Costs and New Technologies in Healthcare Delivery

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INTRODUCTION

Reducing medical costs is one of the major policy questions. A well understanding of this issue requires specific insight into some domains. The three main points which must be clarified relate to: (1) the nature of the costs (production costs and transaction costs), (2) the nature of *new healthcare technologies* (the biotechnology and biomedical engineering vs. the e-healthcare system, the face-to-face communications between the primary care physicians or other providers and the patients vs. the non face-to-face communications), and (3) the nature of *information* (which can be asymmetric, incomplete, or imperfect). This article studies what differences there are when considerations about informational issues and types of medicine are taken into account in the modern health economy characterized by the generation and the implementation of new healthcare technologies. To do this, this article first clarifies and presents some concepts in the framework of the health economy. Then, from these issues, it discusses the cost containment in the current case of the development and adoption of new technologies, and contrasts the opinions and perspectives.

BACKGROUND: COSTS AND INFORMATION ISSUES

An approach for a better understanding of healthcare delivery requires particular insights into the nature and effect of new technologies, information, and costs.

Technologies, Information, and Costs

A first interest concerns the consequences of new medical technological innovations on medical costs. *(i)* On the one hand, biotechnologies (defined by technological applications using biological systems or living organisms to make or change products or processes), biomedical engineering (i.e., the application of engineering techniques and principles), and nanotechnologies (a variety of techniques to produce materials and devices on the scale of the nanometer, their societal implications being a controversial subject) are expensive. Nowadays, this healthcare industry represents one of the international largest and fastest-growing industries. Yet, accurate data on the genuine costs of such new healthcare technologies are not available. *(ii)* On the other hand, technological improvements based on e-healthcare technologies (over the Internet, e-mail, text messages, video conferences, and other ways) seem to reduce costs through efficient use of technology. For financial reasons, e-healthcare systems are becoming strategic necessities. Indeed, various networking technology and information have introduced major transformation in healthcare delivery in particular through telemedicine, electronic patient records, technology-mediated solutions, network design issues for healthcare operations, among others. Moreover, by introducing non face-to-face communications between the practitioners and the patients, the latter is empowered through better access to medical information and care.

The second point which deserves some details is relative to the term information. In the economic sense, it is usual to refer to three major concepts: asymmetric information, incomplete information, and imperfect information. *(i) Informational asymmetries* occur when one party to a transaction knows more information than the other parties either about his/her own position or about the environment. Such asymmetries in information lead to distortions when parties define strategies or assess a situation. Asymmetrical information can induce opportunistic behaviors and can be responsible for problems of contractual performance: the adverse selection problem and the moral hazard problem. "*Adverse selection*" refers to situations in which, *before* the transaction occurs, the ignorant party lacks information about some aspect concerning the characteristics of the other party or the object of the transaction (Akerlof,

1970). "*Moral hazard*" refers to situations where, *after* the transaction occurs, the informed party engages in activities that are undesirable from the other party (Arrow, 1963; Holmström, 1979). *(ii) Informational incompleteness* means that there is a lack of complete information between two parties, the actions or characteristics of one party being not observable by the other one. In other words, one party has private information about something relevant to his/her decision making. *(iii) Imperfect information* refers to situations where a party does not know the previous actions of the other party (Rothschild & Stiglitz, 1976). For example, a physician ignores the patients' behaviors with regard to their own health.

A third clarification concerns the tendency to adopt organizational modes that best reduce healthcare costs, specifically production costs and transaction costs. If the former are generally well-defined, the latter deserve more specific attention. Economists define transaction costs as the costs of running the system: costs of coordinating and of motivating (Milgrom & Roberts, 1992; Williamson, 1979). Coordination costs include, among others, search costs, communication costs, decision costs, and enforcement costs while motivation costs refer to informational situations and encompass costs associated with imperfect, incomplete, and asymmetric information (Milgrom & Roberts, 1992). Such transaction costs can be reduced in the three types of medicines: the preventive medicine (act of protecting, promoting, maintaining health, and preventing disease), the diagnostic medicine (act or process of identifying the cause and nature of the illness through the evaluation of patient history and the examination of laboratory data), and the curative medicine (which covers the actions and treatments correcting a harmful or troublesome situation).

Rising Costs and Medical Practices Faced to Moral Hazard, Supplier-Induced Demand, and Adverse Selection

Besides technological change and aging, most researchers and practitioners focus on three main causes of rising spending on medical care without proportionate increases in the quality of care: *moral hazard* and *supplier-induced demand*.

1.   A first informational problem and source of inefficiency is due to "moral hazard," specifically here to an excessive demand by insured patients. Indeed, in this specific case, moral hazard reflects the state of mind and the change in behavior that can occur when a person becomes insured. Through their insurance, patients pay less out of their own pocket when they consume medical services, and consequently they can demand more of them. In other words, if insurance covers the full cost of care, policyholders may overuse medical services, leading to raise costs. Researchers distinguish *ex ante moral hazard,* which is relative to the absence or lack of preventive action by insured *and ex post moral hazard,* which refers to the insured behavior when the illness appears, such as medical nomadism—people seeking advice from various physicians for the same disease—or repetitive tests. Therefore, to prevent moral hazard, insurers—following the RAND Health Insurance Experiment—limit the incentives of patients to demand services. To do this, thinking that *price matters*, insurance companies share healthcare expenses by imposing a copayment, namely a fixed portion of the actual medical cost that an insured person must pay (Dranove, 2000, pp. 28–31). They use copayments in order to: (1) prevent unnecessary medical care, (2) rein in medical costs, and (3) lead to savings for insurance companies. However, this health-insurance policy, according to which insurers bear only an amount of the actual cost, can produce perverse effects. For example, copayments can cut appropriate and necessary office visits and medications. More broadly**,** they can reduce preventive and curative care (Keeler, Brook, Goldberg, Kamberg, & Newhouse, 1985; Lurie, Kamberg, Brook, Keeler, & Newhouse, 1989). Furthermore, insured people who make copayments can be healthier than those who do not, and therefore purchase fewer medical services; in that case, *price might not matter*.

2.   A second informational problem and source of inefficiency is due to the phenomenon of "supplier-induced demand" (Evans, 1974; Pauly, 1994; Roemer, 1961). The demand inducement problem occurs when primary physicians use their superior knowledge and their influence to generate demand for personal gain, without health benefits. Due to this information gap between such physicians and patients, the former (who are both advisors to the patients and providers of services) can make

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