Correspondence

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Five years later: re-examining the financial burden of boosting with Norvir

The use of boosted ritonavir (Norvir, Abbott Park, Illinois, USA) with other protease inhibitors decreases pill burden and increases the efficacy of antiretroviral therapy [1]. In December 2003, Abbott Laboratories increased the price of its protease inhibitor Norvir five-fold, from $1.71 per 100 mg capsule to $8.57 [2,3]. The manufacturer justified the increase by stating that the new price 'better reflects Norvir's medical value', although a 2007 article in the *Wall Street Journal* concluded that there were other motives underlying the price increase [4]. On the basis of analyses of internal presentations and emails from the manufacturer, the *Wall Street Journal* reported that the decision to increase the price of Norvir was made as part of a strategic effort to protect the sales of Kaletra (Abbott's protease inhibitor combination lopinavir/ritonavir), particularly in the setting of the recent financial success of the protease inhibitor, Reyataz (atazanavir; GlaxoSmithKline, Research Triangle Park, North Carolina, USA), which was introduced in 2003.

Lee *et al.* [5] reviewed the cost of Norvir-boosted protease inhibitors noting a substantial increase in acquisition cost for all boosted regimens immediately after the Norvir cost increase, with the exception of Kaletra. Increases in the acquisition cost of Norvir-boosted protease inhibitor regimens ranged from an increase of 24% (atazanavir) to 100% (indinavir). The price increase resulted in a $103 million (23%) annual price increase of boosted protease inhibitors. To characterize the long-term impact of the 2003 Norvir price increase, we examined Norvir sales and revenues over time.

IMS National Sales Perspective [6] (January 2003 to April 2007) data were used to determine the number of Norvir units sold and the resulting sales dollars from both retail and nonretail channels. These estimates are considered the best analyses of pharmaceutical sales, and the estimates are based on data collected from over 500 distribution centers.

Total dollar value from Norvir sales increased from 69 million in 2003 to 266 million in 2004, a 309% increase (Fig. 1a). Sales have continued to increase from 2003 to 2007 (Fig. 1b). The number of 100-mg pills sold in 2006 increased by 24% compared with that in 2003.

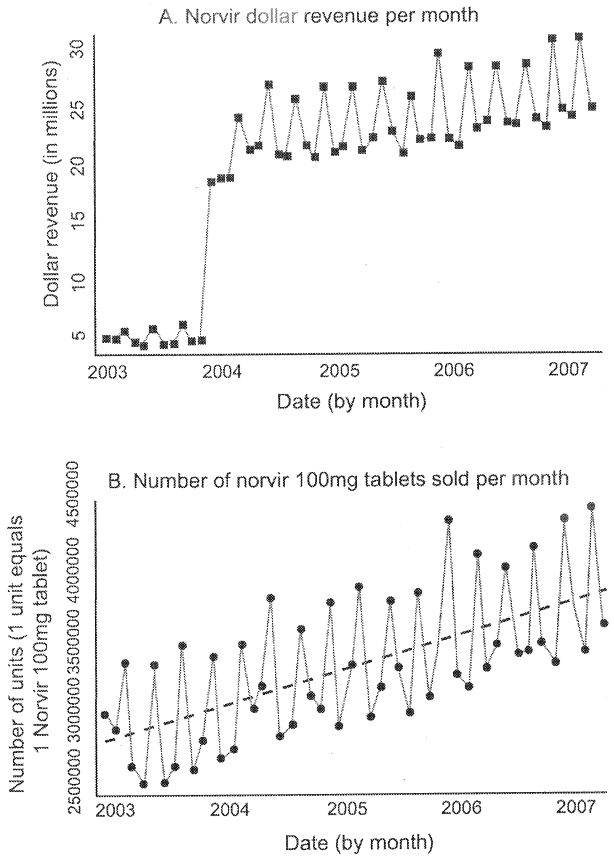

Fig. 1. Total dollar value from Norvir sales. (a) Norvir dollar revenue per month. (b) Number of Norvir 100-mg tablets sold per month.

These data demonstrate the substantial gain in revenues and sales since the Norvir price increase. Our estimated $237 million dollar increase in Norvir revenues from 2003 to 2004 strongly suggests that the cost in the USA of protease inhibitor regimens was greater than that estimated in the study by Lee *et al.* [5]. This variation is likely accounted for by the difference in methods used for estimating costs. Lee *et al.* [5] estimated the cost of the Norvir acquisition by using the average wholesale price and marketshare data for each protease inhibitor regimen and multiplied this by the number of patients estimated to require protease inhibitor-containing regimen. Our method solely used IMS National Sales Perspective data, which are based upon a direct survey of manufacturers, and are likely to be a more accurate estimate of Norvir price and unit sales.

There are some limitations to our estimates. The estimate of sales is based on 85% coverage of retail and nonretail channels. Additionally, our estimate of revenues does not take into account any manufacturer rebates given by the manufacturer, and thus this estimate is likely to be higher than the actual revenues.

Despite the limitations in our study, the data demonstrate that, from 2003 to 2007, Abbott's revenues from Norvir continued to grow. One likely reason for the continued growth is that boosting with Norvir is indispensable to most protease inhibitor treatment regimens. The ramifications of this increased cost burden should not be ignored. In 2003, the price increase was met with protest by AIDS activists and clinicians and numerous antitrust legal battles [7,8]. The manufacturer responded by exempting Medicaid, Medicare, and AIDS drug-assistance programs from the price increase, although those with private insurance still suffer from increased co-pays. The continued backlash has not reversed the price increase, although it has resulted in a continued reduced cost for the publicly funded programs.

It is important to consider the broader implications and the freedom with which pharmaceutical companies set prices. Stricter enforcement and legal restrictions over price increases should be considered, particularly in the treatment of expensive disease states requiring life-long therapy. In light of the financial success associated with the Norvir example, it is inevitable that other pharmaceutical companies will follow similar price increases.

Carina Marquez[a], B. Joseph Guglielmo[b] and Jeffrey D. Klausner[a,c], *[a]Department of Medicine, University of California, San Francisco, [b]Department of Clinical Pharmacy, University of California, San Francisco, and [c]STD Prevention and Control Services, San Francisco Department of Public Health, San Francisco, California, USA.*

Correspondence to Carina Marquez, Department of Medicine, University of California, San Francisco 505 Parnassus Avenue, Room M-987, San Francisco, CA 94143-0119, USA.
Tel: +1 415 476 1528;
e-mail: Carina.Marquez@ucsf.edu

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