The prevalence of both type 1 diabetes (T1DM) and type 2 diabetes (T2DM) continues to rise in the United States. As a result, future challenges with long-term management and the economic burden of complications and comorbidities are anticipated.

Current literature has reported that T1DM accounts for approximately 5-10% of all diagnosed cases of diabetes in adults, with the large majority of the remaining 90-95% being T2DM. However, there is currently little data on variation in rates of T1DM among subpopulations of patients with diabetes.

We reviewed available literature and developed an algorithm that was applied to a population of patients that had Medicare Advantage with Prescription Drug (MAPD) insurance. The rate of T1DM among all patients identified using this algorithm was approximately 2%.

In order to validate this algorithm, the same criteria were applied to a population of commercially insured patients for comparison.

**Objective**

It is anticipated that older populations have lower rates of T1DM due to the low rate of new T1DM diagnoses and the high rate of onset of T2DM. However, no literature is currently available describing how the rate of T1DM changes with age and other demographic factors. This study compares the rates of T1DM and T2DM within a large population of MAPD members and commercially insured adults with diabetes, stratified by insurance type, age, and geographic region in order to explore potential sources of heterogeneity.

**Methods**

MAPD and commercial members of Humana, a large managed care organization, were identified using the criteria described below. The total sample of patients with at least one claim for T1DM or T2DM not meeting any of the inclusion criteria was excluded as “undetermined.”

- **Inclusion Criteria:**
  - ≥1 medical claim with a diagnosis of secondary diabetes (ICD-9-CM code 249.xx) at any time during the baseline period
  - ≥1 medical claim with a diagnosis of gestational diabetes (ICD-9-CM code 648.xx) or pregnancy (650.xx-679.xx or v21.a-a.x) at any time during the study period

The identified study populations with T1DM and T2DM were stratified by age category, geographic region (North East, South, Mid-West, or West), and insurance type (MAPD or commercial insurance). The proportion of patients diagnosed with T1DM to T2DM is reported for each strata.

**Results**

Table 1. Rate of Type 1 and Type 2 Diabetes Stratified by Insurance Type

<table>
<thead>
<tr>
<th>Type 1 Diabetes</th>
<th>Type 2 Diabetes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Insurance Type</strong></td>
<td><strong>Type 1 Diabetes</strong></td>
</tr>
<tr>
<td><strong>Commercial</strong></td>
<td>&gt;0.0%</td>
</tr>
<tr>
<td><strong>MAPD</strong></td>
<td>&gt;0.0%</td>
</tr>
</tbody>
</table>

**Conclusions**

- The proportion of T1DM among adults with diabetes changes significantly with age and geographic region, and among MAPD patients appears to be significantly less than frequently referenced (5-10%).
- However, among commercially insured adults the rate of T1DM was within the reported range, suggesting that the algorithm employed here is not robust estimating the rate of T1DM among MAPD patients.
- The rate of T1DM varies widely among the commercially insured across geographic regions of the U.S. Those findings are consistent with previously-reported trends.

**Limitations**

- Similar to other retrospective database studies, this study is subject to limitations including coding errors of omission and commission, incomplete claims, unverifiable clinical coding, and unobservable factors that may also influence the outcomes.
- Many of the patients identified as having at least one diabetes diagnosis could not be classified using the algorithm described. It is unclear whether the ratio of T1DM to T2DM would be different among the unclassified patients.

**References**


Prepared at the Academy of Managed Care Pharmacy Annual Meeting | April 1-4, 2016 | Tampa, FL | Sponsored by Humana & Eli Lilly and Co.

**Methods Context**

**Inclusion Criteria:**

- Any patient with claims for T1DM and/or T2DM not meeting any of the inclusion criteria was excluded as “undetermined.”
- ≥1 medical claim with a diagnosis of secondary diabetes (ICD-9-CM code 249.xx) at any time during the baseline period
- ≥1 medical claim with a diagnosis of gestational diabetes (ICD-9-CM code 648.xx) or pregnancy (650.xx-679.xx or v21.a-a.x) at any time during the study period

- Patients meeting any of the following criteria during the baseline period will be classified as having T1DM:
  - ≥1 medical claim with a diagnosis of T1DM (ICD-9-CM codes 250.x1 or 250.x3), no gaps of 6 or more months in pharmacy claims for insulin, and no gaps of 6 or more months in pharmacy claims for oral antidiabetic medications
  - ≥1 pharmacy claim for urine acetone test strips (see Appendix C for related codes)

- Patients meeting any of the following criteria during the baseline period will be classified as having T2DM:
  - ≥1 pharmacy claim for a non insulin antidiabetic medication
  - ≥1 pharmacy claim for a non-insulin antidiabetic medication
  - ≥1 pharmacy claim for insulin antidiabetic medication

- Patients meeting any of the following criteria during the baseline period will be classified as having T2DM:
  - ≥1 pharmacy claim for a non insulin antidiabetic medication
  - ≥1 pharmacy claim for an insulin antidiabetic medication

- Patients meeting any of the following criteria during the baseline period will be classified as either having T1DM or T2DM: 1. ≥1 medical claim with a diagnosis of T1DM (ICD-9-CM code 250.x1 or 250.x3), no gaps of 6 or more months in pharmacy claims for insulin, and no gaps of 6 or more months in pharmacy claims for oral antidiabetic medications. 2. ≥1 pharmacy claim for urine acetone test strips (see Appendix C for related codes)