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## Comment Amitabh Chandra

This chapter forces us to think about a number of issues that are central to economics and public health, and is far more general than the specific question that is answered in the chapter. More generally, I think of the chapter

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as encouraging us to ask—why do people not always make decisions that are in their best economic interests?

To set the stage for a broader discussion, consider the key findings from the experiment: Anemia is widely prevalent (over 50 percent of adult women in the sample are anemic) and is correlated with lower physical and cognitive functioning. This is a puzzle because consumption per capita is not low, and average BMI is not extremely low. So simple explanations that emphasize the effect of poverty on material resources are unlikely to be the dominant explanations for the presence of anemia in Bihar. Second, the experiment finds that subsidizing the price of double-fortified salt, which includes iron and iodine, by 55 percent led to a 20 percent increase in take-up. One may cheer that demand curves slope down and that economics is alive, but another view is that even a fairly substantial subsidy does not dramatically increase an activity that is fundamentally good for people. Third, we learn that the informational campaigns that were tried (written promotional materials, a door-to-door campaign) did not increase take-up. And so we learn that imperfect information is not a first-order impediment to low take-up, either. To summarize, while poverty, prices, and information surely matter, they are not by themselves the principal drivers to anemia and low take-up of double-fortified salt.

Similar finding of low take-up of beneficial things are found in a variety of contexts. The Austrian physician Ignaz Semmelweis demonstrated that maternal mortality from puerperal fever (an infection of the genital tract after giving birth) could be reduced from 12.2 percent to 2.4 percent by making physicians wash their hands with chlorinated lime between autopsy and obstetrical rotations. But physicians, even physicians in Boston hospitals in 2013, have been too slow to adopt hand washing. Beta-blockers and aspirin, which showed spectacular results in clinical trials that were conducted in the era of the Apollo landing, had not diffused through American hospitals in the era of iPods. Patients who have suffered heart attacks, and are arguably among the most activated patients as a consequence of what they have confronted, demonstrate remarkably poor adherence with life-saving drugs. There are many examples from outside healthcare, too. Zvi Griliches showed us that hybrid corn was slow to be adopted. David Laibson and Brigitte Madrian have shown us that employees do not avail of the opportunity to maximize wealth by using savings opportunities that are offered to them.

These are behaviors that are hard for simple maximizing models to reconcile. The current approach in economics to explain aberrant, “nonmaximizing” behavior by agents who face the right incentives, is to appeal to behavioral economics and invoke the attendant machinery of discount rates and prospect theory. There is a complementary set of explanations that may be equally powerful. Heterogeneity in the net benefits of adoption, be it adoption of beta-blockers, 401(k)s, or double-fortified salt, may prove to be a worthwhile alternative to consider. I will distinguish between three types of heterogeneity:

Type 1. Heterogeneity in time and hassle costs

Type 2. Heterogeneity in side effects

Type 3. Heterogeneity in benefits, conditional on side effects

Time and hassle costs are incurred by many patients and there is likely to be heterogeneity in these costs across individuals in a way that goes well beyond differences in income and education. Hassle costs, by distracting and exhausting agents, may dissuade people with complex lives from adopting a particular treatment or behavior. Stress and complexity increase the hassle costs and will likely result in an overemphasis on symptom relief.

Heterogeneity in side effects does not make sense for interventions such as 401(k) participation or hand washing, but may be key to the adoption of medical treatments. Individuals know their preferences better than their providers do and it is possible that some of the variation in adherence with their doctor's orders reflects private knowledge of side effects. For iron supplementation for iron deficiency anemia, the CDC notes that the side effects include gastrointestinal side effects such as nausea, vomiting, constipation, diarrhea, dark colored stools, and/or abdominal distress (CDC 1998). That such side effects are likely is not disputed. But their frequency is not known. Even if it is relative to the benefits of supplementation, the presence of hassle costs may focus the mind on short-term reward (avoid side effects) over long-term gain.

This simple framework suggests a number of lessons for public policy. Heterogeneity in hassle costs, without heterogeneity in side effects or heterogeneity in benefits, justifies the case for mandates. Mandates were used to fluoridate water, fight smallpox, and introduce iodized salt. A productive research program would document the absence (or relative absence of) of type 2 and 3 heterogeneity in order for mandates to be used for public health concerns. The presence of type 2 or 3 heterogeneity may be addressed by using user fees (such as copayments). Such fees should discourage use by patients with side effects or low benefits. But in the presence of type 1 heterogeneity (hassle costs), such user fees will almost definitely fire, by reducing demand from agents whose demand will be tempered by the user fees.

In my discussion, I have not focused on the explanations that rely on information (or lack thereof) for behavior. The empirical findings in this chapter, which find that informational campaigns did not increase take-up, support this view. It is also my view that lack of information often may come from the presence of hassle or search costs (type 1 heterogeneity), or that there is substantial type 2 and type 3 heterogeneity (which would predict that people adopt things because they understand the benefits, not because they don't know what's good for them).

The present analysis is not designed to shed light on the particular form of heterogeneity that is responsible for the broad adoption of double-fortified salt. But in principle, uncovering the nature of this latent heterogeneity is

something that can be accomplished with a rich set of baseline data. I look forward to seeing the next set of results from this exciting research program.

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