IBD Characterization

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OHDSI Community Call
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Background

- Inflammatory bowel diseases (IBD)
  - Crohn's disease, ulcerative colitis, indeterminate colitis
- Consistently increasing incidence rates
- Significant impact on patient’s and family quality of life

Kuenzig+ (2022). *Gastroenterology*
Goal, Study Design

• Goal: unified, global characterization of IBD patient cohorts
  • risk factors, symptoms, comorbidities, treatment pathways, outcomes

• Design: characterization study (à la CHARYBDIS), extracting multiple attributes in various time windows
Extracted Attributes (1)

- Demographics, condition groups, drug era groups
- 100+ IBD-specific (binary) attributes, examples
  - Risk factors: Family history of IBD, smoking
  - Related comorbidities: autoimmune diseases, malignancies
  - Symptoms: Diarrhea, abdominal pain, rectal bleeding
  - Lab tests: anemia, high CRP, high calprotectin
  - Complications: Death, hospitalization, extra-intestinal manifestations
  - Medications: immunomodulators, steroids, biologics; antibiotics, NSAIDs
  - Procedures: partial/total colectomy, colostomy, drainage of abscess
  - Vaccines: Pneumococcal, influenza, HPV, MMR
  - ...
Extracted Attributes (2)

• Time windows: entire history, 1y and 30d to index date; index date to 30d, 1y, 3y, 5y, and 10y, and entire follow-up

• Strata: follow-up time (1, 3, 5, and 10 years), sex, specific age groups, race, index date year (in 5-year windows), body mass index (BMI) categories, pregnancy

• Protocol, cohort defs, analysis code available at https://github.com/ohdsi-studies/IbdCharacterization
Preliminary results

- The Ajou University School of Medicine (AUSOM) data
- IQVIA Medical Research Data - UK

<table>
<thead>
<tr>
<th>Demographics</th>
<th>IBD AUSOM</th>
<th>IBD IMRDUK</th>
<th>Crohn’s disease AUSOM</th>
<th>Crohn’s disease IMRDUK</th>
<th>Ulcerative colitis AUSOM</th>
<th>Ulcerative colitis IMRDUK</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>1067</td>
<td>23852</td>
<td>402</td>
<td>6936</td>
<td>635</td>
<td>13924</td>
</tr>
<tr>
<td>Sex = Female</td>
<td>36.36%</td>
<td>51.07%</td>
<td>36.57%</td>
<td>54.44%</td>
<td>36.22%</td>
<td>49.12%</td>
</tr>
<tr>
<td>Very early onset (2-6y)</td>
<td>–</td>
<td>0.21%</td>
<td>–</td>
<td>0.25%</td>
<td>–</td>
<td>0.16%</td>
</tr>
<tr>
<td>Early onset (6-10y)</td>
<td>1.12%</td>
<td>0.70%</td>
<td>2.49%</td>
<td>1.27%</td>
<td>–</td>
<td>0.46%</td>
</tr>
<tr>
<td>Pediatrics</td>
<td>9.28%</td>
<td>6.05%</td>
<td>16.67%</td>
<td>10.90%</td>
<td>4.57%</td>
<td>3.74%</td>
</tr>
<tr>
<td>Age 18 - 65</td>
<td>81.26%</td>
<td>73.06%</td>
<td>73.63%</td>
<td>73.70%</td>
<td>86.46%</td>
<td>72.77%</td>
</tr>
<tr>
<td>Age &gt;= 65</td>
<td>8.06%</td>
<td>19.97%</td>
<td>6.47%</td>
<td>13.88%</td>
<td>8.66%</td>
<td>22.86%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Medications (index date – 1y)</th>
<th>IBD AUSOM</th>
<th>IBD IMRDUK</th>
<th>Crohn’s disease AUSOM</th>
<th>Crohn’s disease IMRDUK</th>
<th>Ulcerative colitis AUSOM</th>
<th>Ulcerative colitis IMRDUK</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-ASA exposure</td>
<td>81.70%</td>
<td>81.10%</td>
<td>72.90%</td>
<td>64.50%</td>
<td>88.30%</td>
<td>88.70%</td>
</tr>
<tr>
<td>IBD antibiotics exposure</td>
<td>21.60%</td>
<td>3.80%</td>
<td>31.60%</td>
<td>4.90%</td>
<td>14.60%</td>
<td>3.10%</td>
</tr>
<tr>
<td>Topical IBD steroid exposure</td>
<td>3.90%</td>
<td>1.40%</td>
<td>1.40%</td>
<td>5.30%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IBD biologics exposure</td>
<td>5.70%</td>
<td>0.10%</td>
<td>9.70%</td>
<td>0.30%</td>
<td>3.50%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Immunomodulator exposure</td>
<td>22.30%</td>
<td>19.40%</td>
<td>35.80%</td>
<td>35.00%</td>
<td>13.90%</td>
<td>11.90%</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Procedures (index date – 3y)</th>
<th>IBD AUSOM</th>
<th>IBD IMRDUK</th>
<th>Crohn’s disease AUSOM</th>
<th>Crohn’s disease IMRDUK</th>
<th>Ulcerative colitis AUSOM</th>
<th>Ulcerative colitis IMRDUK</th>
</tr>
</thead>
<tbody>
<tr>
<td>total colectomy procedure</td>
<td>1.60%</td>
<td>0.60%</td>
<td>2.00%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>partial colectomy procedure</td>
<td>4.50%</td>
<td>9.30%</td>
<td>2.50%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ileostomy procedure</td>
<td>–</td>
<td>1.20%</td>
<td>1.60%</td>
<td></td>
<td>–</td>
<td>1.10%</td>
</tr>
</tbody>
</table>

Full results: https://data.ohdsi.org/IbdCharacterization/
Summary

• Detailed description of disease trajectory in IBD patients
• Characteristics of Korean and British IBD cohorts; 3 Israeli hospitals (awaiting IRB approval) – join us!
• Setting the stage for related prediction and estimation research projects
Collaborators

Rambam Medical Center
• Ramit Magen-Rimon
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• Roni Weisshof

KI Research Institute
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• Maytal Bivas-Benita
• Pinchas Akiva

Ajou University
• Jimyung Park
• Rae Woong Park
• Kwang Jae Lee
• Sung Jae Shin

Ben-Gurion University
• Nadav Rappoport