Identifying High Risk Patients for Readmission Using A Medication-based 15-day Readmission Risk Stratification Algorithm in A Tertiary Acute Care Hospital

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Introduction
- Identifying high risk patients for readmission allows for targeted use of intervention that may help to reduce preventable readmissions and healthcare burden.
- In Singapore, a prediction model[1] was recently developed with the aim to easily identify potentially avoidable early readmissions within 15 days post-discharge.

Objective
- Assess the model performance in predicting readmission 15 days post-discharge.
- Extrapolate and assess the model ability to predict for readmission 30 days post-discharge.

Methodology
- A prospective observational study, involving patients admitted to Alexandra Hospital (Sengkang Health) from Sep to Nov 2017.
- Admissions were pre-screened using the developed prediction model for risk of readmission.
- Patients likely (≥50% for readmission) and unlikely to readmit (<50% for readmission) were then randomly selected for recruitment daily in a 1:1 allocation ratio.

Inclusion criteria
- ≥21 years old
- Gave written informed consent

Exclusion criteria
- Readmission was planned.
- Had been terminally discharged to home or a terminal care facility.
- Medical records were inaccessible.
- Enrolled in a home visit program.
- Uncontactable during the 30-day follow up period.
- Voluntarily withdrawn consent to be contacted post-discharge.

Model Evaluation in Independent Validation Cohort and Original Study Cohort

<table>
<thead>
<tr>
<th></th>
<th>Sensitivity (%)</th>
<th>Specificity (%)</th>
<th>PPV (%)</th>
<th>NPV (%)</th>
<th>Correctly Classified (%)</th>
<th>C-statistic</th>
<th>Hosmer-Lemeshow</th>
<th>Brier Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-day readmission</td>
<td>61.5</td>
<td>52.0</td>
<td>14.3</td>
<td>91.2</td>
<td>53.1</td>
<td>0.64</td>
<td>7.28, p=0.507</td>
<td>0.26</td>
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<td>30-day readmission</td>
<td>62.5</td>
<td>53.1</td>
<td>18.2</td>
<td>89.5</td>
<td>54.5</td>
<td>0.65</td>
<td>6.85, p=0.553</td>
<td>0.26</td>
</tr>
</tbody>
</table>

From original study (cut off 50%)

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<thead>
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<th>Hosmer-Lemeshow</th>
<th>Brier Score</th>
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<tbody>
<tr>
<td>Derivation cohort</td>
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<td>85.1</td>
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<td>8.73, p=0.558</td>
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<td>94.4, p&lt;0.001</td>
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<tr>
<td>Geographical cohort</td>
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<td>60.9</td>
<td>-</td>
<td>-</td>
<td>60.4</td>
<td>0.64</td>
<td>390.1, p&lt;0.001</td>
<td>0.26</td>
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</tbody>
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