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The Cost of Drug Development

TO THE EDITOR: In his Perspective article in this issue of the *Journal*, Avorn¹ comments on the methods and policy implications of our most recent study of the costs of new drug research and development (R&D).² Avorn makes the valid and important point that not all costs associated with the discovery and development of new drugs are borne by the private sector. Our study was designed to capture only the costs incurred by industry. The full social cost would be the sum of the private costs and government and nonprofit funding for research that contributes to the discovery and development of new drugs. The latter element of social cost would be very difficult to quantify adequately. Our sample selection criteria do not exclude cases in which companies use information obtained from research funded by nonprofits or government to guide their own activities. By and large, R&D efforts in the private and public sectors are complements, not substitutes. The Tufts Center for the Study of Drug Development recently issued a white paper detailing the relative R&D contributions of the private and public sectors for the same set of drugs mentioned in Avorn's article.³ These scientific and development histories demonstrate the rich interconnectivity of all sectors in the drug-discovery and drug-development ecosystem.

We would also like to address a few additional discrete points made by Avorn. First, our methods are already fully known. We have provided a methods background⁴ and noted that the methods are the same as those used in our previous studies. A full exposition of methods can be found in our study published in 2003.⁵

Second, our definition of "self-originated" is perhaps broader than what is suggested. It includes compounds that originated in an acquired company.

Third, drug failures are key contributors to development costs. Our estimate of the clinical-approval success rate of 11.8% (as compared with 21.5% in our previous study) was based on pub-

licly available information (commercial pipeline databases) for a broad set of companies regarding investigational compounds that met survey-inclusion criteria (nearly 1500 molecules). It is consistent with results from other studies.

Finally, pharmaceutical companies are overwhelmingly equity-financed. If the offering of debt (corporate bonds) at low rates were a superior form of financing for them, then company capital structures would reflect that. Investors would not fund the R&D activities of drug companies at the bond rate levels indicated in Avorn's article. The discount rate that we use represents the funding requirements that were actually experienced, on average, by drug developers during the period that is analyzed.

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