Low-density lipoprotein cholesterol goal attainment: analysis using National Health and Nutrition Examination Survey data (2003–2012)

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Introduction
- Elevated LDL-C is a well-known and modifiable risk factor for developing CHD. Consequently, most guidelines recommend lowering LDL-C to reduce cardiovascular risk.
- In particular, the NCEP ATP III guidelines recommend reducing LDL-C to certain goals depending on an individual’s level of CHD risk (Table 1).

Table 1. NCEP ATP III CHD risk categories and LDL-C goals

<table>
<thead>
<tr>
<th>CHD risk category</th>
<th>Definition</th>
<th>LDL-C goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>CHD or CHD risk equivalent (&lt;100 mg/dL, or &lt;70 mg/dL if 2+ risk factors)</td>
<td>&lt;&lt;100 mg/dL</td>
</tr>
<tr>
<td>Intermediate</td>
<td>CHD or CHD risk equivalent (&lt;140 mg/dL, or &lt;100 mg/dL if 2+ risk factors)</td>
<td>&lt;140 mg/dL</td>
</tr>
<tr>
<td>Low</td>
<td>CHD or CHD risk equivalent (&lt;160 mg/dL)</td>
<td>&lt;160 mg/dL</td>
</tr>
</tbody>
</table>

- Support for national surveys providing large sample size that is representative of the US population

Methods
- NHANES: National Health and Nutrition Examination Survey

Results
- From 2003–2004 to 2011–2012, there was no obvious change in the distribution of CHD risk (Table 2).
- The proportion of each risk group meeting LDL-C goals and the proportion receiving lipid-lowering therapy were calculated.
- CHD risk was assessed in adult participants (aged ≥20) in five 2-yearly NHANES observations from 2003–2004 to 2011–2012.

Table 2. Estimated distribution of CHD risk in the US adult population

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>High</td>
<td>17</td>
<td>17</td>
<td>10</td>
<td>19</td>
<td>10</td>
</tr>
<tr>
<td>Intermediate</td>
<td>17</td>
<td>15</td>
<td>16</td>
<td>16</td>
<td>14</td>
</tr>
<tr>
<td>Low</td>
<td>62</td>
<td>66</td>
<td>66</td>
<td>66</td>
<td>66</td>
</tr>
</tbody>
</table>

- Prevalence estimates for the total adult US population were age adjusted using the direct method to the US Census 2000 population, and were based on 31,256 observations from NHANES 2003–2012.

Study design
- CHD risk was assessed in adult participants (aged ≥20) in five 2-yearly NHANES surveys from 2003–2004 to 2011–2012.
- Patients were categorized as being at high, intermediate, or low CHD risk (Table 1).
- The proportion of each risk group meeting LDL-C goals and the proportion receiving lipid-lowering therapy were calculated.
- Using five NHANES surveys provides a large sample size that is representative of the US population.

Conclusions
- Despite increased use of lipid-lowering therapy, we observed no trend for improvements in LDL-C goal attainment in adults in the US population.
- In 2011–2012, approximately 89 million US adults were at high or intermediate risk of CHD, but a clinically significant number (approximately 31 million) were not achieving their risk-stratified LDL-C goal.
- These results highlight the need for more aggressive identification and treatment of patients at risk, and the need to monitor adherence to treatment and provide appropriate follow-up.

References

Disclosures
- PP Toth has been involved in speakers bureaus for Amarin, AstraZeneca, Genzyme, GSK, Kowa, and Merck and Co; MK Palmer received fees for statistical analysis for this study from AstraZeneca; KM Henriksson has been a consultant/advisory board member for Amgen, AstraZeneca, Kowa, Merck and Co, Novartis, and Sanofi; P. Toth received funding from the British Heart Foundation, NHMRC, the University of New South Wales, and the Janssen Research Foundation, and was a member of the American Heart Association’s Programming Committee, which was supported by Pfizer Pharma. Writing and editing support was provided by Alex Mellors, Prime Medica Ltd, Cheshire, UK, funded by AstraZeneca.