




## Supplementary Figure S1. Quality of included studies

### Supplementary Figure S1a. Quality of included cluster randomised controlled studies

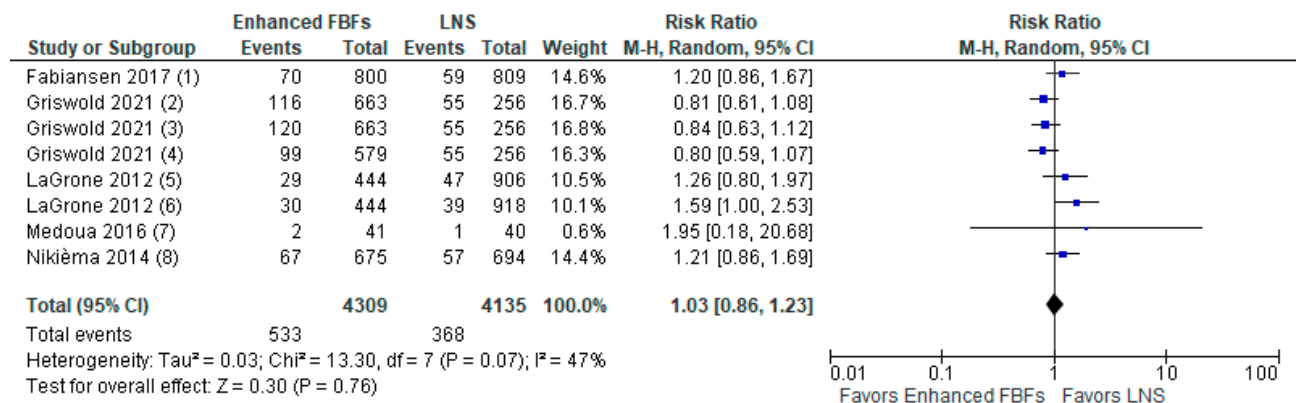
Study ID	D1a: Randomisation process	D1b: Timing of identification or recruitment of participants	D2: Deviations from the intended intervention	D3: Missing outcome data	D4: Measure ment of the outcome	D5: Selection of the reported result	Overall
Ackatia-Armah 2015	!	+	!	+	+	-	-
Amegovu 2014	!	!	+	+	!	!	!
Bailey 2020	+	+	+	+	!	+	!
Griswold 2021	-	-	+	+	+	+	-
Kajjura 2019	!	+	+	+	+	!	!
Karakochuk 2012	+	-	+	+	+	!	-
Nikiema 2014	+	+	+	+	-	+	!

### Supplementary Figure S1b. Quality of included individually randomised controlled studies

Study ID	D1: Randomisation process	D2: Deviations from the intended interventions	D3: Missing outcome data	D4: Measure ment of the outcome	D5: Selection of the reported result	Overall
Chen 2021	+	+	+	!	+	!
Fabiansen 2017	+	!	+	+	+	!
Kohlman 2019	+	+	+	+	-	!
LaGrone 2012	+	!	+	+	+	!
Matilsky 2009	+	+	+	+	+	+
Medoua 2016	+	+	+	+	!	!
Nackers 2010	+	+	-	+	!	-
Nane 2021	+	+	+	+	+	+
Roediger 2020	+	+	+	+	+	+
Stobaugh 2016	+	+	+	+	+	+

 Low risk  
 Some concerns  
 High risk

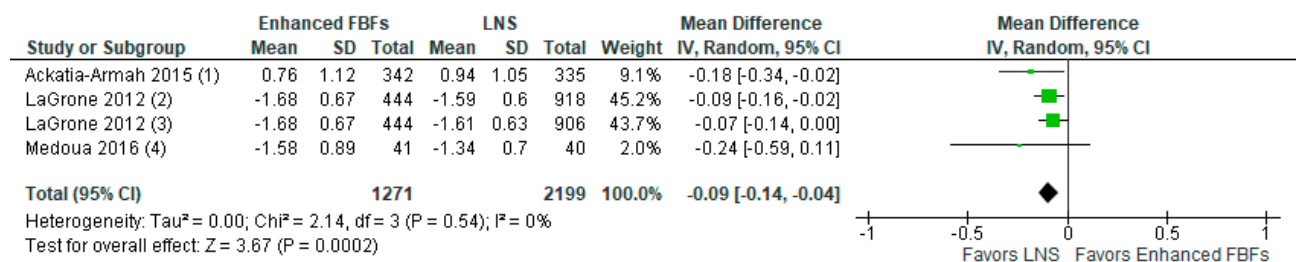
### Supplementary Figure S2. Forest plot of enhanced FBF compared to LNS - Outcome: Deterioration to SAM



#### Footnotes

- (1) Enhanced FBFs vs LNS; developed SAM at any point during the 12 week intervention
- (2) Super Cereal Plus with amylase (SC+A) vs RUSF; developed SAM in the 12 week intervention period.
- (3) CSB+w/oil vs RUSF; developed SAM in the 12 week intervention period.
- (4) Corn Soy Whey Blend w/oil vs RUSF; developed SAM in the 12 week intervention period.
- (5) CSB++ vs Soy RUSF; Developed severe wasting (WHZ <-3) during the intervention period.
- (6) SB++ vs Soy/Whey RUSF; Severe wasting (WHZ <-3) during the intervention period.
- (7) CSB+ with soy oil vs RUSF; Developed SAM (Severe wasting (WHZ <-3)).
- (8) CSB++ vs Locally produced RUSF; developed SAM during the intervention period.

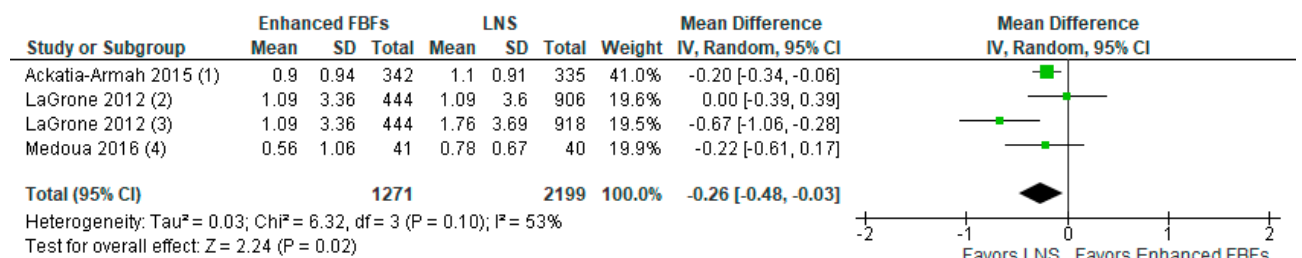
**Supplementary Figure S3. Forest plot of enhanced FBF compared to LNS - Outcome: WHZ**



#### Footnotes

- (1) CSB++ vs Supplementary Plumpy/Nutriset; Change in WHZ during 12 weeks of treatment.
- (2) CSB++ vs Soy/Whey RUSF; WHZ at the end of the intervention.
- (3) CSB++ vs Soy RUSF; WHZ at the end of the intervention.
- (4) CSB+ with soy oil vs RUSF; WHZ at the end of the intervention.

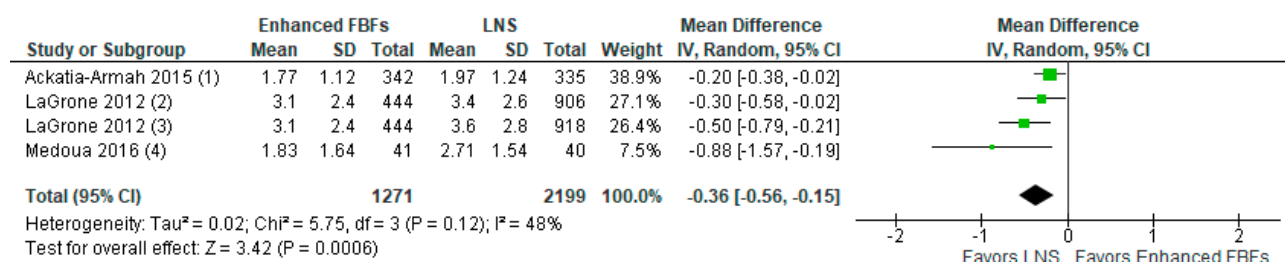
**Supplementary Figure S4. Forest plot of enhanced FBF compared to LNS - Outcome: MUAC gain (in cm)**



#### Footnotes

- (1) CSB++ vs Supplementary Plumpy; MUAC gain in cm over the intervention period.
- (2) CSB++ vs Soy RUSF; MUAC gain in cm over the intervention period.
- (3) CSB++ vs Soy/Whey RUSF; MUAC gain in cm over the intervention period.
- (4) CSB+ with soy oil vs RUSF; MUAC gain in cm over the intervention period.

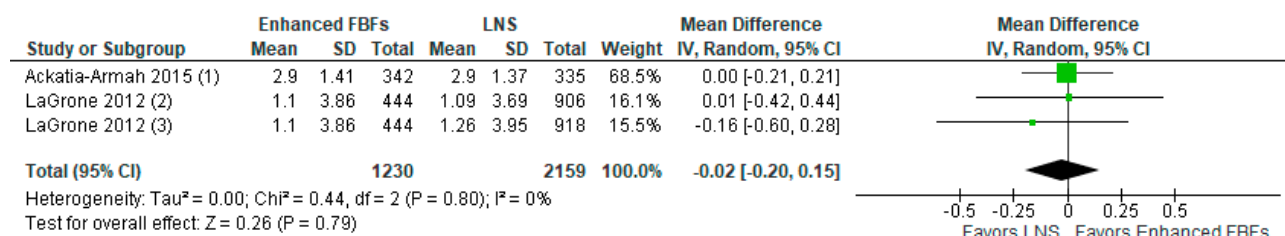
### Supplementary Figure S5. Forest plot of enhanced FBF compared to LNS - Outcome: Weight gain (g/kg/day)



#### Footnotes

- (1) CSB++ vs Supplementary Plumpy; Weight gain in g/kg/day.  
 (2) CSB++ vs Soy RUSF; Weight gain 4 weeks post enrollment in g/kg/day.  
 (3) CSB++ vs Soy/Whey RUSF; Weight gain 4 weeks on enrollment in (g/kg/day).  
 (4) CSB+ with soy oil vs RUSF; Weight gain in g/kg/d over the intervention period.

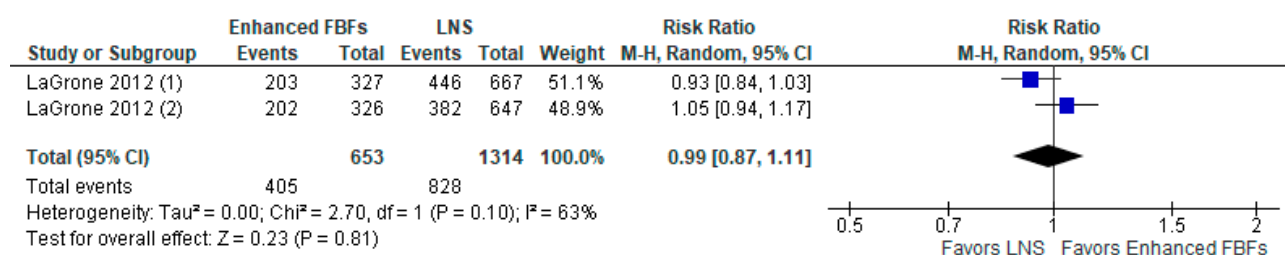
### Supplementary Figure S6. Forest plot of enhanced FBF compared to LNS - Outcome: Height gain (cm)



#### Footnotes

- (1) CSB++ vs Supplemntary Plumpy/Nutriset; height gain in cm over the intervention period.  
 (2) CSB++ vs Soy RUSF; height gain in cm over the intervention period.  
 (3) CSB++ vs Soy/Whey RUSF; height gain in cm over the intervention period.

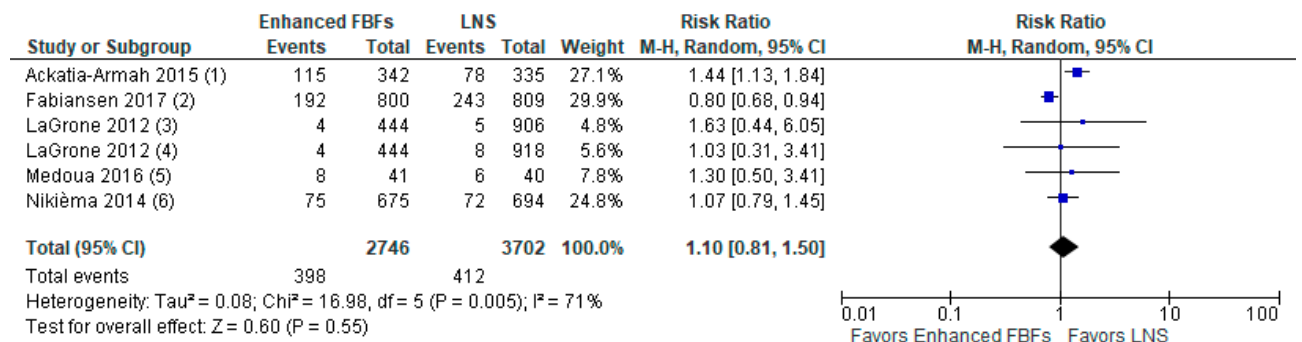
### Supplementary Figure S7. Forest plot of enhanced FBF compared to LNS - Outcome: Sustained recovery



#### Footnotes

- (1) CSB++ vs Soy/Whey RUSF; Sustained recovery at 12 months post discharge.  
 (2) CSB++ vs Soy RUSF; Sustained recovery at 12 months post discharge.

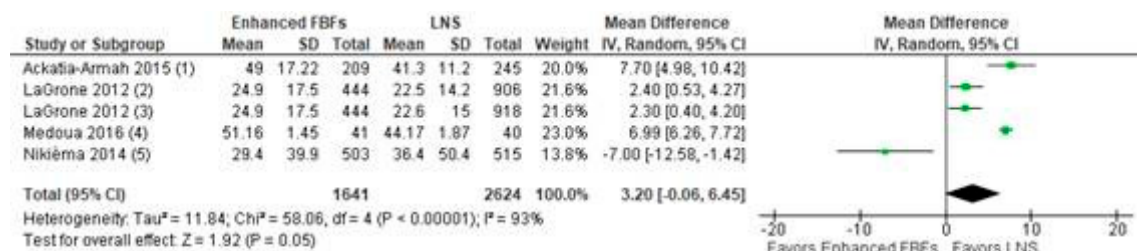
### Supplementary Figure S8. Forest plot of enhanced FBF compared to LNS - Outcome: Non-response



#### Footnotes

- (1) CSB++ vs Supplementary Plumpy; Non-response defined as not recovered by week 12.
- (2) Enhanced FBFs vs LNS; Non-response defined as not recovered by week 12.
- (3) CSB++ vs Soy RUSF; Non-response defined as still MAM by week 12.
- (4) CSB++ vs Soy/Whey RUSF; Non-response defined as still MAM by week 12.
- (5) CSB+ with soy oil vs RUSF; continued MAM despite 8 weeks of therapy.
- (6) CSB++ vs Locally produced RUSF; Non-response defined as remained MAM at the end of 3 months intervention.

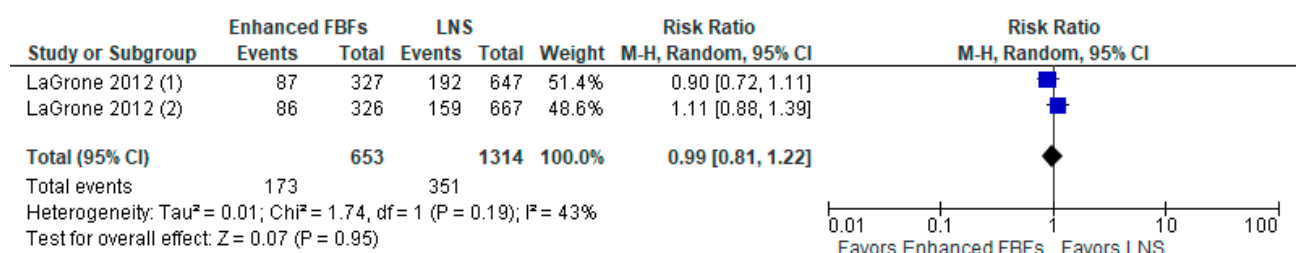
**Supplementary Figure S9. Forest plot of enhanced FBF compared to LNS - Outcome: Time to recovery (in days)**



#### Footnotes

- (1) CSB++ vs Supplementary Plumpy; Time to recovery in days.
- (2) CSB++ vs Soy RUSF; Time to recovery in days.
- (3) CSB++ vs Soy/Whey RUSF; Time to recovery in days.
- (4) CSB+ with soy oil vs RUSF; Time to recovery in days.
- (5) CSB++ vs Locally produced RUSF; Time to recovery in days.

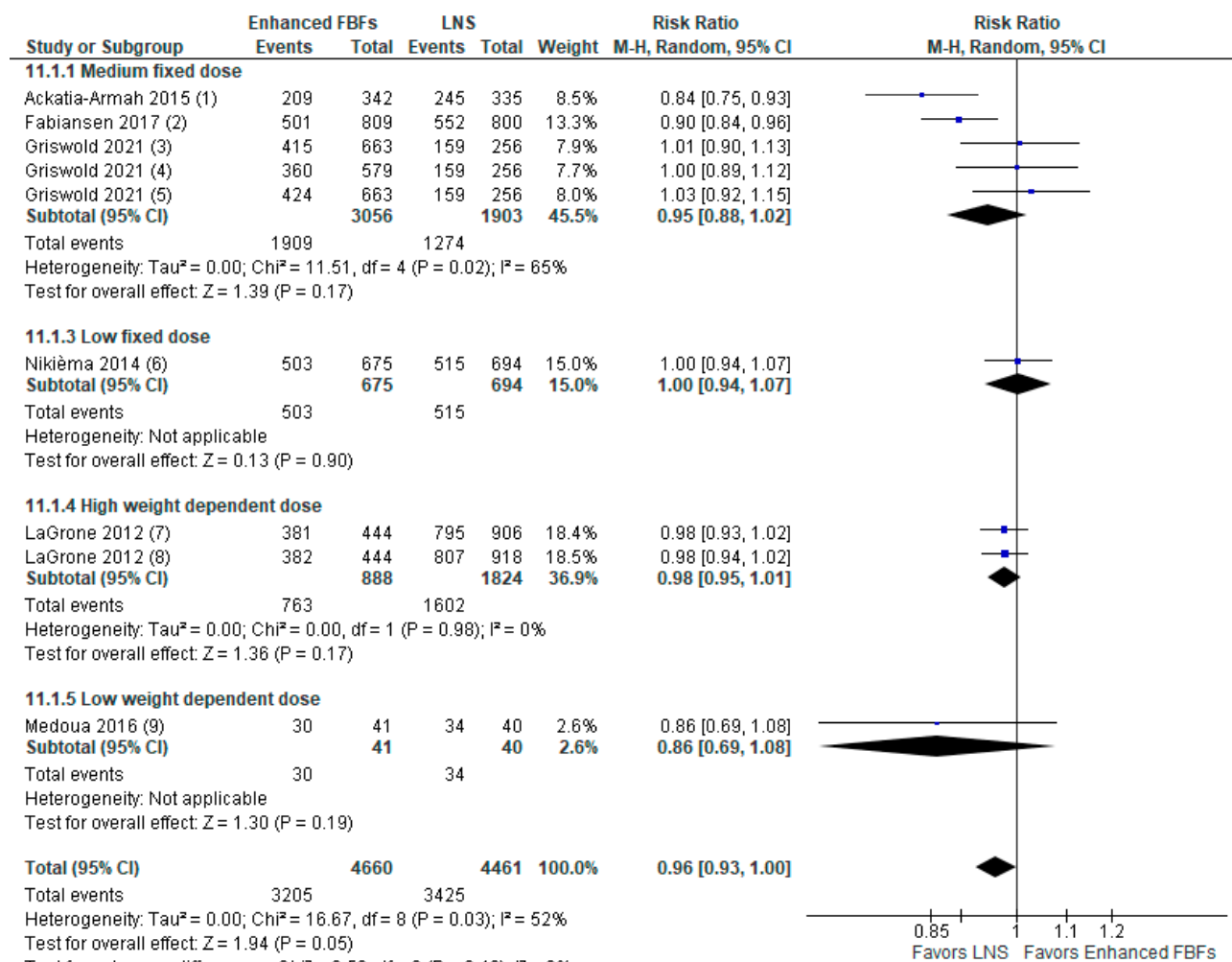
**Supplementary Figure S10. Forest plot of enhanced FBF compared to LNS - Outcome: Relapse**



#### Footnotes

- (1) CSB++ vs Soy RUSF; relapsed to MAM: Relapse defined as recovery children who deteriorated to MAM or SAM.
- (2) CSB++ vs Soy/Whey RUSF; relapsed to MAM: Relapse defined as recovery children who deteriorated to MAM or SAM.

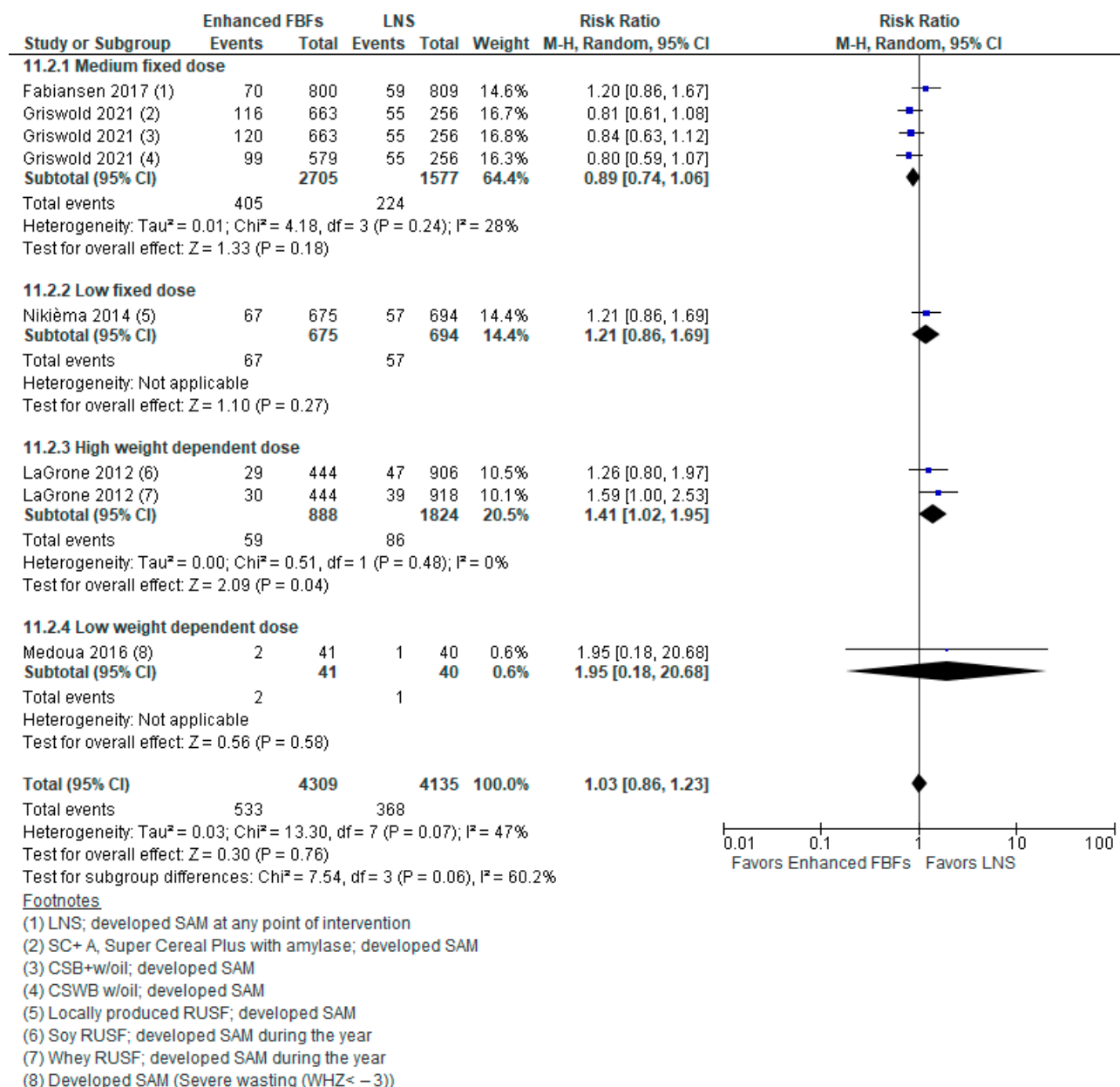
**Supplementary Figure S11. Forest plot of enhanced FBF vs LNS - Outcome: Recovery (subgroup analysis by dose)**



#### Footnotes

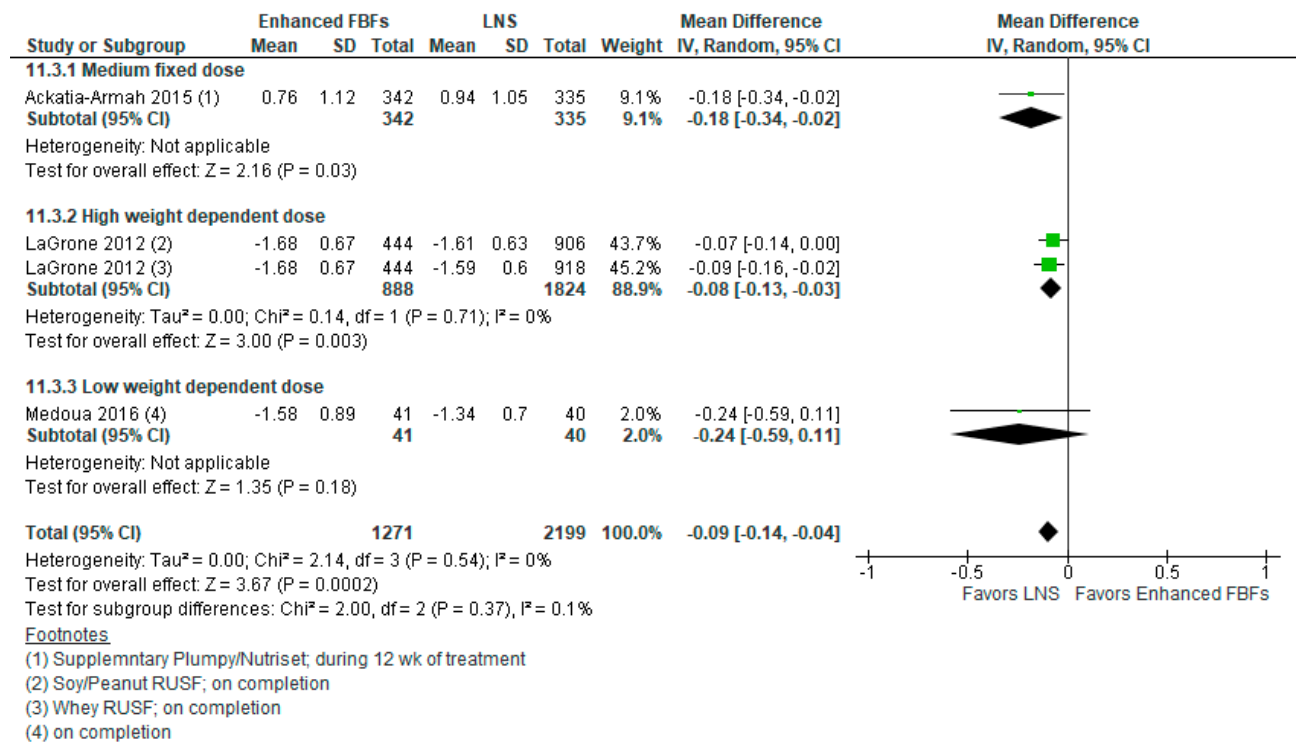
- (1) Supplemntary Plumpy/Nutriset; sustained recovery from MAM, defined as  $WLZ \geq -2.0$  and  $MUAC \geq 12.5$  cm for  $\geq 2$  follow-up visits
- (2) LNS, factorial trial including 12 different products; recovery at 12 weeks ( $WHZ \geq -2$  and  $MUAC \geq 125$  mm)
- (3) SC+ A, Super Cereal Plus with amylase; recovery rate defined as achieving  $MUAC \geq 12.5$  cm by the seventh visit and no bipedal edema
- (4) CSWB w/oil; recovery rate defined as achieving  $MUAC \geq 12.5$  cm by the seventh visit and no bipedal edema
- (5) CSB+w/oil; recovery rate defined as achieving  $MUAC \geq 12.5$  cm by the seventh visit and no bipedal edema
- (6) Locally produced RUSF; recovery rate defined as  $WHZ \geq -2$  SD
- (7) Soy/Peanut RUSF; recovered when they reached a  $WHZ \geq -2$
- (8) Whey RUSF; recovered when they reached a  $WHZ \geq -2$
- (9) RUSF produced by using pre-cooked soya and corn flours, peanut paste, sugar, soya oil and a premix containing concentrated minerals and...

**Supplementary Figure S12. Forest plot of enhanced FBF vs LNS - Outcome: Deterioration to severe wasting (subgroup analysis by dose)**

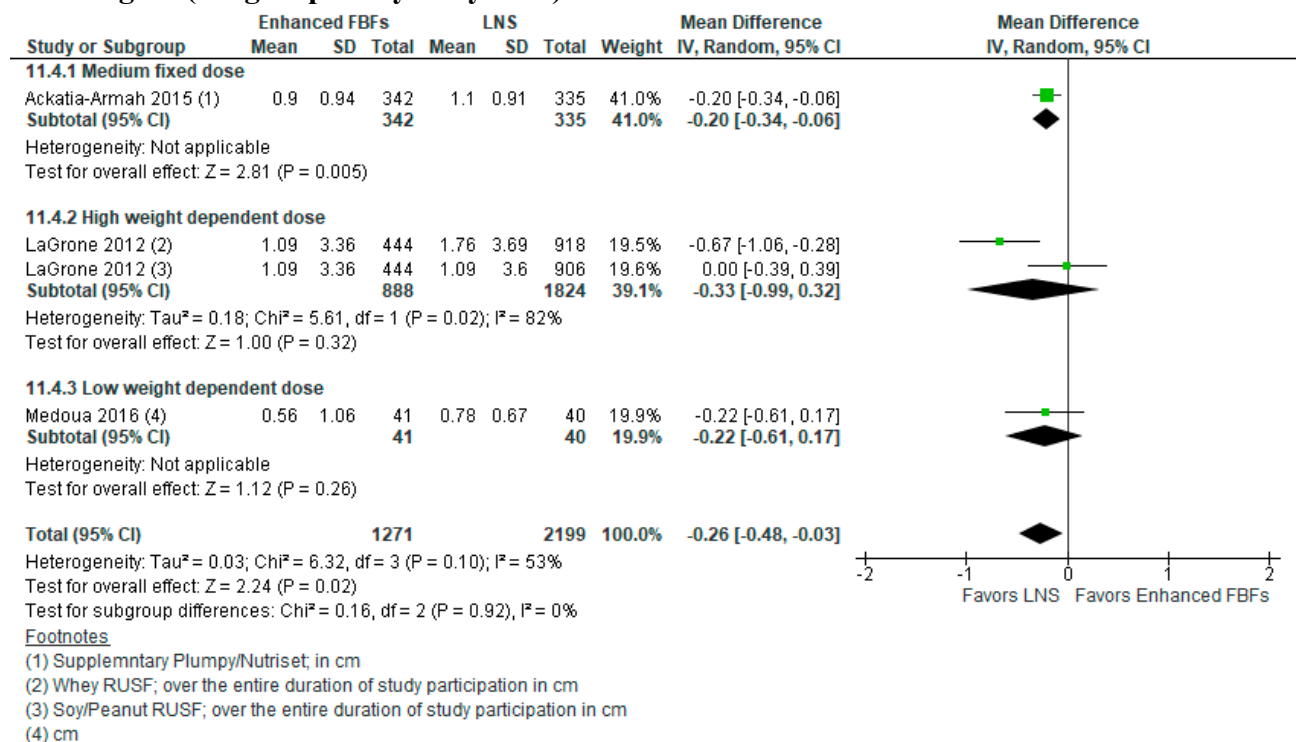


**Supplementary Figure S13. Forest plot of enhanced FBF vs LNS - Outcome: WHZ (subgroup analysis by dose)**

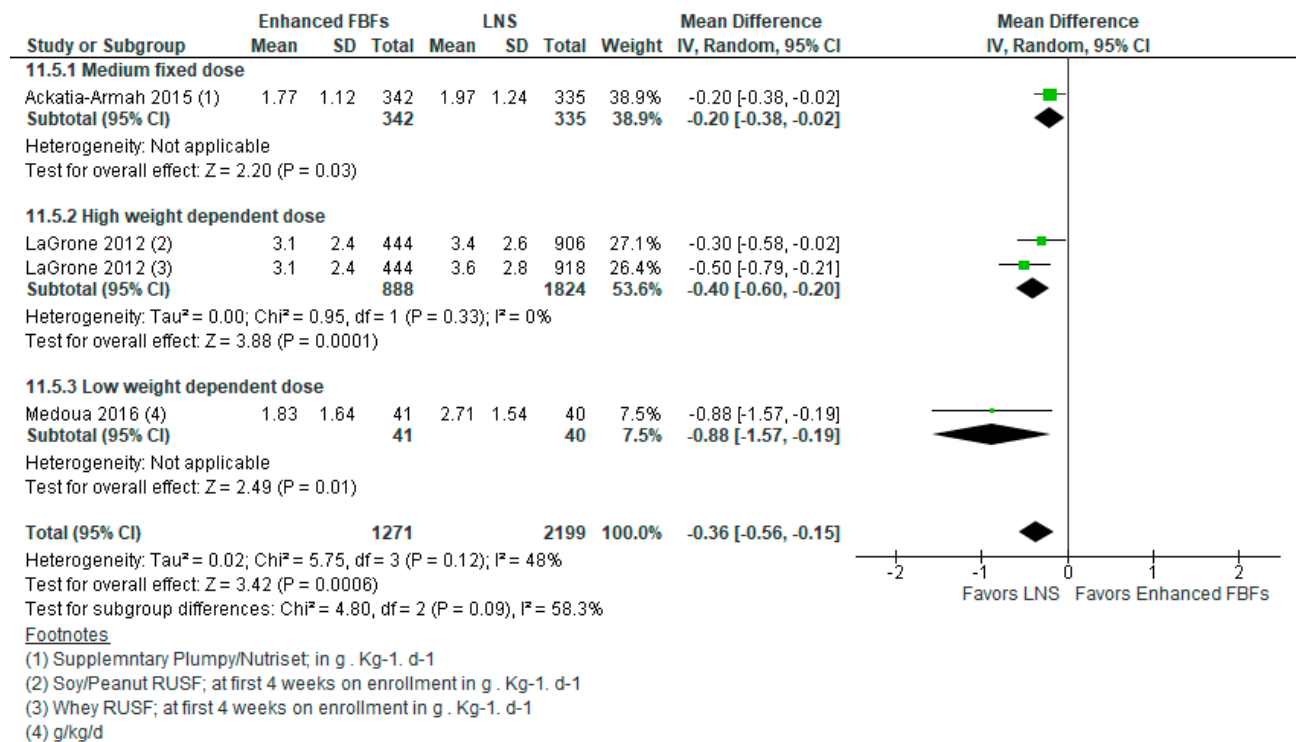




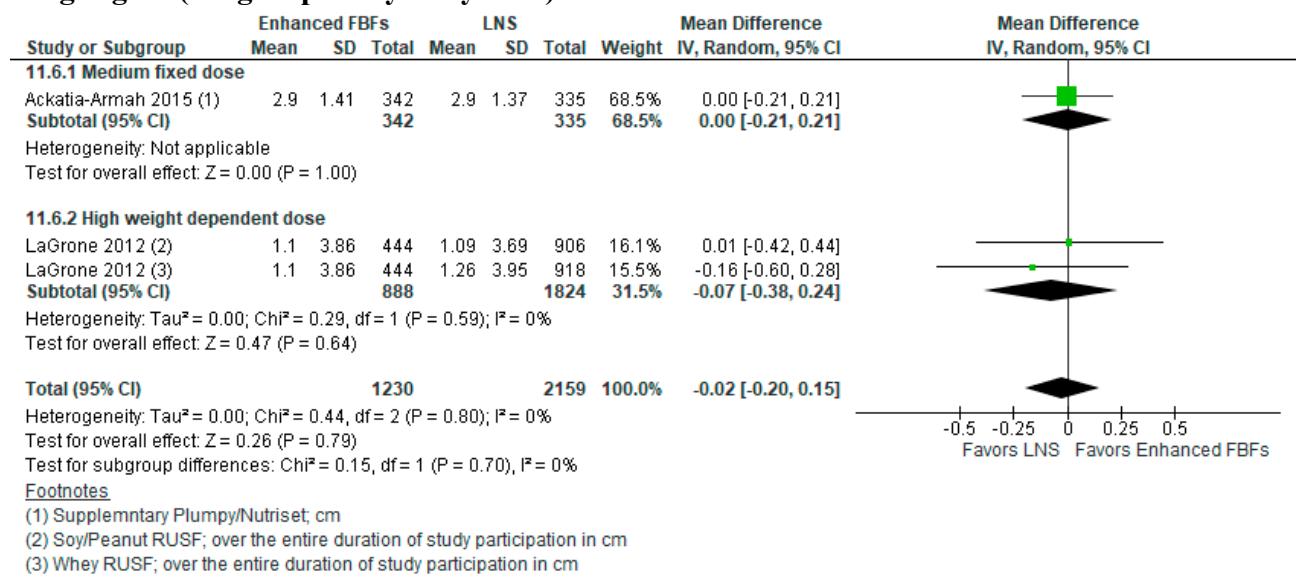
**Supplementary Figure S14. Forest plot of enhanced FBF vs LNS - Outcome: MUAC gain (subgroup analysis by dose)**



**Supplementary Figure S15. Forest plot of enhanced FBF vs LNS - Outcome: Weight gain (subgroup analysis by dose)**

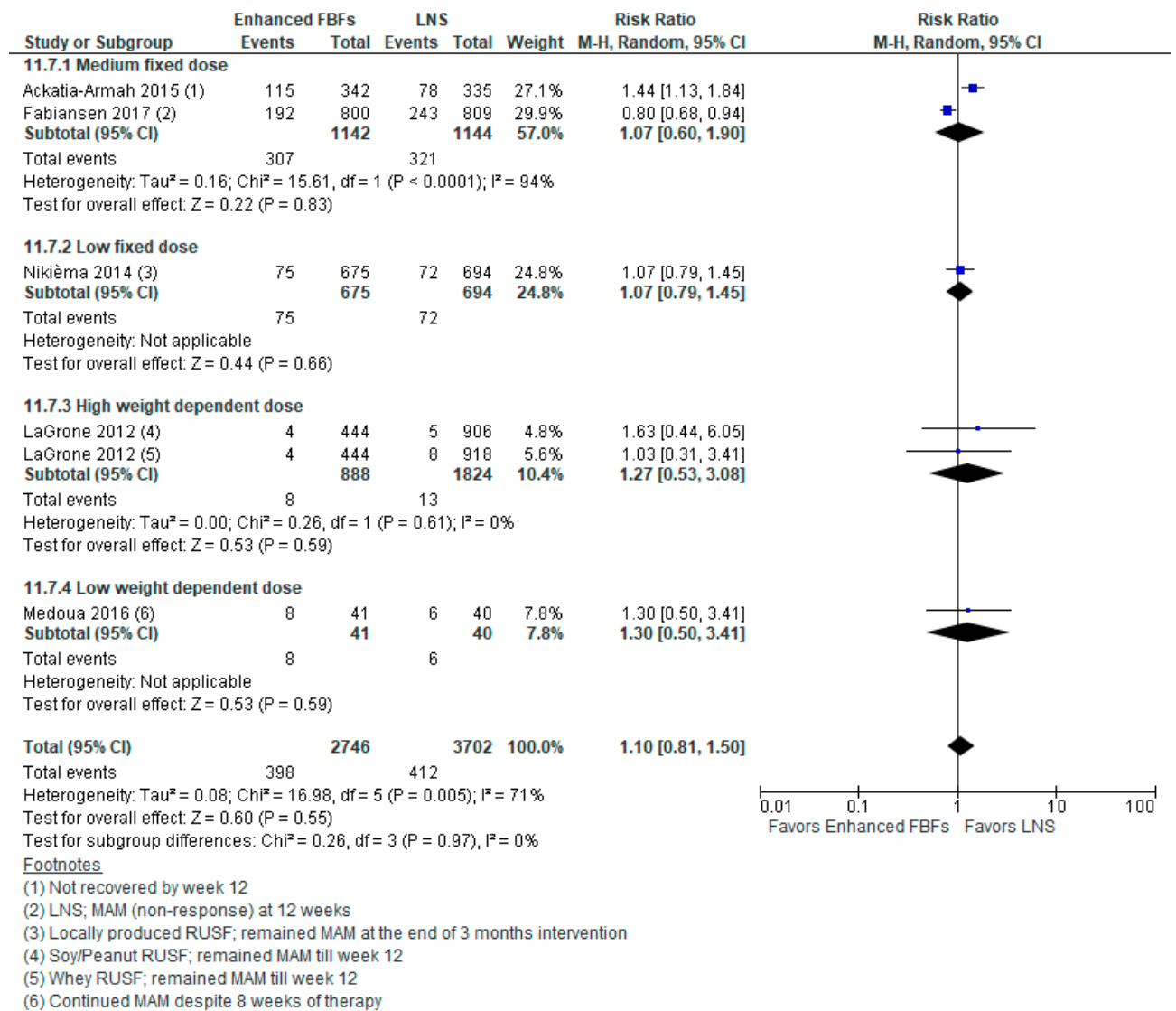


**Supplementary Figure S16. Forest plot of enhanced FBF vs LNS - Outcome: Height gain (subgroup analysis by dose)**

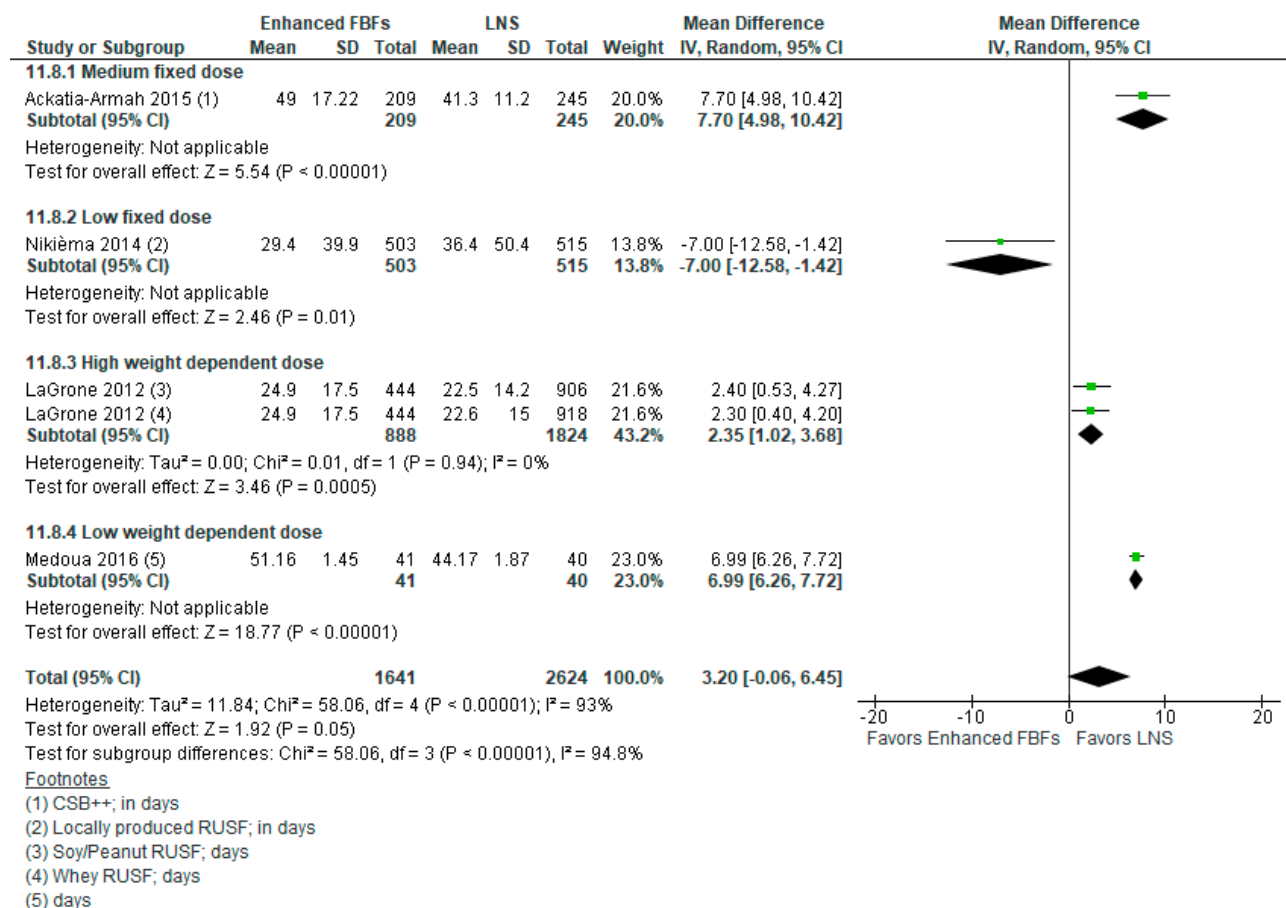


**Supplementary Figure S17. Forest plot of enhanced FBF vs LNS - Outcome: Non-response (subgroup analysis by dose)**

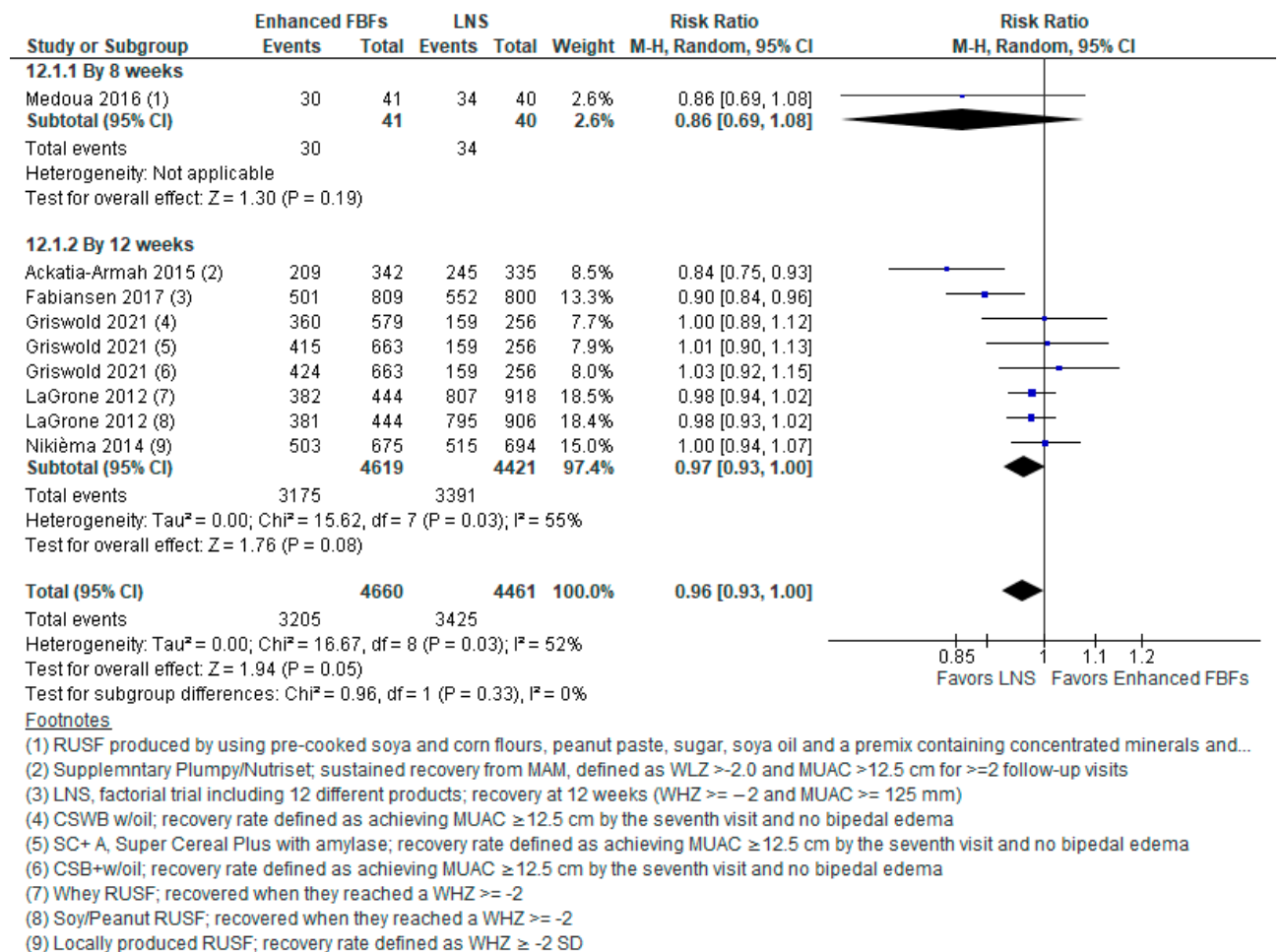




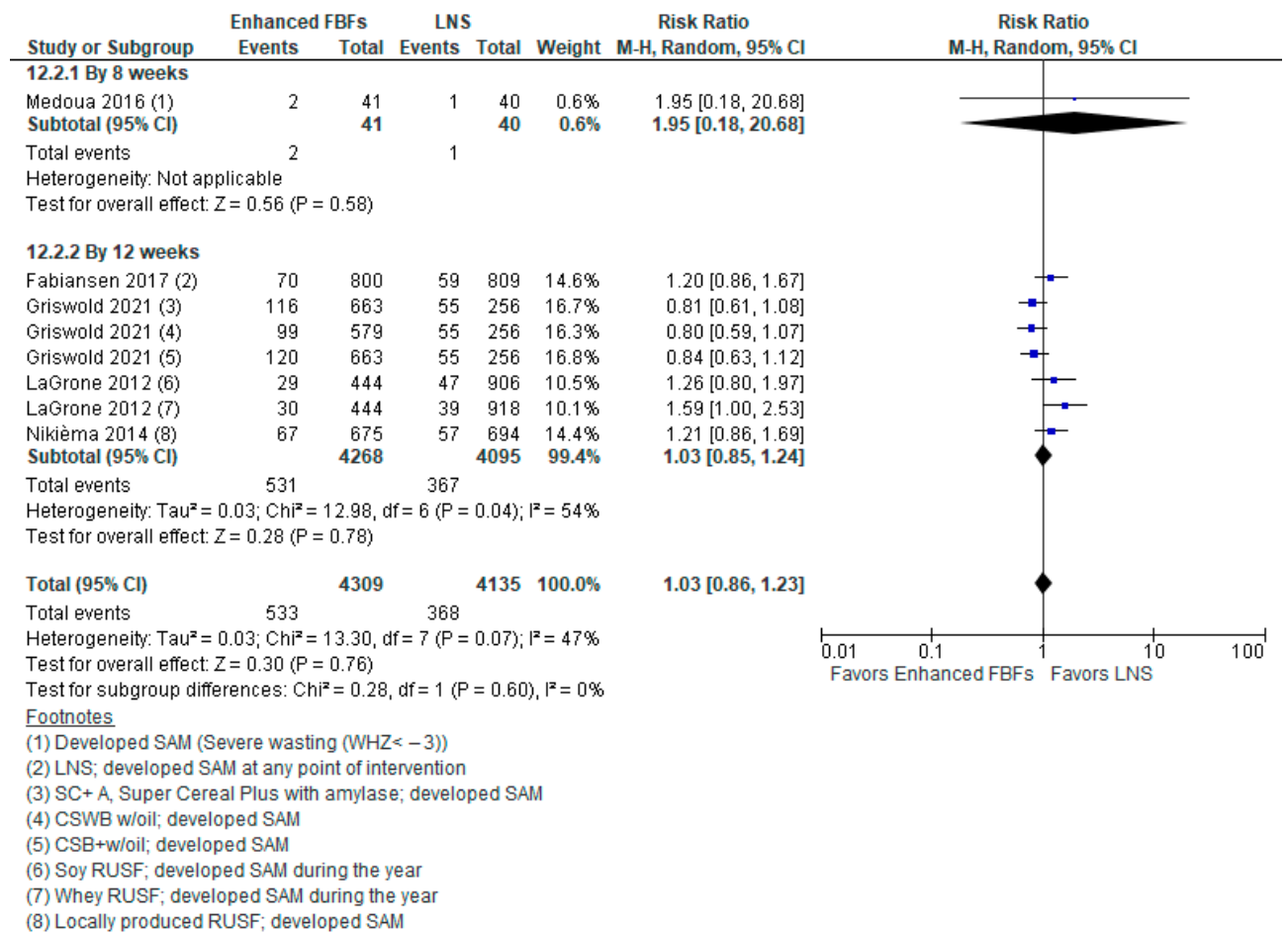
**Supplementary Figure S18. Forest plot of enhanced FBF vs LNS - Outcome: Time to recovery (subgroup analysis by dose)**



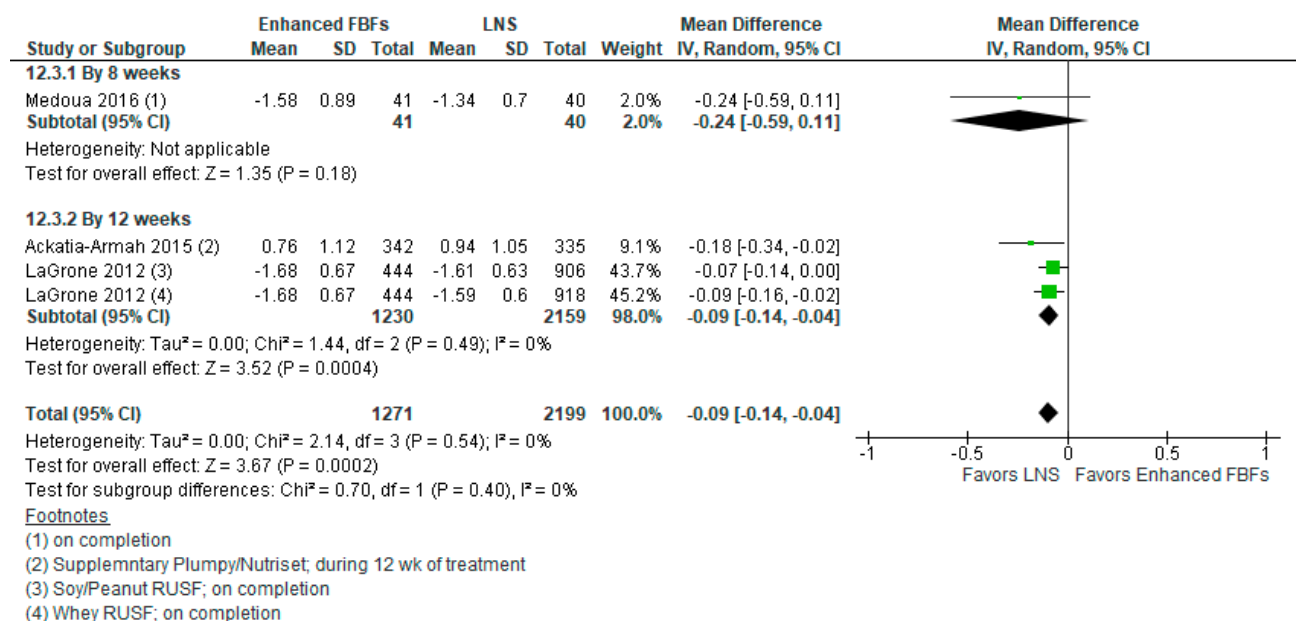
**Supplementary Figure S19. Forest plot of enhanced FBF vs LNS - Outcome: Recovery (subgroup analysis by treatment length)**



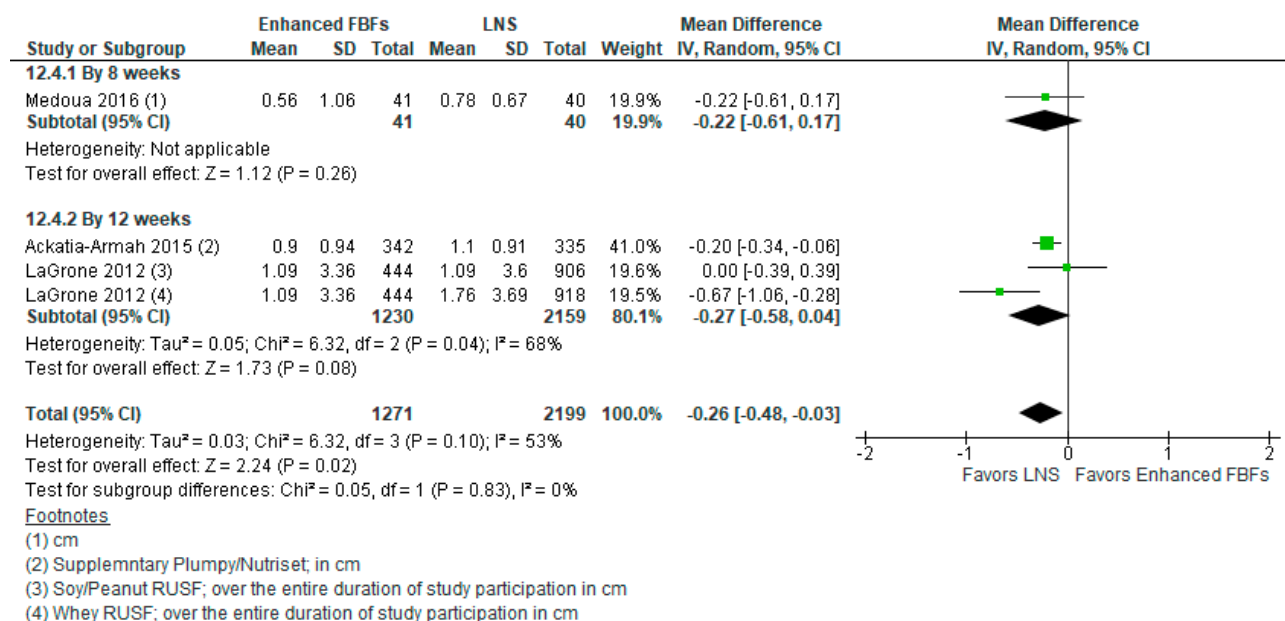
**Supplementary Figure S20. Forest plot of enhanced FBF vs LNS - Outcome: Deterioration to severe wasting (subgroup analysis by treatment length)**



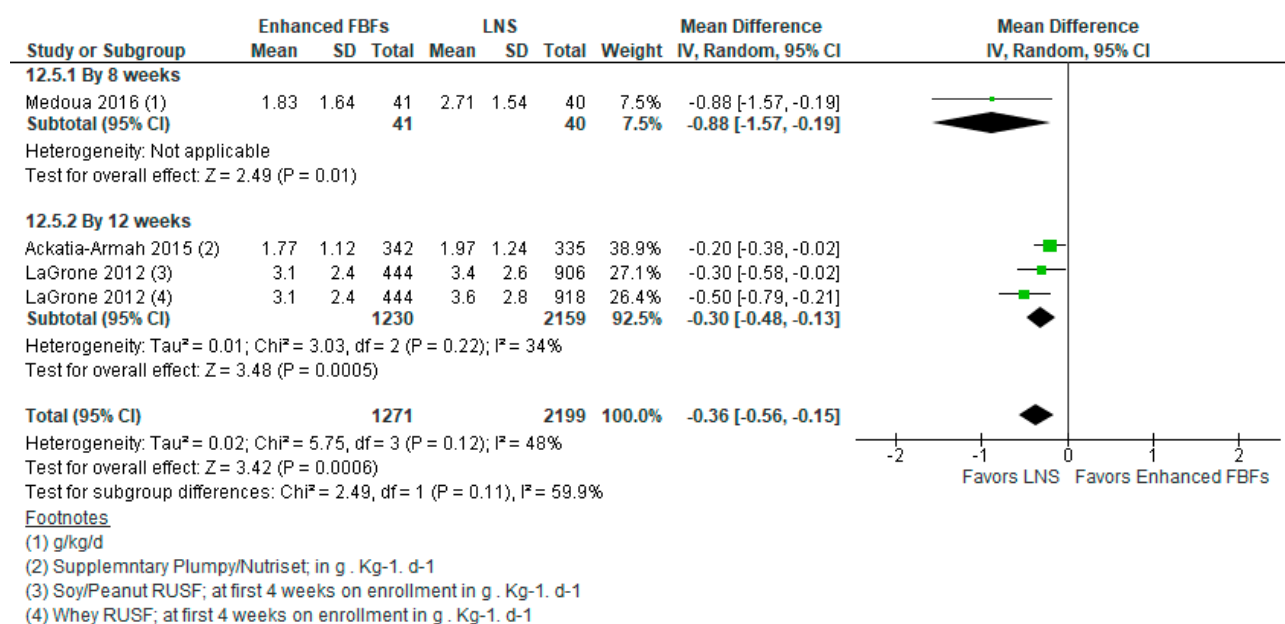
**Supplementary Figure S21. Forest plot of enhanced FBF vs LNS - Outcome: WHZ (subgroup analysis by treatment length)**



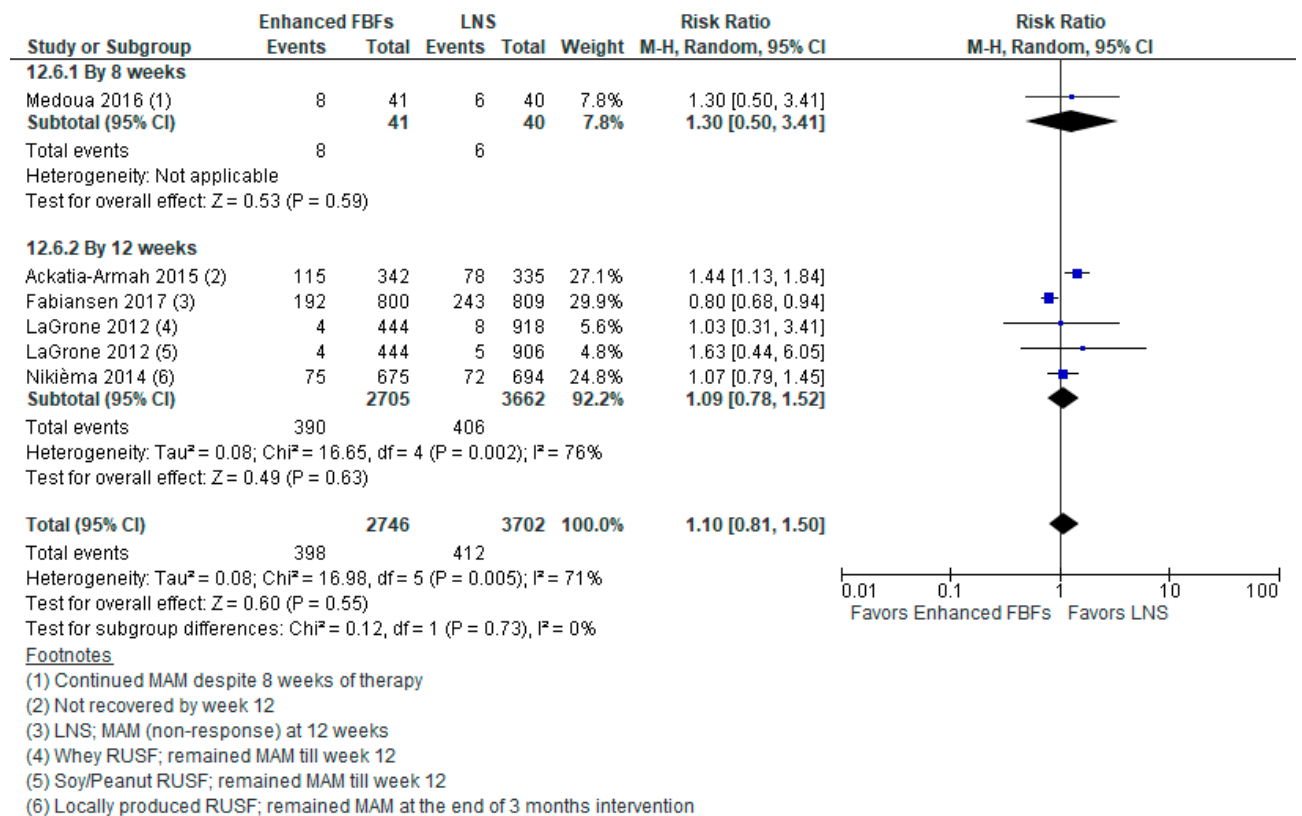
**Supplementary Figure S22. Forest plot of enhanced FBF vs LNS - Outcome: MUAC gain (subgroup analysis by treatment length)**



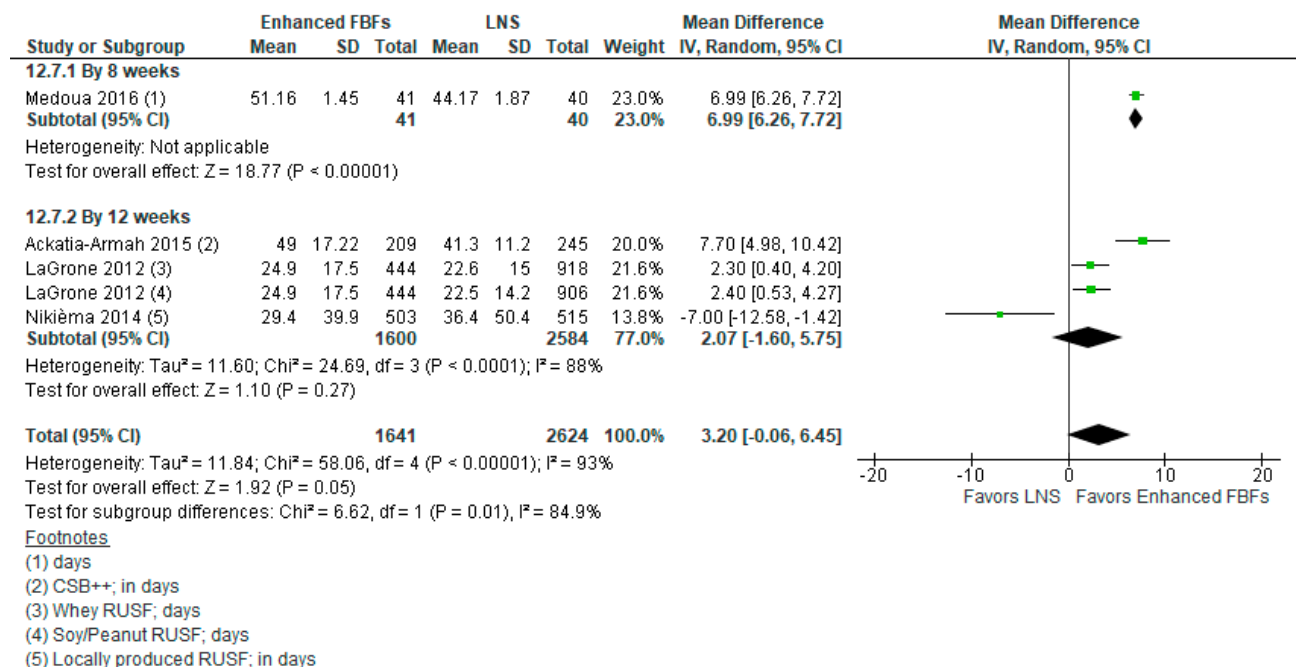
**Figure S23. Forest plot of enhanced FBF vs LNS - Outcome: Weight gain (subgroup analysis by treatment length)**



**Supplementary Figure S24. Forest plot of enhanced FBF vs LNS - Outcome: Non-response (subgroup analysis by treatment length)**

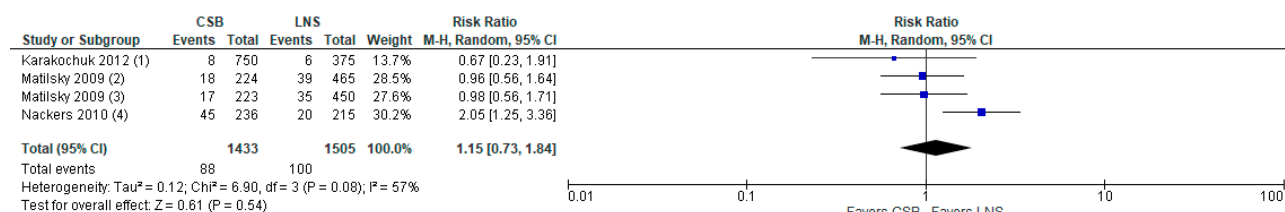


**Supplementary Figure S25. Forest plot of enhanced FBF vs LNS - Outcome: Time to recovery (subgroup analysis by treatment length)**





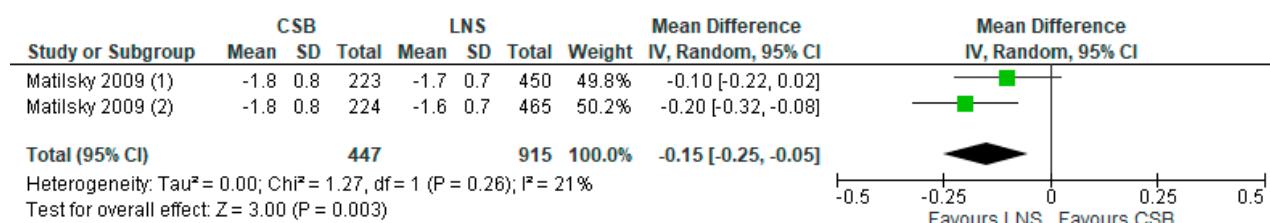
## Supplementary Figure S26. Forest plot of CSB compared to LNS - Outcome: Deterioration to severe wasting



### Footnotes

- (1) CSB vs Supplementary Plumpy by Nutriset; Children who deteriorated to SAM defined as a WFH <70%, MUAC <110mm and required transfer to inpatient care.  
(2) CSB vs Milk/Peanut Fortified Spread; Deterioration to SAM measured by edema only.  
(3) CSB vs Soy/Peanut Fortified Spread; Deterioration to SAM measured by edema only.  
(4) CSB vs Standard RUTF; Number refers to transfers to the inpatient Therapeutic Feeding Centres which in addition to SAM included medical criteria (severe disease, severe anemia or severe dehydration).

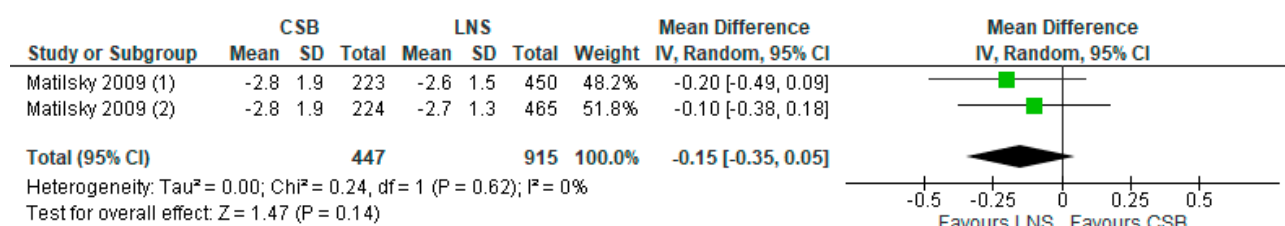
## Supplementary Figure S27. Forest plot of CSB compared to LNS - Outcome: WHZ



### Footnotes

- (1) Soy Peanut Fortified Spread; WHZ at discharge (intervention period was upto 8 weeks)  
(2) Milk Peanut Fortified Spread; WHZ at discharge (intervention period was upto 8 weeks)

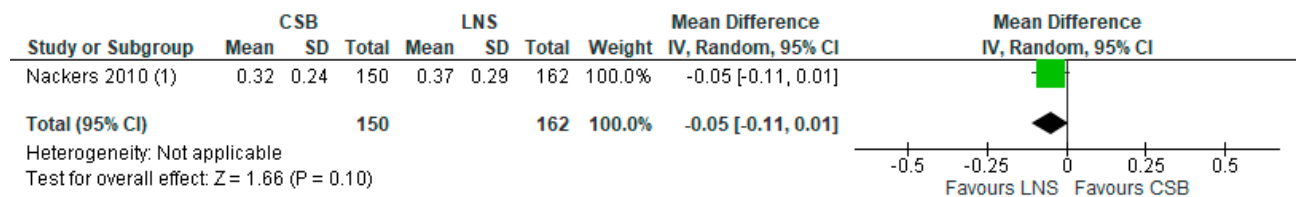
## Supplementary Figure S28. Forest plot of CSB compared to LNS - Outcome: HAZ



### Footnotes

- (1) CSB vs Soy/Peanut Fortified Spread; HAZ at discharge (intervention period was up to 8 weeks).  
(2) CSB vs Milk/Peanut Fortified Spread; HAZ at discharge (intervention period up to 8 weeks).

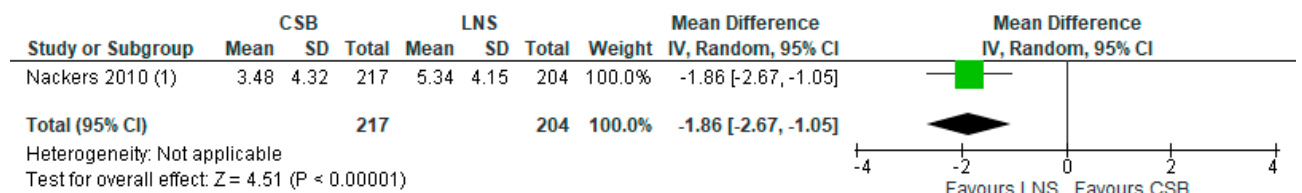
## Supplementary Figure S29. Forest plot of CSB compared to LNS - Outcome: MUAC gain (mm/day)



#### Footnotes

(1) CSB vs standard RUTF; MUAC gain in mm/day up to discharge.

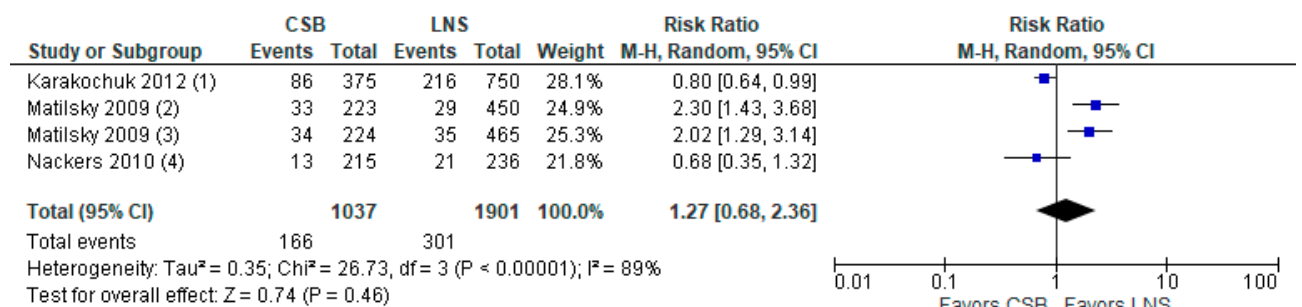
### Supplementary Figure S30. Forest plot of CSB compared to LNS - Outcome: Weight gain (g/kg/day)



#### Footnotes

(1) CSB vs Standard RUTF; Weight gain in g/kg/day during the first 2 weeks of treatment.

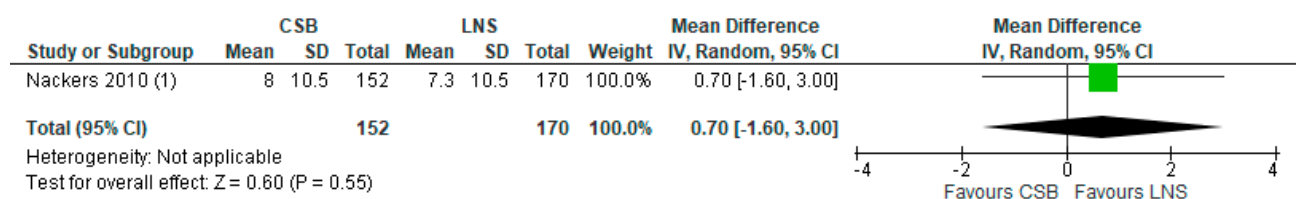
### Supplementary Figure S31. Forest plot of CSB compared to LNS - Outcome: Non-response



#### Footnotes

- (1) CSB vs Supplementary Plumpy Nutriset; Non-response defined as not reaching a WHF > 85% on 2 consecutive visits within 16 weeks.
- (2) CSB vs Soy/Peanut Fortified Spread; Non-response defined as not reaching a WHZ > -2 within 8 weeks.
- (3) CSB vs Milk/Peanut Fortified Spread; Non-response defined as not reaching a WHZ > -2 within 8 weeks.
- (4) CSB vs standard RUTF; Non-response defined as not reaching a WHM > 85% for 2 consecutive weeks within 16 weeks.

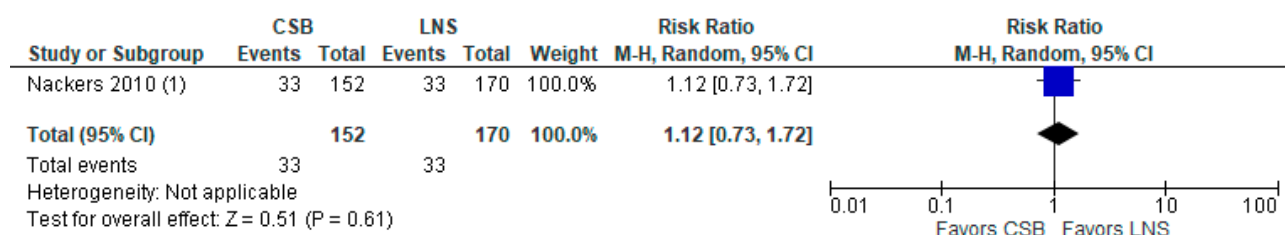
### Supplementary Figure S32. Forest plot of CSB compared to LNS - Outcome: Time to recovery



#### Footnotes

(1) Standard RUTF; length of stay up to discharge (weeks)

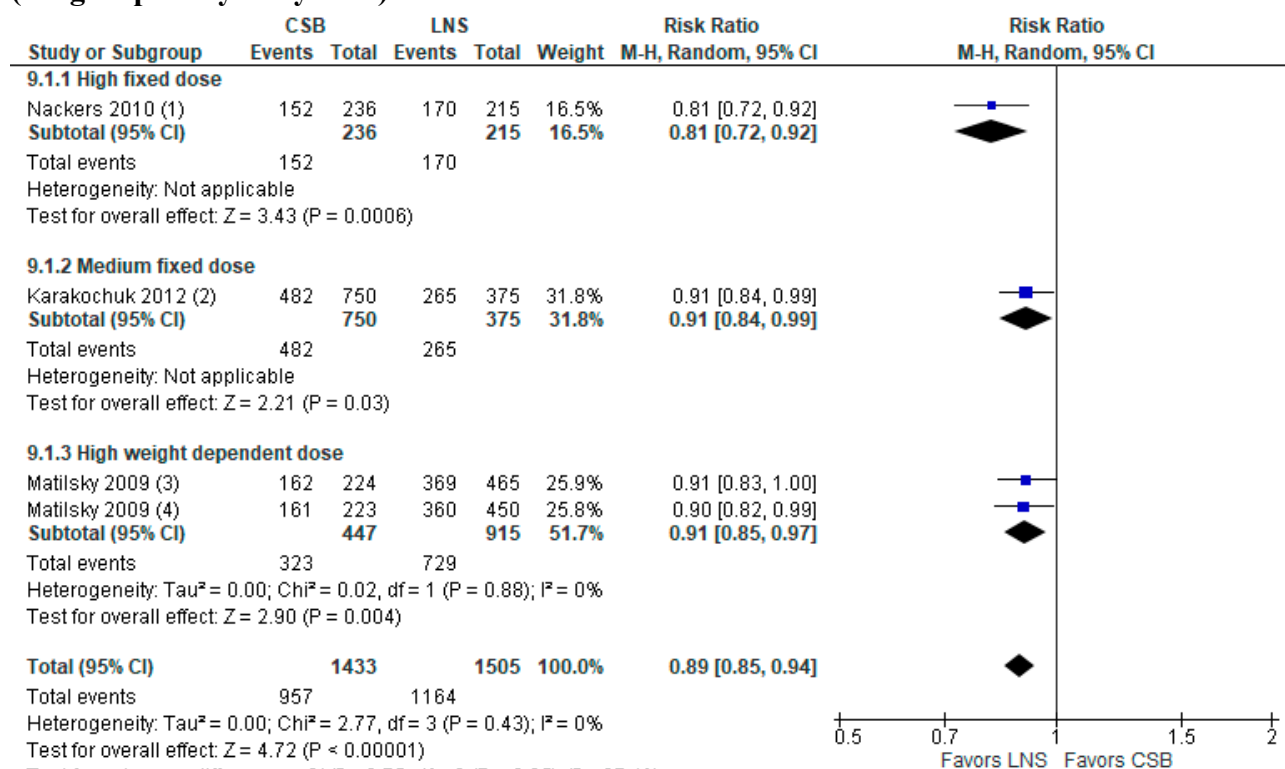
**Supplementary Figure S33. Forest plot of CSB compared to LNS - Outcome: Relapse**



**Footnotes**

(1) CSB vs Standard RUTF; Relapse to acute malnutrition within six months after discharge

**Supplementary Figure S34. Forest plot of CSB vs LNS - Outcome: Recovery rate (subgroup analysis by dose)**



**Footnotes**

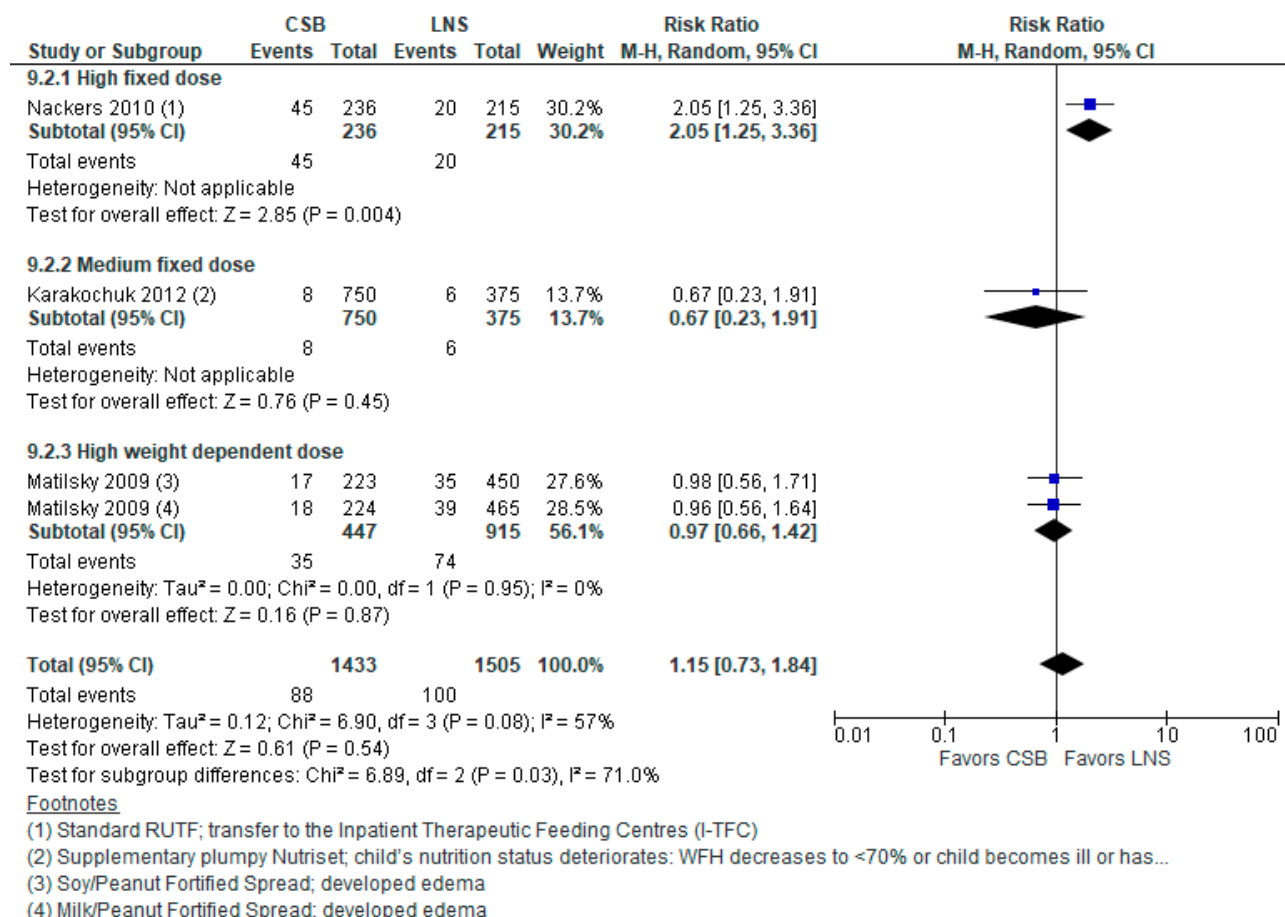
(1) Standard RUTF; WHM%  $\geq$  85% for 2 consecutive weeks

(2) Supplementary plumpy Nutriset; recovery was defined as WFH  $\geq$  85% on 2 consecutive visits within 16 week duration

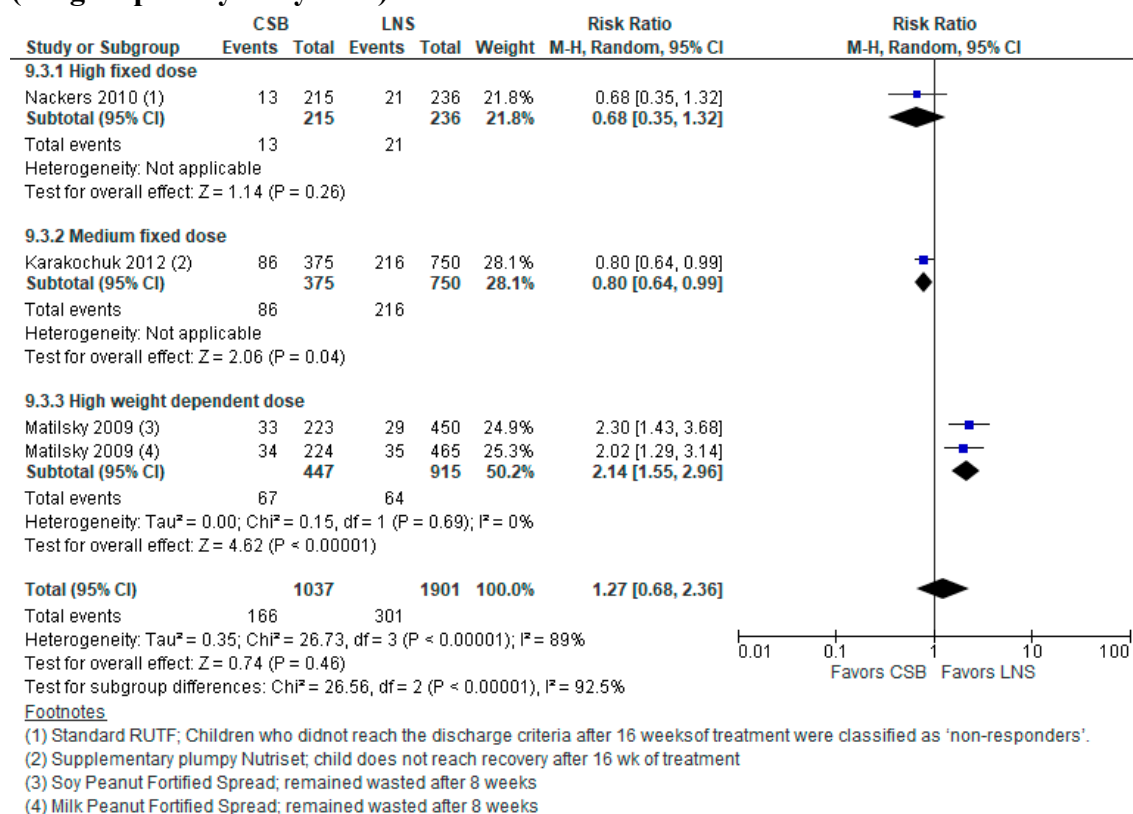
(3) Milk/Peanut Fortified Spread; defined as having a WHZ > -2

(4) Soy/Peanut Fortified Spread; defined as having a WHZ > -2

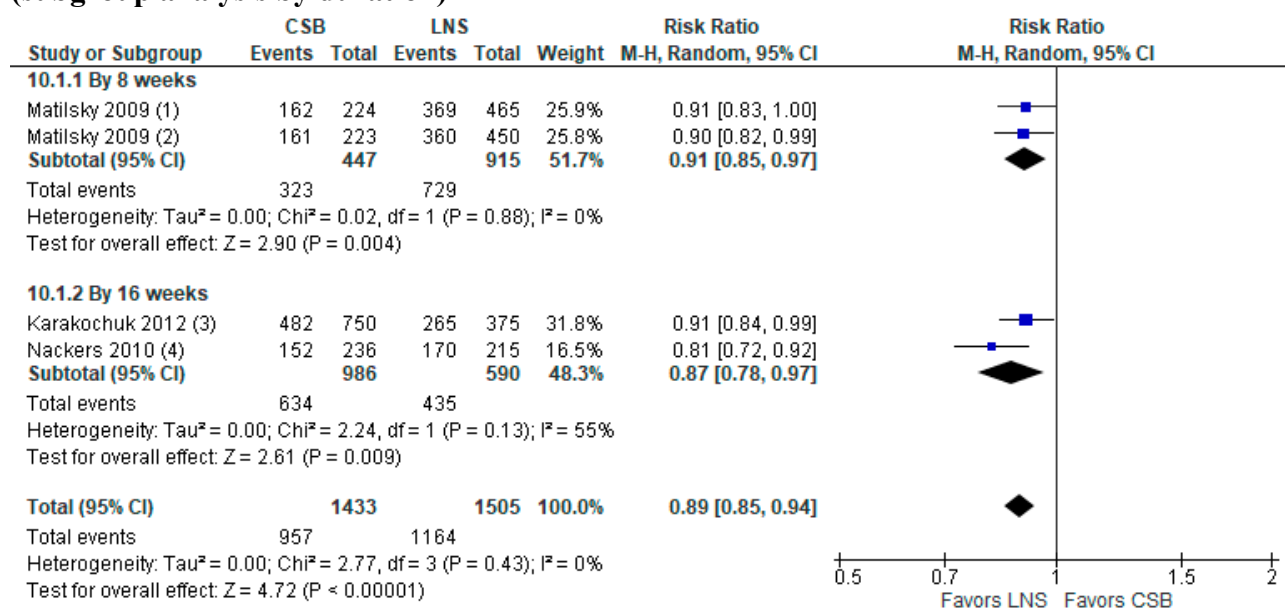
**Supplementary Figure S35. Forest plot of CSB vs LNS - Outcome: Deterioration to severe wasting (subgroup analysis by dose)**



**Supplementary Figure S36. Forest plot of CSB vs LNS - Outcome: Non-response (subgroup analysis by dose)**



**Supplementary Figure S37. Forest plot of CSB vs LNS - Outcome: Recovery rate (subgroup analysis by duration)**



**Footnotes**

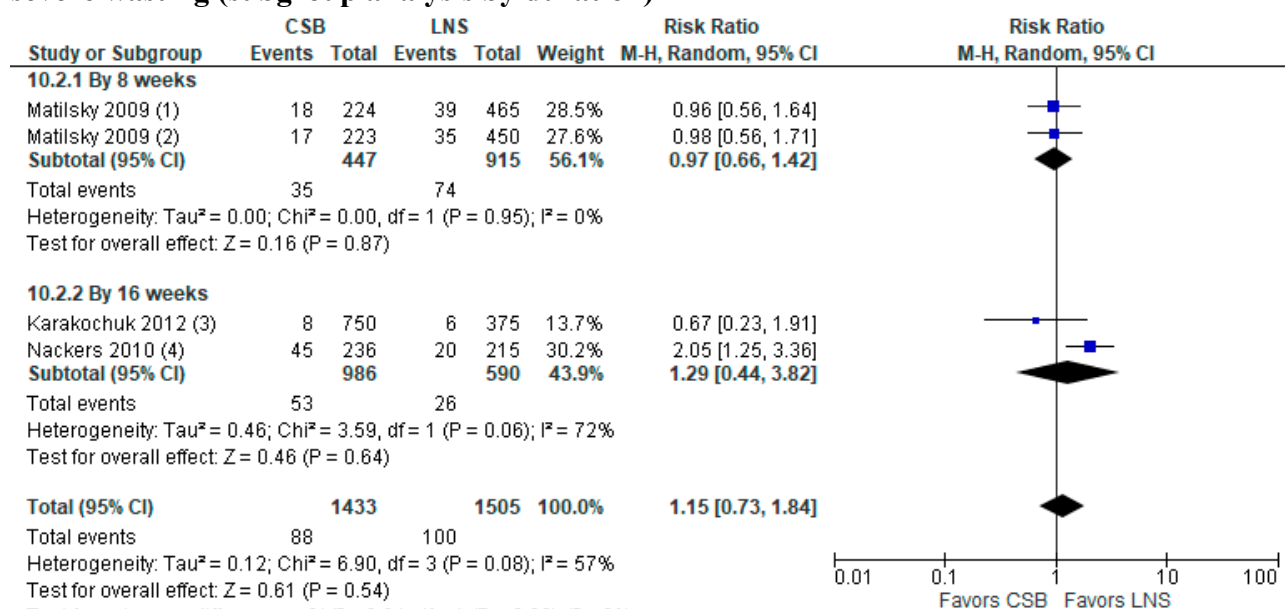
(1) Milk/Peanut Fortified Spread; defined as having a WHZ > -2

(2) Soy/Peanut Fortified Spread; defined as having a WHZ > -2

(3) Supplementary plumpy Nutriset; recovery was defined as WFH  $\geq 85\%$  on 2 consecutive visits within 16 week duration

(4) Standard RUTF; WHM%  $\geq 85\%$  for 2 consecutive weeks

**Supplementary Figure S38. Forest plot of CSB vs LNS - Outcome: Deterioration to severe wasting (subgroup analysis by duration)**



**Footnotes**

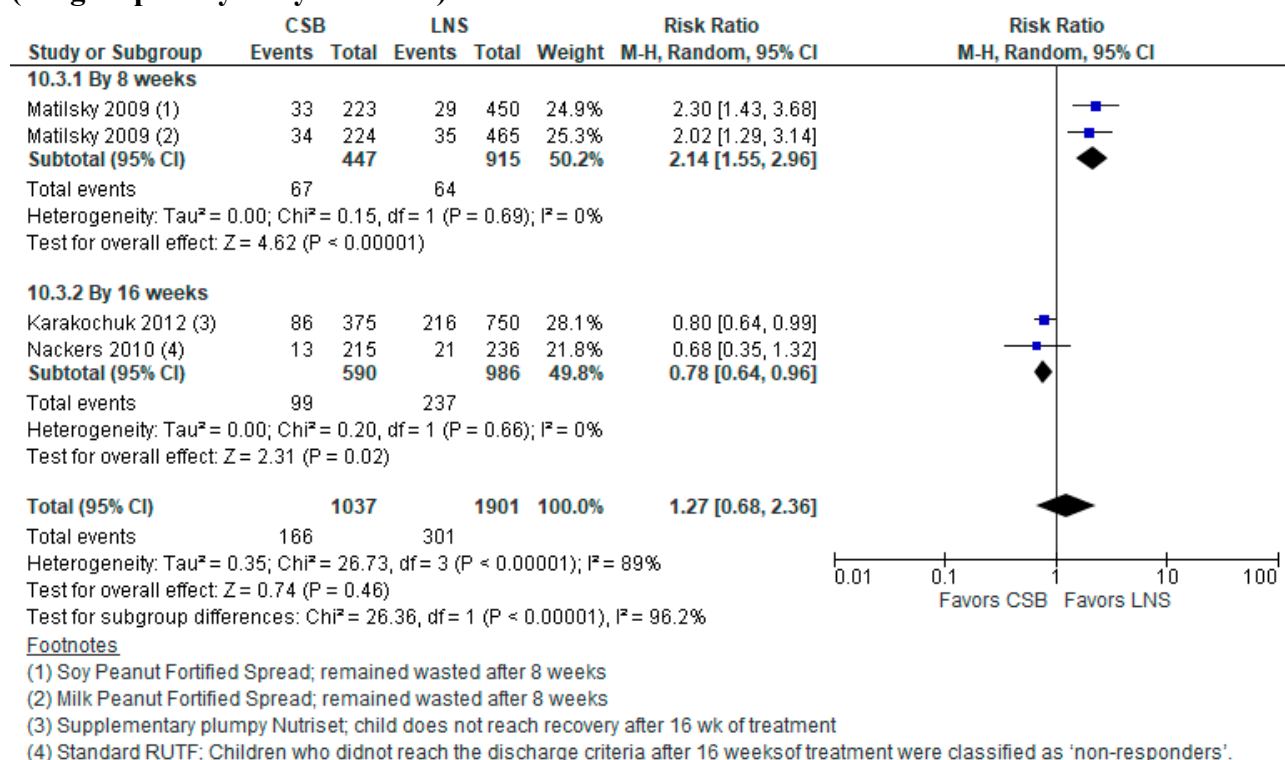
(1) Milk/Peanut Fortified Spread; developed edema

(2) Soy/Peanut Fortified Spread; developed edema

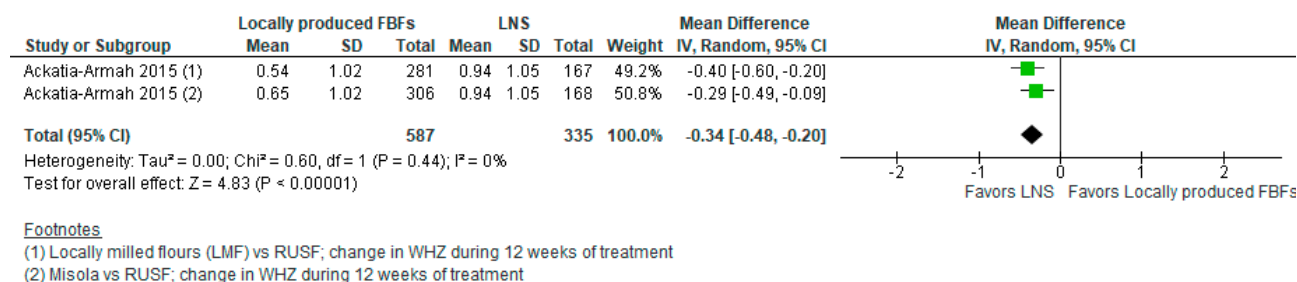
(3) Supplementary plumpy Nutriset; child's nutrition status deteriorates: WFH decreases to <70% or child becomes ill or has...

(4) Standard RUTF; transfer to the Inpatient Therapeutic Feeding Centres (I-TFC)

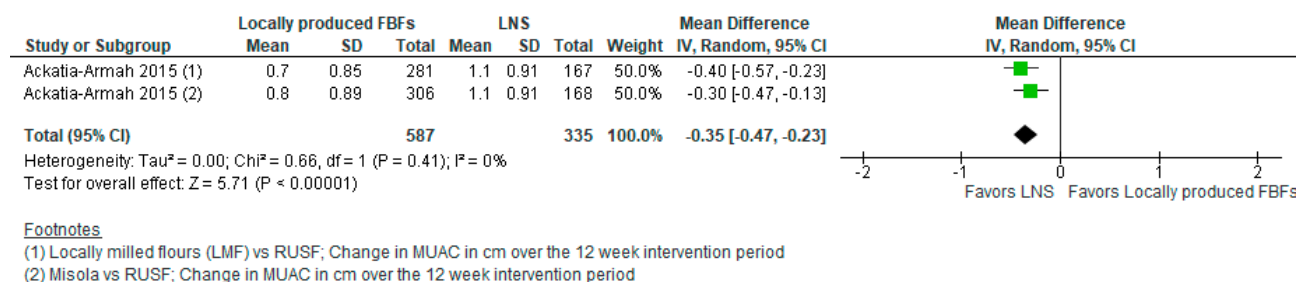
### Supplementary Figure S39. Forest plot of CSB vs LNS - Outcome: Non-response (subgroup analysis by duration)



### Supplementary Figure S40. Forest plot of locally produced FBF compared to LNS - Outcome: Weight for height z-score gain during the 12-week intervention period



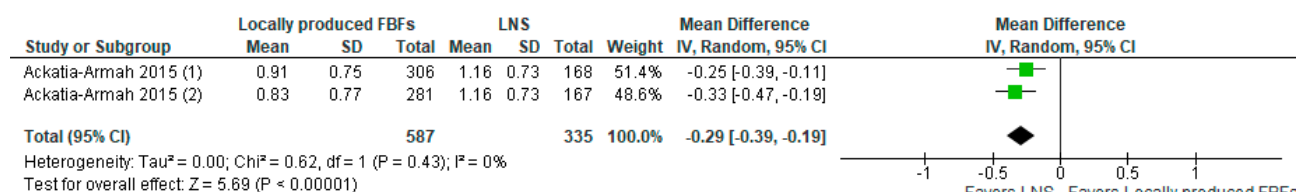
### Supplementary Figure S41. Forest plot of locally produced FBF compared to LNS - Outcome: Change in MUAC over the 12-week intervention period





## Supplementary Figure S42. Forest plot of locally produced FBF compared to LNS

### - Outcome: Weight gain (kg) over the 12-week intervention period

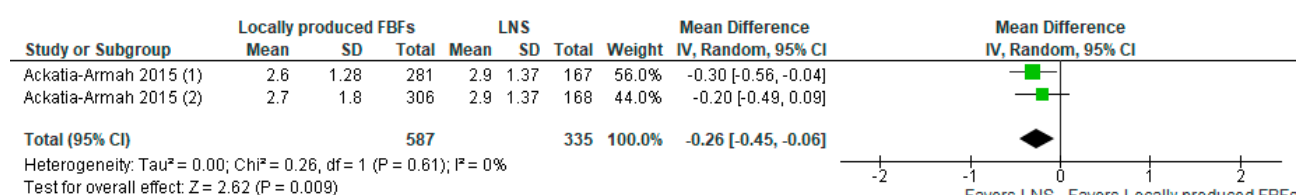


#### Footnotes

- (1) Misola vs RUSF; Weight gain in kg over the 12 week intervention period  
 (2) LMF vs RUSF; Weight gain in kg over the 12 week intervention period

## Supplementary Figure S43. Forest plot of locally produced FBF compared to LNS

### - Outcome: Height gain (cm) over the 12-week intervention period

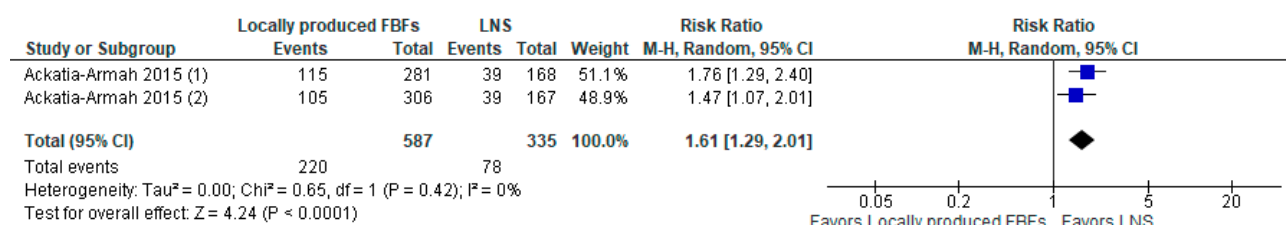


#### Footnotes

- (1) Locally milled flours (LMF) vs RUSF; Height gain in cm over the 12 week intervention period  
 (2) Misola vs RUSF; Height gain in cm over the 12 week intervention period

## Supplementary Figure S44. Forest plot of locally produced FBF compared to LNS

### - Outcome: Non-response

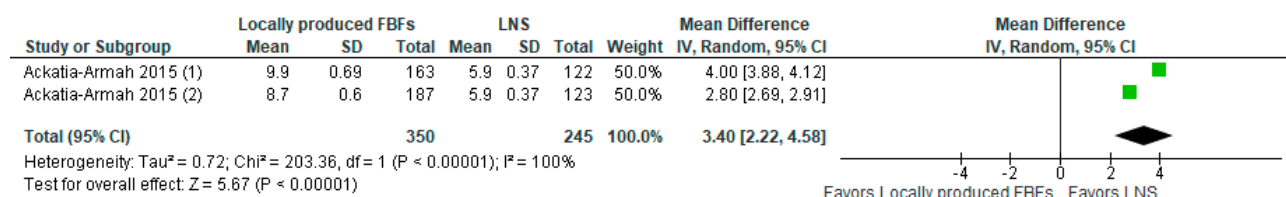


#### Footnotes

- (1) Locally milled flours (LMF) vs RUSF; not recovered by week 12  
 (2) Misola vs RUSF; not recovered by week 12

## Supplementary Figure S45. Forest plot of locally produced FBF compared to LNS

### - Outcome: Time to recovery (weeks)



#### Footnotes

- (1) Locally milled flours (LMF) vs RUSF; Time to recovery in weeks  
 (2) Misola vs RUSF; Time to recovery in weeks