Background
The prevalence of allergic diseases has increased worldwide over the past 50 years, particularly among young children. In the US alone, allergic rhinitis (AR) affects 40-60 million people. Up to 30% of American adults have AR, meaning AR affects 40-60 million people. The economic impact of AR in the US is significant, with estimates at nearly $34 billion annually. By modifying the underlying cause of the disease allergic immunotherapy (AIT) is the only causal treatment of AR and has been shown to be an effective treatment for reducing both symptoms of AR as well as the use of symptom relieving medication. In addition studies have shown an economic benefit associated with AIT. However, there remains a lack of real-world evidence gathered on treatment adherence, symptom relieving medication, and clinical outcomes among patients prescribed AIT.

Objective
To better understand current treatment patterns, healthcare costs and patient outcomes associated with AIT in the United States.

Methods
Sample Selection
This study was an observational, retrospective study of de-identified healthcare claims from the IBM MarketScan Commercial Database from January 1, 2014, through March 31, 2018. All patients were required to present ≥ 1 medical or prescription claims group. The remaining 2,231,323 patients had no AIT claims. The economic impact of AR in the US is significant, with estimates at nearly $34 billion annually. By modifying the underlying cause of the disease allergic immunotherapy (AIT) is the only causal treatment of AR and has been shown to be an effective treatment for reducing both symptoms of AR as well as the use of symptom relieving medication. In addition studies have shown an economic benefit associated with AIT. However, there remains a lack of real-world evidence gathered on treatment adherence, symptom relieving medication, and clinical outcomes among patients prescribed AIT.

Descriptive statistics were reported for all outcome measures and presented for the four cohorts. Differences in comorbidities were compared between groups via chi-square tests.

Results
Table 1. Patient Demographics

<table>
<thead>
<tr>
<th>Age (Year, SD)</th>
<th>NO AIT FILLS</th>
<th>ANY AIT FILLS</th>
<th>1 AIT FILL</th>
<th>6+ AIT FILLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>31.9%</td>
<td>34.2%</td>
<td>35.2%</td>
<td>35.4%</td>
</tr>
<tr>
<td>Female</td>
<td>36.2%</td>
<td>37.7%</td>
<td>39.3%</td>
<td>40.1%</td>
</tr>
<tr>
<td>Age Categories [%]</td>
<td>1-11</td>
<td>12-17</td>
<td>18-24</td>
<td>25+</td>
</tr>
<tr>
<td>1-11</td>
<td>14.6%</td>
<td>17.3%</td>
<td>19.6%</td>
<td>20.4%</td>
</tr>
<tr>
<td>12-17</td>
<td>29.6%</td>
<td>31.8%</td>
<td>33.8%</td>
<td>34.4%</td>
</tr>
<tr>
<td>18-24</td>
<td>37.1%</td>
<td>37.6%</td>
<td>37.8%</td>
<td>37.9%</td>
</tr>
<tr>
<td>25+</td>
<td>18.7%</td>
<td>13.9%</td>
<td>13.8%</td>
<td>11.4%</td>
</tr>
</tbody>
</table>

2,334,530 AR patients qualified for the study: 103,207 received AIT, with 16,278 of these in the 1 AIT claim group, and 71,580 in the 6+ AIT claims group. The remaining 2,231,323 patients had no AIT claims. The cohorts were similar demographically, with mean patient ages in the early 30s with a relatively even split between early and middle adulthood (Table 1). The 6+ AIT claims group presented significantly higher rates of the majority of comorbidities assessed at baseline compared to 1 AIT claims group, including asthma (33.1% vs. 22.4%), conjunctivitis (24.9% vs. 16.5%), sinusitis (34.2% vs. 25.4%), and chronic rhinitis (24.9% vs. 16.5%, ps < 0.001; Figure 1).

During the baseline period, AIT patients were more likely to fill prescription antihistamines (16.8% vs. 4.7%), decongestants (28.9% vs. 6.2%), and intranasal corticosteroids (36.9% vs. 11.3%), and to have an AR-related surgical procedure (4.1% vs. 0.9%). AIT patients also presented a baseline Charlson score which was twofold higher than the non-AIT group (0.45 ± 0.76 vs. 0.22 ± 0.66).

During the post-index period, non-AIT patients incurred lower total healthcare costs compared to AIT (mean = $37,815 ± $27,041 vs. $11,612 ± $7,787; Figure 2). Though increases in total healthcare costs were observed from pre- to post-index across all cohorts, the percentages changes were notably higher for the non-AIT group compared to AIT groups, with similar increases among the 1 and 6+ claims groups (Figure 2).

Healthcare utilization was similar for most service categories between AIT and non-AIT cohorts, though AIT patients were more likely to visit a specialist compared to non-AIT patients (58.7% vs. 26.3%), and also were more likely to have a surgical procedure (4.1% vs. 2.2%). Regardless, AIT-related expenditure did not account for a significant portion of total healthcare expenditure, though was greater among AIT patients (Figure 3).

Figure 1. Pre-existing Comorbidities at Baseline

Figure 2. Pre- and Post-Index Period Total Healthcare Costs By Cohort

Figure 3. Post-Index Healthcare Cost: AR-Related and All-Cause By Cohort

References
1. Burks AW et al., 2013.
4. Hankin CS et al., 2008.
5. Hankin CS et al., 2010.