

Essay

Big Food, Food Systems, and Global Health

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This article was commissioned for the PLoS Medicine series on Big Food that examines the activities and influence of the food and beverage industry in the health arena.

As the *PLoS Medicine* series on Big Food (www.ploscollections.org/bigfood) kicks off, let's begin this Essay with a blunt conclusion: Global food systems are not meeting the world's dietary needs [1]. About one billion people are hungry, while two billion people are overweight [2]. India, for example, is experiencing rises in both: since 1995 an additional 65 million people are malnourished, and one in five adults is now overweight [3,4]. This coexistence of food insecurity and obesity may seem like a paradox [5], but over- and undernutrition reflect two facets of malnutrition [6]. Underlying both is a common factor: food systems are not driven to deliver optimal human diets but to maximize profits. For people living in poverty, this means either exclusion from development (and consequent food insecurity) or eating low-cost, highly processed foods lacking in nutrition and rich in sugar, salt, and saturated fats (and consequent overweight and obesity).

To understand who is responsible for these nutritional failures, it is first necessary to ask: *Who rules global food systems?* By and large it's "Big Food," by which we refer to multinational food and beverage companies with huge and concentrated market power [7,8]. In the United States, the ten largest food companies control over half of all food sales [9] and worldwide this proportion is about 15% and rising. More than half of global soft drinks are produced by large multinational companies, mainly Coca-Cola and PepsiCo [10]. Three-fourths of world food sales involve processed foods, for which the largest manufacturers hold over a third of the global market [11]. The world's food system is not a competitive market-

place of small producers but an oligopoly. What people eat is increasingly driven by a few multinational food companies [12].

Virtually all growth in Big Food's sales occurs in developing countries [13] (see Figure 1). The saturation of markets in developed countries [14], along with the lure of the 20% of income people spend on average on food globally, has stimulated Big Food to seek global expansion. Its rapid entry into markets in low- and middle-income countries (LMICs) is a result of mass-marketing campaigns and foreign investment, principally through takeovers of domestic food companies [15]. Trade plays a minimal role and accounts for only about 6% of global processed food sales [15]. Global producers are the main reason why the "nutrition transition" from traditional, simple diets to highly processed foods is accelerating [16,17].

Big Food is a driving force behind the global rise in consumption of sugar-sweetened beverages (SSBs) and processed foods enriched in salt, sugar, and fat [13]. Increasing consumption of Big Food's products tracks closely with rising levels of obesity and diabetes [18]. Evidence shows that SSBs are major contributors to childhood obesity [19,20], as well as to long-term weight-gain, type 2 diabetes, and cardiovascular disease [21,22]. Studies also link frequent consumption of highly processed foods with weight gain and associated diseases [23].

Of course, Big Food may also bring benefits—improved economic performance through increased technology and know-how and reduced risks of undernu-

trition—to local partners [24]. The extent of these benefits is debatable, however, in view of negative effects on farmers and on domestic producers and food prices [25].

Public Health Response to Big Food: A Failure to Act

Public health professionals have been slow to respond to such nutritional threats in developed countries and even slower still in developing countries. Thanks to insights from tobacco company documents, we have learned a great deal about how this industry sought to avoid or flout public health interventions that might threaten their profits. We now have considerable evidence that food and beverage companies use similar tactics to undermine public health responses such as taxation and regulation [26,27,28,29], an unsurprising observation given the flows of people, funds, and activities between Big Tobacco and Big Food. Yet the public health response to Big Food has been minimal.

We can think of multiple reasons for the failure to act [30]. One is the belated recognition of the importance of obesity to the burden of disease in LMICs [13]. The 2011 Political Declaration of the United Nations High-Level Meeting on Prevention and Control of Non-communicable Diseases (NCDs) recognized the urgent case for addressing the major avoidable causes of death and disability [31], but did not even mention the roles of agribusiness and processed foods in obesity. Despite evidence to the contrary, some development

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Abbreviations: LMIC, low- and middle-income country; SSB, sugar-sweetened beverage

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The Essay section contains opinion pieces on topics of broad interest to a general medical audience.

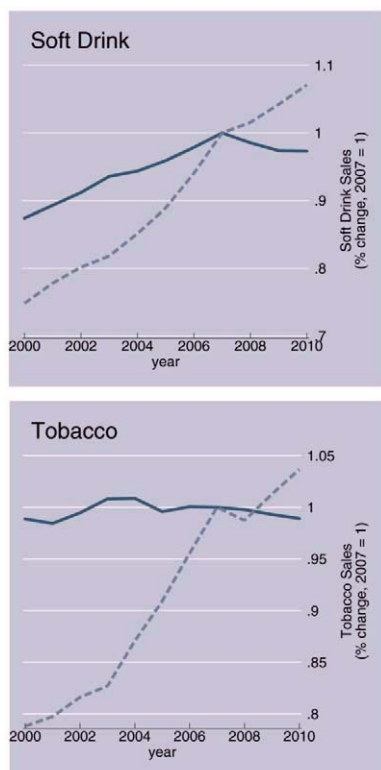


Figure 1. Growth of Big Food and Big Tobacco sales in developing countries: An example. Shaded blue line is developed countries, dashed grey line is developing countries. Source: Passport Global Market Information Database: EuroMonitor International, 2011 [12]. doi:10.1371/journal.pmed.1001242.g001

agencies continue to view obesity as a “disease of affluence” and a sign of progress in combating undernutrition [32].

A more uncomfortable reason is that action requires tackling vested interests, especially the powerful Big Food companies with strong ties to and influence over national governments. This is difficult terrain for many public health scientists. It took five decades after the initial studies linking tobacco and cancer for effective public health policies to be put in place, with enormous cost to human health. Must we wait five decades to respond to the similar effects of Big Food?

If we are going to get serious about such nutritional issues, we must make choices about how to engage with Big Food. Whether, and under what circumstances, we should view food companies as “partners” or as part of the solution to rising rates of obesity and associated chronic diseases is a matter of much current debate, as indicated by the diverse views of officials of PepsiCo and nutrition scientists [24,27,28,33,34].

Engaging with Big Food—Three Views

We see three possible ways to view this debate. The first favors voluntary self-regulation, and requires no further engagement by the public health community. Those who share this view argue that market forces will self-correct the negative externalities resulting from higher intake of risky commodities. Informed individuals, they say, will choose whether to eat unhealthy foods and need not be subjected to public health paternalism. On this basis, UN secretary-general Ban Ki Moon urged industry to be more responsible: “I especially call on corporations that profit from selling processed foods to children to act with the utmost integrity. I refer not only to food manufacturers, but also the media, marketing and advertising companies that play central roles in these enterprises” [35]. Similarly, the UK Health Minister recently said: “the food and drinks industry should be seen, not just as part of the problem, but part of the solution...An emphasis on prevention, physical activity and personal and corporate responsibility could, alongside unified Government action, make a big difference” [36].

The second view favors partnerships with industry. Public health advocates who hold this view may take jobs with industry in order to make positive changes from within, or actively seek partnerships and alliances with food companies. Food, they say, is not tobacco. Whereas tobacco is demonstrably harmful in all forms and levels of consumption, food is not. We can live without tobacco, but we all must eat. Therefore, this view holds that we must work with Big Food to make healthier products and market them more responsibly.

The third approach is critical of both. It recognizes the inherent conflicts of interest between corporations that profit from unhealthy food and public health collaborations. Because growth in profit is the primary goal of corporations, self-regulation and working from within are doomed to fail. Most proponents of this viewpoint support public regulation as the only meaningful approach, although some propose having public health expert committees set standards and monitor industry performance in improving the nutritional quality of food products and in marketing the products to children.

We support the critical view, for several reasons. First, we find no evidence for an alignment of public health interest in curbing obesity with that of the food and beverage industry. Any partnership *must* create profit for the industry, which

has a legal mandate to maximize wealth for shareholders. We also see no obvious, established, or legitimate mechanism through which public health professionals might increase Big Food’s profits.

Big Food attains profit by expanding markets to reach more people, increasing people’s sense of hunger so that they buy more food, and increasing profit margins through encouraging consumption of products with higher price/cost surpluses [28–31,37]. Industry achieves these goals through food processing and marketing, and we are aware of no evidence for health gains through partnerships in either domain. Although in theory minimal processing of foods can improve nutritional content, in practice most processing is done so to increase palatability, shelf-life, and transportability, processes that reduce nutritional quality. Processed foods are not necessary for survival, and few individuals are sufficiently well-informed or even capable of overcoming marketing and cost hurdles [38]. Big Food companies have the resources to recruit leading nutritional scientists and experts to guide product development and reformulation, leaving the role of public health advisors uncertain.

To promote health, industry would need to make and market healthier foods so as to shift consumption away from highly processed, unhealthy foods. Yet, such healthier foods are inherently less profitable. The only ways the industry could preserve profit is either to undermine public health attempts to tax and regulate or to get people to eat more healthy food while continuing to eat profitable unhealthy foods [33,39]. Neither is desirable from a nutritional standpoint. Whereas industry support for research might be seen as one place to align interests, studies funded by industry are 4- to 8-fold more likely to support conclusions favorable to the industry [40].

Our second reason to support the critical view has to do with the “precautionary principle” [41]. Because it is unclear whether inherent conflicts of interest can be reconciled, we favor proceeding on the basis of evidence. As George Orwell put it, “saints should always be judged guilty until they are proved innocent.” We believe the onus of proof is on the food industry. If food companies can rigorously and independently establish self-regulation or private–public partnerships as improving both health and profit, these methods should be extended and replicated. But to date self-regulation has largely failed to meet stated objectives

[42,43,44,45,46,47], and instead has resulted in significant pressure for public regulation. Kraft's decision to ban trans fats, for example, occurred under pressure of lawsuits [48]. If industry believed that self-regulation would increase profit, it would already be regulating itself.

We believe the critical view has much to offer. It is a model of dynamic and dialectic engagement. It will increase pressures on industry to improve health performance, and it will encourage those who are sympathetic to the first or second views to effect change from within large food and beverage companies.

References

- De Schutter O (2011) Report submitted by the Special Rapporteur on the right to food. Geneva: United Nations. Available: <http://www2.ohchr.org/english/issues/food/docs/A-HRC-16-49.pdf>
- Patel R (2008) Stuffed and starved: The hidden battle for the world food system: Melville House. 448 p.
- Doak C, Adair LS, Bentley M (2005) The dual burden household and nutrition transition paradox. *Int J Obesity* 29: 129–136.
- Stein AD, Thompson AM, Waters A (2005) Childhood growth and chronic disease: evidence from countries undergoing the nutrition transition. *Matern Child Nutr* 1: 177–184. Available: http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=16881898
- Caballero B (2005) A nutrition paradox – underweight and obesity in developing countries. *N Engl J Med* 352: 1514–1516.
- Eckholm E, Record F (1976) The two faces of malnutrition. *Worldwatch*. Available: <http://www.worldwatch.org/bookstore/publication/worldwatch-paper-9-two-faces-malnutrition>
- Pollan M (2003) The (agri)cultural contradictions of obesity. *New York Times*. Available: <http://www.nytimes.com/2003/10/12/magazine/12WWLN.html>
- Brownell K, Warner KE (2009) The perils of ignoring history: Big Tobacco played dirty and millions died. How similar is Big Food? *Milbank Quarterly* 87: 259–294.
- Lyson T, Raymer AL (2000) Stalking the wily multinational: power and control in the US food system. *Agric Human Values* 17: 199–208.
- Alexander E, Yach D, Mensah GA (2011) Major multinational food and beverage companies and informal sector contributions to global food consumption: Implications for nutrition policy. *Global Health* 7: 26.
- Alfranica O, Rama R, Tunzelmann N (2003) Technological fields and concentration of innovation among food and beverage multinationals. *International Food and Agribusiness Management Review* 5.
- EuroMonitor International (2011) Passport Global Market Information Database: EuroMonitor International.
- Stuckler D, McKee M, Ebrahim S, Basu S (2012) Manufacturing Epidemics: The Role of Global Producers in Increased Consumption of Unhealthy Commodities Including Processed Foods, Alcohol, and Tobacco. *PLoS Med* 6: e 1001235. doi:10.1371/journal.pmed.1001235.
- Hawkes C (2002) Marketing activities of global soft drink and fast food companies in emerging markets: A review. Geneva: World Health Organization. Available: <http://www.who.int/hpr/NPH/docs/globalization.diet.and.ncds.pdf>
- Regmi A, Gehlhar M (2005) Processed food trade pressured by evolving global supply chains. *Amberwaves: US Department of Agriculture*. Available: <http://www.ers.usda.gov/amberwaves/february05/features/processedfood.htm>
- Popkin B (2002) Part II: What is unique about the experience in lower- and middle-income less-industrialised countries compared with the very-high income countries? The shift in the stages of the nutrition transition differ from past experiences! *Public Health Nutr* 5: 205–214. doi:10.1079/PHN2001295.
- Hawkes C (2005) The role of foreign direct investment in the nutrition transition. *Public Health Nutr* 8: 357–365.
- Basu S, Stuckler D, McKee M, Galea G (2012) Nutritional drivers of worldwide diabetes: An econometric study of food markets and diabetes prevalence in 173 countries. *Public Health Nutrition*. In press.
- Maliv V, Schulze MB, Hu FB (2006) Intake of sugar-sweetened beverages and weight gain: A systematic review. *Am J Clin Nutr* 84: 274–288.
- Moreno L, Rodriguez G (2007) Dietary risk factors for development of childhood obesity. *Curr Opin Clin Nutr Metab Care* 10: 336–341.
- Hu F, Malik VS (2010) Sugar-sweetened beverages and risk of obesity and type 2 diabetes. *Physiol Behav* 100: 47–54.
- Malik V, Popkin BM, Bray GA, Despres JP, Hu F (2010) Sugar-sweetened beverages, obesity, type 2 diabetes mellitus, and cardiovascular disease risk. *Circulation* 121: 1356–1364.
- Pereira M, Kartashov AI, Ebbeling CB, Van Horn L, Slattery ML, et al (2005) Fast food habits, weight gain and insulin resistance in a 15-year prospective analysis of the CARDIA study. *Lancet* 365: 36–42.
- Yach D, Feldman ZA, Bradley DG, Khan M (2010) Can the food industry help tackle the growing burden of undernutrition? *Am J Public Health* 100: 974–980.
- Evenett S, Jenny F (2011) Trade, competition, and the pricing of commodities. Washington D.C.: Center for Economic Policy Research. Available: http://www.voxeu.org/reports/CEPR-CUTS_report.pdf
- Chopra M, Darnton-Hill I (2004) Tobacco and obesity epidemics: Not so different after all? *BMJ* 328: 1558–1560.
- Ludwig D, Nestle M (2008) Can the food industry play a constructive role in the obesity epidemic? *JAMA* 300: 1808–1811.
- Wiist W (2011) The corporate playbook, health, and democracy: The snack food and beverage industry's tactics in context. In: Stuckler D, Siegel, K, editor. *Sick Societies: responding to the global challenge of chronic disease*. Oxford: Oxford University Press.
- Stuckler D, Basu S, McKee M (2011) UN high level meeting on non-communicable diseases: An opportunity for whom? *BMJ* 343: d5336. doi: 10.1136/bmj.d5336.
- Stuckler D (2008) Population causes and consequences of leading chronic diseases: A comparative analysis of prevailing explanations. *Milbank Quarterly* 86: 273–326.
- UN General Assembly (2011) Political declaration of the High-level Meeting of the General Assembly on the Prevention and Control of Non-communicable Diseases (NCDs). New York: UN. Available: <http://www.un.org/en/ga/ncdmeeting2011/>
- Mitchell A (2011) Letter to National Heart Forum about 'Priority actions for the NCD crisis'. In: Lincoln P, editor. London: UK DFID.
- Monteiro C, Gomes FS, Cannon G (2009) The snack attack. *Am J Public Health* 100: 975–981.
- Acharya T, Fuller AC, Mensah GA, Yach D (2011) The current and future role of the food industry in the prevention and control of chronic diseases: The case of PepsiCo. In: Stuckler D, Siegel, K, . *Sick Societies: Responding to the global challenge of chronic disease*. Oxford: Oxford University Press.
- Ki-Moon B (2011) Remarks to the General Assembly meeting on the prevention and control of non-communicable disease. Geneva: UN. Available: http://www.un.org/apps/news/infocus/speeches/statements_full.asp?statID=1299
- Lansley A (2011) 4th plenary meeting. Geneva: UN. Available: <http://www.ncdalliance.org/sites/default/files/rfiles/Monday%20Sep%2019%203pm.pdf>
- Koplan J, Brownell KD (2010) Response of the food and beverage industry to the obesity threat. *JAMA* 304: 1487–1488.
- Wansink B (2007) *Mindless eating: Why we eat more than we think*. Bantam Books.
- Wilde P (2009) Self-regulation and the response to concerns about food and beverage marketing to children in the United States. *Nutr Rev* 67: 155–166.
- Lesser L, Ebbeling CB, Goozner M, Wypij D, Ludwig DS (2008) Relationship between funding source and conclusion among nutrition-related scientific articles. *PLoS Med* 4: e5. doi:10.1371/journal.pmed.0040005.
- Raffensperger C, Tickner J (1999) *Protecting public health and the environment: implementing the precautionary principle*. Washington D.C.: Island Press.
- Lewin A, Lindstrom L, Nestle M (2006) Food industry promises to address childhood obesity: Preliminary evaluation. *J Public Health Policy* 27: 327–348.
- Lang T (2006) *The food industry, diet, physical activity and health: A review of reported commitments and practice of 25 of the world's largest*

- food companies. London: Oxford Health Alliance.
44. Sharma L, Teret SP, Brownell KD (2010) The food industry and self-regulation: Standards to promote success and to avoid public health failures. *Am J Public Health* 100: 240–246.
 45. Bonell C, McKee M, Fletcher A, Haines A, Wilkinson P (2011) The nudge smudge: misrepresentation of the “nudge” concept in England’s public health White Paper. *Lancet* 377: 2158–2159.
 46. Campbell D (2012) High street outlets ignoring guidelines on providing calorie information. *The Guardian*. London. Available: <http://www.guardian.co.uk/business/2012/mar/15/high-street-guidelines-calorie-information>
 47. Hawkes C, Harris JL (2011) An analysis of the content of food industry pledges and marketing to children. *Public Health Nutr* 14: 1403–1414.
 48. Zernike K (2004) Lawyers shift focus from Big Tobacco to Big Food. *New York Times*. New York. Available: <http://www.nytimes.com/2004/04/09/us/lawyers-shift-focus-from-big-tobacco-to-big-food.html>
 49. Conflicts of Interest Coalition (2011) Statement of Concern.