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Changing the Way We Think About Drug Prices: Insights from Economics

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Executive summary

Pharmaceutical treatment has been growing in significance in Canadian health care over the years, with prescription drug spending rising as a percentage of total health expenditure from 6.3% in 1975 to 13.4% in 2014, while the hospital expenditure share fell from 44.7% to 29.6% and the physician expenditure share remained fairly constant at roughly 15%. The rate of increase in publicly funded pharmaceutical expenditure, which was greater than the rates of increase in spending on hospitals and physicians in the early 2000s, dropped to rough equality with the rates of growth in other sectors in 2009 and to virtually zero from 2012-2014[1].

The benefits of pharmaceuticals have also been growing: a 2013 Conference Board of Canada report, looking at spending on six classes of drugs, concluded that the province of Ontario gets back roughly twice as much in benefits as it spends on pharmaceutical treatment[2]. Nevertheless, discussions of the role of pharmaceuticals in health care tend to focus solely on costs and in particular on the prices of individual pills. One common comparison is between the price charged for individual pills and the cost of the physical manufacture of a pill, with the interpretation always being that the research-based pharmaceutical companies are making unjustifiable profits on essential medications.

The public debate is likely to become more contentious as research continues to shift from traditional chemical drugs to biologics and as personalized medicine becomes more important. Recent developments in cancer immunotherapy are particularly relevant here since training the body's immune system to attack certain types of cancer involves both of these new fields.

Eventually we should be able to develop personalized medicine markers so that we will be able to tell which drugs will work on which patients, but until then we are facing considerable uncertainty about the likely effectiveness of a new drug once it moves from the clinical trial setting to the world of real medical practice. This sort of uncertainty has prompted the design of various types of Risk Sharing pricing schemes: we propose that these schemes should be looked at through the lens of the economic theory of insurance, and suggest that an insurance market could be developed to make Risk Sharing Schemes more effective.

This paper suggests that there has been a fundamental failure in the way the pricing of medication has been explained to the public and to politicians. We suggest that the most fruitful way to think about pills is not as individual inputs into the production (and cost) of medical care but as the equivalent of kilowatt hours of electricity: units of measurement which represent the flow of services generated by a production sector: in the case of electricity, when we pay for kilowatt hours of power we are paying for the services produced by the capital assets embodied in generating plants, and in the case of health care, when we pay for pills we are paying for the services produced by the intellectual capital embodied in the pharmaceutical R&D enterprise. From that perspective, expecting the price of a pill to be closely tied to the price of its physical manufacture is akin to expecting the price of a Kilowatt hour of electricity to be closely tied to the cost of manufacturing the wire over which it is delivered. Pharmaceutical R&D is a capital asset that incurs costs and yields benefits over time. The analysis of this asset is complicated by the fact that the time pattern

[1] Canadian Institute for Health Information (2015): *Prescribed Drug Spending in Canada, 2013: A Focus on Public Drug Programs*

[2] Conference Board of Canada (2013): *Reducing the Health Care and Societal Costs of Disease: The Role of Pharmaceuticals*

of the costs is in general quite different from the time pattern of the benefits, but the net present value of the flows of costs and benefits can be used to value the original asset.

Seen as an asset, we can value pharmaceutical R&D from both the perspective of the firm and from the benefit of the payer. In the latter case the stream of benefits incorporates both the stream of health benefits produced by a new drug, as valued by the agency involved, and the stream of cost savings to the health care system overall. When we look at the original research enterprise as a capital asset, we can also see more clearly how to allow for the benefits to the health care system that will follow from a prescription drug going off patent. We argue that, since the generic copy would not exist had the original drug not been developed, the cost savings and health benefits of the post-patent period should be credited in part to the original research-based pharmaceutical company.

There has also been a failure to explain the basis on which drug prices are set in various countries. While drug companies are often accused of putting a dollar value on human life, in countries whose regulatory agencies use cost effectiveness analysis as part of the marketing approval process, it is in fact the regulatory agencies that set acceptable threshold values on a year of healthy life. While the academic literature tends to treat these threshold values as known, in practice there is considerable uncertainty about some of them. This has led to calls, most notably in the UK, for a more transparent approach to setting out the regulatory agencies willingness to pay for a year of healthy life.

Whether a drug is approved for sale in a particular market typically depends in part on its Cost Effectiveness, measured by an Incremental Cost Effectiveness Ratio (ICER) which is, in essence, dollars per unit of health generated by the pharmacological treatment. The public debate, on the other hand, is frequently framed in terms of dollar per pill. On a 'dollars per pill' basis, a wonder drug which could pack its cure into a single pill would come out as worse than a treatment which delivered an equal improvement in health at identical total cost but which required the patient to take several pills per day every day for a decade. Since it seems unlikely that the language of ICERs can be made accessible to public and political debate, it seems desirable to try and find a language that conveys the same type of information in a manner which is accessible to a wide audience.

We suggest that increased transparency in the assumptions underlying pricing decisions on both the firm and the regulatory sides of the market would at least improve the quality of public discourse about the drug price issue. After a discussion of some of the issues involved, we propose starting from a framework set out by Patricia Danzon and colleagues[3] and building in explicit assumptions about uncertainty and the time pattern of revenues, including assumptions about the effect on prices of the originator drug going off patent.

We are not suggesting that looking at drugs as an asset will end all debate about the price of drugs. To take one example, there is, and will continue to be, considerable debate about what the true cost of pharmaceutical R&D is. Nevertheless, we suggest that taking an asset-based approach and incorporating ideas from the relevant economic literature will at least help clarify the debate and improve the light to heat ratio.

[3]Patricia Danzon, Adrian Towse, Jorge Mestre-Ferrandiz (2013): "Value-Based Differential Pricing: Efficient Prices for Drugs in a Global Context" *Health Economics* 24(3), 294-301, March.