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How to Choose (even more) Wisely: Prioritizing waste reduction targets and identifying gaps in knowledge

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Healthcare accounts for a large, and escalating, proportion of the gross domestic product, yet the overall value of many of these expenditures is unclear. The Institute of Medicine estimates that \$750 billion could be saved annually by reducing healthcare inefficiencies including \$210 billion by eliminating unnecessary services.¹ A recent attempt to reduce these unnecessary services, the Choosing Wisely campaign, aims to stimulate a conversation between physicians and patients about the necessity of tests, procedures, and medications. The initial Choosing Wisely lists, including one from the American Academy of Neurology, represent an essential first step in reduction of waste. Moving forward, physicians can choose even more wisely. To do so requires a framework for the complex task of prioritizing waste reduction targets out of the innumerable combination of tests, procedures, and medications.

A framework for evaluating waste reduction should focus on three factors: *net benefit*, *net cost*, and the *certainty of the benefit and cost estimates*. *Net benefit* is defined as the total improvement in health outcomes for a given service.² An example of a neurologic service with large net benefit is carotid endarterectomy for symptomatic carotid stenosis, which provides substantial stroke reduction for many patients each year. However, measuring net benefit is challenging because it requires knowledge of both real-world clinical effectiveness and how widely a service is used.

Net cost refers to the total resources devoted to a given health service including direct and indirect costs (e.g. additional medical expenditures, caregiving expenses, lost productivity). While initial Choosing Wisely efforts have not prioritized cost reduction specifically, net cost should be an essential part of future waste reduction initiatives. Failure to consider net cost will lead to targeting services that have minimal effects on the financial bottom line. When choosing between two waste reduction targets of comparable net benefit, the focus should be on targets accounting for high net expenditures (hundreds of millions) as opposed

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to those accounting for a low amount (tens of millions). Furthermore, waste reduction interventions can be costly, and we need to make sure this is money well spent.

In addition, the *certainty of the benefit and cost estimates* is a crucial factor in pinpointing high yield, important targets. Credibly estimating net benefit and cost requires accurate data on clinical effectiveness, utilization, and cost, but the scientific literature is constantly evolving resulting in changing levels of evidence for these parameters. To minimize the odds of identifying low yield targets, targets with net benefit/cost estimates of high certainty are preferred. Taken together, the components of this framework will allow the identification of the services that are the biggest drivers of health care inefficiencies in the United States.

Somewhat counter-intuitively, this framework suggests that when prioritizing waste reduction targets, the net cost and benefit/cost certainty of targets may be more informative than actual net benefit. Figure 1 illustrates rough estimates of net benefit, net cost and the benefit/cost certainty (size of the circles) of a series of recent neurologic Choosing Wisely targets compared to reference examples known to be either beneficial or harmful. The Choosing Wisely targets, as they should be, are largely clustered around the zero net benefit line (grey zone). Reducing unnecessary care implies that the care delivered isn't of substantive net benefit, so there are not any targets well above the zero benefit line. Similarly, targeting demonstrably harmful care through waste reduction initiatives is redundant as there already are a number of mechanisms to constrain such care (e.g. guidelines, quality measures, insurance companies, malpractice lawsuits). Going forward, a renewed emphasis on net cost is needed as well as studies to reduce the uncertainty of current benefit/cost estimates.

Specific neurologic Choosing Wisely guidelines further illustrate how the proposed framework can be used to prioritize waste reduction targets. The American College of Radiology (ACR) guideline "Don't do imaging for uncomplicated headaches" is an example of an optimal waste reduction target. Neuroimaging for uncomplicated headaches is of sufficiently low benefit (yield in those with headaches comparable to that in healthy volunteers) to be the rare diagnostic service that is specifically discouraged by guidelines,^{3,4} accounts for substantial net cost (roughly \$1 billion annually using data from the National Ambulatory Medicare Care Survey (NAMCS)⁵ and both the benefit and cost estimates are based on high quality data. By contrast, the AAN recommendation, "don't perform electroencephalograms (EEGs) for headaches" while likely a target of zero net benefit with little uncertainty,⁶ is a relatively low cost target accounting for approximately \$40 million annually in direct medical expenditures and only modestly more in net cost.⁷ So, while reducing the use of EEGs for headache is a valuable goal, reducing headache neuroimaging should receive considerably higher priority.

Another AAN recommendation "Don't prescribe interferon-beta or glatiramer acetate to patients with disability from progressive, non-relapsing forms of multiple sclerosis," illustrates the role of uncertainty in prioritizing targets. NAMCS reveals that approximately 45,000 patients with multiple sclerosis receive extremely expensive disease modifying medications annually. However, the proportion of this patient population with progressive

forms of the disease is unknown, and given the high cost of these medications, small changes in this proportion would have an enormous influence on estimated net cost. If 25% of this population has progressive disease, the net cost of treatment could exceed the cost of headache neuroimaging, but if the proportion with progressive disease is only 3%, these expenditures would approximate the cost of EEG for headache. This framework demonstrates the importance of prioritizing high net cost services such as neuroimaging for patients with headaches, and reducing the uncertainty in benefit/cost estimates such as disease modifying therapies for progressive MS patients before making any decision about whether it is worth targeting this service.

Waste reduction initiatives, like Choosing Wisely, have reasonably targeted services in the grey zone of net benefit, those services not responsible for either substantial harm or benefit. Choosing even more wisely requires prioritizing targets in this grey zone by net cost while also considering uncertainty. Following this framework will allow physicians to help reduce the \$210 billion spent on unnecessary services in the US without compromising quality of care.

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Figure 1. Net benefit, net cost, and benefit/cost certainty of recent neurologic Choosing Wisely targets

Schematic representation of waste reduction target prioritization, representing the three elements of the framework. The y-axis represents net benefit and the x-axis represents net cost. The diameter of each ellipse in the y and x planes illustrates uncertainty in the net benefit and net cost estimates for each target. Three neurologic Choosing Wisely targets are illustrated using ellipses. Examples of positive and negative net benefit targets are in the green (guideline recommended) and red (guideline opposed) regions respectively.