Intervention target populations and effects

Table 1: Intervention target populations and effects

Target populations and effects			
Intervention	Target population	Effects	Source / Effect sizes
Cash transfers (unconditional)	Children below the poverty line	Reduces the incidence of SAM Reduces the incidence of MAM	RRR = 0.32 (0.16-0.61) for SAM incidence RRR = 0.40 (0.23-0.68) for MAM incidence [Langendorf et al. 2014, PLoS Med [1], Niger study comparing super cereal plus + cash (US$52 per month) compared to super cereal plus.]
Delayed umbilical cord clamping	Pregnant women (at birth, but impact is for children <1 month)	Reduces anaemia	RRR = 0.53 (0.40-0.70) for being anaemic [Hutton and Hassan, 2007 Jama [2]]
Infant and young child feeding (IYCF) education	**Home/community promotion for children 0-23 months:**		
	For children < 1 months	Increases exclusive breastfeeding	OR = 2.17 (1.84-2.56) for exclusive breastfeeding [Sinha et al. 2017 J Nutr [3] for interventions delivered in home or community settings in low- and middle-income countries]
	For children < 6 months	Increases exclusive breastfeeding	OR = 2.48 (1.99-3.09) for exclusive breastfeeding [Sinha et al. 2017 J Nutr [3] for interventions delivered in home or community settings in low- and middle-income countries]
	For children 6-23 months	Increases age-appropriate (partial) breastfeeding	OR = 1.82 (1.36-2.45) for age-appropriate breastfeeding; [Sinha et al. 2017 J Nutr [3]]
	For children 6-23 months	Promotion of appropriate complementary feeding reduces odds of stunting	OR = 0.77 for stunting; [Panjwani et al. 2017 J Nutr [4] food secure population with nutrition education or counselling compared to receiving no intervention]
Immediate initiation of breastfeeding	Children < 1 month	Increases exclusive breastfeeding Reduces deaths due to prematurity	OR = 1.50 (1.26-1.78) for exclusive breastfeeding in children < 1 month. OR = 1.39 (1.11-1.74) for exclusive breastfeeding in children 1-6 months [Boundy et al. 2016, Pediatrics[5]] RRR = 0.49 (0.29-0.82) for mortality due to prematurity [Lawn et al. 2010, I J Emi 2010[6]]
Lipid-based nutrition supplements	Children 6-23 months old who live	Reduces the odds of stunting	OR = 0.89 for stunting [Panjwani et al. 2017 J Nutr [4] food insecure with supplementation compared to no supplementation]

	in households below the poverty line	Reduces the incidence of SAM Reduces the incidence of MAM Reduces anaemia	RRR = 0.915 for SAM and MAM incidence [based on Panjwani et al. 2017 J Nutr [4] food insecure with supplementation compared to no supplementation] RRR = 0.69 (0.60-0.78) for anaemia [De-Regil et al. 2013 Cochrane review [7], assumed the same as micronutrient powders]
Oral rehydration solution (ORS) + Zinc	Children 0-59 months (different quantity by age)	Reduces diarrhoea mortality	RRR = 0.24 (0.15-0.38) for diarrhoea mortality. Calculated as RRR = 0.31 (0.20-0.49) for ORS [Munos, et al. 2010, I J Epi [8]], with additional RRR of 0.77 due to the addition of zinc [Walker & Black 2010, I J Epi [9]]
Public provision of complementary foods	Children 6-23 months old who live in households below the poverty line	Reduces the odds of stunting Reduces the incidence of SAM Reduces the incidence of MAM	OR = 0.89 for stunting [Panjwani et al. 2017 J Nutr [4] food insecure with supplementation compared to no supplementation] RRR = 0.915 for SAM and MAM incidence [based on Panjwani et al. 2017 J Nutr [4] food insecure with supplementation compared to no supplementation]
Treatment of severe acute malnutrition (SAM)	Children experiencing SAM	Increases recovery from episode	OR = 0.78 for wasting among children receiving intervention [Bhutta et al. 2013, Lenters et al. 2013 [10, 11]]. Note that this intervention is defined as treating children until they reach a weight-for-height of three standard deviations below the WHO Child Growth Standards median, at which point their mortality risks are significantly reduced but they are still defined as being wasted (i.e. children who are severely wasted are treated to become only moderately wasted, but wasted nonetheless).
Vitamin A supplementation	Children 6-59 months	Reduces diarrhoea incidence mortality	RRR = 0.85 (0.82-0.87) for diarrhoea incidence [Imdad et al. 2017, Cochrane review [12]] RRR = 0.88 (0.79-0.98) for diarrhoea-specific mortality [Imdad et al. 2017, Cochrane review [12]]
Balanced energy-protein supplementation	Pregnant women below the poverty line	Reduces risk of small for gestational age (SGA) birth outcomes	RRR = 0.79 (0.69-0.90) for SGA birth outcomes [Ota et al. 2015, The Cochrane Library [13]]
Calcium supplementation	Pregnant women	Reduces maternal mortality (hypertensive disorders) Reduces pre-term births	RRR = 0.80 (0.66-0.98) for maternal mortality [Hofmeyr et al. 2018 Cochrane review [14]] RRR = 0.76 (0.60-0.97) for preterm birth [Hofmeyr et al. 2018 Cochrane review [14]]
Iron and folic acid supplementation	Women of reproductive age (pregnant / non-pregnant)	Reduces anaemia Reduces neonatal mortality	RRR = 0.33 (0.16-0.69) for anaemia in pregnant women [Pena-Rosas et al, Cochrane Database Reviews 2015 [15]] RRR = 0.73 (0.56-0.95) for anaemia in non-pregnant women [Fernandez-Gaxiola & De-Regil 2011, Cochrane Database Syst Rev [16]]
Intermittent preventative	Pregnant women in areas where there is malaria risk	Reduces anaemia Reduces SGA birth outcomes	RRR = 0.83 (0.74-0.93) for being anaemic [Radeva-Petrova et al. 2014, The Cochrane Library [17]] RRR = 0.65 (0.55-0.77) for SGA birth outcomes [Eisele et al. 2010, I J Epi [18]]

treatment of malaria during pregnancy			
Multiple micronutrient supplementation	Pregnant women	Reduces anaemia and risk of SGA birth outcomes	RRR = 0.33 (0.16-0.69) for anaemia in pregnant women [Pena-Rosas et al, Cochrane Database Reviews 2015 [15]] RRR = 0.92 (0.88-0.97) for SGA births [Keats et al. 2019 Cochrane Database Reviews [19]]
Iron and folic acid fortification (wheat, maize or rice)	Everyone	Reduces anaemia Reduces neonatal mortality	OR = 0.976 (0.975-0.978) for being anaemic [Barkley et al. 2015, B J Nutrition [20]] RRR = 0.87 (0.84-0.89) of neonatal mortality [prevention of neural tube defects Blencowe et al. 2010, I J Epidemiology [21]]
Iron and iodine fortification of salt	Everyone	Reduces anaemia Reduces neonatal mortality	OR = 0.976 (0.975-0.978) for being anaemic [Barkley et al. 2015, B J Nutrition [20]]
Long-lasting insecticide-treated bed nets	Everyone in areas where there is malaria risk	Reduces anaemia Reduces SGA birth outcomes	RRR = 0.83 (0.74-0.93) for anaemia [Radeva-Petrova et al. 2014, The Cochrane Library [17]] RRR = 0.65 (0.55-0.77) for SGA birth outcomes [Eisele et al. 2010, Int J Epi [18]]

Abbreviations: DHS, Demographic and Health Survey; GDP, gross domestic product; IQR, interquartile range; IYCF, infant and young child feeding; LC, low income country; LiST, Lives Saved Tool; LMC, lower-middle income country; MAM, moderate acute malnutrition; OR, odds ratio; ORS, oral rehydration solution; RRR, relative risk ratio; SGA, small for gestational age; SAM, severe acute malnutrition; SQ-LNS, small quantity lipid nutrient supplement paste; UMC, upper-middle income country; WHO-CHOICE, World Health Organization CHOosing Interventions that are Cost-Effective.

Other model parameters

1. **Mortality risk factors**

a) *Birth outcomes*

Table 2: Relative risk ratios for neonatal mortality types by birth outcome (term / pre-term and appropriate for gestational age [AGA] / small for gestational age [SGA])

Birth outcome	Neonatal sepsis	Neonatal pneumonia	Neonatal asphyxia	Neonatal prematurity
Term AGA	Ref	Ref	Ref	Ref
Term SGA	2.07	2.07	2.07	1
Pre-term AGA	8.02	8.02	8.02	999.99
Pre-term SGA	11.54	11.54	11.54	999.99

Source: Katz et al. 2013 [23]

b) *Stunting*

Table 3: Relative risk ratios for 1-59 month old mortality types, by height-for-age Z-score (HAZ) category

Age group	HAZ-status	Diarrhoea	Pneumonia	Meningitis	Measles	Other
1-59 months	None (HAZ-score >=-1)	Ref	Ref	Ref	Ref	Ref
	Mild (HAZ-score >= -2 and < -1)	1.67	1.55	1	1	1
	Moderate (HAZ-score >= -3 and < -2)	2.38	2.18	1.86	2.79	1.86
	Severe (HAZ-score < -3)	6.33	6.39	3.01	6.01	3.01

Source: Olofin et al. 2013 [24]

c) *Wasting*

Table 4: Relative risk ratios for 1-59 month old mortality types, by weight-for-height Z-score (WHZ) category

Age group	Status	Diarrhoea	Pneumonia	Meningitis	Measles	Other
1-59 months	None (WHZ-score >= -1)	Ref	Ref	Ref	Ref	Ref
	Mild (WHZ-score >= -2 and < -1)	1.6	1.92	1.65	1	1.65
	MAM (WHZ-score >= -3 and < -2)	3.41	4.66	2.73	2.58	2.73
	SAM (WHZ-score < -3)	12.33	9.68	11.21	9.63	11.21

Source: Olofin et al. 2013 [24]

d) *Breastfeeding practices*

Table 5: Relative risk ratios for mortality types, by breastfeeding practices and age group

Age group	Status	Neonatal diarrhoea / sepsis / pneumonia*	Diarrhoea†	Pneumonia^	Meningitis / measles / pertussis^
<1 month	Exclusive	Ref			
	Predominant	1.35			
	Partial	1.35			
	None	5.40			
1-5 months	Exclusive		Ref	Ref	
	Predominant		2.28	1.66	1.48
	Partial		4.62	2.50	2.84
	None		10.53	14.97	14.40
6-11 months	Partial		Ref	Ref	Ref
	None		1.47	1.92	3.69
12-23 months	Partial		Ref	Ref	Ref
	None		2.57	1.92	3.69

Sources: * NEOVITA Study Group 2016 [25] with predominant / partial assuming late initiation; † Lamberti et al. 2011 [26]; ^ Lamberti et al. 2013 [27].

e) *Anaemia*

Table 6: Relative risks of maternal mortality types by anaemia status.

Pregnant women age in years	Status	Antepartum haemorrhage	Intrapartum haemorrhage	Postpartum haemorrhage
15-49	Not anaemic	Ref	Ref	Ref
15-49	anaemic	10.675	10.675	10.675

Source: LiST [22].

Applies only to the fraction who are severely anaemic

2. Birth outcomes

a) *Impact of birth outcomes on stunting, wasting and anaemia*

Table 7: Odds ratios for stunting (HAZ-score <-2) and wasting (WHZ-score <-2), by birth outcome

	Odds ratio for condition if born:			
Condition	Term AGA	Term SGA	Pre-term AGA	Pre-term SGA
Stunting	Ref	5	6.4	46.5
Wasting	Ref	2.52	1.96	4.19

Sources: stunting LiST [22]; wasting Christian et al. 2013 [28] for low and middle income countries.

b) *Odds of birth outcomes with maternal anaemia*

Table 8: Odds ratios for being born term / pre-term and appropriate for gestational age [AGA] / small for gestational age [SGA] if mother is anaemic

Condition	Term SGA^	Pre-term AGA†	Pre-term SGA^
No maternal anaemia	Ref	Ref	Ref
Maternal anaemia	1.53	1.32	1.53

Sources: ^ Child Health Epidemiology Reference Group 2011 [29]; † Xiong et al. 2015 [30].

3. Impact of diarrhoea on stunting, wasting and anaemia

Table 9: Odds ratios for stunting, wasting and anaemia as diarrhoea incidence increases.

Condition	Age band	Odds ratio for every additional episode	Source
Stunting	0-59 months	1.025	LiST [22]
Wasting	0-59 months	1.025	Assumed the same as stunting

4. Impact of past stunting on stunting

Table 10: Odds ratios for continued stunting (<-2 HAZ-score) if stunted in a prior age band

Age in months	Odds Ratio
1-5	45
6-11	361.6
12-23	174.7
24-59	174.7

Source: LiST [22].

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