### **Healthcare Data Dashboard Project**

## **Overview**

This project leverages the Synthea synthetic healthcare dataset to create an interactive dashboard for analyzing patient demographics, psychiatric diagnoses, treatment patterns, and healthcare utilization. The dashboard provides visualizations and insights to explore age group distributions, psychiatric diagnosis rates, PHQ-9 scores, depression treatment gaps, and the frequency of CPT code utilization for psychiatric conditions.

## **Approach**

1. **Data Preprocessing**
   * Imported and cleaned multiple datasets, including patients, conditions, medications, observations, and procedures.
   * Handled missing data by excluding incomplete rows or imputing values where appropriate.
   * Added derived fields such as AGE, AGE\_GROUP, and TREATMENT\_DELAY to facilitate analysis.
2. **Analysis Steps**
   * **Age Group Distribution**: Calculated patient ages from BIRTHDATE and categorized them into predefined age groups.
   * **Psychiatric Diagnoses**: Identified psychiatric conditions using ICD-10 codes for depression, anxiety, and schizophrenia.
   * **PHQ-9 Scores**: Extracted patients with PHQ-9 scores above 10 and linked them to their diagnoses.
   * **Depression Treatment Analysis**: Determined if patients diagnosed with depression received antidepressant medications within 90 days.
   * **CPT Code Utilization**: Analyzed procedure codes for patients with psychiatric-related diagnoses to identify trends.
3. **Tools Used**
   * **Data Processing**: Python with pandas and numpy.
   * **Visualization**: matplotlib, seaborn, and plotly.
   * **Dashboard Framework**: streamlit for an interactive and user-friendly interface.
4. **Insights**
   * A significant proportion of patients fall into the 19–64 age group.
   * Many patients with psychiatric diagnoses, particularly depression, experience delays in receiving treatment.
   * PHQ-9 scores are strongly correlated with depression diagnoses but are not consistently monitored across patients.
   * Certain CPT codes are used predominantly for psychiatric care, highlighting procedural trends.