

## Choosing Wisely: Highest Cost Tests in Outpatient Neurology

Peter A. Grant, MD,<sup>1</sup> Francis O. Walker, MD,<sup>2</sup> and John C. Kincaid, MD<sup>3</sup>

We applaud the intent of the recent *Annals of Neurology* article, “Choosing Wisely: Highest-Cost Tests in Outpatient Neurology,”<sup>1</sup> in which the authors identified ways to manage health care costs. However, no data show that high test costs correlate with unnecessary use, as suggested by the authors. But data do show that electrodiagnostic (EDX) testing, which they identified as a global high-cost procedure, can save health care dollars when other high-cost procedures are not needed based on the EDX test results.

For example, Fox and colleagues demonstrated the cost savings of using trained physicians to perform these tests.<sup>2</sup> They studied whether an insurer rule requiring consultation by back pain specialists, in this case physiatrists, before nonurgent surgical consultation would affect surgery rates. The results showed a 12.1% decrease in total spine care costs and a 25.1% decrease in surgical costs overall, representing a net decrease of more than \$14 million in 1 year. EDX testing was 1 tool used to determine the need for surgery. Research on upper limb complaints shows that, in 42% of patients undergoing EDX testing by a properly trained physician, a diagnosis other than those indicated in the referral is identified.<sup>3</sup> An early and accurate diagnosis eliminates the need for further tests and ensures patients receive appropriate treatments quickly, thereby reducing health care spending.

In 1997, the American Association of Neuromuscular and Electrodiagnostic Medicine (AANEM) addressed appropriate use of EDX testing in its Recommended Policy for Electrodiagnostic Medicine.<sup>4</sup> Now the AANEM is developing a top 5 list of diagnoses for which electromyography is not indicated for the Choosing Wisely campaign.

As AANEM members, we agree that patients need to have thoughtful conversations with their health care providers on the necessity of testing. But cost is just 1 variable that needs to be assessed. The development of national databases and electronic medical record systems has made cost data widely accessible, whereas researching patient outcomes remains time consuming. In the best interests of patients, we recommend a balanced approach, weighing the costs of diagnostic procedures against the benefits identified in outcomes research. The key to reducing health care spending is to ensure the right test is performed at the right time by the right provider—and sometimes the right test is an EDX test.

## Potential Conflicts of Interest

P.A.G.: board member and current President, AANEM. F.O.W.: consultancy, Ipsen; royalties, Elsevier; President-Elect of the nonprofit AANEM. J.C.K.: consultancy as medical expert

on Social Security administration; royalties, Lippincott William & Wilkins; board member, AANEM.

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## Reply

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In response to unsustainable growth in health care expenditures and concerns about unnecessary care, the Choosing Wisely initiative—which is supported by >50 medical societies—was started as a proactive effort to reign in unnecessary spending. Early Choosing Wisely initiatives had a common weakness—targets were responsible for modest aggregate costs. Consequently, even if spending on these targets were completely eliminated, there would be little impact on health care growth. So, although we agree with Grant et al that valuing health care services requires consideration of both clinical utility and cost, the explicitly stated purpose of our study was to define the cost side of the value equation. Our goal was to help initiatives in neurology to implement Sutton’s law and go “where the money is” when identifying diagnostic Choosing Wisely targets.

Since our analysis, the American Academy of Neurology published the first neurology Choosing Wisely targets. The list includes 2 diagnostic tests, which were both relatively low aggregate cost items: “Do not perform EEG [electroencephalography] for headache” and “Do not image the carotid arteries for simple syncope.”<sup>1</sup> Use of EEG for headache accounts for about 10% of the expenditures of neuroimaging for headache. Thus, targeting even 20% of headache neuroimaging studies would have twice

the cost-reducing potential of targeting all headache EEGs. Similarly, although Grant et al argue for the value of electromyography (EMG) in some clinical contexts, it is less clear what proportion of the \$500 million spent annually by US neurologists on EMGs is clinically valuable and what proportion may be unnecessary testing. Thus, we applaud the American Association of Neuromuscular Electrodiagnostic Medicine's plan to develop an EMG-specific set of Choosing Wisely targets and hope that they systematically consider the cost of their targets.

Data on regional variation in health care expenditures suggest that 30% of all expenditures may be unnecessary.<sup>2</sup> Although these data define an enormous problem, they do not inform which 30% of health care expenditures is unnecessary. For neurology, identifying unnecessary care is particularly challenging, because neurologists heavily rely on costly diagnostic tests and few data exist for determining the value of tests. Even for routine tests for common neurologic diseases,<sup>3</sup> little is known about whether these tests change management or improve patient outcomes.<sup>4</sup> Thus, to understand and ultimately limit unnecessary neurologic care, more research is needed to determine the value of neurologic diagnostic testing.<sup>5</sup> We hope that our study, by identifying high aggregate cost targets, serves to establish priority areas for such future investigations.

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## Potential Conflicts of Interest

Nothing to report.

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## Age, Rate of Change in Neuropathology, and Trajectory of Cognitive Decline

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Boyle et al present a striking analysis of cognitive decline among 856 subjects in relation to their neuropathology.<sup>1</sup> They conclude

that 59% of late life cognitive decline was not explained by the standard pathologic indices of the common causes of dementia. Two related aspects of this analysis warrant comment.

First, the underlying assumption in their analysis is that the amount of pathology contributes directly to trajectory of cognitive decline. Another plausible relationship not discussed is that the rate of buildup of neuropathology (not final neuropathology burden at autopsy alone) could be related to rate of cognitive decline.

Neuropathology builds up over the preceding decades prior to onset of cognitive symptoms. Younger old individuals in their sample (<75 years) could have an earlier start and/or fewer number of years of pathology buildup before onset of dementia with a faster rate of buildup of neuropathology than the oldest old (>95 years).

Neuroimaging markers of cortical atrophy that relate to cognitive decline have been noted to have a slower rate of change with age among subjects >65 years old with Alzheimer disease in the Alzheimer's Disease Neuroimaging Initiative study.<sup>2</sup> Dementia rates have been reported to decrease with age in some studies of subjects older than 90 years<sup>3</sup> (but see Corrada et al<sup>4</sup>). Even when the neuropathology burden is well characterized, the rate of buildup in neuropathology and its contribution to rate of cognitive decline could change with age.

Second, the study notes correlations between different measures of neuropathology and age (the largest being 0.28), but age at death did not change the core model significantly. It is unclear from the results whether a linear model performs adequately in capturing the trajectory of decline across age.

Results from the Medical Research Council Cognitive Function and Ageing Study noted that the association between neocortical neuritic plaques and dementia was strong at 75 years of age and reduced at 95 years of age,<sup>5</sup> but results from the Baltimore Longitudinal Study of Aging did not note a similar relationship.<sup>6</sup> However, in the Gothenburg 95+ study, strokes appeared to show less association with dementia, mortality, and institutionalization among 97-year-olds than reported in studies of younger elderly populations. Given the interest and controversy regarding the contribution of neuropathology burden to rate of cognitive decline with age, it would be useful to know whether Boyle et al's conclusion applied equally to younger old persons and older old persons in their large, well-characterized sample.

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## Potential Conflicts of Interest

Nothing to report.

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