A comparison of comorbidity in CKD patients based on MDRD vs. CKD-EPI equations

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Introduction

- Estimation of glomerular filtration rate (GFR) is commonly done using the MDRD equation, first published in 1999.
- The MDRD equation, published in 1999, was developed on patients across wide ranges of GFR, better estimates actual GFR in patients with GFR > 60 mL/min/1.73 m².
- We investigated the burden of comorbidity across CKD stage, comparing the two GFR equations.

Methods

- Using 13 Ingenix data on individuals with coverage in 2008 and with at least 1 serum creatinine, we computed eGFR using both equations and compared comorbidity burdens across CKD stages, particularly for patients classified differentially.
- For patients with >1 creatinine, the average was computed.
- Since ACR data was mostly unavailable, we compared the following categories/CKD stages: ≥ 90, 60-90, and stage 3, respectively, by MDRD.
- Comorbidity identified from inpatient and outpatient claims, and included atherosclerotic heart disease (ASHD), cancer, diabetes (DM), COPD, and hypertension (HTN).

Results

- The cohort was 56% female, and the age distribution was 3% <18, 27% 19-40, 42% 41-55, and 28% 58 or older.
- We identified 786,348 persons with continuous insurance coverage and at least 1 serum creatinine during 2008.
- 49.7%, 45.4%, and 4.4% were identified as ≥ 90, 60-90, and stage 3, respectively, by CKD-EPI.
- 28.3%, 63.2%, and 8.1% were similarly classified by MDRD.
- The table shows the comorbidity burden of patients classified with higher eGFR by MDRD vs. CKD-EPI; the comorbidity burden was generally similar to the comorbidity burden of the higher eGFR group (top half of table).
- The figures compare comorbidity burden across eGFR, comparing MDRD to CKD-EPI; primary differences are found with stage 3; individuals identified as stage 3 with CKD-EPI generally have more comorbidity than those identified as stage 3 by MDRD.

Conclusions

- These results are consistent with other studies showing more accurate estimation of actual GFR with the CKD-EPI equation for patients with less severe CKD.
- Limitations:
  - Race, which is a factor in both equations, was not available.
  - Comorbidity identified from claims.
  - Patients with serum creatinine available may be different than patients with creatinine measured.

Table 1

<table>
<thead>
<tr>
<th>Comorbidity</th>
<th>Stage 0 (n=0)</th>
<th>Stage 1 (n=0)</th>
<th>Stage 2 (n=0)</th>
<th>Stage 3 (n=0)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypertension</td>
<td>5.7%</td>
<td>7.8%</td>
<td>9.1%</td>
<td>9.1%</td>
</tr>
<tr>
<td>Diabetes</td>
<td>5.5%</td>
<td>7.8%</td>
<td>9.1%</td>
<td>9.1%</td>
</tr>
<tr>
<td>COPD</td>
<td>3.0%</td>
<td>4.2%</td>
<td>5.1%</td>
<td>5.1%</td>
</tr>
<tr>
<td>Anemia</td>
<td>4.0%</td>
<td>5.1%</td>
<td>5.7%</td>
<td>5.7%</td>
</tr>
<tr>
<td>Arteriosclerotic Heart Disease (ASHD)</td>
<td>2.7%</td>
<td>3.5%</td>
<td>3.8%</td>
<td>3.8%</td>
</tr>
<tr>
<td>Cancer</td>
<td>2.7%</td>
<td>3.5%</td>
<td>3.8%</td>
<td>3.8%</td>
</tr>
<tr>
<td>DM</td>
<td>2.7%</td>
<td>3.5%</td>
<td>3.8%</td>
<td>3.8%</td>
</tr>
</tbody>
</table>