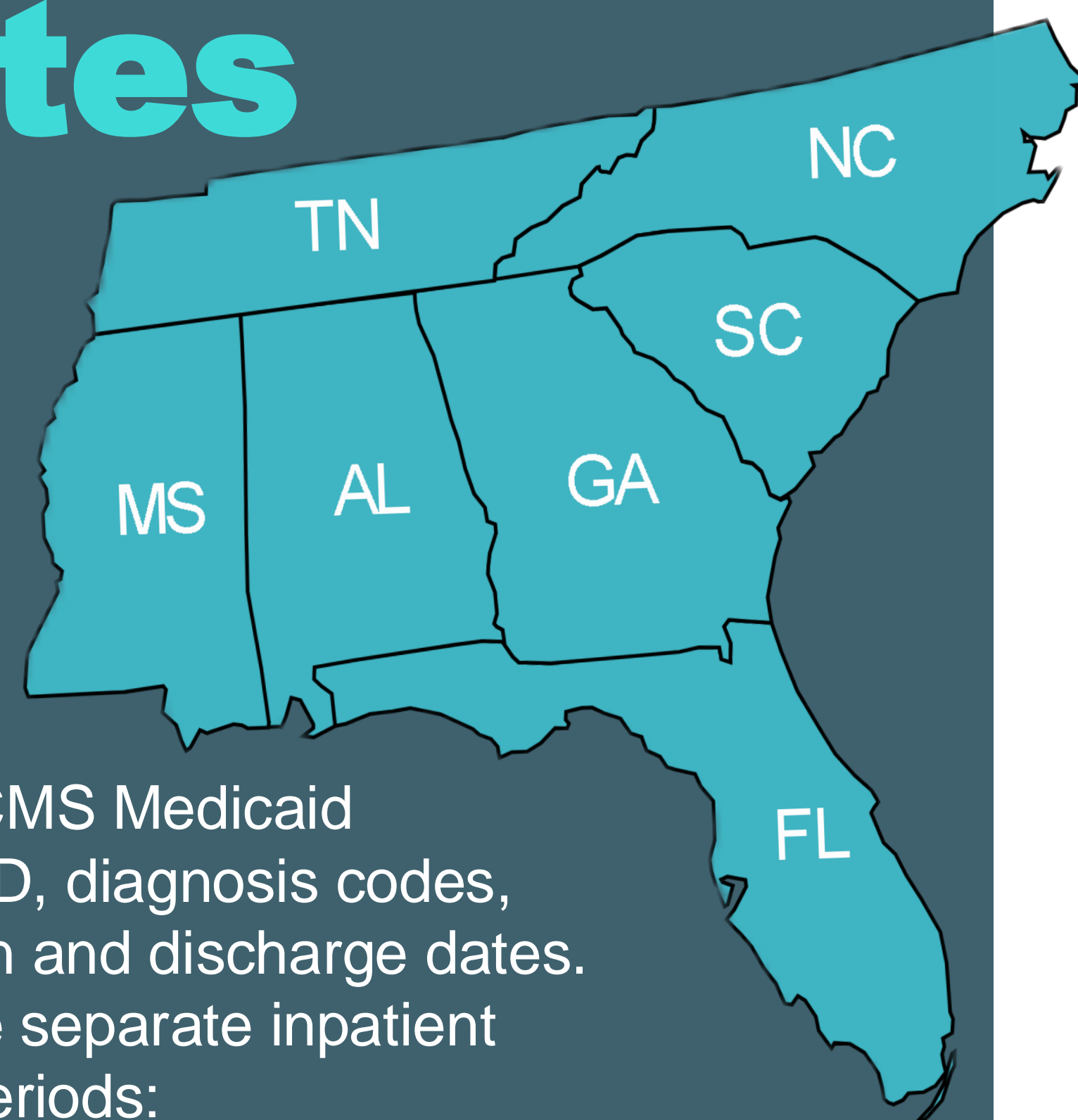


# Comparative Insights of Diabetes Analysis from South-Eastern States

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## Affiliations

Research done in partnership with Dr. Shihao Yang through sponsor CMS (Center for Medicaid & Medicare Service) under Georgia Tech's H. Milton Stewart School of Industrial and Systems Engineering.



## The Approach

Column	Type
patient_id	varchar(40)
BENE_ID	varchar(15)
STATE_CD	varchar(2)
state_key	int
YR_NUM	int
EL_DOB	date
EL_SEX_CD	varchar(1)
EL_RACE_ETHNICY_CD	varchar(1)
DIAG_CD_1	varchar(8)
DIAG_CD_2	varchar(8)

The Inpatient table in the CMS Medicaid database captures patient ID, diagnosis codes, procedure codes, admission and discharge dates. From this we've made three separate inpatient tables for different record periods:

- inpatient (2005-2012)
- inpatient1315 (2013-2015)
- inpatient\_taf (2016-2020)

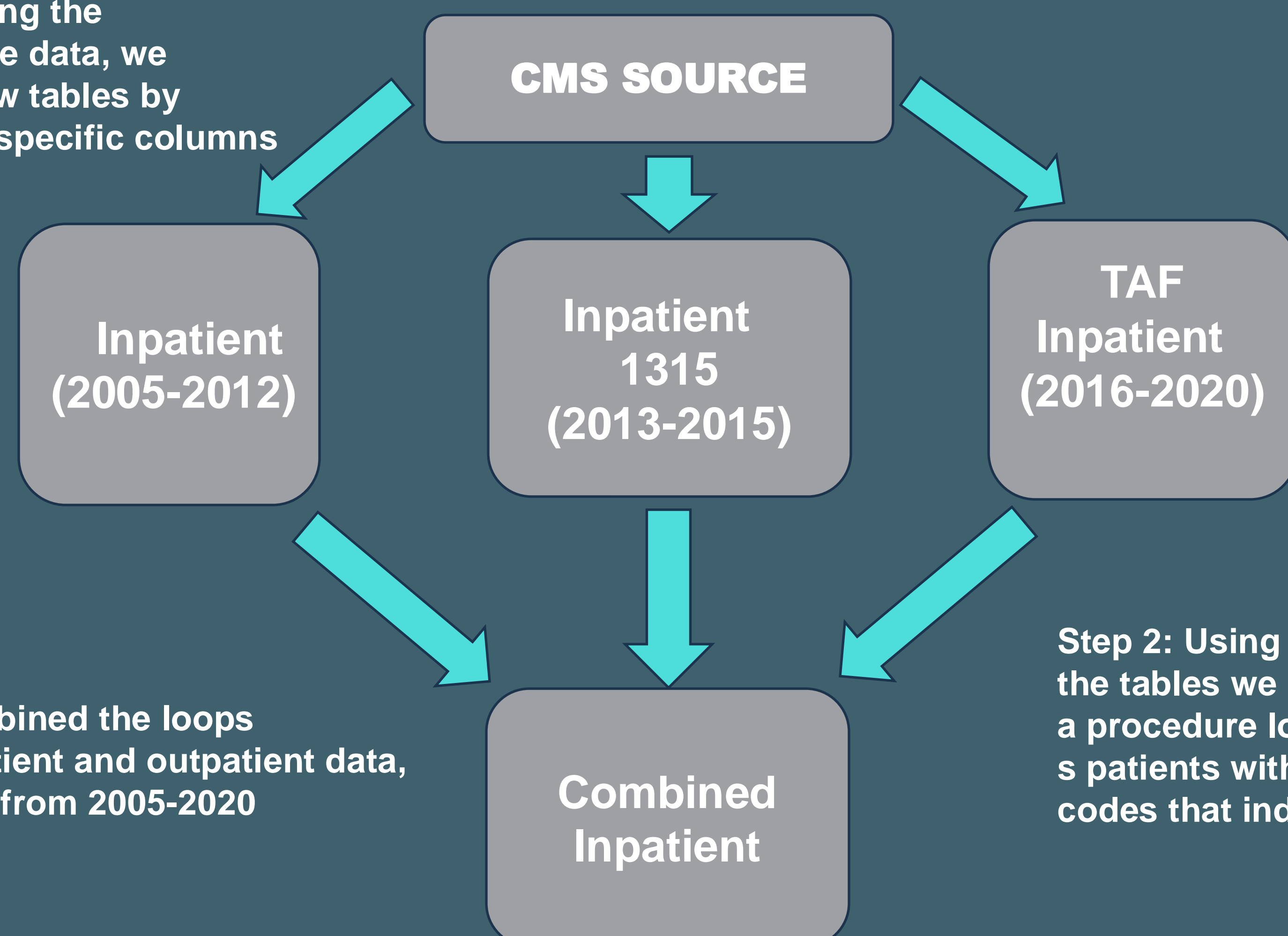
\*Inpatients are patients who are admitted to the hospital for at least one night for extensive care\*

- Every **Inpatient** has a discharge code when leaving the hospital.
- These **codes** are used to classify and document the reason for the hospital stay & condition(s) treated during the visit.
- They are called **ICD-9 & ICD-10**.

```
from cms_source.taf_inpatient_header
where STATE_KEY = st_key
and RFRNC_YR = year_num
and (DGNS_CD_1 like '250.0%' OR DGNS_CD_1 like '250.2%' OR
      OR DGNS_CD_2 like '250.0%' OR DGNS_CD_2 like '250.2%'
      OR DGNS_CD_3 like '250.0%' OR DGNS_CD_3 like '250.2%'
      OR DGNS_CD_4 like '250.0%' OR DGNS_CD_4 like '250.2%'
      OR DGNS_CD_5 like '250.0%' OR DGNS_CD_5 like '250.2%'
      OR DGNS_CD_6 like '250.0%' OR DGNS_CD_6 like '250.2%')
```

## Data Processing

Step 1: Using the CMS source data, we created new tables by extracting specific columns



Step 3: We combined the loops for inpatient and outpatient data, ranging from 2005-2020

Step 2: Using the tables we created, we set up a procedure loop, which identifies patients with ICD-9 & 10 codes that indicate diabetes

## The Problem

Diabetes Type 2 is a chronic condition affecting millions of youth and young adults. Understanding the longitudinal treatment outcomes and healthcare utilization patterns among Medicaid users is crucial for improving care and policy making.

## Why Do We Care?

Evaluating longitudinal treatment outcomes can help identify gaps in care, disparities in healthcare access, and provide insights for targeted interventions to improve health outcomes for adults with diabetes.

## Key Findings

### Proportion of Severe Complications:

$$\text{Proportion of Severe Cases} = \frac{\text{Total Severe Complications}}{\text{Total Diagnoses}} \times 100\%$$

$$\text{Proportion of Severe Cases} = \frac{178}{566} \times 100\% \approx 31.4\%$$

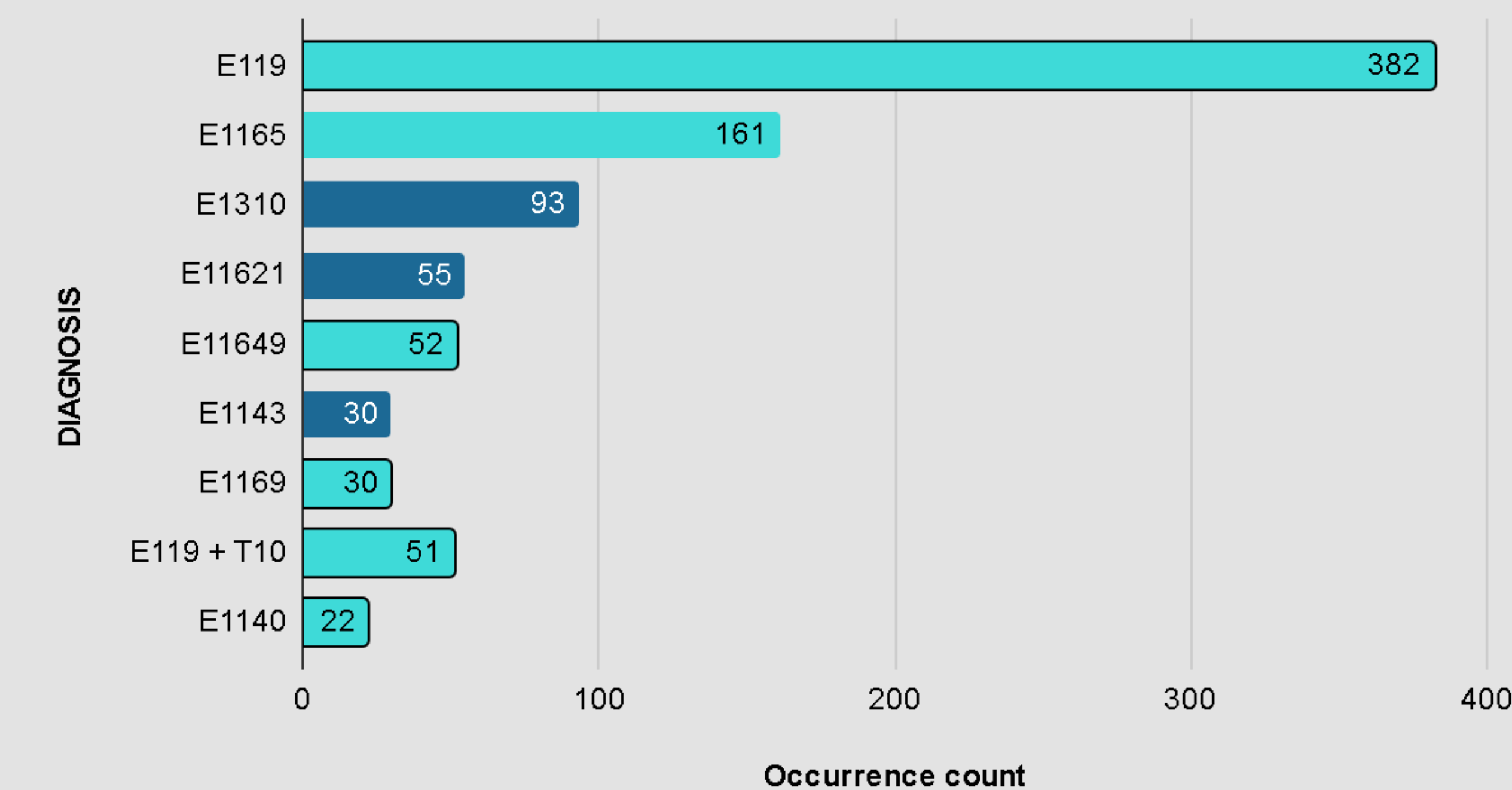
### Relative Frequency of Each Severe Complication:

$$\text{Type 2 Diabetes with keto-acidosis without coma} = \frac{93}{566} \approx 16.4\%$$

$$\text{Type 2 Diabetes with foot ulcer} = \frac{55}{566} \approx 9.7\%$$

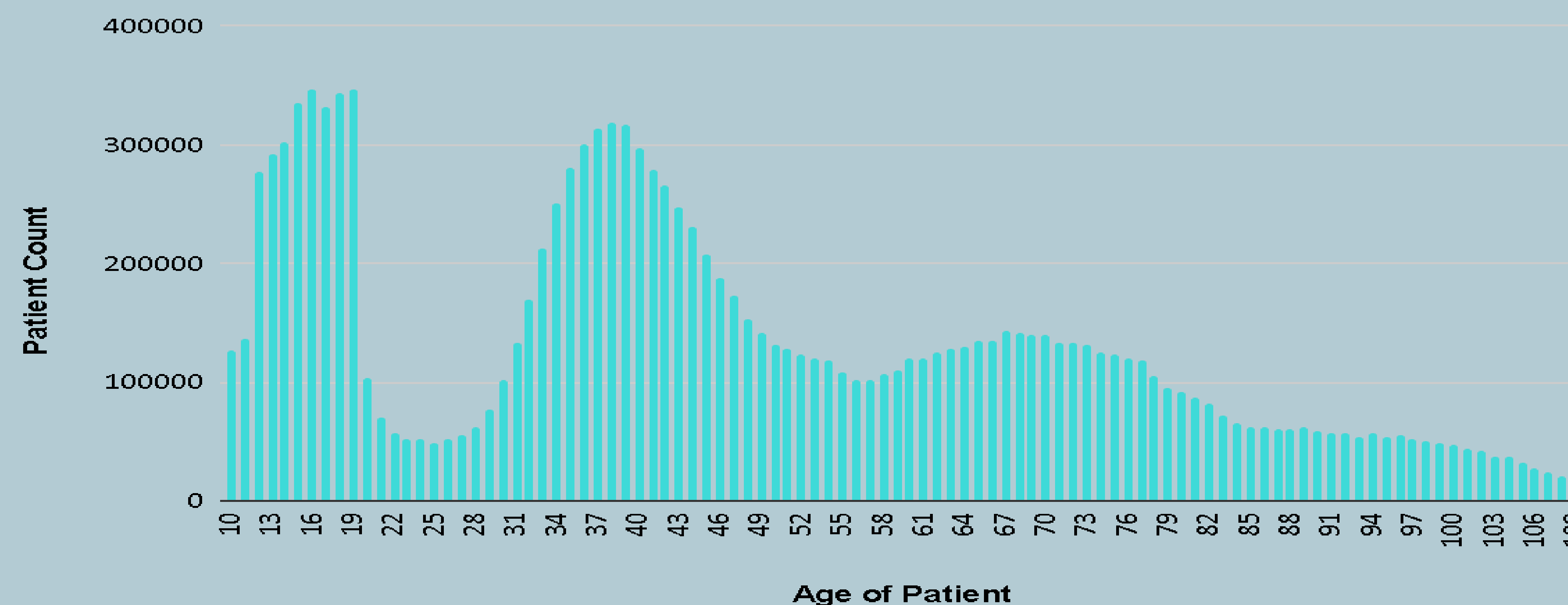
$$\text{Type 2 Diabetes with diabetic autonomic (poly)neuropathy} = \frac{30}{566} \approx 5.3\%$$

### Inpatient Diagnosis Count



The bar chart shows significant peaks in diabetes patients in their early teens and early thirties, with a secondary peak around ages 50-54, followed by a steady decline in older age groups. These trends suggest targeted healthcare interventions are needed for specific age groups to manage and prevent diabetes effectively.

### Diabetes Patients by Age



## Conclusion

This study aimed to evaluate the longitudinal healthcare utilization patterns among youth and young adult Medicaid users with diabetes across different geographic regions. By analyzing diabetes-related inpatient Medicaid claims data over time, stratified by age, we were able to compare health service utilization and assess the impact of disease management on the incidence of severe outcomes. Our findings provide insights into the regional disparities and age-related trends in healthcare utilization among this population, highlighting the importance of targeted interventions and effective disease management strategies to reduce severe outcomes in diabetic youth and young adults. As there is increasing prevalence in Type 2 Diabetes, we are continuing to find faster, more efficient ways of detection and treatment.



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