Evaluating the Reliability of Electronic Health Record Data for Chronic Diseases

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Background

Medical coding such as ICD codes are powerful tools for both clinical decision making and epidemiological research. ICD codes, captured in the HER, are not able to capture patient voices and may not accurately represent patient's perceived diagnosis, especially for chronic diseases.

Objectives

Evaluate how well EHR data captures patient's perceived chronic disease diagnosis in a Colorado-based primary care clinic.

Determine if there are individual characteristics that modify the relationship between patient self-reported and provider-reported disease.

Data

248 patients from a Colorado primary care clinic filled out the chronic condition checklist (CCC).

The CCC contains 15 high frequency chronic conditions and ask patients to indicate if they have a diagnosis for each condition.

Active ICD codes were collected for the sample.

Methods

ICD codes were mapped to chronic conditions using three commonly used tools, PheCodes, Charlson comorbidities, and Elixhauser comorbidities.

Concordance between patient self-reported chronic conditions and EHR-based indicators was measured using a diagnostic odds ratio for conditions with at least 10% (n=24) positive cases.

We searched for potential interactions between EHR indicators and individual characteristics (age, gender, etc.) using a novel technique, the sparsity-ranked LASSO.

Results

<table>
<thead>
<tr>
<th>Condition</th>
<th>Phecode Concordance</th>
<th>Charlson Concordance</th>
<th>Elixhauser Concordance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypertension</td>
<td>12.64</td>
<td>Increases with age</td>
<td>12.93</td>
</tr>
<tr>
<td>Chronic Respiratory Illness</td>
<td>19.18</td>
<td>Increases with age</td>
<td>19.51</td>
</tr>
<tr>
<td>Osteoarthritis</td>
<td>5.52</td>
<td>--</td>
<td>10.50</td>
</tr>
<tr>
<td>Depression</td>
<td>13.17</td>
<td>Decreases with age</td>
<td>Higher for males</td>
</tr>
</tbody>
</table>

Concordance was measured using a diagnostic odds ratio for conditions with at least 10% (n=24) positive cases. We searched for potential interactions between EHR indicators and individual characteristics (age, gender, etc.) using a novel technique, the sparsity-ranked LASSO.

Conclusion

When measuring patient's perceived chronic disease, the reliability of ICD codes varies by condition and patient demographics.