

Introducing the Double Burden of Malnutrition

National Academy of Science Roundtable on Obesity Solutions
Current Status and Response to the Global Obesity Pandemic
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Overview of Double Burden of Malnutrition

- What, where and why?
- Drivers and reasons for double burden
- Costs of double burden
- Responses – the notion of “double-duty”
- Challenges and research issues



Roundtable on Obesity Solutions

National Academies of Sciences, Engineering, and Medicine

Double burden: the what?

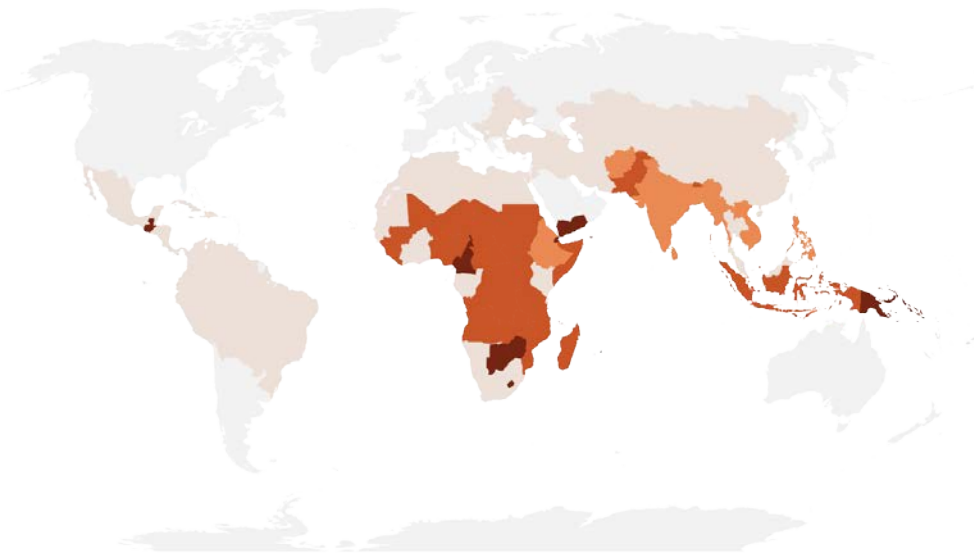
- DBM: simultaneous undernutrition (one or all of stunting, waste, micronutrient deficiencies) and overweight/obesity in household
- Number of people affected by undernutrition (~800 million) vastly < number affected by ow/obesity (>2 billion roughly)
- **Malnutrition in all its Forms** – Second International Congress on Nutrition (ICN2) in 2014 institutionalized a broad vision of malnutrition at WHO and FAO



Double burden of malnutrition: the where?

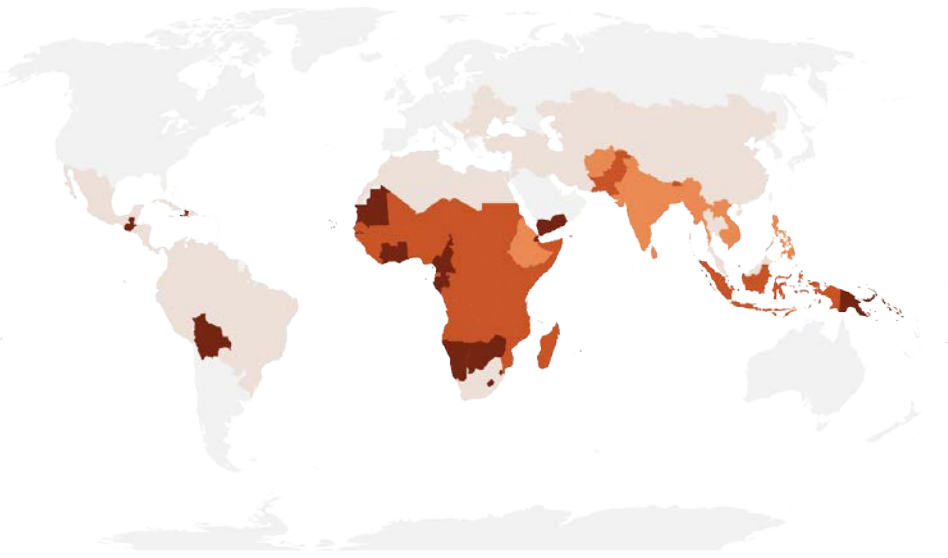
Based on two alternate measures for all countries using the most recent data for low- and middle-income countries

a. Current Double burden countries according to weight/height data: at least 1 wasted/stunted/thin and 1 overweight/obese child, adolescent, or adult in household



Criteria, any two: child with wasting $\geq 15\%$, stunting $\geq 30\%$, wasting and stunting both $\geq 35\%$, or overweight $\geq 15\%$; woman with overweight $\geq 40\%$ or thinness $\geq 20\%$,

b. Double burden countries (anemic/wasted/stunted and overweight/obese in household), based on most recent year

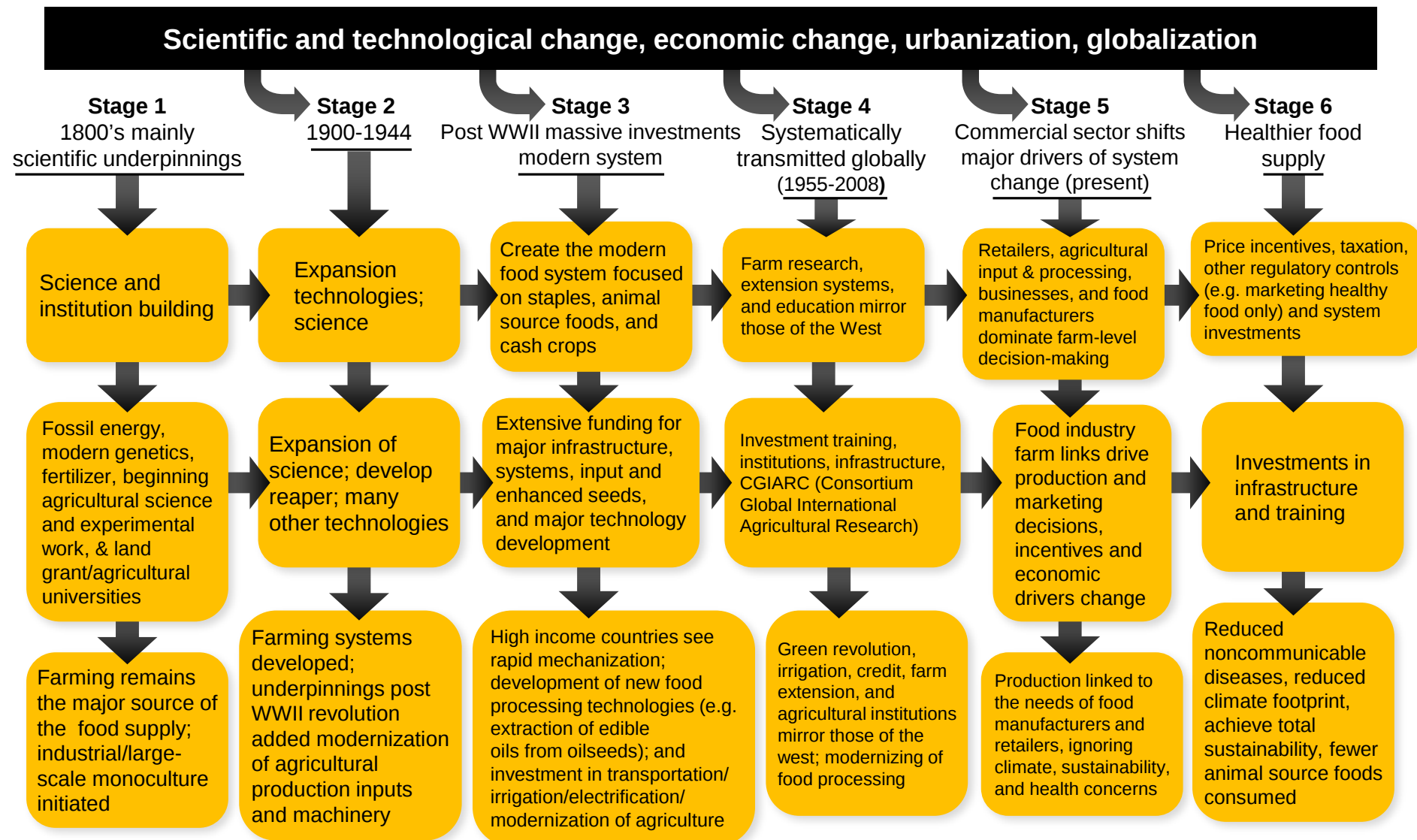


Criteria, any 2: Child with wasting $\geq 15\%$, stunting $\geq 30\%$, wasting and stunting both $\geq 35\%$, overweight $\geq 15\%$, and/or severe anemia $\geq 40\%$; woman with overweight $\geq 40\%$, thinness $\geq 20\%$, and/or severe anemia $\geq 40\%$.

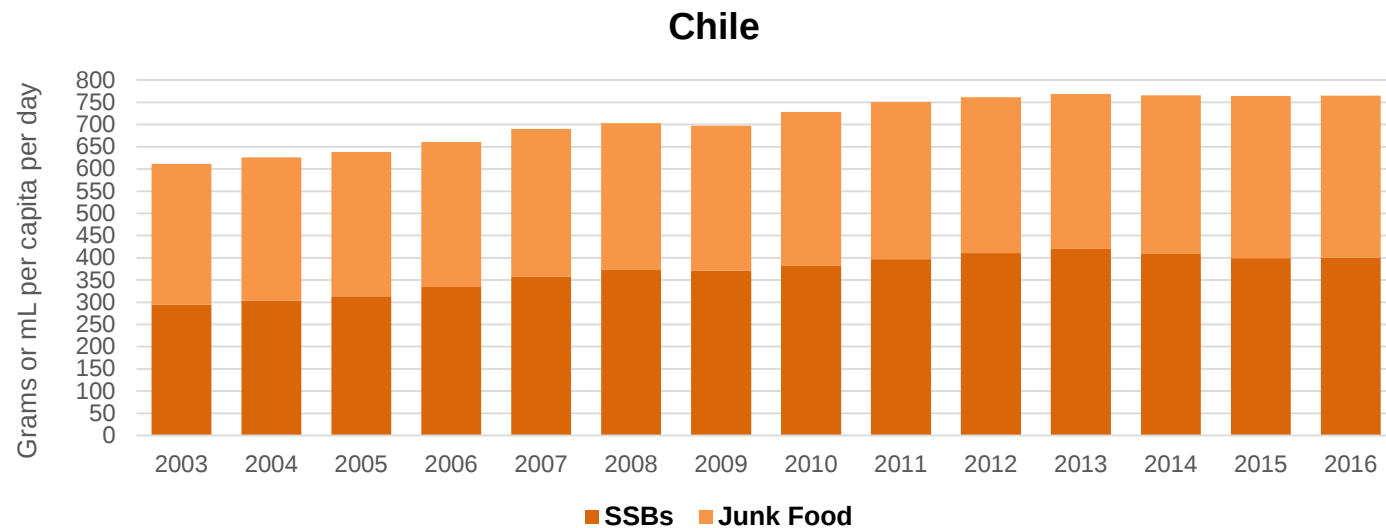
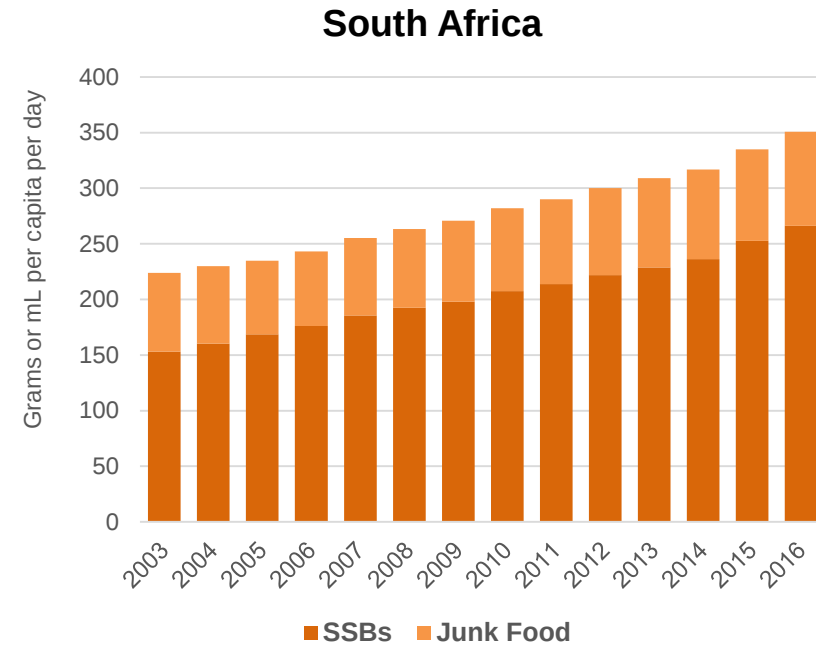
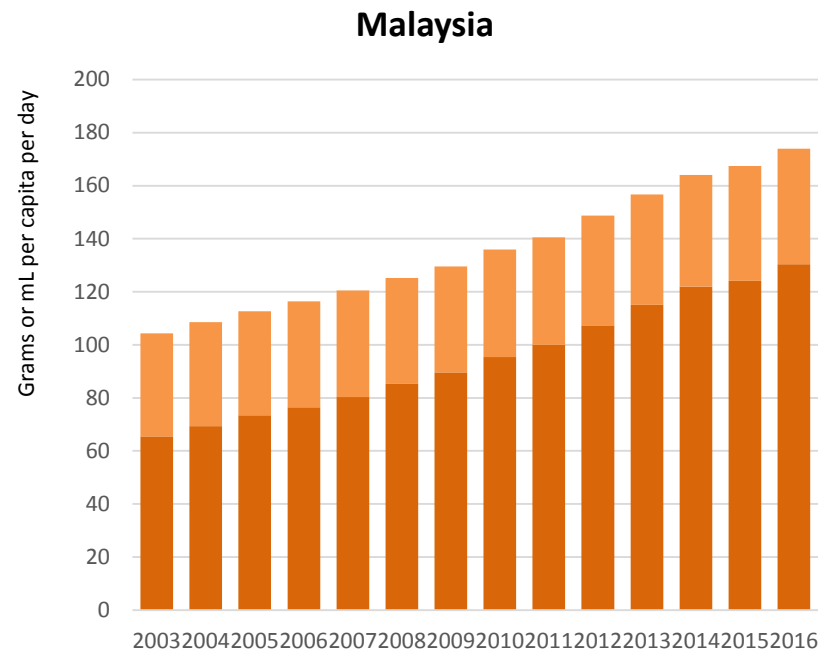
Double burden at:

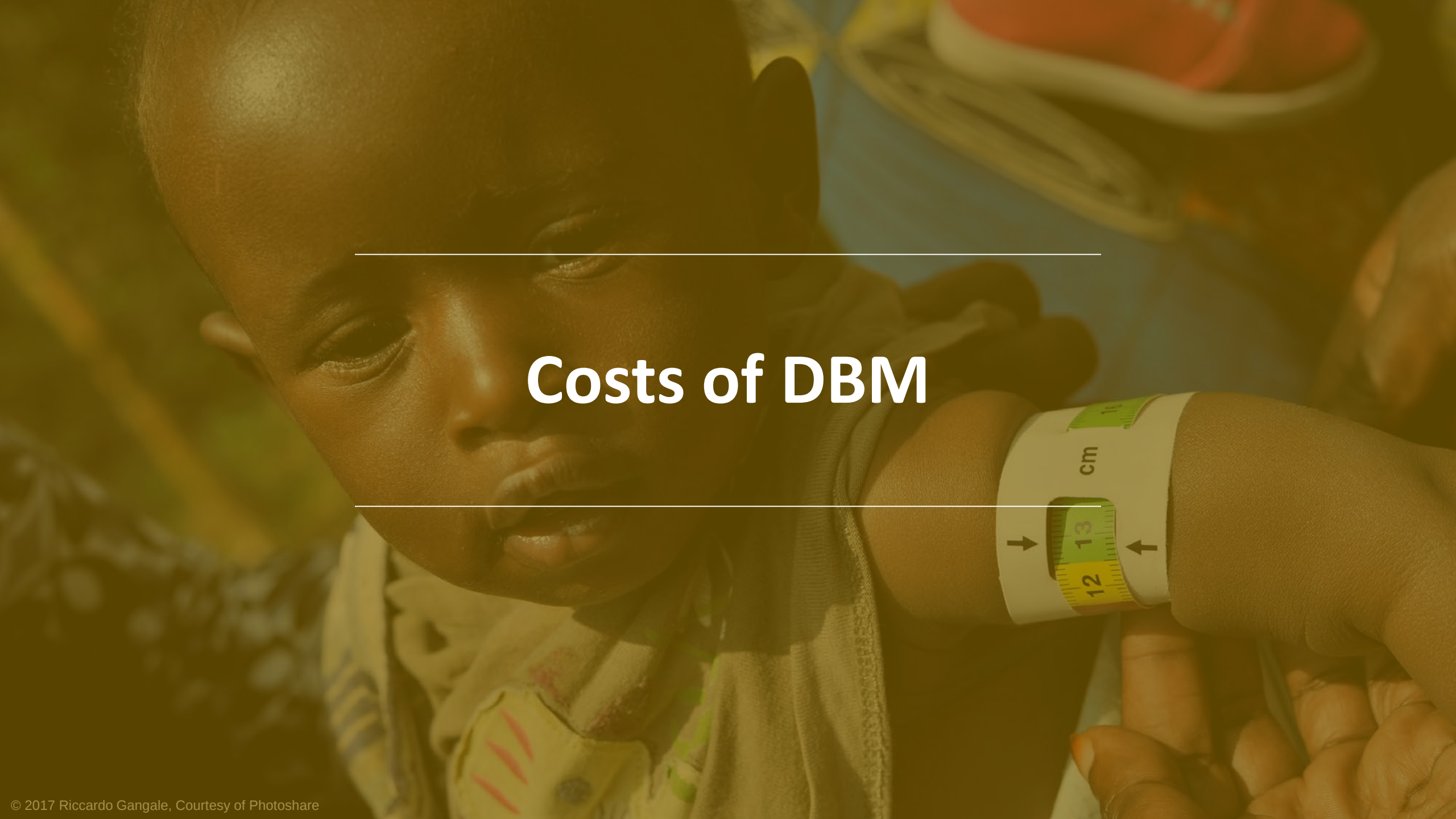
-  20% overweight prevalence
-  30% overweight prevalence
-  40% overweight prevalence
-  No double burden
-  High-income countries

Double Burden: the why? Drivers and Conditions: Stages of Modern Global Agricultural and Food System Development



Trends in total retail + food service sales volumes for sugar-sweetened beverages (SSBs) and junk foods, 2003-2016



A close-up photograph of a young child's face and arm. The child has dark skin and is looking slightly down. A white measuring tape with green and yellow markings is wrapped around their upper arm. The tape shows measurements in centimeters, with '12' and '13' visible. The background is blurred, showing some outdoor elements. The entire image has a warm, golden-brown color overlay.

Costs of DBM

Economic literature to date: double burden

- Only two studies have looked at economic costs of both under-nutrition and overweight and obesity (ECLAC 2016 and Popkin 2001)

ECLAC 2016: Methods and results	Popkin BM, et al. (2001): Methods and results
Measured: undernutrition through multiple pathways; (risk of disease, educational attainment, lifetime earnings). Overweight and obesity impacts are medical costs and productivity losses Methods: projected over 65 years with undernutrition and obesity measured separately and combined Results: range from a total cost of 0.2% of GDP in Chile (all obesity) to 4.3% of GDP in Ecuador (2.6% from undernutrition and 1.7% from obesity).	Measures: undernutrition and diet related NCDs in China and India Methods: uses epidemiological models for the years 1995 and 2025, combined with the best available information on costs Results: in 1993, diet related NCDs from under and over nutrition amounted to 2.1% of GDP in China and 1.1% of GDP in India. These estimates were updated for China, showing that in 2000, these costs were 4% of GDP and projected to reach 9% of GDP by 2025 (Popkin et al 2006).

A photograph of three young girls sitting on the ground, eating from metal plates. They are wearing school uniforms consisting of white shirts and red checkered skirts. The girl on the left is looking down at her food. The girl in the middle is looking down at her food. The girl on the right is looking up and smiling. The background is a plain, light-colored wall. The image has a blue tint and a semi-transparent white text overlay in the center.

Interventions

Possible “double-duty” interventions

Intervention	Supporting evidence
Advertising regulations and healthy food marketing to children	1, 3
Breastfeeding promotion	1
Complementary feeding practices	1
Improve food transportation and trade to reduce food loss and improve diet	3
Nutrition counseling in health care settings	2, 3
Offer healthy food and set standards in public institutions	2, 3
Reformulation of food products to fortify with nutritious ingredients	3
School nutrition and physical activity programs	1, 3
Supplementation programs (folic acid and iron) and antenatal care	1, 2
Support healthy food production through price support to agriculture and consumers	3

Intervention sources:

1. WHO. Double-duty actions for nutrition. Policy brief. Geneva: World Health Organization; 2017.
2. Shekar M, Kakietek J, Eberwein JD, Walters D. An Investment Framework for Nutrition: Reaching the Global Targets for Stunting, Anemia, Breastfeeding, and Wasting. Directions in Development Series. Washington, DC: World Bank; 2017. doi:10.1596/978-1-4648-1010-7.
3. NOURISHING database. World Cancer Research Fund International. 2018. Available at: <https://www.wcrf.org/int/policy/nourishing-database>

Interventions selected for analysis

Intervention	Undernutrition	Overweight and obesity
 Breastfeeding promotion	Breastmilk contains vital nutrients during early development that help stimulate growth	Breastmilk provides the perfect amount of calories to the infant and helps mothers lose weight
 School nutrition programs	Provides regular and nutrient-dense meals to improve growth	Healthy food options changes tastes and behaviors away from high fat and low nutrient foods
 Food advertising	Increases desire to consume healthy, nutritious foods	Reduces desire to consume unhealthy foods



Challenges to research on DBM

Challenges

- Complex set of drivers and conditions
- Uneven and non-comparable data sources on forms of malnutrition
- Intergenerational factors that are both epigenetic and environmental
- Different impacts are important across the life cycle. For u/w, it will be physical and cognitive losses. For o/w, it will be productivity, social disadvantages
- Domains use different outcomes measures (undernutrition = linear growth, overweight/obesity = BMI)
- Most important is lack of evidence from double-duty interventions and programs (see eg, Ruel et al 2017, Hawkes forthcoming Lancet 2018)

A high-angle, wide shot of a bustling outdoor market. The ground is covered with large piles of fresh produce, primarily tomatoes and bananas. Numerous people, including men, women, and children, are scattered throughout the scene, some standing and others sitting on the ground. They are engaged in various activities like sorting produce, weighing items, and interacting. The market is organized into sections, with some vendors using crates and others using large sacks. The overall atmosphere is one of active commerce and community. The image has a warm, orange-toned filter.

Key Literature

Selected References

1. Doak CM, Adair LS, Bentley M, Monteiro C, Popkin BM. The dual burden household and the nutrition transition paradox. *International journal of obesity*. 2005; **29**(1): 129-36.
2. Doak CM, Adair LS, Monteiro C, Popkin BM. Overweight and underweight coexist within households in Brazil, China and Russia. *J Nutr*. 2000; **130**(12): 2965-71.
3. Garrett J, Ruel M. Stunted child-overweight mother pairs: Prevalence and association with economic development and urbanization. *Food Nutr Bull*. 2005; **26**(2): 209 - 21.
4. Victora CG, Rivera J. Optimal child growth and the double burden of malnutrition: research and programmatic implications. *Am J Clin Nutr*. 2014; **100**(6): 1611S-2S.
5. Rivera JA, Pedraza LS, Martorell R, Gil A. Introduction to the double burden of undernutrition and excess weight in Latin America. *The American Journal of Clinical Nutrition*. 2014; **100**(6): 1613S-6S.
6. Kroker-Lobos MF, Pedroza-Tobías A, Pedraza LS, Rivera JA. The double burden of undernutrition and excess body weight in Mexico. *The American Journal of Clinical Nutrition*. 2014; **100**(6): 1652S-8S.
7. World Health Organization. Double-duty actions for nutrition: policy brief. In: *Nutrition*, editor. Geneva: WHO; 2017. p. 10.
8. Hawkes C, Demaio AR, Branca F. Double-duty actions for ending malnutrition within a decade. *The Lancet Global Health*. 2017.
9. Tzioumis E, Adair LS. Childhood dual burden of under- and overnutrition in low- and middle-income countries: A critical review. *Food and Nutrition Bulletin*. 2014; **35**(2): 230-43.
10. Popkin BM. The shift in stages of the nutrition transition in the developing world differs from past experiences! *Public Health Nutr*. 2002; **5**(1A): 205-14.
11. Popkin BM, Adair LS, Ng SW. Global nutrition transition and the pandemic of obesity in developing countries. *Nutrition Reviews*. 2012; **70**(1): 3-21.



Thank You

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