and cost reductions. Doing so might be accomplished with traditional methods of evidence-based recommendations, such as systematic review and health technology assessment. Alternatively, one might leverage already-generated lists of practices that are known to have evidence of harm and are high in cost. Several such lists already exist, with groups having completed systematic reviews as well as sophisticated cost modeling to project potential cost reduction.4,6

Choosing Wisely and Choosing Wisely Canada aspired to initiate conversations about eliminating low-value health care,3,7 and they have succeeded in realizing their goal. We are now ready and eager for the next steps—to realize a measurable decrease in low-value health care utilization. Currently, we are not aware of any evidence that the top 5 lists, in the United States or abroad, have reduced low-value medical practices. The American Board of Internal Medicine Foundation studied the effect of their campaign using a telephone survey of 600 US physicians and found that 21% had heard of the Choosing Wisely campaign and that, among this subgroup, 62% reported having reduced unnecessary testing in the past year.a These results suggest, at best, a modest effect; but because the results are self-reported, they cannot be used to estimate the net effect on cost-effective care. Building on the success of the Choosing Wisely campaign will require demonstration of a reduction in wasteful practices. As global enthusiasm for top 5 lists mounts, so will the desire to use the lists to shape policy and practices. Evidence of the effectiveness of top 5 lists must grow, not just the number of lists—otherwise, physicians may question the value of the campaigns. The resulting skepticism and cynicism are likely to lead to decreased support.

Even more dangerous to the movement than the present lack of evidence would be top 5 list “burnout.” Survey studies9 have shown that physicians who were faced with multiple guidelines on a single topic become less certain of how to proceed. Professional organizations around the world already publish guidelines that outline the best evidence-based practices. While top 5 lists are not guidelines, it is likely that the finding of guideline burnout is generalizable to top 5 lists. This potential seems more likely now that individual institutions are adopting their own top 5 lists. For example, Gupta and Detsky2 describe the creation of a top 5 list for the general internal medicine inpatient service at Mount Sinai Hospital in Toronto, Ontario, Canada, that might be considered in addition to the top 5 lists from the 21 Canadian specialty societies that partnered with Choosing Wisely Canada. It is not hard to imagine a near future in which every service at an individual institution generates a top 5 list to be considered in the context of the national specialty society top 5 lists, all without specific evidence of effectiveness. Particularly, if some of these lists are discordant, they will be unlikely to change behavior.

Internationally, health care costs are increasing without a commensurate improvement in health outcomes. Therefore, we strongly believe in the global spirit behind the Choosing Wisely campaigns and movement; that is why we advocate that the priority in 2015 should be the thoughtful implementation and rigorous evaluation of existing top 5 lists. Changing behavior is more complex and challenging than writing a list, but clearly the will to change exists among physicians and patients. Systematic, repeated, deliberate effort is required, and tools such as dashboards, performance reporting, financial incentives, benchmarking, and repeated feedback loops may be useful. We believe all top 5 lists should be accompanied by an implementation plan and should be evaluated and continuously monitored to assess their effect on low-value health care utilization.

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Stress Testing Before Low-Risk Surgery: So Many Recommendations, So Little Overuse

The Choosing Wisely (CW) campaign, which commenced in 2011, focuses on reducing medical services that are of questionable value or may be harmful.1 In 1996 and 2002, guidelines from the American College of Cardiology and the American Heart Association implied that routine stress testing before low-risk surgeries should be avoided; this was codified in the 2007 guidelines2 because the risk of cardiac complications from these surgeries is very low. Consequently, 7 specialty societies for the CW campaign...
Now recommend not performing cardiac stress testing prior to low-risk surgery. Recently, Thilen et al\(^4\) documented that the use of preoperative stress testing for cataract surgery in 2006 approached 20% among Medicare patients, but they did not comment on the use of stress testing. Therefore, we sought to determine the prevalence of cardiac stress testing before low-risk surgeries, prior to commencement of the CW campaign, to estimate the potential effect of the recommendations on future use of resources. We examined the use of preoperative stress testing in the 2 largest US federally sponsored health care programs: the Department of Veterans Affairs (VA) and fee-for-service Medicare.

**Methods** We performed a retrospective cohort study using data from the VA’s Corporate Data Warehouse and from a nationally representative 5% sample of Medicare fee-for-service claims. The Ann Arbor VA Human Studies Committee and the Kaiser Permanente of the Mid-Atlantic States institutional review board approved this study with waiver of informed consent. Using Current Procedural Terminology codes, we identified all asymptomatic patients 65 years or older who underwent 1 or more cataract surgical procedures, knee arthroscopies, or shoulder arthroscopies from February 1 to December 31, 2009. Using an approach similar to that used by Schwartz et al,\(^5\) we then examined the proportion of these patients who had an exercise or pharmacologic electrocardiographic treadmill, echocardiographic, or nuclear stress test in the 28-day period before their first low-risk surgery. To isolate routine preoperative stress tests, we excluded stress tests during that period that also occurred 0 to 30 days after a hospitalization or 0 to 3 days after an emergency department visit. We also examined a more sensitive measure without such exclusions. To assess regional variation, we estimated stress test rates by hospital referral region using 2-level empty logit models.

**Results** A total of 22,670 VA patients and 109,270 Medicare patients had cataract surgery, knee arthroscopy, or shoulder arthroscopy from February to December 2009. The mean age of patients was approximately 75 years in both cohorts (Table 1). A routine preoperative stress test preceded 1 of the 3 low-risk surgeries in only 0.67% of VA patients and 2.14% Medicare patients (Table 2). Estimated stress test rates by hospital referral region ranged in the VA from 0.3% to 2.0% (interquartile range, 0.4%-0.7%) and in Medicare from 1.5% to 3.1% (interquartile range, 1.8%-2.1%). Applying the more sensitive measure, 0.8% of VA patients and 2.4% of Medicare patients had stress testing before surgery.

**Discussion** We found that the use of routine preoperative stress testing before low-risk surgery in both VA and Medicare patients was very low and varied little across geographic regions, even before the CW campaign started. Although the rates in the Medicare group were 3 times as high as those in the VA group, these low absolute numbers suggest that interventions to further decrease use of the testing would minimally improve quality while diverting attention away from high-yield interventions that would more strongly affect care. It appears that the recommendations in the CW campaign may have yielded interventions that would more strongly affect care. It appears that the recommendations in the CW campaign may have had relatively limited impact.

### Table 1. Characteristics of Patients Undergoing Low-Risk Surgerya

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>VA Patients</th>
<th>Medicare Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total (n = 22,670)</td>
<td>Stress Test (n = 151)</td>
</tr>
<tr>
<td>Age as of January 1, 2009, mean (SD), y</td>
<td>75.5 (6.7)</td>
<td>73.8 (5.9)</td>
</tr>
<tr>
<td>Male sex, No. (%)</td>
<td>22,137 (97.6)</td>
<td>146 (96.7)</td>
</tr>
<tr>
<td>Diagnosis of CV risk factors in 2009, No. (%)b</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coronary artery disease</td>
<td>7,887 (34.8)</td>
<td>89 (58.9)</td>
</tr>
<tr>
<td>Ischemic stroke or TIA</td>
<td>1718 (7.6)</td>
<td>15 (9.9)</td>
</tr>
<tr>
<td>Hyperlipidemia</td>
<td>14,827 (65.4)</td>
<td>114 (75.5)</td>
</tr>
<tr>
<td>Heart failure</td>
<td>2699 (11.9)</td>
<td>32 (21.2)</td>
</tr>
<tr>
<td>Cardiac arrhythmias</td>
<td>4341 (19.1)</td>
<td>43 (28.5)</td>
</tr>
<tr>
<td>Peripheral vascular disease</td>
<td>3381 (14.9)</td>
<td>26 (17.2)</td>
</tr>
<tr>
<td>Hypertension</td>
<td>17,954 (79.2)</td>
<td>127 (84.1)</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>9666 (42.6)</td>
<td>80 (53.0)</td>
</tr>
<tr>
<td>Renal failure</td>
<td>3061 (13.5)</td>
<td>26 (17.2)</td>
</tr>
<tr>
<td>Obesity</td>
<td>3180 (14.0)</td>
<td>38 (25.2)</td>
</tr>
</tbody>
</table>

Abbreviations: CV, cardiovascular; TIA, transient ischemic attack; VA, Veterans Affairs.

a Low-risk surgical procedures included knee arthroscopy (Current Procedural Terminology [CPT] codes 29866-29868, 29870, 29873-29877, and 29879-29889), shoulder arthroscopy (CPT codes 29805-29807, and 29819-29828), and cataract surgery (CPT codes 66982 and 66984).

b Comorbidities were identified using Elixhauser coding criteria.
ears that most physicians had already incorporated guidelines about appropriate preoperative stress testing into their practices before the CW recommendations became available. Although this is good news for patients, it is not helpful for a campaign that aims to improve appropriateness. Specialty societies should focus future CW recommendations on services that have high baseline rates of inappropriate care to call attention to areas where interventions can best improve quality.

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Drafting of the manuscript: Kerr, Klamerus.

Critical revision of the manuscript for important intellectual content: Kerr, Chen, Sussman, Nallamothu.

Obtained funding: Kerr, Sussman, Nallamothu.

Study supervision: Kerr, Chen.

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Editor’s Note

Time for Professional Societies to Be Bold and Wise

The Choosing Wisely campaign1 has ignited an international discussion of what medical practices should be done less frequently or not at all. Sixty professional societies have created Top Five lists of ways to eliminate waste in medical care. Because this is the first broad discussion of unnecessary care to include so many professional societies, it is not surprising that some of the items chosen were “safe bets” so as not to upset particular constituencies. For example, eliminating preoperative stress testing before low-risk surgery appears on no less than 7 professional societies’ Top Five lists. However, Kerr et al2 found that preoperative stress testing was not in common use for this indication (0.7%–2.1%) even before the launch of Choosing Wisely. With the growing clout of the Choosing Wisely campaign, now is the time for professional societies to be bolder in identifying common interventions that add little value to our medical care.

Rita F. Redberg, MD, MSc

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COMMENT & RESPONSE

Adjuvant Diagnostic Procedures for Percutaneous Coronary Intervention

To The Editor We read with great interest the study published by Fröhlich et al3 regarding long-term survival in patients undergoing fractional flow reserve (FFR)-guided percutaneous coronary intervention (PCI) or intravascular ultrasonography (IVUS)-guided PCI vs PCI guided by angiography alone. In this large cohort study, using a PCI registry in London, England, the authors expertly demonstrate that neither FFR nor IVUS, when used as adjuncts to PCI, translate into improved long-term survival in these “real-world” patients.4 These findings are not entirely surprising, since prior randomized studies and meta-analyses have failed to show a mortality benefit for PCI in addition to optimal medical therapy in the management of stable coronary disease.2,3 However, this study consisted of a more heterogeneous population than those that have been pre-

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