INTRODUCTION

- Understanding the regional epidemiology of asthma morbidity is important for:
  - Identifying potential regional causes of asthma morbidity
  - Planning and implementing interventions aimed at reducing the burden of asthma

- One area of the US that has received less attention in this regard is Travis County, TX, which has a large Latinx population and a unique environmental exposure profile, which may contribute to unique profiles of asthma morbidity.

- Objectives:
  - Map asthma-related ED visit and hospitalization PBIRs by race/ethnicity among children aged 0-17 years, 2001-2017 data.
  - Estimate population-based incidence rates (PBIRs) for asthma-related emergency department (ED) visits and hospitalizations for Travis County residents by:
    - Age (adults vs. children)
    - Race/Ethnicity (Non-Latinx White, Black/African American, and Latinx)
  - Census tract for adults and children overall
  - Map asthma-related ED visit and hospitalization PBIRs by race/ethnicity

METHODS

- We used data from the Texas Health Care Information Collection (THCIC) from 2016 and 2017 and the American Community Survey (ACS) to calculate population-based incidence rates.
- **Population Based Incidence Rates (PBIRs)**: PBIRs were calculated using combined 2016-2017 data. PBIRs are expressed per 10,000 person-years of corresponding observations.
- **Health Care Encounter Data**: Texas Health Care Information Collection (THCIC) is an administrative claims dataset collected from hospital records. Hospitals are required to report this information by Texas state law.
- **Data Quality**: The data contain variables such as ICD-10 diagnostic codes, the date of the emergency visit or hospitalization, demographic variables such as age, race, and ethnicity, and the patient’s residence at the census tract level.
- **Population Data**: The denominator for the incidence rate estimation was obtained from the American Community Survey (ACS). The data are for all Travis County residents for 2016 and 2017.
- **Statistical Analysis**: All statistical analyses were performed using the software program R version 3.5.1. PBIRs and significance tests were performed using the “epitools” package. Choropleth maps were created with the “sf” and “tmap” packages. When possible, we tested our estimates against national rate estimates (when no standard errors were available) or confidence intervals.
- **Mapping**: Choropleth maps of Travis county were made using census tract level PBIRs. Non-zero event counts less than ten are suppressed.

RESULTS

Table 1. Overall-population-based incidence rates for emergency department visits and hospitalizations for Travis County adults and children compared to national estimates (no SE reported for hospitalization)

<table>
<thead>
<tr>
<th></th>
<th>Adult PBIRs</th>
<th>Pediatric PBIRs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>National</td>
<td>2017 (1)</td>
</tr>
<tr>
<td>Emergency Department</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visits</td>
<td>50.5 [37.2, 63.4]</td>
<td>28.7 [27.3, 29.9]</td>
</tr>
<tr>
<td>Hospital Inpatient Stay</td>
<td>4.4 (3.4, 5.3)</td>
<td>3.1 (2.3, 3.9)</td>
</tr>
</tbody>
</table>

Table 2. Population-based incidence rates for emergency department visits and hospitalizations for Travis County children (<18 years) by race/ethnicity compared to national estimates where available.

<table>
<thead>
<tr>
<th></th>
<th>Non-Latinx White</th>
<th>Non-Latinx White</th>
<th>African American</th>
<th>African American</th>
<th>Latinx</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency Department</td>
<td>85.1 [79.0, 93.4]</td>
<td>77.6 [74.8, 80.7]</td>
<td>286.43</td>
<td>251.7 [282.8, 321.8]</td>
<td>554.4 [414.4, 646.7]</td>
</tr>
<tr>
<td>Hospital Inpatient Stay</td>
<td>22.97* (20.9, 25.2)</td>
<td>10.1* (9.4, 10.9)</td>
<td>44.3</td>
<td>33.3</td>
<td>5.6</td>
</tr>
</tbody>
</table>

Table 3. Population-based incidence rates for emergency department visits and hospitalization stays for Travis County adults by race and ethnicity. National estimates for adults by race-ethnicity not available.

<table>
<thead>
<tr>
<th></th>
<th>Non-Latinx White</th>
<th>African American</th>
<th>Latinx</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency Department</td>
<td>15.1 (14.4, 15.9)</td>
<td>106.2 [96.0, 116.7]</td>
<td>30.3</td>
</tr>
<tr>
<td>Hospital Inpatient Stay</td>
<td>2.0 (1.7, 2.3)</td>
<td>8.81 (7.6, 10.5)</td>
<td>3.88</td>
</tr>
</tbody>
</table>

CONCLUSIONS

- Travis County Residents Overall:
  - Asthma-related ED visits and hospitalization rates are similar or less than national incidence rates except for hospitalizations among children.
- Asthma-related ED and hospitalization rates among the Travis County:
  - Non-Latinx White population are similar or less than rates among the US Non-Latinx White population, except for hospitalization rates among white children, which were higher than rates among US Non-Latinx White children.
  - African American population are similar to rates within the US African American population.
  - Latinx population are less than rates among the US Latinx population.
- Spatial Distribution:
  - The highest asthma-related ED visit and hospitalization rates are observed in eastern Travis County, where tracts with higher poverty rates are clustered.
  - The spatial distribution of asthma-related ED visits is similar across all racial and ethnic groups.

IMPLICATIONS

- Travis County Children:
  - Travis County children have a higher hospitalization rate than US children.
  - Potential explanations:
    - Different criteria for admission?
    - More severe exacerbations?
- Racial & Ethnic Disparities:
  - Disparities between African American and White populations in Travis County are similar to national disparities.
  - Travis County Latinx population seems to be at lower risk than US Latinx.
- Spatial Distribution:
  - The spatial distribution of asthma morbidity is similar among racial and ethnic groups, suggesting that asthma morbidity could be due to spatial factors such as poverty and/or poverty-related factors such as environmental exposures.
- Public Health Interventions:
  - Public health interventions should focus on children, minority populations, and areas with disproportionate morbidity in Eastern Travis County.

REFERENCES