Global Biomedical R&D Expenditures

TO THE EDITOR: In their Perspective article, Chakma et al. (Jan. 2 issue) report estimates for global trends in expenditures on health research and development (R&D). Their analysis is questionable. First, expenditure data should be deflated in the national currency and then compared with the use of an appropriate exchange rate for one base year. The authors’ approach overestimates growth in countries with relative currency appreciation. Second, the standard approach is to deflate expenditure data with the use of the implicit gross domestic product (GDP) price index, not the National Institutes of Health R&D price index, which flatters countries with high inflation. Third, it is better to compare R&D expenditures with the use of GDP purchasing power parities (PPPs) than with current exchange rates, which underestimate the contribution of countries in which exchange rates overstate the cost of domestic activities and thus of R&D.

When we recalculate the data using 2012 PPP exchange rates and 2012 GDP prices, China (up $8.7 billion between 2007 and 2012) shows the largest increase in R&D expenditures, instead of Japan (up $2.8 billion). India (up $1.6 billion) and South Korea (up $4.3 billion) show larger increases than originally estimated; Australia’s increase is smaller (up $0.4 billion). The decline in the United States is not so marked (down $4.0 billion).

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The Authors Reply: We disagree with the unreferenced assertion that the approaches suggested by Young et al. are “standard” or “better.” Most important, their suggestion to use the implicit GDP price index is problematic because it reflects economy-wide inflation, not biomedical R&D inflation, which diverges significantly from GDP.1-2 In particular, Young et al. are incorrect to conclude that there has been a “not so marked” U.S. decline on the basis of economy-wide inflation, when U.S. biomedical R&D inflation is known.3,4 Similarly, their suggestion to use GDP PPP is flawed, because costs of domestic biomedical R&D activities and corresponding PPP are unknown. Decade-long analyses of R&D-specific prices show that “at the industry level, use of GDP PPP as a proxy for R&D PPP is inappropriate.”5 Finally, we do agree that currency appreciation may overstate domestic growth, but on this point, our approach and their approach do not produce meaningfully dissimilar results. Adjusting historical nominal R&D expenditures at an exchange rate from a single time point shows similar annual growth rates, except for those in Japan and India. Our analysis supporting the relative and absolute decline of U.S. spending remains valid.

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Since publication of their article, the authors report no further potential conflict of interest.

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Emphysematous Aortitis after Endovascular Graft

To the Editor: Huang and Wu (Jan. 9 issue)1 report a case of death after endovascular aortic repair of a thoracic aortic aneurysm. I was surprised that the authors did not consider the diagnosis of aortoesophageal fistula, a rare but well-known and well-described complication of this surgery.2-5 Persistent mechanical pressure from the enlarged aneurysm sac causes an erosive communication with the adjacent esophagus, leading to sac infection and hematemesis. The described findings of endoleak (persistent pressurization of the aneurysm sac), fever, air in the aneurysm adjacent to the esophagus, and death due to massive hematemesis strongly suggest a diagnosis of aortoesophageal fistula rather than poor oral hygiene, as was presumed.

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The Authors Reply: Johnston points out that our diagnosis should have been aortoesophageal fistula. We agree that aortoesophageal fistula may have been the cause of massive hematem-