Elevated low-density lipoprotein cholesterol (LDL-C) levels are a modifiable risk factor for the development of coronary heart disease (CHD), the leading cause of death in the United States. Treatments to lower these levels help decrease the risk of CHD events and reduce mortality rates in patients with existing CHD and those with no history of CHD. Rates of screening and treatment for high cholesterol levels have improved somewhat in recent years, but there is still room for substantial improvement, especially in patients at high risk of CHD, who benefit most from aggressive LDL-C-lowering therapies. The American Osteopathic Association Clinical Assessment Program, a Web-based program that measures physician performance by analyzing data abstracted from patient medical records and helps guide treatment decisions, is a tool to help physicians improve outcomes in patients with elevated LDL-C levels.

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Elevated cholesterol levels are a major modifiable risk factor for the development of cardiovascular disease, with a reported prevalence of approximately 25% in the United States. In particular, epidemiologic studies have identified low-density lipoprotein cholesterol (LDL-C) as the most atherogenic lipoprotein. This status is evidenced by the noted acceleration of atherogenesis in genetic disorders in which serum LDL-C is markedly increased in the absence of other CHD risk factors and by the well-established benefit of lowering LDL-C levels in patients with CHD. In particular, such lowering is associated with a decreased risk of CHD and a reduction in mortality in patients with existing CHD (secondary prevention) and in those with no history of CHD (primary prevention). The benefit of lowering LDL-C levels is seen regardless of whether the reduction is achieved via diet, surgery, or pharmacotherapy. Data from recent trials with statins indicate that a 1% decrease in LDL-C lowers the risk of CHD by approximately 1%. Because of this, screening patients for elevated LDL-C levels and determining appropriate management regimens are extremely important and highly effective for improving clinical outcomes.

Trends in Screening and Lipid Control
Despite the proven benefit of managing hyperlipidemia, patients frequently do not receive adequate treatment. However, treatment rates have been increasing in recent years. Data from the National Committee for Quality Assurance indicate that in 2008, among patients...
aged 18 to 75 years who were discharged after admission for acute myocardial infarction or coronary angioplasty or who had a diagnosis of ischemic vascular disease, cholesterol screening was performed in 88.9% of patients enrolled in commercial health insurance plans, 88.6% of those enrolled in Medicare, and 79.6% of those enrolled in Medicaid. More notably, cholesterol control (defined as LDL-C levels <100 mg/dL) was achieved in only 59.7%, 56.7%, and 40.1%, respectively, of patients in these 3 groups. Although these rates of screening and control represent modest improvements since 2006, they also indicate that outcomes in these patients can still be substantially improved.

The second Lipid Treatment Assessment Project survey was conducted between September 2006 and April 2007 in more than 10,000 patients from 9 countries in North America, South America, Europe, and Asia. The survey was designed to determine the proportion of patients achieving appropriate LDL-C goals for their given level of risk, as defined by the National Cholesterol Education Program Adult Treatment Panel III. Overall, 73% of patients achieved their LDL-C goal, including 75.7% of those in the United States. However, success was dependent on the baseline level of risk. Among patients at low risk (ie, ≤1 risk factor), moderate risk (ie, ≥2 risk factors), and high risk (ie, cardiovascular disease or diabetes mellitus), target LDL-C goals were achieved in 86%, 74%, and 67%, respectively. With more aggressive therapy to achieve an optional LDL-C level of less than 70 mg/dL for those at very high risk (ie, patients with CHD plus ≥2 risk factors), only 30% of patients achieved their goal.

By comparison, the first Lipid Treatment Assessment Project survey, performed in 1996 and 1997, found that 38% of patients overall and 18% of high-risk patients achieved their LDL-C goal. These results are very similar to those reported by Kitkungvan et al for 765 patients at high or very high risk of CHD. Among the 217 patients at very high risk (defined as having a history of CHD, a CHD risk equivalent, or ≥2 risk factors and a 10-year Framingham score of >20%), only 37% achieved their LDL-C goal of less than 70 mg/dL. Overall, these data indicate that, though there is a trend toward improvement in attaining lipid goals, a substantial proportion of patients, particularly those at highest risk, would benefit from more aggressive therapy.

American Osteopathic Association Clinical Assessment Program

The American Osteopathic Association Clinical Assessment Program (AOA-CAP) is a Web-based performance measurement program that analyzes data abstracted directly from patient medical records. The goals of the AOA-CAP are as follows:

- provide a structure for quantitative evaluation of current osteopathic medical care provided individually and in the aggregate by osteopathic physicians
- identify where quality-of-care improvements can be made in osteopathic physicians’ offices and provide educational interventions to promote such improvements
- provide osteopathic physicians with information on how they are treating their populations, including patient outcomes data

This program will help physicians move beyond the recall structures that are commonly used in the office setting to a system that captures patient outcomes more objectively. The program includes 5 assessment modules—for coronary artery disease (CAD), diabetes mellitus, women’s health screening, asthma, and chronic obstructive pulmonary disease. Data elements for each of these modules include demographic information...
and clinical information. Clinical indicators were developed using evidence-based guidelines that represent state-of-the-art professional standards of care. The guidelines track patient outcomes so that changes in treatment can be instituted, thereby improving the quality of patient care. The AOA-CAP is compliant with the Health Insurance Portability and Accountability Act and has been developed to avoid the collection of identifiable patient information. Physician-specific data are also confidential. Parameters that are measured in the CAD module include evaluation and control of LDL-C levels, smoking cessation counseling, appropriate use of pharmacotherapy (eg, aspirin, β-blockers, angiotensin-converting enzyme inhibitors, and warfarin in appropriate patients), assessment of kidney function, screening for depression, and osteopathic assessment of patients.7

Outcome Data

Since 2005, data have been collected on randomly selected patients across the program from participating family practice settings and internal medicine residencies. Data provided in the following paragraphs were provided by Sharon McGill, MPH, and Richard J. Snow, DO, MPH, from the Steering Committee of the American Osteopathic Association Clinical Assessment Program (written communication, September 2010 and April 2011).

Currently, more than 200 total programs have participated in the diabetes module, and the CAD module has 86 active programs. These data allow an assessment of outcomes and an evaluation of how physicians are responding to patient conditions. For example, among the 12,650 patients in the diabetes module, the overall rate for achieving the target LDL-C concentration (ie, ≤100 mg/dL) was 51.9%. Rates of control were higher for patients older than 65 years (58.8%) and lowest among those who were self-paying (44.4%), probably reflecting a decreased ability to purchase medications in the latter group.

Physician responses to elevated LDL-C levels, as defined by the National Cholesterol Education Program Adult Treatment Panel III, were variable. The most common response was to encourage diet and weight loss (30.1%). Other documented responses included increasing the dosage of the current lipid-lowering medication (18.7%), adding a new lipid-lowering medication (15.5%), rechecking LDL-C values (14.8%), and value not available on the last visit (4.5%). Notably, no response was documented in the record in 16.5% of patients with elevated LDL-C values.

The CAD module included patients at very high risk, with acute myocardial infarction, revascularization, or stroke as the entry criterion. Among the 3463 patients in the database, 55.7% achieved an LDL-C level of 100 mg/dL or lower and 20.4% achieved the more aggressive goal of 70 mg/dL or lower (Table 2).

These results highlight opportunities for improving care. To address this need, the AOA-CAP offers an approach that supports a patient-centered medical home model, which may help achieve therapeutic goals. This model is a health care approach that facilitates partnerships between individual patients (and their families, when appropriate) and their personal physicians. The AOA-CAP helps physicians improve the quality of patient care by using evidence-based medicine and clinical decision support tools to guide their decision making. Another key component is the use of a registry, which allows the tracking of patients and their care. This model also takes advantage of and leverages information from systems, such as electronic health records, that support high-quality care, practice-based learning, and continuous quality improvement.

Participation

Physicians who decide to participate in the AOA-CAP can visit the AOA Web site (www.osteopathic.org), log in, and select 1 of the 5 modules.7 Participants are asked to abstract data from 20 patient records for chart review. The medical records are selected based on patient characteristics (eg, diagnostic criteria, inclusion or exclusion criteria) and sampling technique. The data are then entered online through the Web site. After entering the data, participants receive a performance analysis report that compares their performance with that of other participants and with national benchmarks (eg, National Committee for Quality Assurance, Healthcare Effectiveness Data and Information Set measures). For evaluation, 20 additional charts are abstracted and entered into the database to generate a comparison report. In addition, the physician can select educational interventions designed to improve clinical performance. As an incentive for participation, physicians receive 20 hours of AOA Category 1-B continuing medical education (CME)

### Table 1. LDL-C Control in Patients With Diabetes Mellitus Enrolled in the American Osteopathic Association Clinical Assessment Program (n=12,650) *

<table>
<thead>
<tr>
<th>Attribute</th>
<th>With Attribute</th>
<th>Without Attribute</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Care delivered in 2009-2010 vs 2005-2008</td>
<td>53.2</td>
<td>50.9</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Male sex</td>
<td>54.4</td>
<td>50.0</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Age &gt;65 years</td>
<td>58.8</td>
<td>48.8</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

* Low-density lipoprotein cholesterol (LDL-C) control was defined as LDL-C levels ≤100 mg/dL. The overall rate of control was LDL-C 51.9%.1

P.<0.001). The rate of control was highest among patients with Medicare insurance (58.8%) and lowest among those who were self-paying (44.4%), probably reflecting a decreased ability to purchase medications in the latter group.

Physician responses to elevated LDL-C levels, as defined by the National Cholesterol Education Program Adult Treatment Panel III, were variable. The most common response was to encourage diet and weight loss (30.1%). Other documented responses included increasing the dosage of the current lipid-lowering medication (18.7%), adding a new lipid-lowering medication (15.5%), rechecking LDL-C values (14.8%), and value not available on the last visit (4.5%). Notably, no response was documented in the record in 16.5% of patients with elevated LDL-C values.

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Elevated LDL-C levels are a modifiable risk factor for the development of CHD, and there is compelling evidence that therapies to lower these levels are associated with substantial reductions in CHD events and overall mortality rates in both primary and secondary prevention settings. However, despite increased proportions of patients achieving target LDL-C levels, there remains a treatment gap, particularly among those at highest risk. Clinical tools exist to help physicians achieve treatment goals and improve the quality of care and clinical outcomes by evaluating current practices and guiding improvements. The AOA-CAF is one such tool that can help improve outcomes for patients with dyslipidemia and promote an approach to delivering patient care that’s aligned with the patient-centered medical home model.

### Conclusion

Elevated LDL-C levels are a modifiable risk factor for the development of CHD, and there is compelling evidence that therapies to lower these levels are associated with substantial reductions in CHD events and overall mortality rates in both primary and secondary prevention settings. However, despite increased proportions of patients achieving target LDL-C levels, there remains a treatment gap, particularly among those at highest risk. Clinical tools exist to help physicians achieve treatment goals and improve the quality of care and clinical outcomes by evaluating current practices and guiding improvements. The AOA-CAF is one such tool that can help improve outcomes for patients with dyslipidemia and promote an approach to delivering patient care that’s aligned with the patient-centered medical home model.

### Partnership to Fight Chronic Disease

The American Osteopathic Association has been an active member of the Partnership to Fight Chronic Disease (PFCD) since 2007. This supplement promotes the ideals of this partnership. The PFCD is a national and state-based coalition of hundreds of provider, patient, community, business, and labor groups committed to raising awareness of the leading causes of death, disability, and rising healthcare costs in the United States—chronic diseases such as diabetes, asthma, cancer, and heart disease. In addition, the PFCD has worked to ensure that prevention and wellness measures were incorporated into healthcare reform legislation passed by Congress in 2010.

For additional information, visit www.fightchronicdisease.org.

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### References


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### Table 2.

**LDL-C Control in Patients with Coronary Artery Disease Enrolled in the American Osteopathic Association Clinical Assessment Program (n=3463)**

<table>
<thead>
<tr>
<th>Attribute</th>
<th>% of Patients With LDL-C Control</th>
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</thead>
<tbody>
<tr>
<td><strong>Target LDL-C Level, &lt;100 mg/dL</strong></td>
<td></td>
</tr>
<tr>
<td>Care delivered 2009-2010 vs 2005-2008</td>
<td>57.6 54.6 .076</td>
</tr>
<tr>
<td>Male sex</td>
<td>57.3 53.5 .026</td>
</tr>
<tr>
<td>Age ≥65 years</td>
<td>61.5 49.5 &lt;.001</td>
</tr>
<tr>
<td><strong>Target LDL-C Level, &lt;70 mg/dL</strong></td>
<td></td>
</tr>
<tr>
<td>Care delivered 2009-2010 vs 2005-2008</td>
<td>20.6 20.3 .8</td>
</tr>
<tr>
<td>Male sex</td>
<td>21.8 18.5 .15</td>
</tr>
<tr>
<td>Age ≥65 years</td>
<td>23.8 16.7 &lt;.001</td>
</tr>
</tbody>
</table>

* The overall rates of low-density lipoprotein cholesterol (LDL-C) control were 55.7% and 20.4% for the targets of <100 and <70 mg/dL, respectively.