The economic rationale for investing in stunting reduction

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Abstract

About 175 million preschool children are stunted, primarily in South Asia and Sub-Saharan Africa. Early-life stunting is linked to a number of adverse outcomes over the life cycle. This study estimates economic benefit/cost ratios for a number of heavily-burdened countries, arguably under conservative assumptions. These benefit/cost estimates range from 3.8 (DRC) to 34.1 (India), with a median of 18 (Bangladesh). These results suggest that rates of return to investments in reducing stunting are comparable to or better than many other uses of public resources, particularly because there are distributional gains in terms of reducing poverty in the next generation as well as non-economic gains such as reducing child suffering.

Introduction

- ~175 million preschool children stunted.
- Stunting usually develops < 2-3 y of age.
- Marker of systemic dysfunction during sensitive phase of child development.
- Linked to many adverse outcomes related to later developments over life.
- To assess economic benefits relative to costs (B/C ratio) need value impacts and costs over life cycle.

Photo 1. Consumption of INCAP *Atole* in Guatemala in 1969-1977

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Methods

- Benefits and costs over life cycle (Fig. 1)
- Individual stunted at age 36m has 66% lower per capita income when age 25-42 y (INCAP Guatemalan data, Photo 1) if stunting treated as endogenous (Hoddinott *et al*); assume half income gains are realized.
- Costs of intervention (Table 1).
- Intervention package estimated to reduce stunting by 36% (Bhutta *et al*).
- Predicted income increase 11.4%.
- Apply to predicted per capita incomes for 2036-2050 (i.e., first 15 y of working lives if born in 2015 and start work when 21 y) of those stunted in infancy (based on current income levels and projected growth rates) in selected countries in which stunting widespread.
- Construct net present value of increased income using 5% discount rate.

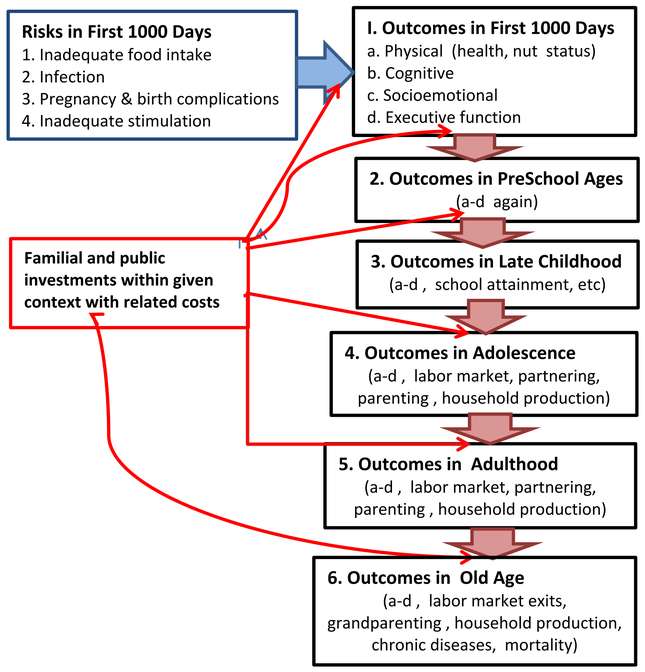

Figure 1: A lifecycle approach to investments in the First 1000 days

Intervention	Child age range (months)	Cost per unit	Total cost per child
Community based nutrition programs	0 – 59	$7.50 per child	$7.50
Vitamin A supplementation	6-59	$1.20 per year	$4.80
Zinc supplementation	6-59	$1.00 per year (2-3 treatments/year)	$4.00
Multiple micronutrient powders	6-23	$3.60 per course (3 courses recommended)	$10.80
Deworming	12-59	$0.25 per round (1 round/year)	$1.00
Iron-folic acid supplementation for mothers during pregnancy		$2.00 per pregnancy	$2.00
Iron fortification of staples	12-59	$0.20 per year	$0.80
Universal salt iodization	12-59	$0.05 per year	$0.20
Providing complementary foods	6-23	$0.11 per day $0.14 per day in India	$56.88
Community based management of malnutrition	6-59		$8.13*

Table 1. Per child costs of interventions to reduce stunting in children under 36 months from Horton (2010)

Results

Benefits/costs in selected high-burden countries substantially exceed one (Figure 2).

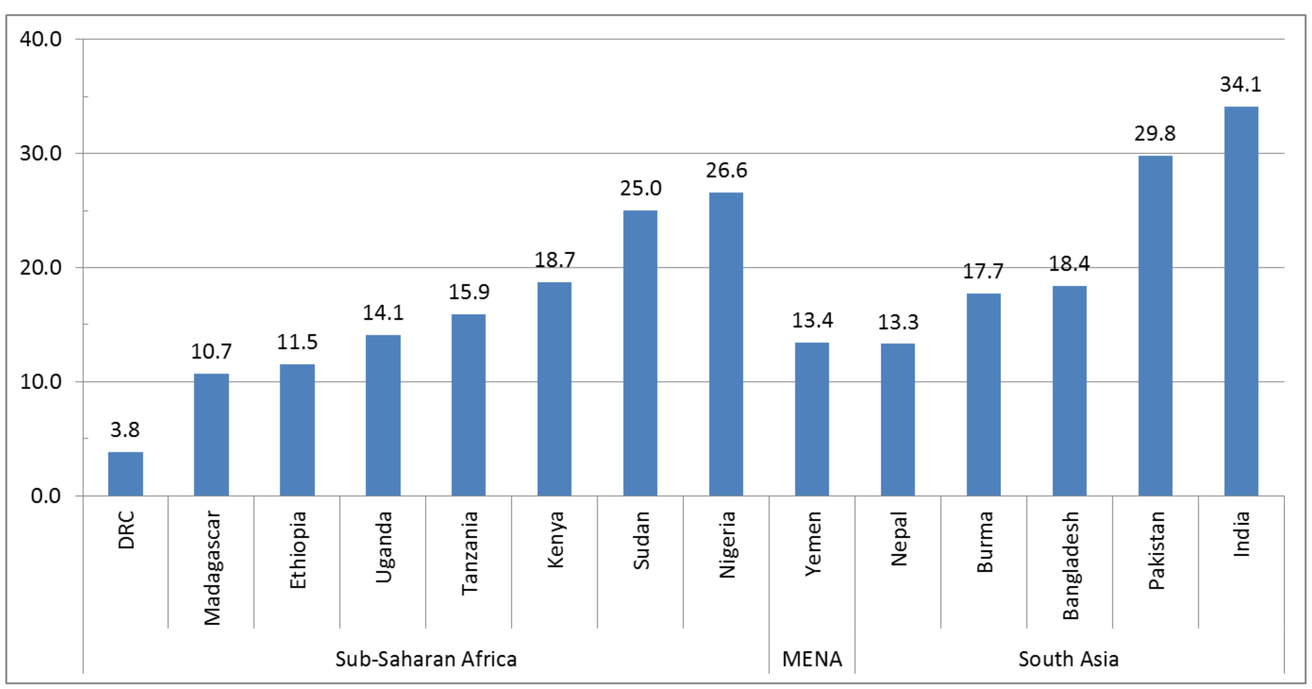

Figure 2: Benefit/cost ratios for investments to reduce stunting in selected high-burden countries

Discussion

- Overall goal: to generate credible estimates of benefit/cost ratios for a plausible set of nutritional interventions.
- Considerable challenges in measuring benefits and costs; assumptions probably conservative (e.g., half of INCAP effect , only income/consumption and not other effects, only effects for young adults 21-35 y of age – not when younger or older,).
- Estimated average benefit/cost estimates between 3.8 (DRC) and 34.1 (India), with median of 18 (Bangladesh).
- All estimated benefit/cost ratios > 1 even if overestimate by factor of 2 or 3.
- Compare favorably with other investments that public funds will compete for.
- Focus on private benefits, not social benefits that might differ from private benefits and create efficiency rationale for policy.
- Raises question why not more private investment to reduce stunting? Information problems? Imperfect capital markets?
- Since those stunted tend to be poorer, distributional (anti-poverty) motive for use of public resources to reduce stunting.

Conclusions

- In countries in which stunting widespread, primarily in South Asia and Sub-Saharan Africa, our estimates of benefit/cost ratios are substantially above one in terms of economic benefits alone.
- This suggests that investments in reducing stunting have rates of return comparable to or better than many other uses of public resources, particularly because there are distributional gains in terms of reducing poverty in the next generation as well as non-economic gains such as reducing child suffering.

References

Bhutta, Z.A., T. Ahmed, R.E. Black, S. Cousens, K. Dewey, E. Giugliani, B.A. Haider, B. Kirkwood, S.S. Morris and HPS Sachdev. 2008. "Maternal and Child Undernutrition 3: What Works? Interventions for Maternal and Child Undernutrition and Survival." *Child-Care Health and Development*, 34(3), 41-64.

Hoddinott, J., J. Maluccio, J. Behrman, R. Martorell, P. Melgar, A. R. Quisumbing, M. Ramirez-Zea, A. D. Stein, and K. M. Yount. 2013. "The consequences of early childhood growth failure over the life course," Discussion Paper 1073, International Food Policy Research Institute, Washington DC.

Horton, S., M. Shekar, C. McDonald, A. Mahal and J. Brooks, 2010. *Scaling up nutrition: What will it cost?* World Bank, Washington DC