Barts Health NHS Trust
Preventing ED re-attendances by leveraging narrative data

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Founded 1123
Turnover £1.2B
Marmot Indicators for Local Authorities in England, 2014 - Tower Hamlets

The chart below shows key indicators of the social determinants of health, health outcomes and social inequality that broadly correspond to the policy recommendations proposed in Fair Society, Healthy Lives. Results for each indicator for this local authority are shown below. On the chart, the value for Tower Hamlets is shown as a circle, against the range of results for England, shown as a bar. For three indicators, local authority figures are not available and so only the regional value is reported.

### Health outcome indicators

<table>
<thead>
<tr>
<th>Health outcome indicators</th>
<th>Period</th>
<th>Local value</th>
<th>Regional value</th>
<th>England value</th>
<th>England worst</th>
<th>Range</th>
<th>England best</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthy life expectancy at birth - Male (years)</td>
<td>2010 - 12</td>
<td>52.5</td>
<td>63.2</td>
<td>63.4</td>
<td>52.5</td>
<td></td>
<td>70.0</td>
</tr>
<tr>
<td>Healthy life expectancy at birth - Female (years)</td>
<td>2010 - 12</td>
<td>57.2</td>
<td>63.6</td>
<td>64.1</td>
<td>55.5</td>
<td></td>
<td>71.0</td>
</tr>
<tr>
<td>Life expectancy at birth - Male (years)</td>
<td>2010 - 12</td>
<td>77.1</td>
<td>79.7</td>
<td>79.2</td>
<td>74.0</td>
<td></td>
<td>82.1</td>
</tr>
<tr>
<td>Life expectancy at birth - Female (years)</td>
<td>2010 - 12</td>
<td>82.0</td>
<td>83.8</td>
<td>83.0</td>
<td>79.5</td>
<td></td>
<td>85.9</td>
</tr>
<tr>
<td>Inequality in life expectancy at birth - Male (years)</td>
<td>2010 - 12</td>
<td>6.9</td>
<td></td>
<td>-</td>
<td>16.0</td>
<td></td>
<td>3.0</td>
</tr>
<tr>
<td>Inequality in life expectancy at birth - Female (years)</td>
<td>2010 - 12</td>
<td>3.3</td>
<td></td>
<td>-</td>
<td>11.4</td>
<td></td>
<td>1.3</td>
</tr>
<tr>
<td>People reporting low life satisfaction (%)</td>
<td>2012/13</td>
<td>6.7 *</td>
<td>6.3</td>
<td>5.8</td>
<td>10.1</td>
<td></td>
<td>3.4</td>
</tr>
</tbody>
</table>

### Giving every child the best start in life

<table>
<thead>
<tr>
<th></th>
<th>Period</th>
<th>Local value</th>
<th>Regional value</th>
<th>England value</th>
<th>England worst</th>
<th>Range</th>
<th>England best</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good level of development at age 5 (%)</td>
<td>2012/13</td>
<td>45.9</td>
<td>52.6</td>
<td>51.7</td>
<td>27.7</td>
<td></td>
<td>69.0</td>
</tr>
<tr>
<td>Good level of development at age 5 with free school meal status (％)</td>
<td>2012/13</td>
<td>42.6</td>
<td>43.1</td>
<td>36.2</td>
<td>17.8</td>
<td></td>
<td>60.0</td>
</tr>
</tbody>
</table>
Risk stratification

- Very high
- High
- Moderate
- Low
- Very low

QAdmission® algorithm

Co-ordinated care

- Reduce emergency attendances
- Reduce emergency admissions
- Improve outcomes
Target population for community-based intervention

- ≥ 1 ED attendance: 3,024
- ≥ 4 ED attendances: 510
- Total: 7,074
Reasons for attending the ED

56%

- Pain
- Shortness of breath
- Generally Unwell
- Fall
- Chest Pain
- Confusion
- Chest infection
Current algorithm

- Dependent on structured data in primary care record
- Focuses on medical problems
- Social history and functional status not included

Hypothesis

- Point of care narrative information = most accurate
- May indicate factors increasing risk of attendance

ED clerkings

- Barts Health ED: 7 years of electronic documents

NLP & ML

- Clinithink CliX ENRICH

The answer is in the data...?
Top 20 factors driving repeat attendance

- COPD Symptoms
- Heart Failure Symptoms
- Diabetes
- Care provided through informal routes
- Congestive heart failure
- COPD or IECOPD
- COPD
- Cancer
- Smoker
- Problematic ADL
- Impaired mobility
- Chronic kidney disease
- Signs of confusion
- Lives in supported home
- Transportation by ambulance
- Alcohol abuse
- Was not seen by general practitioner
- Inadequate community care available
- Was not seen by specialist
- Was not seen by pharmacist
Preliminary findings

• The method allows for encoding of free text narrative to identify features

• Further validation is underway

• The features can predict risk of multiple attendances to the ED with an accuracy of 83%
Next steps

• Apply methodology to real-time clinical situations to reduce frequency of attendance and improve outcomes

• Deeper examination of selected features

• Combine knowledge of presenting complaint with feature analysis