

Vitamin A to children (6 to 59 months)

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Description of condition and intervention

Vitamin A is an essential micronutrient necessary for rapid growth and developing resistance to fight infections in infants and children. Deficiency of Vitamin A may arise due to its inadequacy in intake and lead to multiple health effects. It may lead to visual impairment in the form of night blindness. Vitamin A deficiency also predisposes the child to an increased risk of developing illness like measles and diarrhoea and death, if left untreated. Several countries have developed national strategies for provisioning of Vitamin A supplementation along with part of their routine health care and immunization services. The World Health Organization (WHO) recommends supplementation of Vitamin A in children aged 6-59 months, especially in high prevalence settings where vitamin A is a public health problem. (Source: WHO 2019). This evidence brief assesses effects and costs for one intervention being analyzed in FairChoices: DCP analytical tool (For an overview of other interventions, see appendix below and the separate evidence briefs for these):

NUTR01-02-03

Vitamin A supplementation to children 6 to 59 months

International guidelines

Organization	Indications/recommendations	Applicability in LIC & Lower MIC settings
WHO 2011	<p>In children aged 6-11 months, 100 000 IU (30 mg RE) vitamin A supplementation once a year is recommended. For children 12-59 months of age, 200 000 IU (60 mg RE) vitamin A supplementation every 4-6 months is recommended.</p> <p>1 x Vitamin A, caplet, 100,000 IU for children 6-11 months per year</p> <p>2 x Vitamin A, caplet, 200, 000 IU for children 12-59 months every 4-6 months per year</p>	<p>Prevalence of night blindness is 1% or more in age group 24-59 months or vitamin A deficiency (serum retinol 0.70 µmol/l or lower) is 20% or more in age group 6-59 months</p>

Source: WHO 2011

Intervention attributes

Type of interventions & delivery platform

Table 1: Type of interventions & delivery platform

Intervention	Type	Delivery platform
Vitamin A supplementation	Prevention	Community

Equity

In addition to considerations like cost-effectiveness and health systems factors, dimensions of equity can be relevant for priority setting. The opportunity for a long and healthy life varies according to the severity of a health condition that individuals might have, so there are inequities in individuals' opportunities for long and healthy lives based on the health conditions they face. Metrics used to estimate the severity of illness at an individual level can be used to help prioritize those with less opportunity for lifetime health. FairChoices: DCP Analytics Tool uses Health adjusted age of death (HAAD), which is a metric that estimates the number of years lived from birth to death, discounting years lived with disability. A high HAAD thus represents a disease less severe in terms of lifetime health loss, while a low HAAD represents a disease that is severe on average, causing early death or a long period of severe disability. It is also possible to estimate the distribution of HAAD across individuals with a health condition. FairChoices shows for each intervention an average HAAD value of the conditions that are affected by respective interventions that have health effects. Additionally, a plot shows HAAD values for around 290 conditions (Johansson KA et al 2020).

Time dependence

Moderate level of urgency. Treatment outcomes not highly affected by some days of delay in onset of Vitamin A intake.

Population in need of interventions

Table 2: Population in need of interventions

Intervention	Treated population		Affected population		Disease state addressed
	Treated age	Treated fraction	Affected age	Affected fraction	

Vitamin A supplementation	0 to 4 years	Treated fraction is 1. All children with the condition, both genders according to Henriksen et al. (Unpublished work in progress)	0 to 5 years (Children up to five years)	Those with the condition: According to Henriksen et al. All newborns and children up to five years are affected which is equal to 1 (Unpublished work in progress)	Vitamin A deficiency
	0 to 4 years	Treated fraction is 1. All children with the condition, both genders according to Henriksen et al. (Unpublished work in progress)	0 to 5 years (Children up to five years)	Those with the condition: According to Henriksen et al. All newborns and children up to five years are affected which is equal to 1 (Unpublished work in progress)	Diarrheal diseases
	0 to 4 years	Treated fraction is 1. All children with the condition, both genders according to Henriksen et al. (Unpublished work in progress)	0 to 5 years (Children up to five years)	Those with the condition: According to Henriksen et al. All newborns and children up to five years are affected which is equal to 1 (Unpublished work in progress)	Blindness and vision loss

Disease stage addressed

This is a preventive health care intervention to delay or prevent development of Vitamin A deficiency, diarrheal disease and night blindness.

Intervention effect and safety

Table 3.0: Effect and safety

Effect of intervention	Certainty of evidence
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Mortality reduction Keats et al 2021. Found that vitamin A supplementation reduced the relative risk of all-cause mortality by 0.88 (CI 0.83 to 0.93)	⊕⊕⊕⊕ Very High
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Table 3.1: Effect and safety

Effect of intervention	Certainty of evidence
Incidence reduction: Keats et al 2021. Found that Vitamin A supplementation had a relative risk of diarrhea incidence of 0.85 (95% CI 0.82 to 0.87)	⊕⊕⊕⊕ Low

Table 3.2: Effect and safety

Effect of intervention	Certainty of evidence
Prevalence reduction: Imdad et al 2017. Found that VAS had a Relative risk of night blindness by 0.32 (95% CI 0.21 to 0.50)	⊕⊕⊕⊕ Moderate

Model assumptions

Table 4.0: Summary of model parameters and values used in FairChoices – DCP Analytical Tool

Category	Model parameter	Notes
Intervention	Vitamin A supplementation (mortality)	
Cost parameters		
Treated population	Children with Vitamin A deficiency	Epidemiological data from Global Burden of Disease study
Effect calculation		
Affected Population	Children with Vitamin A deficiency	
Affected gender	See table 2	
Affected fraction age	See table 2	
Affected fraction	See table 2	
Comparison	Placebo	
Mortality Reduction (RRR)	0.12	

Table 4.1: Summary of model parameters and values used in FairChoices – DCP Analytical Tool

Category	Model parameter	Notes
Intervention	Vitamin A supplementation (Diarrheal disease)	
Cost calculation		
Treated population	Children with Vitamin A deficiency	Epidemiological data from Global Burden of Disease study
Effect calculation		
Affected Population	Children with Diarrheal diseases	
Affected gender	See table 2	
Affected fraction age	See table 2	
Affected fraction	See table 2	
Comparison	Placebo	
Incidence Reduction (RRR) of diarrhea	0.15	

Table 4.2: Summary of model parameters and values used in FairChoices – DCP Analytical Tool

Category	Model parameter	Notes
Intervention	Vitamin A supplementation (Night blindness)	
Cost calculation		
Treated population	Children with Vitamin A deficiency	Epidemiological data from Global Burden of Disease study
Effect calculation		
Affected Population	Children with blindness and vision loss	
Affected gender	See table 2	
Affected fraction age	See table 2	
Affected fraction	See table 2	
Comparison	Placebo	
Prevalence Reduction (RRR)	0.68	

Intervention Cost

The total unit cost is estimated to be USD 0.30 (Year: 2020) per child per case for the prevention of vitamin A deficiency according to *Henriksen et al. (Unpublished work in progress)*

References

Keats, E. C., Das, J. K., Salam, R. A., Lassi, Z. S., Imdad, A., Black, R. E., & Bhutta, Z. A. (2021). Effective interventions to address maternal and child malnutrition: an update of the evidence. *The Lancet Child & Adolescent Health*.

Imdad A, Mayo-Wilson E, Herzer K, Bhutta ZA. Vitamin A supplementation for preventing morbidity and mortality in children from six months to five years of age. *Cochrane Database Syst Rev*. 2017;3:CD008524.

Henriksen ES, Økeland J, Malawim O, Said S, Kaur G, Rava` MS, et al. Economic evaluation of nutritional interventions in Zanzibar: An analysis using FairChoices – DCP analytic tool.(Work in progress)

Appendix

Literature Review for effectiveness & safety

This literature search is an example of level 4 evidence(metaanalysis) for intervention inputs taken from DCP3. (Despite low significant level for efficacy)

Level of evidence of efficacy studies:

1. Low (expert opinions, case series, reports, low-quality case control studies)
2. Moderate (high quality case control studies, low quality cohort studies)
3. High (high quality cohort studies, individual RCTs)
4. Very high (Multiple RCTs, metaanalysis, systematic reviews, clinical practice guidelines)

An overview of all NUTR interventions in FairChoices-DCP analytical tool (Interventions assessed in this evidence brief are marked in bold)

NUTR01-01	Daily Iron Folic acid supplementation (pregnant women)
NUTR01-02	Calcium supplementation, pregnancy
NUTR01-03 households	Food and caloric supplementation to pregnant women in insecure
NUTR01-04-02	Promotion of breastfeeding and/ or complementary feeding
NUTR01-05	Intermittent Iron-folic acid supplementation (Menstruating women)
NUTR01-06	Food to non-pregnant women in insecure households

NUTR01-02-01-01	Daily iron supplementation for children 6 to 23 months
NUTR01-02-01-02	Daily iron supplementation in children health center
NUTR01-02-02	Intermittent iron supplementation in children (24 -59 months)
NUTR01-02-03	Vitamin A supplementation to children 6 to 59 months
NUTR01-02-04	Zink to children 6 to 59 months
NUTR01-02-05	Food to children, if below basic food poverty line
NUTR01-03-01	Management of severe acute malnutrition without medical complications
NUTR01-03-02	Management of severe acute malnutrition associated with medical complications