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Editors' Note: Commenting on "The cost of multiple sclerosis drugs in the US and the pharmaceutical industry: Too big to fail?" John R. Tischner, a patient with multiple sclerosis (MS), shares his personal experience with MS and MS drug cost and insurance issues. In response, Hartung et al. again stress the importance of controlling MS drug costs. In the same article, Rittenhouse found an error in table 1, columns 5–7, which should have been labeled "cumulative percent change per year" rather than "annualized changes." The authors acknowledge this error but also point out that it does not alter their conclusions about the rapid rise in MS drug costs. A correction related to the labeling of table 1 appears on page 1728. The Editors thank Dr. Rittenhouse for noting the error.

—Chafic Karam, MD, and Robert C. Griggs, MD

THE COST OF MULTIPLE SCLEROSIS DRUGS IN THE US AND THE PHARMACEUTICAL INDUSTRY: TOO BIG TO FAIL?

John R. Tischner, West Jordan, UT: I am a 47-year-old man diagnosed with multiple sclerosis (MS) in my late 20s. The disease-modifying therapy (DMT) interferon (IFN)-β-1a has improved my quality of life and lessened the impact of my condition on society by allowing me to experience fewer and less serious exacerbations so that I can maintain employment and enjoy self-sufficiency. Three years ago, my insurance held a review which forced me to halt my DMT regimen for a period of 3 months.

During that time, I experienced a major episode that resulted in significant nerve damage that rendered me unable to control my bladder and bowels or drive responsibly. The timing of this incident was enough to convince me that if I wanted to hold down a job, I must find a way to resume my injections. My neurologist works to "keep the horse in the barn" through DMTs, and her point is well-taken: prevention is better than dealing with flare-ups after they occur. I need this medicine, and I am grateful for the brilliant minds, funding, and patience that created it. But projecting price trends into the future suggests it is rapidly becoming unaffordable, not just for my budget but also for my insurance. Relatives gasp to learn that this single prescription costs over $5,000. Imagine their faces when I explain that this is not even an annual charge, but a monthly price. Hartung et al. conclude: "there is an urgent need to confront the soaring costs of DMTs." Quite so. Equally disturbing is the thought that pharmaceutical companies have a vested interest in ensuring that progress toward a cure for MS is hampered because it would affect profits.

Author Response: Daniel M. Hartung, Dennis N. Bourdette, Ruth H. Whitham, Portland, OR: We thank Mr. Tischner for sharing his personal account, illustrating the human impact of high MS drug prices as summarized in our article.[1] The increased regularity of navigating medication access issues was the primary driver to investigate pricing of these therapies.

Mr. Tischner's comments show that MS therapies are effective and can have a major impact on controlling MS and improving the lives of people with the illness, but also illustrate the counterproductive practices insurance companies are taking in response to skyrocketing drug costs. Disruption of therapy can result in MS reactivation with potential for serious relapse. Other increasingly common strategies that can disrupt care include tiered formularies, which limit access to medications based on one-size-fits-all criteria, and high deductible health care plans, which often have a substantial patient cost-sharing component.

The root cause of these harmful actions is the exceedingly high cost of MS drugs. It is imperative that patients and clinicians continue to publicly express their concern about the disturbing trends in MS drug pricing. We hope our article will encourage such dialogue.

Brian E. Rittenhouse, Boston: Hartung et al.[1] indicated that annualized US MS drug price increases are high and exceed selected consumer price indices (CPIs). Whatever the merits of such analyses, some of the calculations appear to be incorrect.

"Annualized change, %" (table 1) was apparently calculated by taking the difference in 2013 and launch year prices, calculating the percentage increase, and then dividing by the number of intervening years (variable by product). This calculation ignores the compounding of any annual price increases and may be checked by assuming such an "annualized change" does occur each year. For Avonex (table 1, row 2), the claimed 34.6% annualized change would—over the course of the

17 years between launch and 2013—imply a price of approximately $1,620,721 rather than the actual price of $62,394. The correct answer for Avonex is a more modest 12% annual change (note that the error is greater the more years since a product launch).

CPI calculation errors are much smaller so that the differences between drug and CPI changes are also not maintained when corrected. Thus the difference from CPI is also more modest. While these corrected price increases (and differences from CPI increases) may still suggest further exploration, a 12% annual price increase is not as striking as the claimed 34.6%.

Author Response: Daniel M. Hartung, Dennis N. Bourdette, Sharia Ahmed, Ruth H. Whitham, Portland, OR: We thank Dr. Rittenhouse for his interest in our article. Dr. Rittenhouse is correct that in table 1 we report the annualized change as the overall percentage increase divided by the number of years since market approval for each DMT and the 2 CPIs corresponding to the same time periods. This allowed us to show changes in each DMT from introduction onto the market until December 2013 and compare these with the changes in CPI for the corresponding time period. We agree that the labels used for the 3 columns could lead some readers to misconstrue the data as being the annual growth rate.

We could have presented the data as a cumulative percentage change in price from marketing approval to the present rather than an annualized percentage increase. The ratio of the cumulative increase in DMT prices to CPI increases would remain unchanged from table 1. For example, there has been a 615% cumulative increase in the price of Avonex relative to an 84% cumulative increase in CPI for prescription drugs since introduction of the DMT until December 2013, a greater than 7-fold difference. For all the MS DMTs, price changes exceed prescription drug inflation during the same period by at least 3-fold.

We appreciate the opportunity to clarify the labeling and method used to generate the data presented in table 1. However, this clarification does not alter our analyses or conclusions about the rapid rise in MS DMT costs since 2002.

1. Hartung DM, Bourdette DN, Ahmed SM, Whitham RH. The cost of multiple sclerosis drugs in the US and the pharmaceutical industry: too big to fail? Neurology 2015;84:2185–2192.

CORRECTIONS

The cost of multiple sclerosis drugs in the US and the pharmaceutical industry: Too big to fail?

In the article "The cost of multiple sclerosis drugs in the US and the pharmaceutical industry: Too big to fail?" by D.M. Hartung et al. (*Neurology*® 2015;84:2185–2192), there is an error in table 1. Columns 5–7 should have been labeled "cumulative percent change per year" rather than "annualized changes." The authors regret the error.

Role for the microtubule-associated protein tau variant p.A152T in risk of α-synucleinopathies

In the article "Role for the microtubule-associated protein tau variant p.A152T in risk of α-synucleinopathies" by C. Labbé et al. (*Neurology*® 2015;85:1680–1686), originally published ahead of print on September 2, 2015, there is an omission in the author list. The missing author, Andreas Puschmann, MD, PhD, should appear between Michael G. Heckman and Allan McCarthy in the author list. A corrected version was posted on September 25, 2015. The authors regret the omission.

Author disclosures are available upon request (journal@neurology.org).