

Models of Risk Management in Healthcare Financing

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In recent decades the healthcare industry has seen rapid and widespread innovation in the set of products and services available for the diagnosis, treatment and delivery of care to patients. At the same time, however, an increased focus on value, coupled with increased pressures on healthcare spending, has forced policy makers to investigate avenues for innovation in the ways such product innovations are financed. Such financing-related innovations represent a necessary link between innovators and patients, and are meant to deal with the inherent uncertainty around the ultimate effectiveness and demand associated with any new product innovation.

Financing innovations come in different forms. Risk-sharing agreements (RSAs) in the pharmaceutical sector, for example, are used to manage risk between payers and manufacturers resulting from uncertainty in drug cost-effectiveness. In addition to mitigating risk, they allow for faster patient access, while rewarding the innovation efforts of manufacturers. Risk can also be negotiated and managed in other settings, such as the financing of healthcare services involving different stakeholders in the value chain. Diagnostic related groups (DRGs), for example, upended the reimbursement approach taken by national healthcare systems with respect to in-patient hospital costs.

This note provides examples of three different classes of financing-related innovations that can be employed by policy makers to manage product introduction risks in healthcare. These are referred to as the (a) smoothing, (b) leasing, and (c) procurement models. In the remainder of this paper we examine each of these models in turn, discussing their particular features, and providing examples of their use in managing risk and uncertainty in healthcare innovation.

Smoothing Model: DRGs

DRGs are arguably one of the most important innovations in healthcare delivery over the last few decades.¹ In the early 1980s, prior to the adoption of DRGs, hospitals operated in a ‘risk-free’ environment, financially speaking, where they were reimbursed for whatever costs were billed for the treatment of Medicare patients under the fee-for-service model. Hospital administrators and providers held significant power over the federal government in the transaction. The payer assumed most of the risk associated with uncertain demand and subsequent financial implications. The DRG model, based on

¹ For more information on DRGs, see: J. Kimberly et al, *The Globalization of Managerial Innovation in Health Care* (New York: Cambridge University Press, 2009); and R. Busse et al, *Diagnosis-Related Groups in Europe* (European Observatory on Health Systems and Policies) (England: Open University Press, 2011).

a prospective pre-determined payment system, was established to impose constraints on hospitals in an effort to better manage costs and to influence the provider behavior. Hospitals across much of the developed world are paid a flat rate per case (or DRG) of inpatient care, thus rewarding efficient hospitals for efficiency while incentivizing inefficient hospitals to become efficient. As a result of smoothing inpatient costs, the risk is partly transferred to hospitals, which must ensure that DRG reimbursement covers inpatient treatment costs. Hospitals receive a fixed fee per DRG, irrespective of what they actually spend on the patient, driving them to manage patient care in way such that they mitigate their own risk exposure. It has been argued that DRG-based billing may result in premature patient discharges to free up capacity for subsequent admissions. However, controls such as penalties for readmission within 30 days for complications or additional care in relation to previous admissions, may be used to limit the extent of such practices.

Leasing Model: “Power by the Hour”

A second example of financing innovation relates to what we call the “Leasing Model”; the “power by the hour” approach adopted by General Electric Aviation exemplifies this model. The idea, pioneered 25 years ago by Rolls-Royce, involves a performance-based contract in which customers pay only when the particular machine or device is in use.² The cost to manufacture can be significant (in the case of aircraft engines, for example, each unit can cost in the order of tens of millions of dollars). As a consequence, the market potential associated with the sale of engines themselves is limited (in part because the customer base consists of only two prominent customers, Boeing and Airbus). Rather, the revenue for GE associated with engines derives primarily from maintenance contracts and the sale of spare parts.

Given the revenue profile, GE began what was essentially a leasing model in which, instead of selling each product for a lump sum, customers were charged on a per-operating-hour basis. This allowed both for a rearrangement of the risks borne by the vendor and customer, as well as an alignment of incentives between these two parties: from the vendor’s (GE) perspective there was greater revenue potential, together with

² For more information on the ‘Power by the Hour’ concept, see: S. Kim et al, Performance Contracting in After-Sales Service Supply Chains (Management Science, 2007); and H. Chesbrough, Open Services Innovation: Rethinking Your Business to Grow and Compete in a New Era (California: Jossey-bass (A Wiley Imprint), 2011).

an incentive to maximize engine operating time through better service and improved R&D focus on reliability; from the buyer's perspective, larger fixed costs were transformed into variable costs. Alignment of incentives came from both GE and its customers profiting when the engines were operational. The risk lies in the reliability and availability (downtime versus uptime) of the engines. If the 'power by the hour' model were applied to healthcare delivery, for example, it would imply that physicians are paid when patients remain healthy and not when they are sick.

The question then is whether such a model could be profitably implemented in a different healthcare context. Diagnostic imaging technologies involving high fixed costs, for example, could benefit from similar agreements between manufacturers and providers (e.g. hospitals). While the nature of the customer base is certainly different in the imaging case (a more concentrated set of customers in the case of Boeing and Airbus versus a more fragmented set of providers in the case of high-cost medical imaging technologies), there may be potential for performance-based contracts to mitigate some of the risk- and uncertainty-based considerations associated with high-cost healthcare innovations.

Procurement Model: Preparing for a Pandemic

A final example of healthcare financing innovation involves risk management across procurement contracts. As an example, in 2004 the U.S. Department of Health and Human Services (HHS) granted Sanofi Pasteur, a leading producer of the flu vaccine, funds to manage flocks of egg-laying hens to ensure ongoing capacity to manufacture flu vaccines on a year-round basis in the event of a pandemic. As part of a separate initiative in 2007, the HHS awarded Sanofi \$77.4 million to speed up the process of developing cell culture influenza vaccine (H5N1), again to plan for a potential influenza emergency. This 5-year contract included funds for designing, retrofitting, and maintaining the company's existing production facilities. Sanofi was asked to keep the facilities open for 2 years, with the option to maintain "warm base operations" for an additional 3 years.

In both cases, the US government was risk-averse due to the potential threat associated with the pandemic, and attempted to mitigate risk through multiple procurement contracts.³ The scale of the threat was particularly large: according to the World Health

³ For more information, see: Sanofi Pasteur awarded contract to retrofit influenza vaccine facility (Sanofi Pasteur, 2007); Flu vaccine makers get HHS funds to prepare for pandemic (Center for Infectious Disease Research and Policy, 2007); and

Organization (WHO), the pandemic could result in 1 to 2.3 million hospitalizations and 280,000 to 650,000 deaths in the developed world. The initial contract was a fixed cost to maintain flocks of chickens for continued (not just seasonal) egg production, while the subsequent agreement would allow for marginal pricing if the capacity to produce vaccines was utilized. Moreover, both the US government and Sanofi took on risk in this setting: HHS by investing in flu vaccine manufacturing capacity as an insurance contract against the possibility of a large-scale pandemic; and Sanofi, given its role as the only producer of the FDA licensed pre-pandemic H5N1 vaccine, by investing \$25 million of its own funds in the 2007 project.

In conclusion, while attitudes toward risk are important, a key aspect to bear in mind in designing innovative business models in the healthcare sector is the set of tools and techniques that can be used to manage such risk. In many cases, these tools can create value by aligning incentives in such a way as to mitigate financing concerns, thereby promoting the adoption of innovations.

Sanofi Pasteur awarded \$97 million HHS contract to accelerate cell-culture pandemic influenza vaccine development (Sanofi Pasteur, April 1).