Using decision tree to identify the ITP with high probability of SLE development from a nationwide cohort study

Background and aims: Idiopathic thrombocytopenic purpura (ITP) is an immune-related thrombocytopenia which may herald the development of systemic lupus erythematosus (SLE), and thus regular follow up has been suggested. Whereas widespread surveillance on all ITP patients would be time and cost-consuming, therefore identifying those with high probability of development of SLE among ITP patients should be more practical.

Methods: We enrolled ITP patients without previous SLE diagnosis from the Taiwan National Health Insurance research database between 1997 and 2012 and identified those with SLE diagnosis during follow up. We also analysed the symptoms and comorbidities as well as the dose of average oral steroid to derive the decision trees, which classified the ITP patients with different probability of development of SLE.

Results: A total of 10,263 ITP patients were enrolled, among whom 80 patients developed SLE while following up. The whole ITP patients were allocated to development group (7186 patients including 57 with SLE) and validation group (3079 patients including 23 with SLE); the former was used for derivation of the decision-tree based model (Figure 1) and the latter for validation of the previously mentioned model (Figure 2), and provided high sensitivity (78.2%) and specificity (99.2%) and negative prediction value (99.8%). To reduce the complexity, we also proposed another models with different complexity parameters (Figure 3).

Conclusions: We derived different decision tree models exempt from the necessity of laboratory data and adequate for various clinical scenarios of ITP patients, among whom those with high probability of development of SLE could be identified.
Methods This was a retrospective cohort study (No. HO-15–16208) using the Japan Medical Data Centre claims database. Patients aged 15 to 65 years who had an SLE-related visit between April 2010 and March 2012 were identified, their first visit date was set as the index. Direct medical cost, comorbidities and treatments were collected during the three-year period from the index date. Disease severity and flare episode were determined by proxy algorithms defined with steroid dosage change, immunosuppressant use, or appearance of SLE-related symptoms.

Results Among 295 SLE patients identified as the study cohort, disease severity of mild, moderate, and severe was 28, 134, and 133 patients, respectively. Basic characteristics are shown in Table 1. Most patients (282 patients, 95.6%) experienced at least one flare episode and the mean (SD) frequency was 5.5 (3.3) times over the three-year study period. Recorded comorbidities (inflammations, cardiovascular diseases, etc) and medications (corticosteroid, NSAIDs, etc) are shown in Table 2 and 3. Most patients were treated with multiple drug classes. Additionally, mean direct medical cost per patient
was 2,913,509 JPY over the study period and ones by disease severity are shown in Figure 1.

Conclusions This study described the economic burden and clinical characteristics of Japanese SLE patients based on a claims database, which indicated a high level of disease burden.

Funding This study was funded by GlaxoSmithKline.

### Abstract 409 Figure 1 Direct medical cost over the three-year study period.

<table>
<thead>
<tr>
<th>Severity Level</th>
<th>Total (mil JPY)</th>
<th>Mild (mil JPY)</th>
<th>Moderate (mil JPY)</th>
<th>Severe (mil JPY)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean (SD)</td>
<td>2.91 (4.17)</td>
<td>0.72 (0.49)</td>
<td>1.69 (1.44)</td>
<td>4.61 (5.58)</td>
</tr>
<tr>
<td>Median</td>
<td>1.67</td>
<td>0.69</td>
<td>1.23</td>
<td>2.84</td>
</tr>
<tr>
<td>Min</td>
<td>0.08</td>
<td>0.08</td>
<td>0.15</td>
<td>0.21</td>
</tr>
<tr>
<td>Max</td>
<td>28.59</td>
<td>2.41</td>
<td>7.03</td>
<td>28.59</td>
</tr>
</tbody>
</table>

*ANOVA p<0.001 among severity groups

*Box plot diagram: Box bottom: 25 percentile, Box top: 75 percentile, Box middle bar: median, Lower whisker: minimum, Upper whisker: maximum (but limited to show upper limit 5 mil JPY)

### Background and aims
Systemic lupus erythematosus (SLE) is an autoimmune disease with a myriad of manifestations, that could vary among different ethnic and racial groups.

Aim of the study: To study the prevalence of various manifestations of SLE in an Egyptian population.

### Methods
Information in this study was derived from the medical records of SLE patients, who followed up in 2 private clinics in Cairo from January 1980 to June 2016.

**Results**
This study included 1109 SLE patients, of which 114 (10.3%) were males and 995 were females (89.7%). Age of onset showed a mean of 26±11.19 years, and the mean of disease duration was 48.78±58.46 months. The most common manifestations were synovitis (76.7%), malar rash (48.5%), leukopenia (45.7%), and photosensitivity (45.6%). At least one of the antiphospholipid antibodies was present in 41.8% of the patients, with thromboembolic manifestations and/or recurrent fetal loss present in 18.3% of the patients. Neuropsychiatric manifestations were evident in 7.8% of the patients, with seizures being the most common neuropsychiatric manifestation, present in 4%. 33.1% of the patients had nephritis, which succeeded the onset of the disease by a mean duration of 20±21.3 months. 29.3% of the patients continued follow up and received induction therapy according to the guidelines at the time of presentation (cyclophosphamide: 11.8%, mycophenolate mofetyl: 7.6%, and azathioprine: 9.8%). Of which, 24.9% continued follow up and achieved partial (9.9%) and complete (15%) remission.

**Conclusions**
Synovitis and malar rash were the most common manifestations in our study. Secondary antiphospholipid was present in 18.3% of the patients.