HEALTHCARE INSURANCE DATA TRANSPARENCY

Course: BUAN 6390.001 Analytics Practicum
Mentor: Vijay Koneru

Group Members: Shreyance Jain, Sowmya Kothari, Hao-Yu Chou, Swastik Bhatnagar, Apurva Jagtap, Paridhi Pandey, Aditya Kulkarni, Sarthak Verma

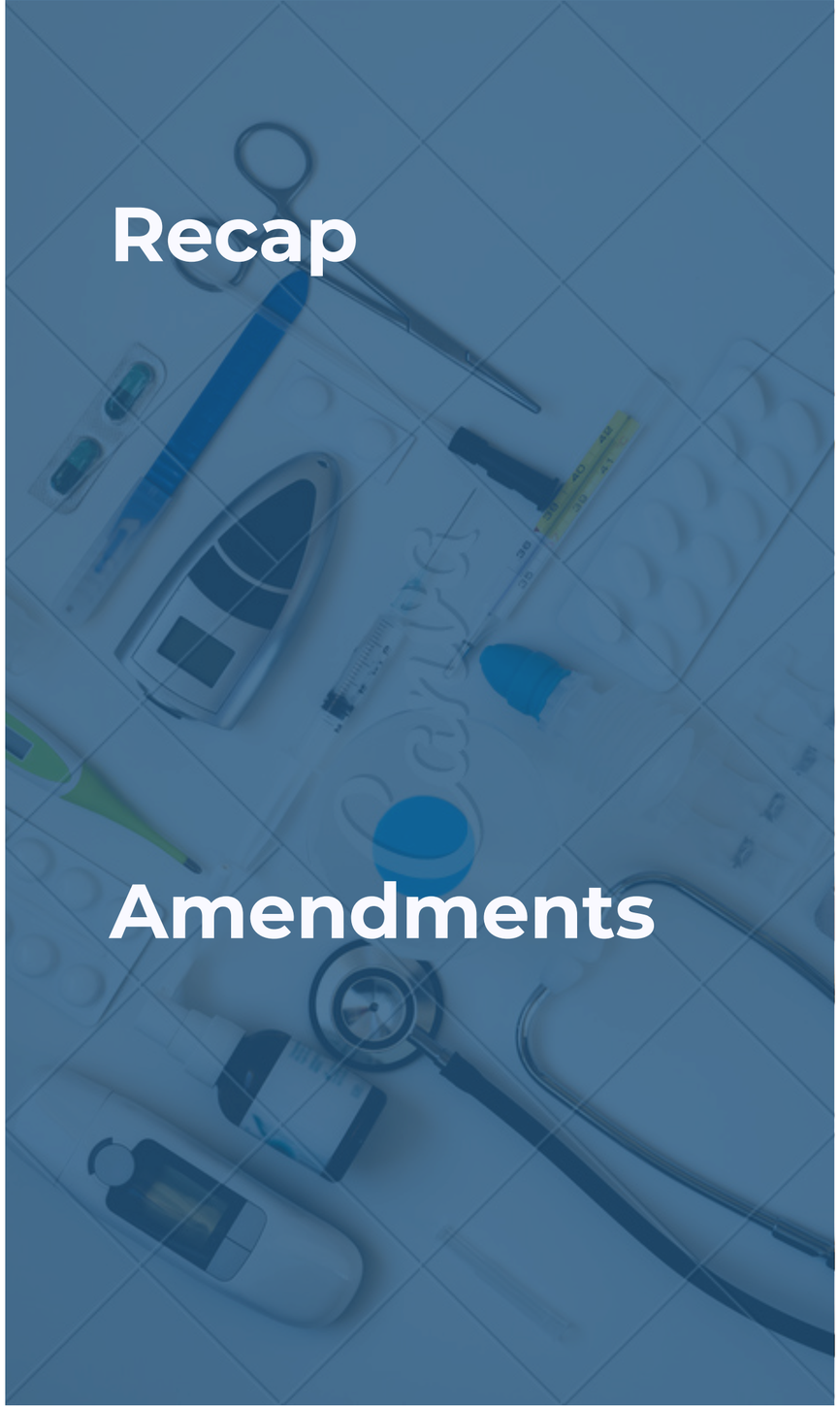
Group 7

Problem Statement

The U.S. healthcare system lacks price transparency, making it difficult for patients to compare treatment costs before receiving care. The Healthcare Insurance Data Transparency Initiative addresses this issue by analyzing price variations among hospitals and insurers in three major regions—Miami-Fort Lauderdale-Pompano Beach, FL; Philadelphia-Camden-Wilmington, PA-NJ-DE-MD; and Tampa-St. Petersburg-Clearwater, FL.

Objective

The project aims to provide a centralized, standardized dataset of hospital- and insurer-specific procedure pricing to support informed decision-making, enhance transparency, and promote affordability in healthcare.



Recap

- 3 Regions (Miami, Tampa, Philadelphia)
- 16 Hospitals
- 2.2 Million Records
- Exploratory Data Analysis
- Visualizations

Amendments

Focusing on 5 areas

- Increasing data size for the project
- Cleaning the collected data
- Moving data from CoLab to online cloud platforms for scalability
- Creating pipeline for automation on the cloud platform
- Improving the hospitalization pricing tool

Pipeline

Azure
Databricks

Azure
Blob Storage

Bronze

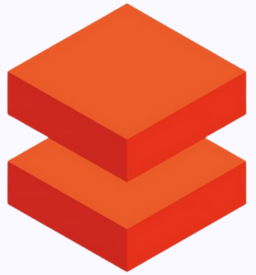
Loaded data into databricks

Silver

Cleaned data, integrated datasets into unified frame, standardized schemas

Gold

Performed EDA, aggregations



Databricks serverless SQL Warehouse

Stored data as Delta table

Challenges

Challenges with open source tools

- Integration requires manual setup and tool integration.
- Managing dependencies and ensuring compatibility between tools is time-consuming.
- Handle cluster setup, scaling, monitoring, and failure recovery manually.
- Multiple users collaboration in shared notebooks with real-time editing was difficult.

Challenges with data transfer to cloud

Library Compatibility

- Colab often utilizes specific versions of libraries (e.g., TensorFlow, Keras) that may not be pre-installed or compatible with Databricks.

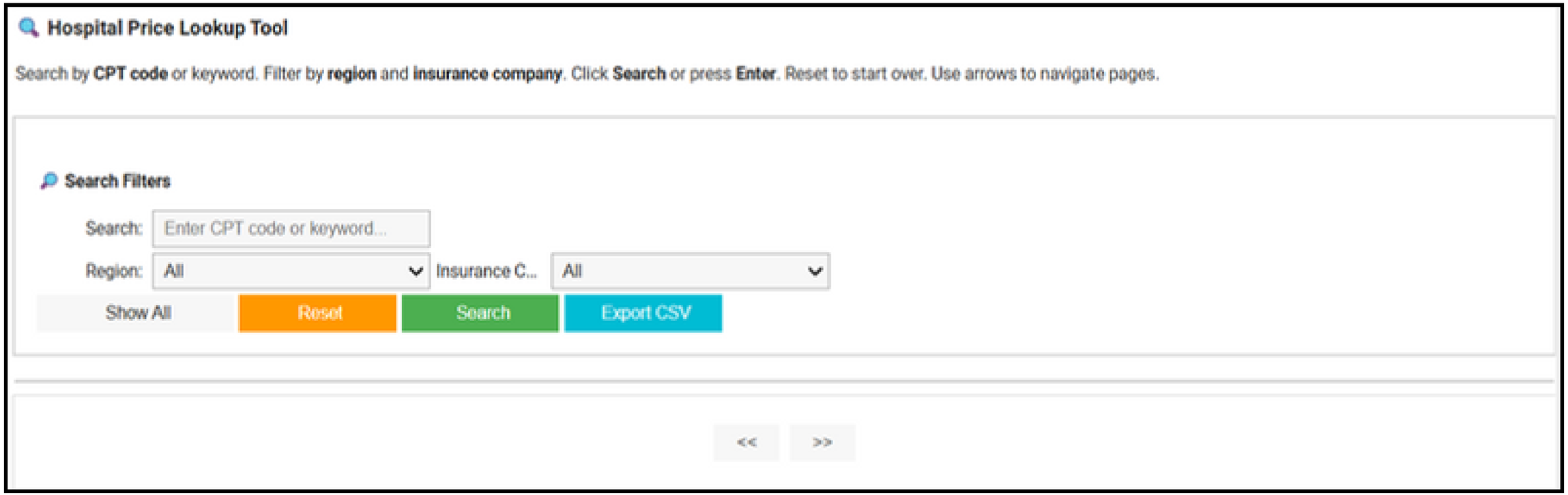
Environment Differences

- Colab provides a specific environment with pre-installed packages and configurations, which may differ from Databricks' environment.

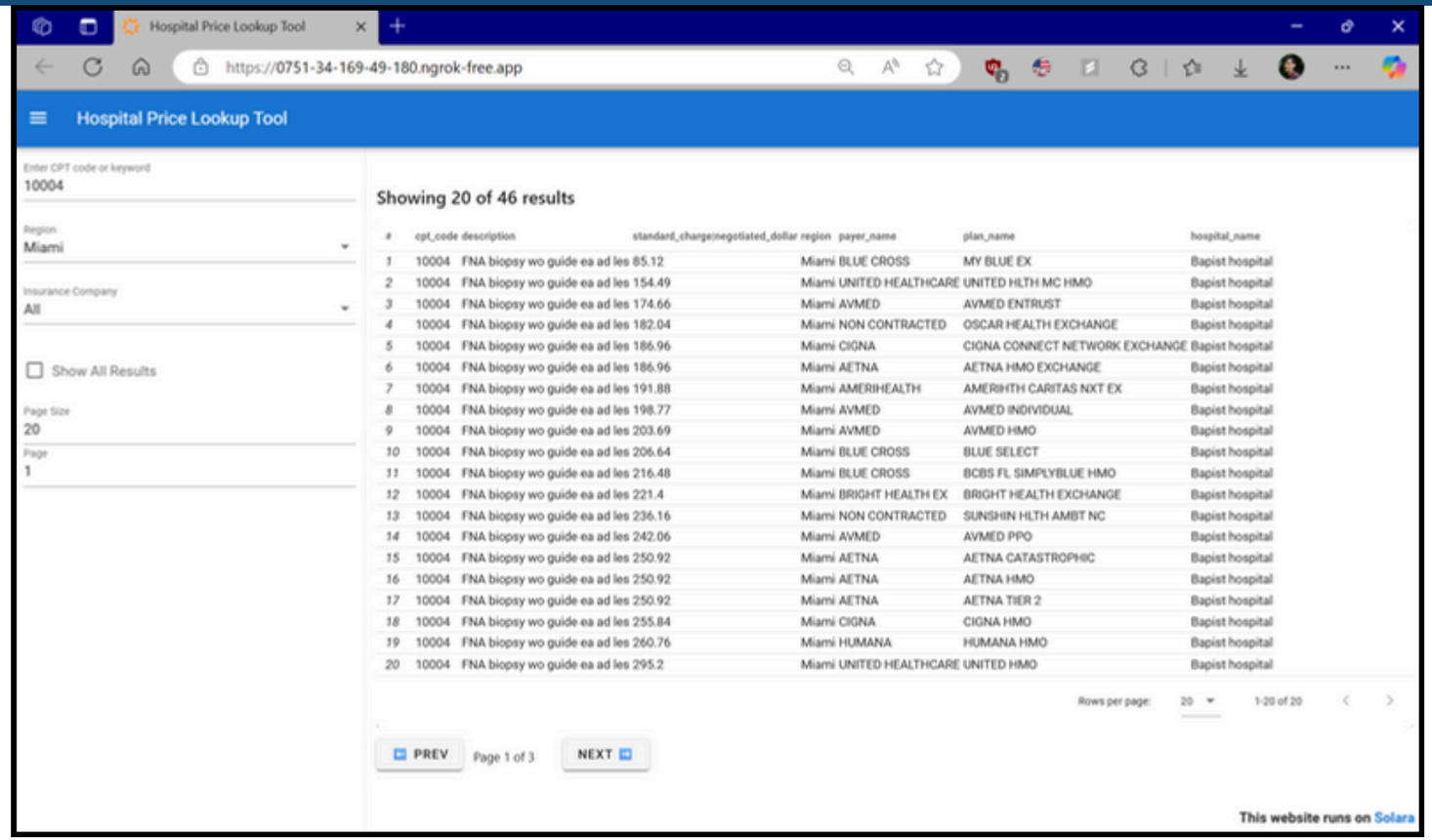
Magic Commands and Cell Markers

- Colab supports magic commands (e.g., %time) and specific cell markers that may not be recognized by Databricks.
- Replaced or remove unsupported magic commands.

Widget


Hospital Price Lookup Tool
Search by CPT code or keyword. Filter by region and Insurance company. Click Search or press Enter. Reset to start over. Use arrows to navigate pages.
Search Filters
Search:
Enter CPT code or keyword...
Region:
All
Insurance C...
All
Show All
Reset
Search
Export CSV
<<
>>

Widget


Hospital Price Lookup Tool
https://0751-34-169-49-180.ngrok-free.app
Hospital Price Lookup Tool
Enter CPT code or keyword
10004
Region
Miami
Insurance Company
All
Show All Results
Page Size
20
Page
1
Showing 20 of 46 results
cpt_code description standard_charge|negotiated_dollar region payer_name plan_name hospital_name
1 10004 FNA biopsy wo guide ea ad les 85.12 Miami BLUE CROSS MY BLUE EX Bapist hospital
2 10004 FNA biopsy wo guide ea ad les 154.49 Miami UNITED HEALTHCARE UNITED HLTH MC HMO Bapist hospital
3 10004 FNA biopsy wo guide ea ad les 174.66 Miami AVMED AVMED ENTRUST Bapist hospital
4 10004 FNA biopsy wo guide ea ad les 182.04 Miami NON CONTRACTED OSCAR HEALTH EXCHANGE Bapist hospital
5 10004 FNA biopsy wo guide ea ad les 186.96 Miami CIGNA CIGNA CONNECT NETWORK EXCHANGE Bapist hospital
6 10004 FNA biopsy wo guide ea ad les 186.96 Miami AETNA AETNA HMO EXCHANGE Bapist hospital
7 10004 FNA biopsy wo guide ea ad les 191.88 Miami AMERIHEALTH AMERIHTH CARITAS NXT EX Bapist hospital
8 10004 FNA biopsy wo guide ea ad les 198.77 Miami AVMED AVMED INDIVIDUAL Bapist hospital
9 10004 FNA biopsy wo guide ea ad les 203.69 Miami AVMED AVMED HMO Bapist hospital
10 10004 FNA biopsy wo guide ea ad les 206.64 Miami BLUE CROSS BLUE SELECT Bapist hospital
11 10004 FNA biopsy wo guide ea ad les 216.48 Miami BLUE CROSS BCBS FL SIMPLYBLUE HMO Bapist hospital
12 10004 FNA biopsy wo guide ea ad les 221.4 Miami BRIGHT HEALTH EX BRIGHT HEALTH EXCHANGE Bapist hospital
13 10004 FNA biopsy wo guide ea ad les 236.16 Miami NON CONTRACTED SUNSHIN HLTH AMBT NC Bapist hospital
14 10004 FNA biopsy wo guide ea ad les 242.06 Miami AVMED AVMED PPO Bapist hospital
15 10004 FNA biopsy wo guide ea ad les 250.92 Miami AETNA AETNA CATASTROPHIC Bapist hospital
16 10004 FNA biopsy wo guide ea ad les 250.92 Miami AETNA AETNA HMO Bapist hospital
17 10004 FNA biopsy wo guide ea ad les 250.92 Miami AETNA AETNA TIER 2 Bapist hospital
18 10004 FNA biopsy wo guide ea ad les 255.84 Miami CIGNA CIGNA HMO Bapist hospital
19 10004 FNA biopsy wo guide ea ad les 260.76 Miami HUMANA HUMANA HMO Bapist hospital
20 10004 FNA biopsy wo guide ea ad les 295.2 Miami UNITED HEALTHCARE UNITED HMO Bapist hospital
Rows per page: 20
1-20 of 20
PREV
Page 1 of 3
NEXT
This website runs on Solara

Key Insights

01 Major cost differences for the same procedures.

02 Inconsistent transparency between providers.

03 Some Cities showed higher costs overall.

04 Flagged unusually high-cost providers.

For The Future

Expand to All Hospitals

Extend the widget's availability to hospitals nationwide.

Integrate into Health Portals

Embed the widget into existing health portals for seamless access.

Add Filters

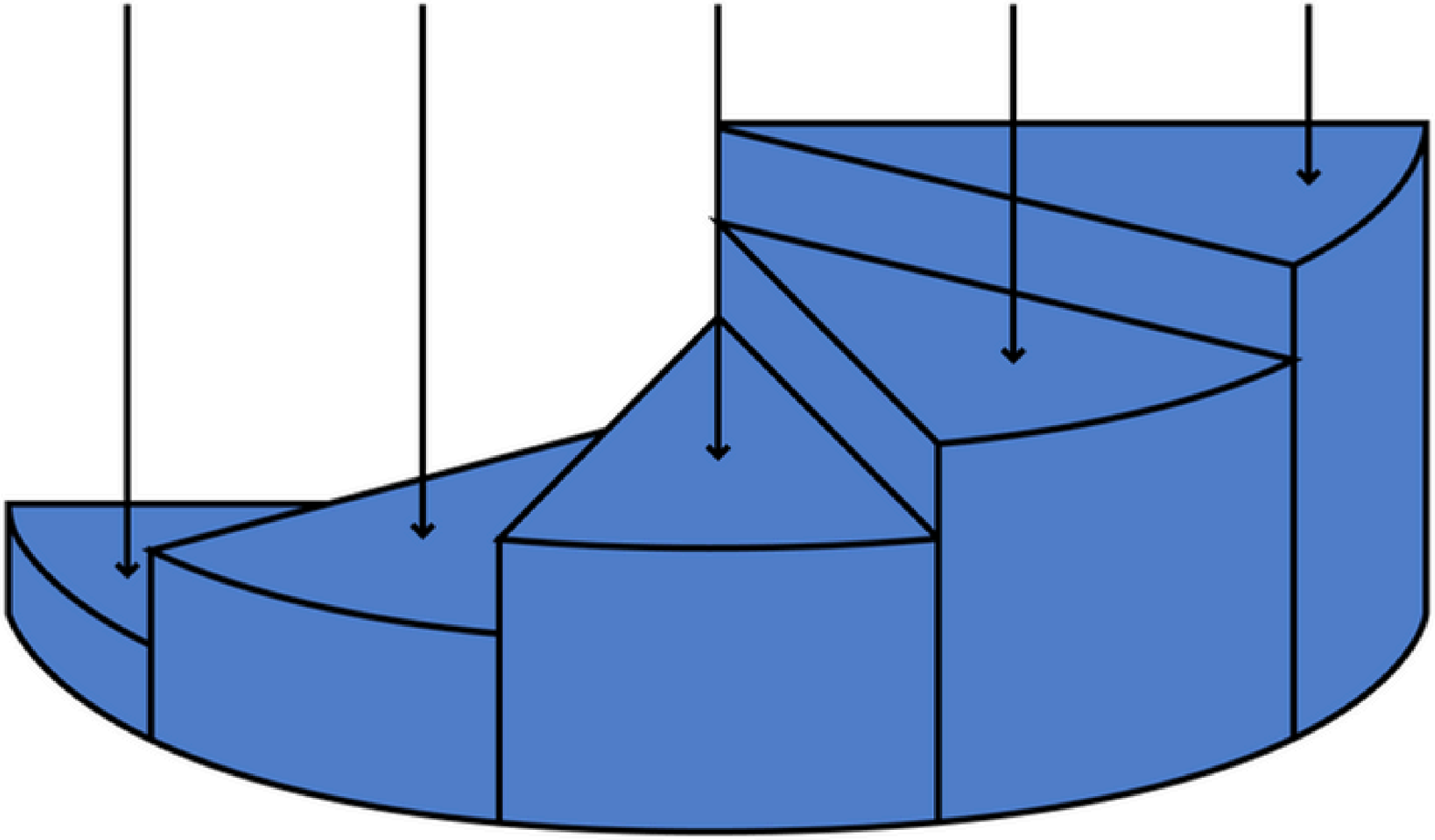
Implement filters for insurance, city, and procedure to refine searches.

Enable Real-Time Updates

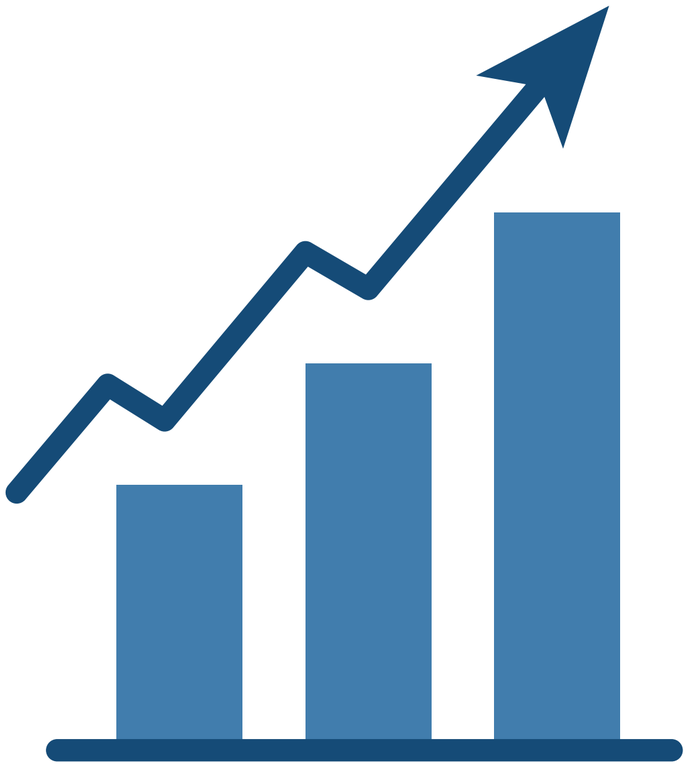
Ensure data is updated in real-time for accurate information.

Build Analytics Tools

Develop tools for policy-focused analytics to enhance decision-making.



Scalabilty



- **Data: Use cloud storage (Azure) for national datasets.**
- **Widget: Host as a modular web app (e.g., Streamlit, Flask).**
- **Rollout:**
  Phase 1: Top 10 metro areas
  Phase 2: All CMS hospitals
  Phase 3: Public API access
- **Growth: Serve patients, insurers, and government agencies.**

Thank you!