutr.* 2012 Apr;8(2):225-38. Epub 2010 Aug 4.

[The acceptance and feasibility of replacement feeding at 6 Months as an HIV prevention method in Lilongwe, Malawi: Results from the BAN study.](#) *(abstract and free full-text)*

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