Additional Contributions: Andrea Benjamin, RN, provided skilful interviews of the participants.


Results. We found a wide range of frequencies (1.4%-56.0%) of nonrecommended activities in primary care, accounting for an approximate annual cost of $6.76 billion (95% CI, $5.0-$9.1 billion) (Table). The ordering of a complete blood cell count for a general medical examination was the most prevalent activity (56.0%; 95% CI, 40.8%-70.2%) and was associated with a cost of $32.7 million (95% CI, $23.9-$40.8 million).

Several practice activities occurred less commonly, such as ordering of bone density testing in women younger than 65 years (1.4%; 95% CI, 0.9%-2.2%) and Papanicolaou tests for patients younger than 21 years (2.9%; 95% CI, 1.7%-5.0%). We were unable to report the performance of dual-energy x-ray absorptiometry scans in men younger than 70 years and imaging for children with head injuries in ambulatory settings owing to their low frequency (visits <30).

Cost of unnecessary services was a function of both the frequency and the reimbursement rates for each service. The practice activity associated with the highest cost was the prescribing of brand name instead of generic statins, resulting in excess expenditures of $5.8 billion per year (95% CI, $4.3-$7.3 billion). Bone density testing in women younger than 65 years was the least prevalent activity but accounted for $527 million (95% CI, $474-$510 million) in costs.

Comment. Our analysis of outpatient visits demonstrates that there is considerable variability in the frequency of inappropriate care and that many of the activities identified in the Good Stewardship “Top 5” lists have marginal impact on health care costs. Approximately 80% of the costs associated with the “Top 5” lists were from the use of brand name instead of generic statins. Although generic drug substitutions may appear to be a “low hanging fruit” for drug savings, numerous efforts have already been made by the US states (generic substitution laws), payers (tiered formularies), and health care providers (generic drug detailing) to achieve this goal. In this light, our data suggest that considerably more work is needed to reduce the costs associated with brand name statin use. Our results also demonstrate that highly prevalent activities with small individual costs can result in large overall costs to the health care system and thus warrant further attention.

Our analysis is limited by the available data of the NAMCS/NHAMCS data set and by our ability to accurately estimate visits with inappropriate care. We were conservative in our assessment of inappropriate care and were careful to exclude visits where care could be potentially appropriate, likely lowering our cost estimates.

The recent debate surrounding escalating health care costs and the sustainability of Medicare have focused attention on the delivery of high-quality, efficient care. The discussion certainly needs the participation of physicians who are willing to examine their own practices, such as the Good Stewardship Working Group. However, most primary care activities identified by the working group...
Table. Prevalence of Good Stewardship Working Group “Top 5” Activities in US Ambulatory Care, 2009

<table>
<thead>
<tr>
<th>Primary Care Activity</th>
<th>Inappropriate Activity Definition</th>
<th>Eligible Visit Definition</th>
<th>Exclusions</th>
<th>Eligible Visits, No. Weighted</th>
<th>Eligible Visits With Inappropriate Activity, % (95% CI)b</th>
<th>Direct Costs, $ (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Routine laboratory studies</td>
<td>CBC ordered or performed</td>
<td>Visits by adults older than 18 y who present for GME</td>
<td>None</td>
<td>4 186 261</td>
<td>56.0 (40.8-70.2)</td>
<td>32 679 628</td>
</tr>
<tr>
<td>Antibiotics for children with pharyngitis</td>
<td>Antibiotics prescribed</td>
<td>Visits by children younger than 18 y who present with pharyngitis</td>
<td>Strep pharyngitis, fever</td>
<td>10 907 680</td>
<td>40.9 (33.4-48.9)</td>
<td>116 365 312</td>
</tr>
<tr>
<td>Expensive brand-name statins on initiating lipid-lowering therapy</td>
<td>Atorvastatin or rosuvastatin prescribed</td>
<td>Visits by adults who are prescribed a statin as a new medication</td>
<td>None</td>
<td>13 462 214</td>
<td>34.6 (26.2-44.1)</td>
<td>5 817 251 527</td>
</tr>
<tr>
<td>Annual ECGs</td>
<td>ECG ordered or performed</td>
<td>Visits by adults older than 18 y who present for GME</td>
<td>None</td>
<td>4 186 261</td>
<td>19.1 (7.0-42.9)</td>
<td>16 639 550</td>
</tr>
<tr>
<td>Routine laboratory studies</td>
<td>Urinalysis ordered or performed</td>
<td>Visits by adults older than 18 y who present for GME</td>
<td>None</td>
<td>4 186 261</td>
<td>17.9 (9.4-31.6)</td>
<td>3 353 195</td>
</tr>
<tr>
<td>Imaging for back pain</td>
<td>Imaging (CT, MRI, radiography) ordered</td>
<td>Visits by adults aged 18-55 y who present with acute low back pain</td>
<td>Malignancy, weight loss, fever, cachexia, neurological signs</td>
<td>4 970 245</td>
<td>16.7 (11.1-24.2)</td>
<td>175 403 922</td>
</tr>
<tr>
<td>Routine laboratory studies</td>
<td>Basic metabolic panel ordered or performed</td>
<td>Visits by adults older than 18 y who present for GME</td>
<td>None</td>
<td>4 246 308</td>
<td>16.0 (6.9-32.9)</td>
<td>10 129 992</td>
</tr>
<tr>
<td>Cough medicines for children</td>
<td>Visits by children &lt;18 y, who present with URI and are prescribed cough/cold medications</td>
<td>Visits by children &lt;18 y, who present with URI</td>
<td>None</td>
<td>21 472 734</td>
<td>11.8 (0.8-16.9)</td>
<td>10 306 912</td>
</tr>
<tr>
<td>Pap tests for patients younger than 21 years</td>
<td>Pap test ordered or performed</td>
<td>Visits by girls aged 10-21 y</td>
<td>None</td>
<td>22 570 460</td>
<td>2.9 (1.7-5.0)</td>
<td>47 763 607</td>
</tr>
<tr>
<td>DEXA scans for younger patients</td>
<td>Bone density scan ordered</td>
<td>Visits by women aged 40-64 y</td>
<td>Fractures, exposure to corticosteroids, anorexia, vitamin D deficiency, tobacco use</td>
<td>734 894 486</td>
<td>1.4 (0.9-2.2)</td>
<td>527 433 773</td>
</tr>
<tr>
<td>DEXA scans for younger patients</td>
<td>Bone density scan ordered</td>
<td>Visits by men aged 40-70 y</td>
<td>Fractures, exposure to corticosteroids, anorexia, vitamin D deficiency, tobacco use</td>
<td>151 651 500</td>
<td>NAc</td>
<td>NAc</td>
</tr>
<tr>
<td>Head injury imaging in children</td>
<td>Imaging ordered</td>
<td>Visits by children aged 2-18 y, who present with head injury</td>
<td>Hemotympanum, loss of consciousness, dizziness</td>
<td>NAc</td>
<td>NAc</td>
<td>NAc</td>
</tr>
<tr>
<td>Total cost</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6 757 327 419</td>
</tr>
</tbody>
</table>

Abbreviations: CBC, complete blood cell count; CT, computed tomography; DEXA, dual-energy x-ray absorptiometry; ECG, electrocardiography; GME, graduate medical education; MRI, magnetic resonance imaging; NA, not applicable; Pap, Papanicolaou; Strep, streptococcal; URI, upper respiratory tract infection.

a Survey weighted percentages, which represent national estimates based on the population that was sampled.
b Based on National Ambulatory Medical Care Survey/National Hospital Ambulatory Medical Care Survey 2008 because of changes in survey design.
c Estimates were suppressed for reporting owing to very small sample size (n < 30).

d are not major contributors to health care costs. Expanding the methods of physician consensus to identify “high-value” targets to specialties outside of primary care could bring us closer to achieving the goal of affordable and high-quality health care.

Minal S. Kale, MD
Tara F. Bishop, MD, MPH
Alex D. Federman, MD, MPH
Salomeh Keyhani, MD, MPH

Published Online: October 1, 2011. doi:10.1001/archinternmed.2011.501

Author Affiliations: Division of General Internal Medicine, Department of Medicine, Mount Sinai School of Medicine, New York, New York (Drs Kale and Federman); Division of Outcomes and Effectiveness, Departments of Public Health and Medicine, Weill Cornell Medical College, New York (Dr Bishop); and Division of General Internal Medicine, Department of Medicine, University of California, San Francisco, and San Francisco Veterans Affairs Hospital, San Francisco (Dr Keyhani).

Correspondence: Dr Kale, Division of General Internal Medicine, Mount Sinai School of Medicine, One Gustave
Psychological Distress as a Risk Factor for Dementia Death

Current estimates suggest that neuropsychiatric disorders account for 28% of the global burden of disease. While depression and anxiety (commonly referred to as psychological distress) have been shown to be a consequence of dementia, the converse is less clear. The possibility that psychological distress might be a risk factor for dementia has major public health implications. However, longitudinal studies—which are best placed to examine this relationship—have, with some exceptions, been small in scale (affecting study precision), excluded individuals younger than 65 years (limiting insights into the pre–older age origins of dementia), or have used clinical samples (reducing generalizability). Accordingly, we examined the role of psychological distress as a risk factor for and dementia death by pooling 10 large community-based cohort studies.

Methods. Participants were recruited from the Health Survey for England,4 an annual general population-based cross-sectional study (with a longitudinal component) representative of household-dwelling individuals in England. Results from 1994 through 2004 were pooled. Participants gave informed consent; ethical approval was obtained from the London Research Ethics Council.

Psychological distress was measured during a household visit using the 12-item General Health Questionnaire (GHQ-12), a widely used measure of psychological distress in population studies comprising items rating anxiety, depression, social dysfunction, and loss of confidence. Higher scores indicate greater distress. We used a cut off score of 4 or greater to denote psychological distress as validated against standardized psychiatric interviews. Dementia was identified from death certification and coded according to the International Classification of Diseases, Ninth Revision (ICD-9) codes 290.0 through 290.4 and 294.9 and International Statistical Classification of Diseases, Tenth Revision (ICD-10) codes F01, F03, F09, and G30. Follow-up was until date of death or February 15, 2008, whichever came first.

We used Cox proportional hazards models to compute hazard ratios with accompanying 95% confidence intervals for GHQ-12 score in relation to dementia-related deaths. Study members scoring zero (no apparent distress) denoted the reference group. Models were adjusted for age, sex, occupational social class (OSC), parental OSC, age at leaving full-time education, current smoking (yes/no), alcohol consumption (units per week), and existing cardiovascular disease (CVD) (yes/no), and diabetes (yes/no). Statistical analyses were conducted using PASW statistics, version 18.0 (SPSS, Chicago, Illinois), and R for Max OS X, version R-2.13.0.

Results. The initial sample included 85 261 adults (in 1996 the GHQ-12 was not used). After removing individuals who declined linkage to mortality records (n = 9325) and those with missing GHQ-12 data (n = 2865), the analytic sample comprised 73 071 individuals (54.8% women) with a mean (SD) age of 55.9 (14.3) years (range, 35-102 years). Data were missing for 1 or more variables in 21% (n = 15 355) of the sample. Individuals with missing data were more likely to be older, be female, belong to a manual OSC, leave school later, be a nonsmoker, drink alcohol moderately, and have CVD and diabetes.

Of the 10 170 deaths during follow-up, 455 had dementia coding. A higher GHQ-12 score was associated with increased risk of dementia death in an age-adjusted model (GHQ-12 score of 1-3: HR, 1.44 [95% CI, 1.17-1.78]; GHQ-12 score of 4-12: HR, 1.74 [95% CI, 1.36-2.22]; P value for trend, <.001). Adding all remaining covariates (sex, OSC, parental OSC, age at leaving full-time education, current smoking, alcohol consumption, and existing CVD and diabetes) led to some attenuation of effect but statistical significance at conventional levels was retained (GHQ-12 score of 1-3: HR, 1.27 [95% CI, 1.00-1.61]; GHQ-12 score of 4-12: HR, 1.56 [95% CI, 1.17-2.07]; P value for trend, .005). In the Figure we relate 7 categories of GHQ score to dementia death to provide more detailed insight into the shape of the relationship. There was evidence of a dose-response effect (P value for trend, .001). Excluding individuals with any missing data (sample n = 57 716; 361 dementia deaths) or dementia deaths within 5 years (sample n = 72 926; 310 dementia deaths)—the latter to explore reverse causality—did not affect our results.

Comment. We found an association between elevated psychological distress and an increased risk of dementia death in a large general population sample of apparently dementia-free adults, which remained after adjustment for age, sex, OSC, education, alcohol use, smoking, and existing CVD and diabetes. Cardiovascular risk factors have been linked