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WASH and Nutrition in Madagascar



BushProof



Objectives

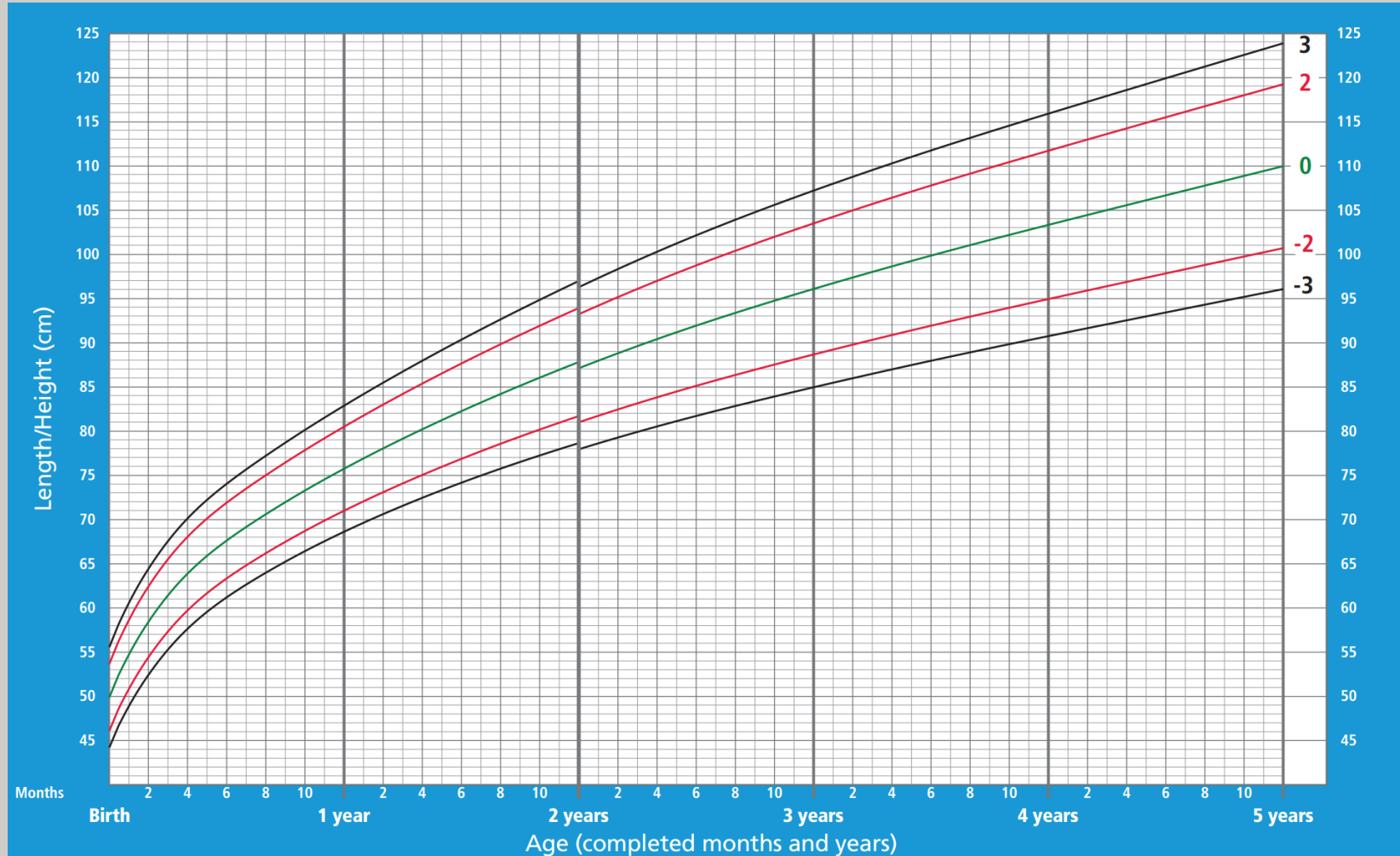
- key definitions related to WASH and nutrition
- current status of WASH and nutrition in Madagascar
- causes and determinants of undernutrition
- links between WASH and undernutrition

Definitions: Nutrition

Term	Definition
Undernutrition	Outcome of inadequate food intake or repeated infectious diseases
	General term for any nutritional deficiency
	Reduces body function, capacity to fight infections, growth, and cognitive development
Stunting	Height for Age (HAZ) below 2 standard deviations of reference population
	Indicator of chronic undernutrition
	Largely irreversible, associated with reduced health & developmental outcomes
Wasting	Weight for height (WHZ) below 2 standard deviations of a reference population
	Indicator of acute undernutrition
	Can be treated, although treatment largely focused only on humanitarian response

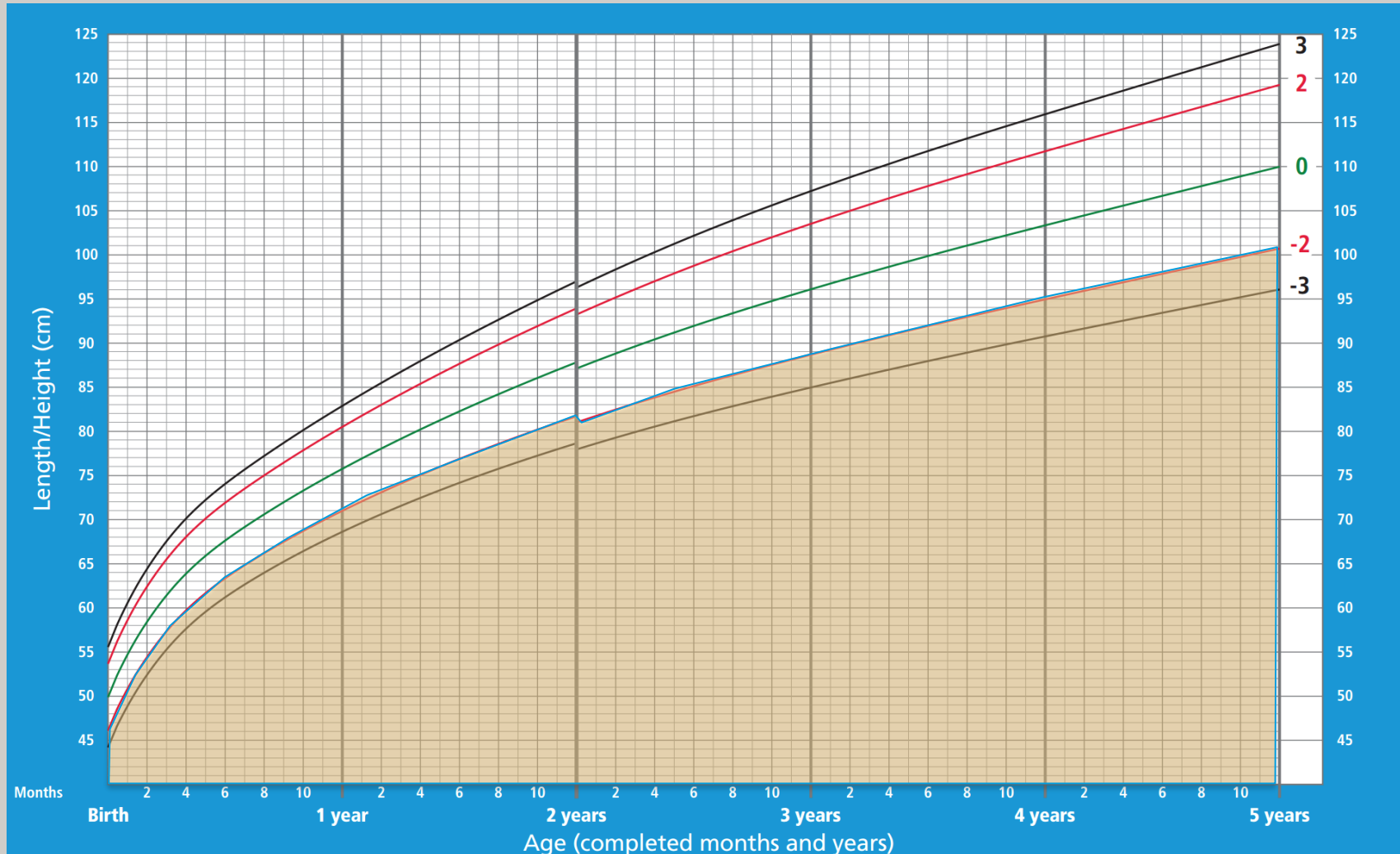
Length/height-for-age BOYS

Birth to 5 years (z-scores)



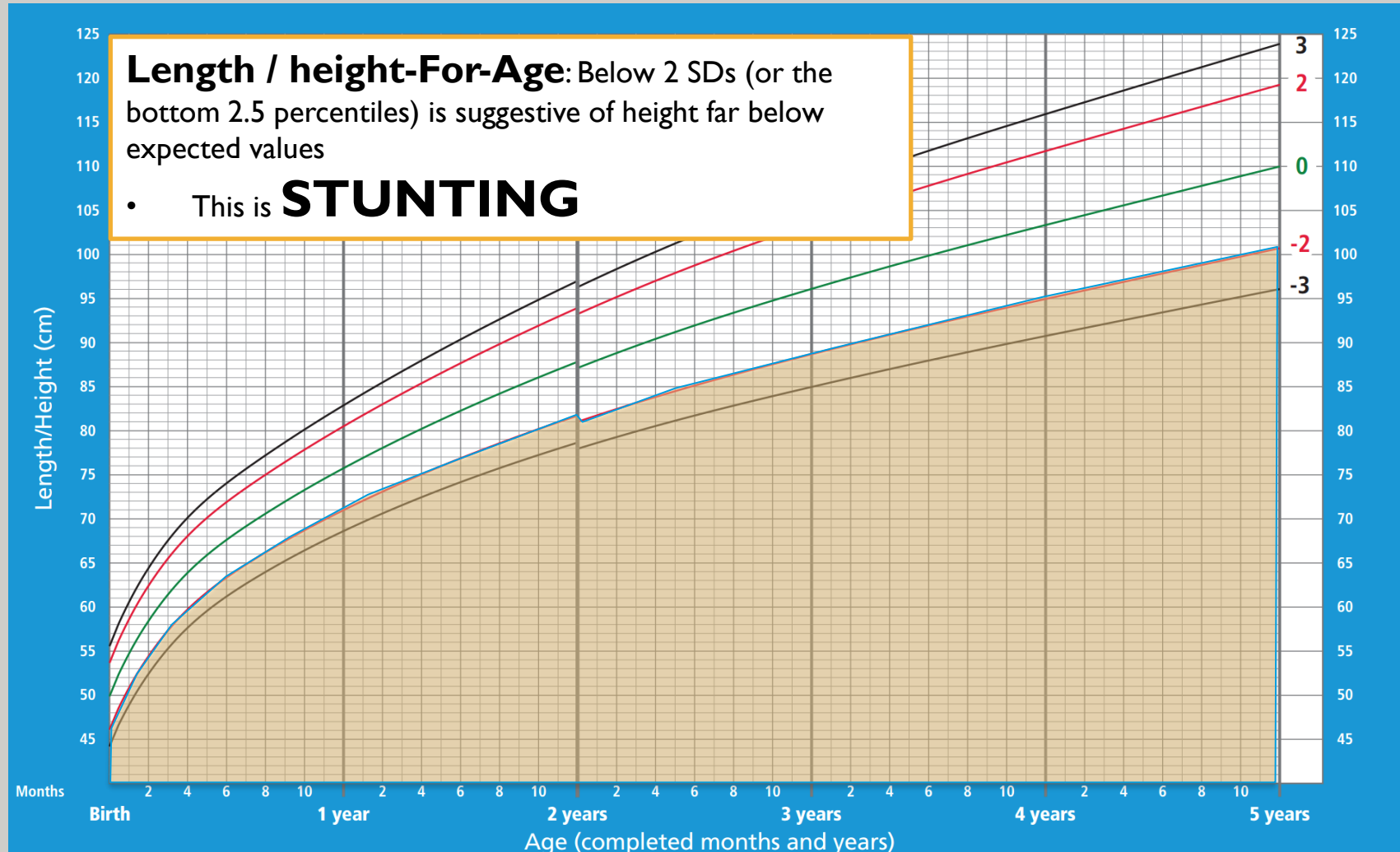
Length/height-for-age BOYS

Birth to 5 years (z-scores)



Length/height-for-age BOYS

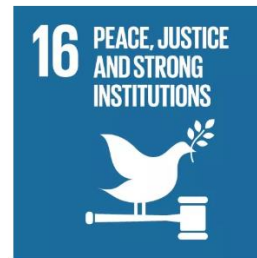
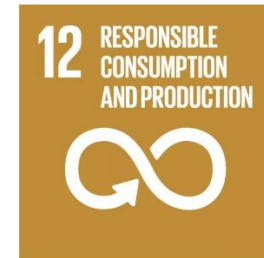
Birth to 5 years (z-scores)



Definitions: JMP WASH Ladders

Water	Sanitation	Hygiene
<p>Safely managed located on premises, always available, free from contamination</p>	<p>Safely managed Not shared, excreta safely disposed or treated</p>	<p>Availability of handwashing facility on premises with both soap and water</p>
<p>Basic Improved source less than 30 min roundtrip</p>	<p>Basic Improved facility not shared with other households</p>	
<p>Limited Improved source, collected exceeds 30 min roundtrip</p>	<p>Limited Use of an improved source between two or more households</p>	<p>Availability of a handwashing facility on premises without soap and water</p>
<p>Unimproved Drinking water from an unprotected well or spring</p>	<p>Unimproved Use of pit latrine without slab or platform</p>	<p>No handwashing facility on premises</p>
<p>Surface water</p>	<p>Open Defecation</p>	

Undernutrition and WASH: Global Targets



Undernutrition and WASH: Global Targets

2 ZERO HUNGER



End hunger, achieve food security and improved nutrition and promote sustainable agriculture

Targets:

End all forms of malnutrition, including achieving by 2025, the WHA internationally agreed targets on stunting and wasting among children under five:

- **STUNTING:** 40% Reduction in the number of children under-5 who are stunted
- **WASTING:** Reduce and maintain childhood wasting to less than 5%

6 CLEAN WATER AND SANITATION



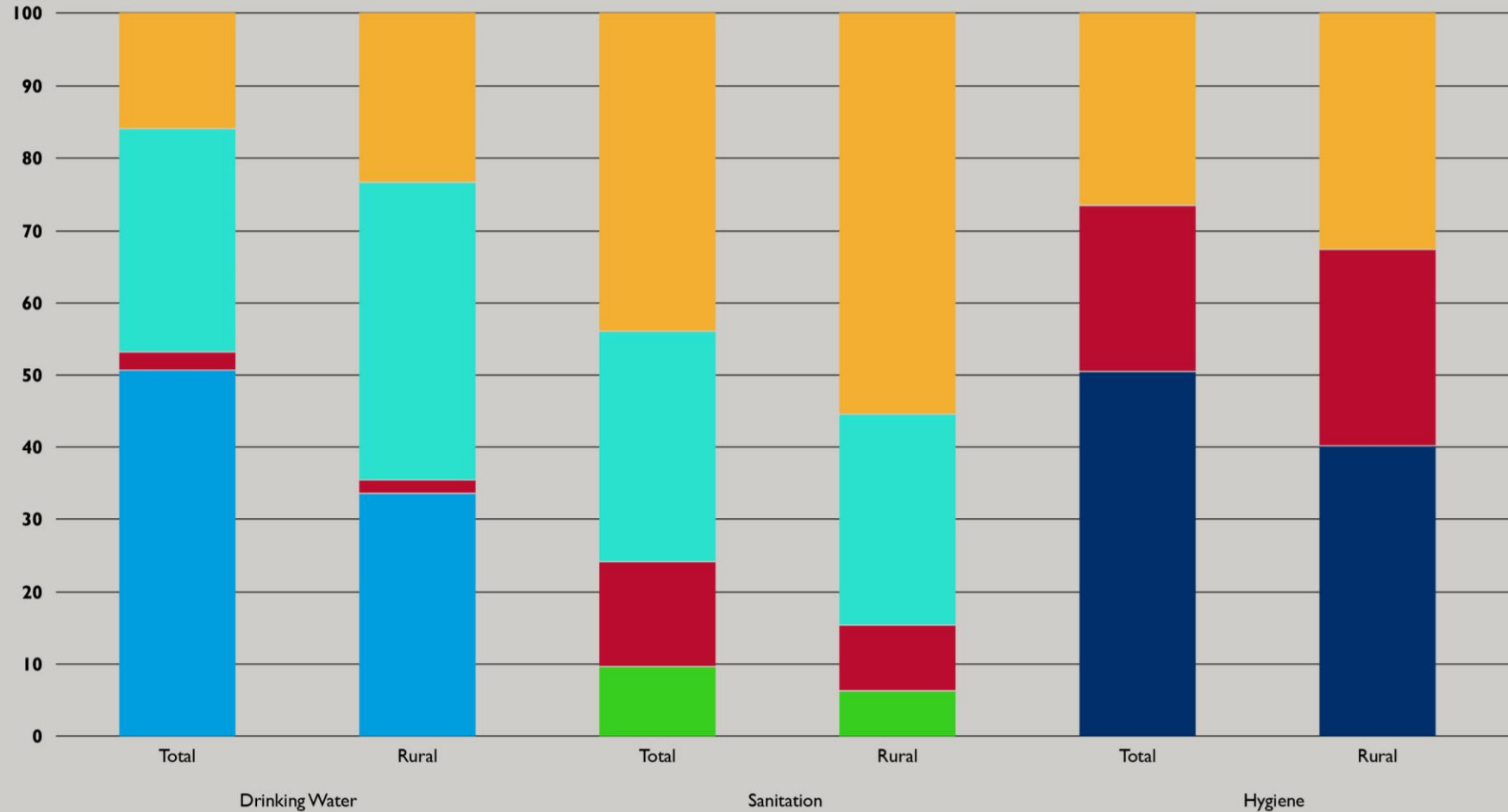
Ensure access to water and sanitation for all

Targets:

- By 2030, achieve universal and equitable access to safe and affordable drinking water for all
- By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations

WASH in Madagascar

Madagascar – 2015 – Service Levels

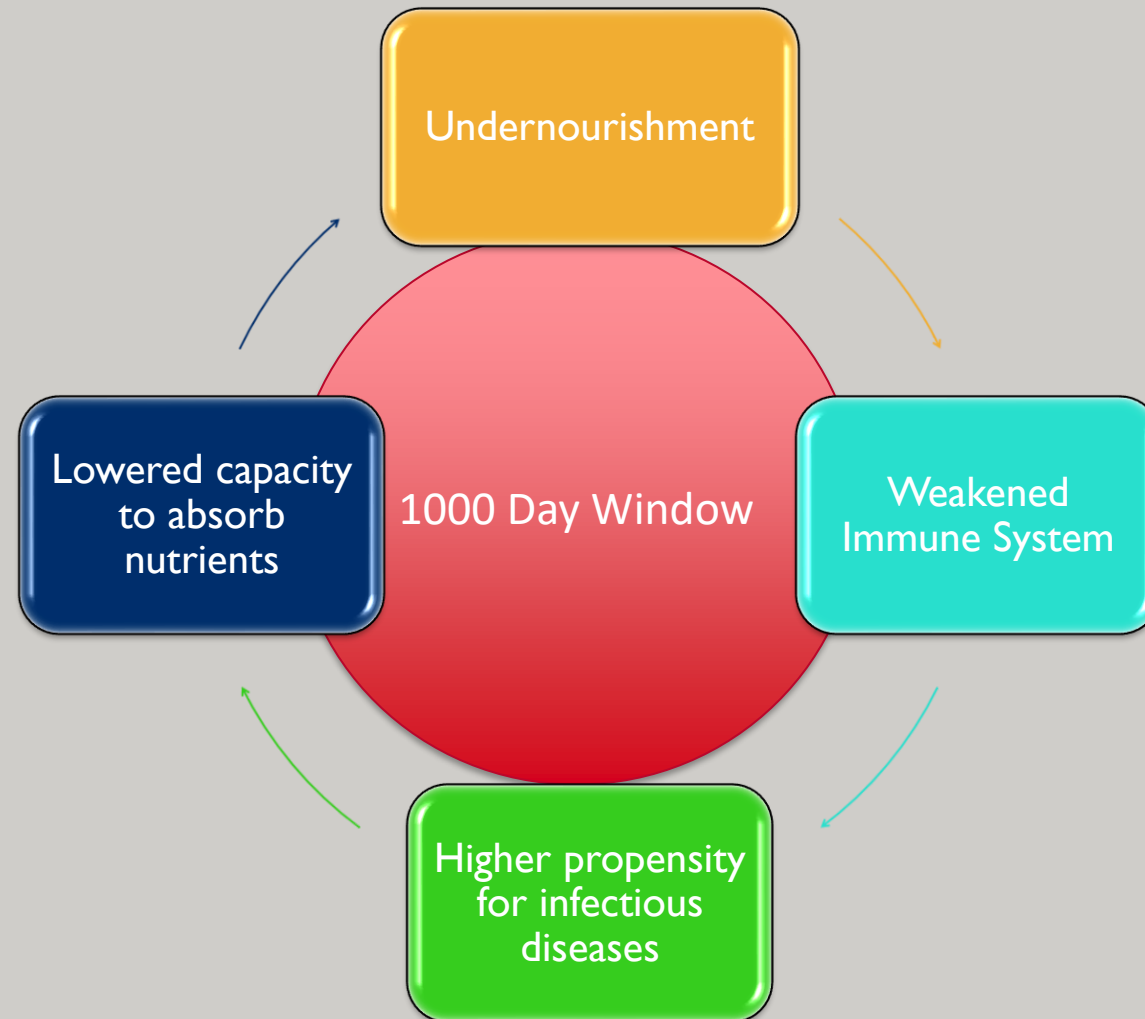


Nutrition Indicators in Madagascar

Internationally targets	Madagascar
40% reduction in number of stunted children	49% of children under 5 are stunted (DHS 2009)
50% reduction in anaemia in women of reproductive age	37% of women of reproductive age have anaemia (WB 2016)
30% reduction in low birth rate	16% of neonates low birth weight (WB 2009)
Increase in rate of exclusive breastfeeding in first six months by 50%	42% of under 6 months are exclusively breastfed (UNICEF 2012)
Reduce and maintain childhood wasting to 5%	15% of children under 5 are wasted (DHS 2004)

Nutrition Interventions: 1000 Day Window

Conception until a child's second birthday is recognized as a critical window for childhood nutrition outcomes.

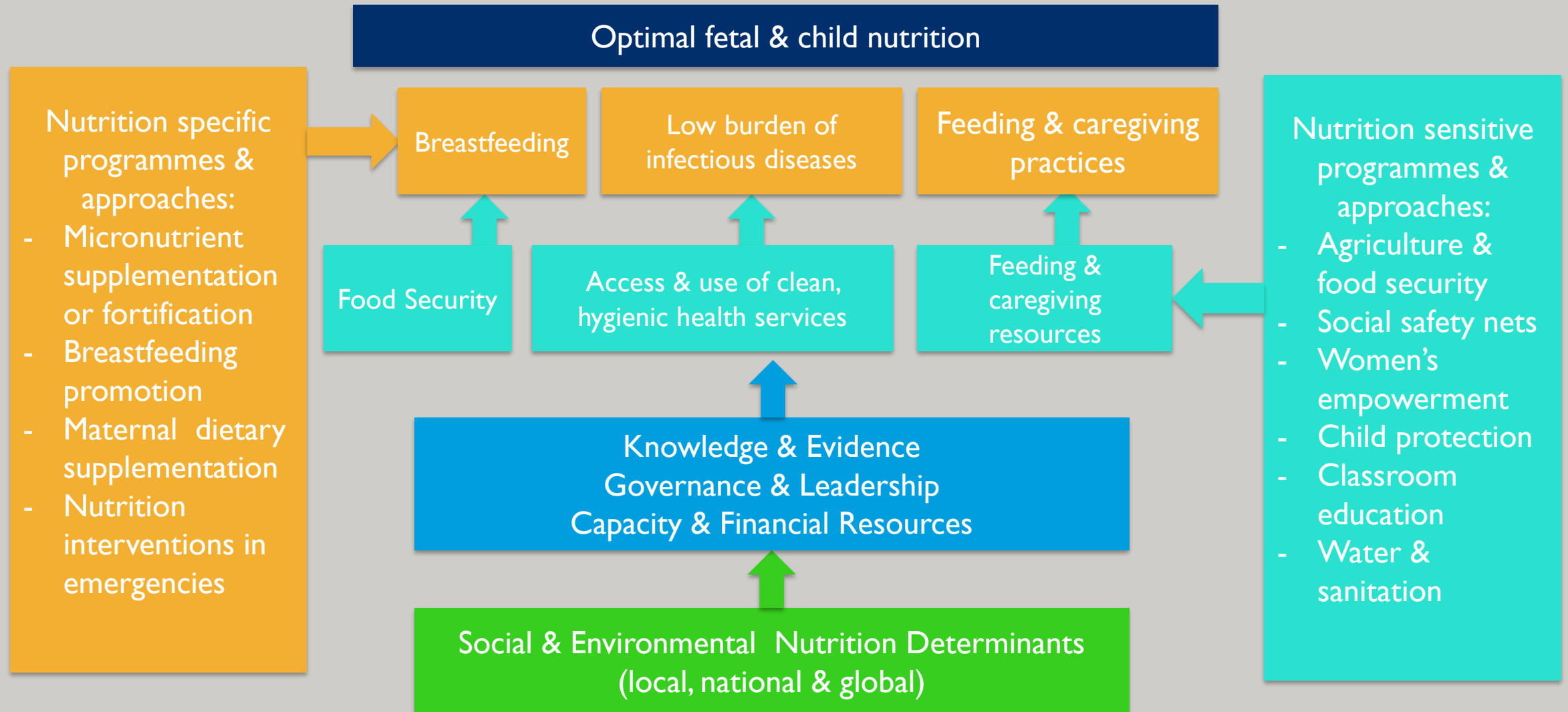


Adequate nutrition during this period can help reduce a child's risk of **stunting**.

Nutrition Interventions: Specific and Sensitive

Nutrition Specific	Nutrition Sensitive
Interventions which address the immediate causes of undernutrition	Interventions which address the underlying causes of undernutrition
<ul style="list-style-type: none">- Breastfeeding promotion- Vitamin A and Zinc supplementation- Complementary feeding- Dietary supplementation- Treatment of SAM and MAM	<ul style="list-style-type: none">- Water, sanitation and hygiene- Family planning- Women's empowerment- Schooling- Livelihoods or economic programs
Shown to be insufficient to alleviate the burden of undernutrition	Allows for emphasis on underlying contextual factors

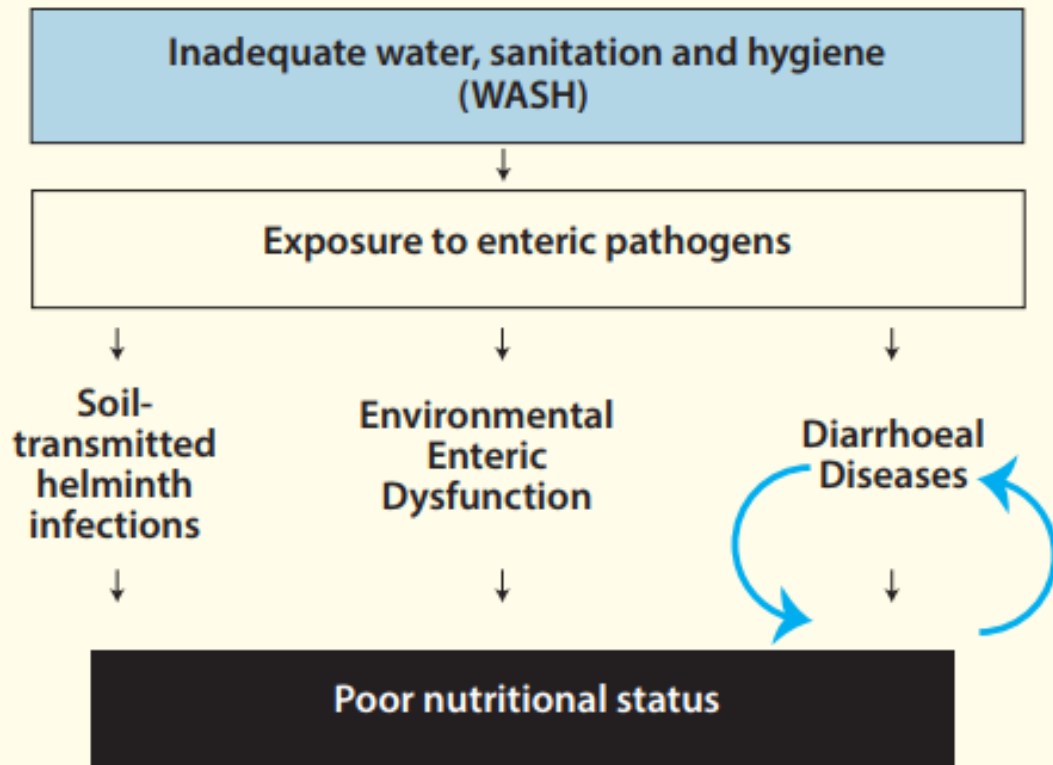
Child Nutrition Framework



adapted from Black R.E et al

WASH and Undernutrition

Figure 3: How WASH can affect childhood undernutrition

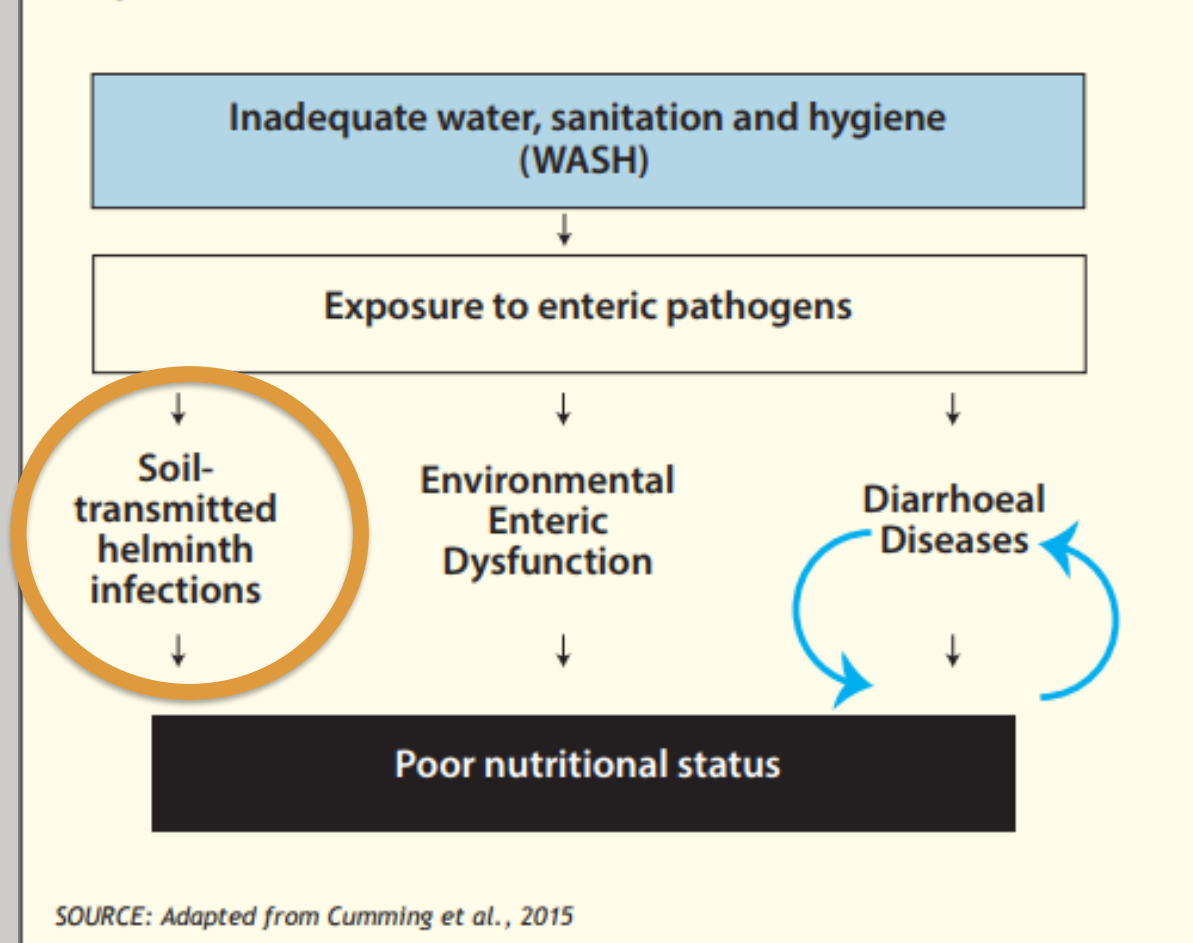


SOURCE: Adapted from Cumming et al., 2015

- Three biologically plausible mechanisms:
 1. Soil transmitted helminth
 2. Environmental Enteric Dysfunction (EED)
 3. Diarrheal Disease

WASH and Undernutrition

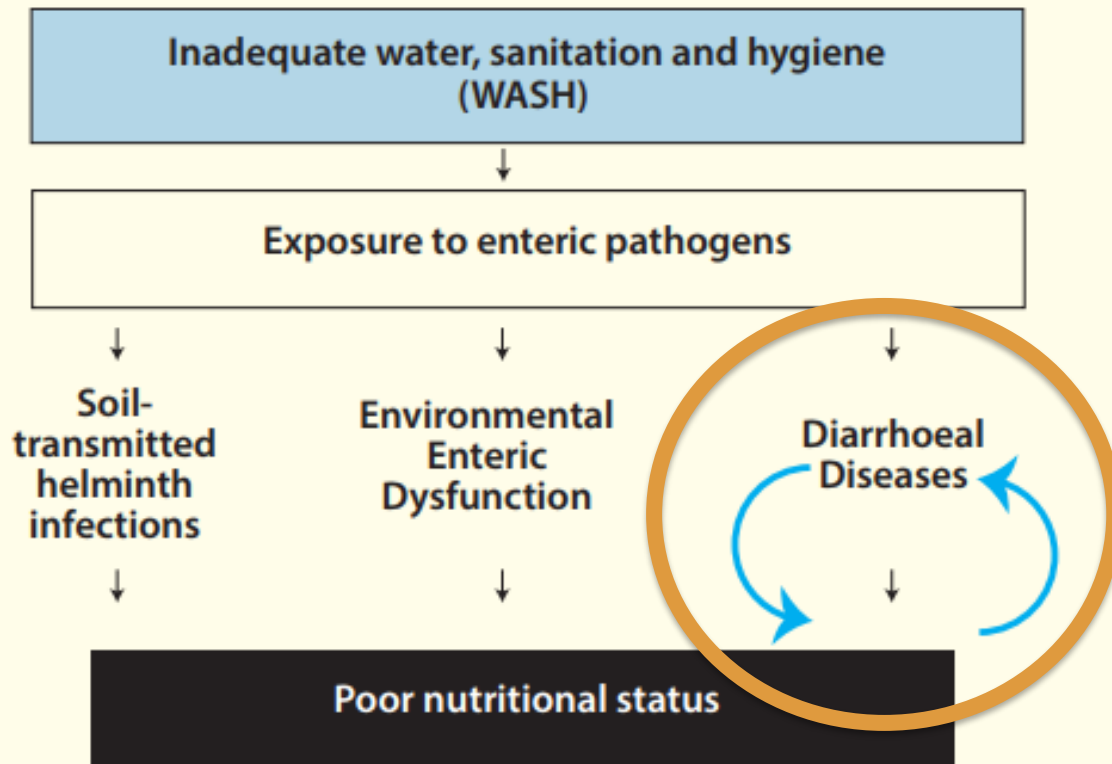
Figure 3: How WASH can affect childhood undernutrition



- **Soil transmitted helminth infections**
- Intestinal parasites transmitted through feces from infected individual through soil and foods
- Reduces body's capacity to absorb nutrients and suppresses appetite
- Sanitation: 33% reduction in STH
- Hygiene: 47% reduction in STH

WASH and Undernutrition

Figure 3: How WASH can affect childhood undernutrition

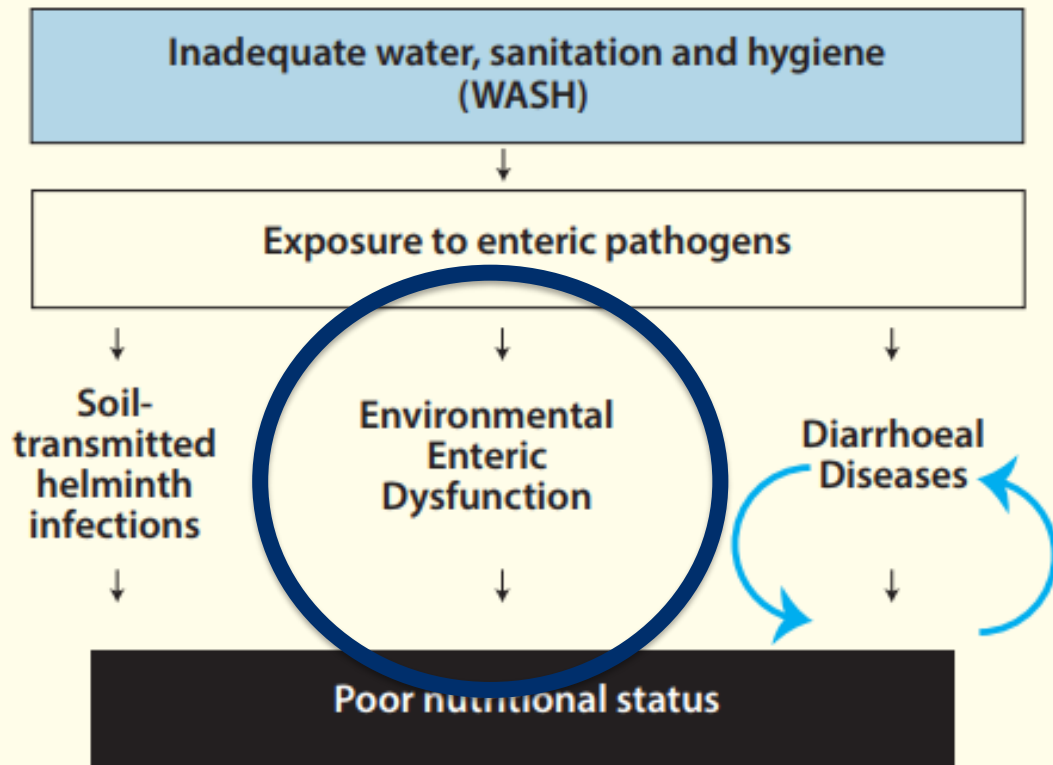


SOURCE: Adapted from Cumming et al., 2015

- **Diarrheal diseases**
- Symptomatic expresses of a wide range of viral, bacterial, or parasitic infections
- Reduces body's capacity to absorb nutrients and suppresses appetite, decreases capacity to resist infection
- Sanitation: 25% reduction
- Hygiene: 30% reduction

WASH and Undernutrition

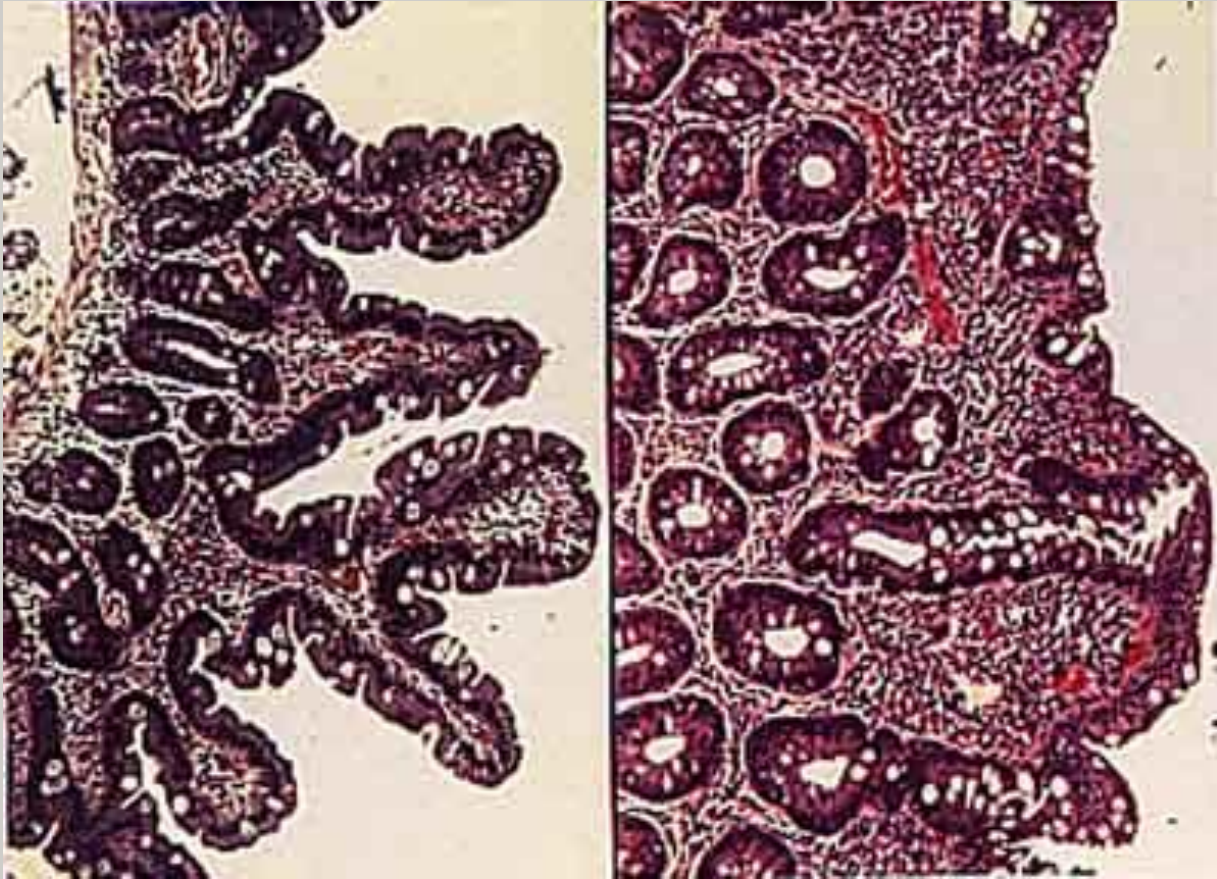
Figure 3: How WASH can affect childhood undernutrition



SOURCE: Adapted from Cumming et al., 2015

- **Environmental Enteric Dysfunction**
- Asymptomatic condition in which repeated infection alter the shape and function of the gut

WASH and Undernutrition



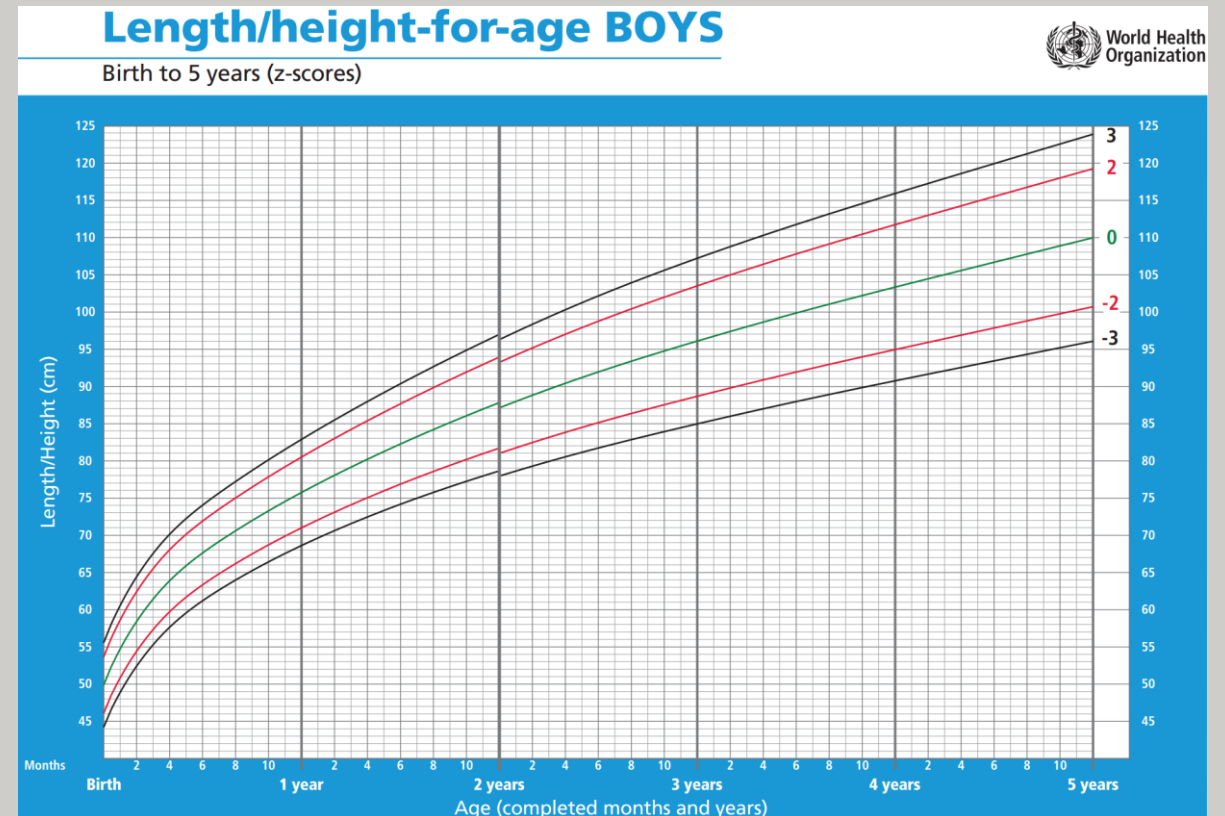
- **Environmental Enteric Dysfunction**
- Asymptomatic condition in which repeated infection alter the shape and function of the gut
- Poorly understood, no reference standard

WASH and Undernutrition: The Evidence

- Large number of studies have identified a link between various WASH factors and undernutrition
- However, many of these studies are cross-sectional
- Outcome and exposure assessed at some point in time (temporality)
- Potential for both undernutrition and WASH to be correlated with yet another, unmeasured outcome (education, wealth)
- Limited number of rigorously designed studies

WASH and Undernutrition: The Evidence

- Cochrane review in 2013
- Meta-analysis including data from over 4,000 children
- WASH interventions associated with a 0.08 increase in HAZ scores
- Stunting defined as HAZ > -2.0
- Did not include any sanitation interventions



WASH and Undernutrition: The Evidence

- Since the 2013, multiple large-scale cluster-randomized trials assessing impact between WASH and undernutrition

	Pickering	Hammer	Patil	Clasen	Sinharoy
Location	Mali	India	India	India	Rwanda
Intervention	CLTS	CLTS	Latrine promotion	Latrine promotion	Community-health clubs
Uptake	HIGH	Moderate	Low	Low	Moderate
Impact	+	+	-	-	-

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WASH and Undernutrition: The Evidence

- Three large-scale trials that assessed the impact of WASH interventions on undernutrition alone and in combination with child-feeding interventions
- SHINE Trial Zimbabwe
- WASH-Benefits Bangladesh
- WASH-Benefits Kenya

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	SHINE	Kenya	Bangladesh
Stunting	NO	NO	NO
Diarrhea	NO	NO	YES

WASH and Undernutrition: What went wrong?

1. Robust baseline conditions
2. Community-level coverage not addressed
3. Water quantity / water supply not assessed
4. May not have interrupted critical pathways

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All of the study sites had relatively high WASH coverage at baseline

Interventions with the largest effect on stunting (Mali) occurred where

- open defecation was high
- High rates of adoption

WASH and Undernutrition: What went wrong?

1. Robust baseline conditions
2. Community-level coverage not addressed
3. Water quantity / water supply not assessed
4. May not have interrupted critical pathways

Increasing evidence that community-level coverage is important predictor of health outcomes

- You aren't exposed to just your own pathogens, you're also exposed to your neighbors

Interventions with the largest effect on stunting (Mali) were delivered to the entire village

WASH and Undernutrition: What went wrong?

1. Robust baseline conditions
2. Community-level coverage not addressed
3. Water quantity / water supply not assessed
4. May not have interrupted critical pathways

Increasing water availability is key to enable adequate hygiene and sanitation

Important to note: changes in water consumption require household connections, not just new community-sources

WASH and Undernutrition: What went wrong?

1. Robust baseline conditions
2. Community-level coverage not addressed
3. Water quantity / water supply not assessed
4. May not have interrupted critical pathways

All studies focused on traditional sanitation and/or hygiene interventions

Potential exposure pathways not addressed:

- Complimentary food hygiene
- Geophagy

WASH and Undernutrition: What went wrong?

1. Robust baseline conditions
2. Community-level coverage not addressed
3. Water quantity / water supply not assessed
4. May not have interrupted critical pathways
5. Interventions may not have addressed root causes of undernutrition

Interventions focused on changing specific WASH behaviors

Link between inadequate WASH and undernutrition may be indirect

- Time spent collecting water, finding a defecation site could reduce time and attention to care giving
- Money spent on water could reduce household food budget

Conclusions: WASH and Undernutrition

- Biological plausibility and observational data suggest that WASH plays an important role in undernutrition
- Evidence from robust field trials is mixed
- Low coverage
- Inadequate community coverage
- May not change key behaviours / exposures pathways
- **More attention needed to designing and delivering nutrition sensitive WASH intervention**