

Healthcare Claims Management Company Analysis Project

- By Avinash Rai



Contents

03

Introduction

04

Problem Statement

05

SQL Analysis

10

Dashboard Creation

17

SQL Analysis Insights Report

18

Dashboard Insights Report



Introduction

- Analytical Enthusiast: Skilled in data analysis, visualization, and extracting actionable insights to support informed decision-making.]
- Project Experience: Hands-on experience in working on diverse data-driven projects, with tools like Python, SQL, Excel, Tableau and Power BI.
- Lifelong Learner: Committed to continuous learning and growth, with a focus on applying knowledge to solve real-world problems.



Problem Statement

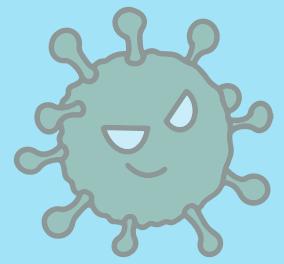
As a Data Analyst for a healthcare claims management company, you are tasked with analyzing claims data to provide actionable insights and build interactive dashboards. The dataset contains information about inpatient and outpatient claims, beneficiary demographics, and healthcare providers, offering a comprehensive view of the healthcare system.



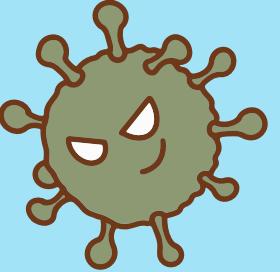
Phase 1: SQL Analysis – Healthcare Claims Data

01
Phase 2: Dashboard Creation – Power BI

02
Phase 3: Insights Report from SQL Analysis and Dashboard



SQL ANALYSIS



Objective:

To extract key insights from healthcare claims data using SQL queries for better understanding and decision-making.

Tasks and Questions:

1. Claims Analysis:

Retrieve the total amount reimbursed (InscClaimAmtReimbursed) for inpatient claims grouped by provider.

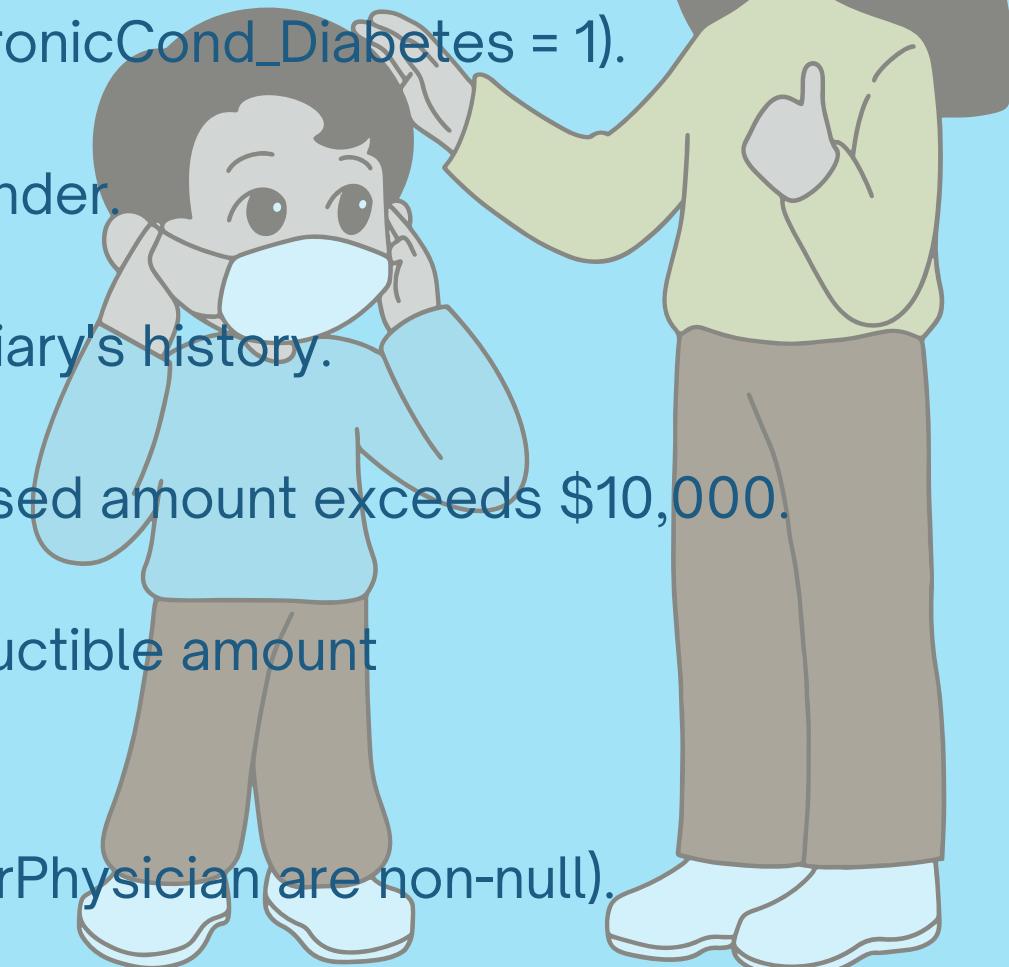


2. Provider Insights:

Identify the top 5 providers with the highest number of outpatient claims.

3. Chronic Conditions:

Find the number of beneficiaries with claims associated with chronic conditions like diabetes (ChronicCond_Diabetes = 1).



4. Gender-Based Analysis:

Calculate the average inpatient claim amount reimbursed (InscClaimAmtReimbursed) for each gender.

5. Beneficiary History:

Retrieve all claims (inpatient and outpatient) for a specific BenID to analyze an individual beneficiary's history.

6. High-Value Claims:

Identify providers with claims where the admission date (AdmissionDt) is in 2009 and the reimbursed amount exceeds \$10,000.

7. Demographic Analysis:

Combine beneficiary demographic information with inpatient claims to calculate the average deductible amount (IPAnnualDeductibleAmt) for beneficiaries aged 65+.

8. Physician Involvement:

List all claims involving more than one physician (AttendingPhysician, OperatingPhysician, or OtherPhysician are non-null).

SQL QUERIES

1. Claims Analysis:

- Retrieve the total amount reimbursed (**InscClaimAmtReimbursed**) for inpatient claims grouped by provider.

```
SELECT provider,  
       Sum(inscclaimamtreimbursed)  
AS TotalAmountReimbursed  
FROM in_patient_data  
GROUP BY provider  
ORDER BY totalamountreimbursed  
DESC;
```

Provider	TotalAmountReimbursed
PRV53866	6006500
PRV52618	3383180
PRV51407	2827400
PRV53105	2133500
PRV56573	1975040
PRV56460	1712400

2. Provider Insights:

- Identify the top 5 providers with the highest number of outpatient claims.

```
SELECT  
       Provider, COUNT(*) AS  
TotalClaims  
FROM  
       out_patient_data  
GROUP BY Provider  
ORDER BY TotalClaims DESC  
LIMIT 5;
```

Provider	TotalClaims
PRV56573	3065
PRV52080	3036
PRV55485	2823
PRV53105	2763
PRV51939	1804



SQL QUERIES

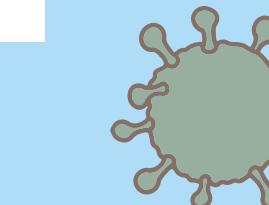


3. Chronic Conditions:

- Find the number of beneficiaries with claims associated with chronic conditions like diabetes.

```
SELECT  
    COUNT(*) AS TotalCount  
FROM  
    beneficiary_data  
WHERE  
    ChronicCond_Diabetes = 1;
```

TotalCount
41786



4. Gender-Based Analysis:

- Calculate the average inpatient claim amount reimbursed (`InscClaimAmtReimbursed`) for each gender.

```
SELECT  
    b.gender,  
    AVG(i.InscClaimAmtReimbursed)  
AS AverageReimbursed  
FROM  
    beneficiary_data b  
    LEFT JOIN  
    in_patient_data i ON b.BenID =  
i.BenID  
GROUP BY b.gender;
```

gender	AverageReimbursed
2	10112.5308
1	10095.7421

SQL QUERIES

5. Beneficiary History:

- Retrieve all claims (inpatient and outpatient) for a specific BenID to analyze an individual beneficiary's history.

```
SELECT
    BenID, ClaimID, ClaimStartDt, ClaimEndDt, Provider, InscClaimAmtReimbursed
FROM
    in_patient_data
WHERE
    BenID = 'BENE21203'
UNION SELECT
    BenID, ClaimID, ClaimStartDt, ClaimEndDt, Provider, InscClaimAmtReimbursed
FROM
    out_patient_data
WHERE
    BenID = 'BENE21203';
```

BeneID	ClaimID	ClaimStartDt	ClaimEndDt	Provider	InscClaimAmtReimbursed
BENE21203	CLM110016	2008-12-12	2009-01-01	PRV57494	1000
BENE21203	CLM502810	2009-08-02	2009-08-02	PRV52600	10

6. High-Value Claims:

- Identify providers with claims where the admission date (AdmissionDt) is in 2009 and the reimbursed amount exceeds \$10,000.

```
SELECT
    Provider, AdmissionDt,
    InscClaimAmtReimbursed
FROM
    in_patient_data
WHERE
    YEAR(AdmissionDt) = 2009
        AND InscClaimAmtReimbursed
    > 10000;
```

Provider	AdmissionDt	InscClaimAmtReimbursed
PRV55825	2009-06-23	16000
PRV52338	2009-01-20	19000
PRV57214	2009-06-14	15000
PRV52117	2009-08-24	19000
PRV54853	2009-03-02	11000
PRV53275	2009-07-11	13000

SQL QUERIES

7. Demographic Analysis:

- Combine beneficiary demographic information with inpatient claims to calculate the average deductible amount (IPAnnualDeductibleAmt) for beneficiaries aged 65+ for the Inpatient claims.

```
SELECT
    AVG(IPAnnualDeductibleAmt) AS
Avg_Deductible
FROM
    in_patient_data i
    JOIN
    beneficiary_data b ON i.BenID = b.BenID
WHERE
    TIMESTAMPDIFF(YEAR, b.DOB, CURDATE())
    >= 65;
```

Avg_Deductible
1858.9850

8. Physician Involvement:

- List all claims involving more than one physician (AttendingPhysician, OperatingPhysician, or OtherPhysician are non-null).

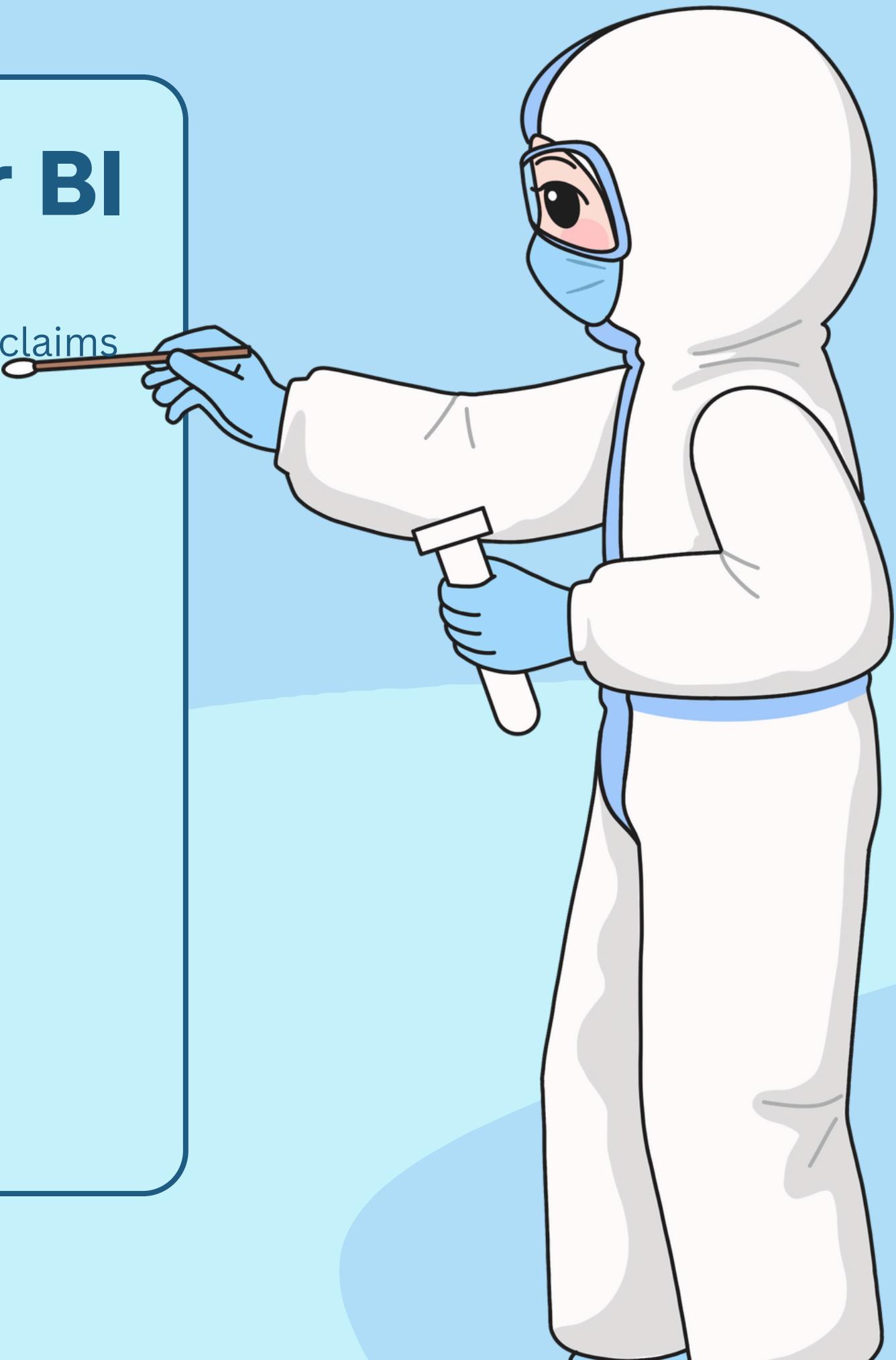
```
SELECT
    BenID, ClaimID, ClaimStartDt, ClaimEndDt, Provider,
    InscClaimAmtReimbursed,
    AttendingPhysician, OperatingPhysician, OtherPhysician
FROM
    in_patient_data
WHERE
    (AttendingPhysician IS NOT NULL AND OperatingPhysician IS NOT NULL)
    OR (AttendingPhysician IS NOT NULL AND OtherPhysician IS NOT NULL)
    OR (OperatingPhysician IS NOT NULL AND OtherPhysician IS NOT NULL)
UNION SELECT
    BenID, ClaimID, ClaimStartDt, ClaimEndDt, Provider,
    InscClaimAmtReimbursed,
    AttendingPhysician, OperatingPhysician, OtherPhysician
FROM
    out_patient_data
WHERE
    (AttendingPhysician IS NOT NULL AND OperatingPhysician IS NOT NULL)
    OR (AttendingPhysician IS NOT NULL AND OtherPhysician IS NOT NULL)
    OR (OperatingPhysician IS NOT NULL AND OtherPhysician IS NOT NULL)
```

BeneID	ClaimID	ClaimStartDt	ClaimEndDt	Provider	InscClaimAmtReimbursed	AttendingPhysician	OperatingPhysician	OtherPhysician
BENE11014	CLM67387	2009-09-09	2009-09-16	PRV57070	9000	PHY317786	PHY427017	NULL
BENE11017	CLM31237	2008-12-25	2009-01-08	PRV54750	14000	PHY314656	PHY426644	NULL
BENE11031	CLM56810	2009-06-23	2009-07-06	PRV55825	16000	PHY429538	PHY371893	NULL
BENE11176	CLM55569	2009-06-14	2009-06-14	PRV57214	15000	PHY405200	PHY432053	NULL
BENE11218	CLM65115	2009-08-24	2009-08-31	PRV52117	19000	PHY335369	PHY344060	NULL
BENE11221	CLM44395	2009-03-28	2009-04-01	PRV55190	5000	PHY313424	PHY313424	NULL

Dashboard Creation - Power BI

Objective:

To create an interactive and insightful dashboard for healthcare claims analysis.



Pages For Dashboard

Home Page - Claims Overview - Provider Analysis - Demographic Insights - Trends Over Time



Page 1

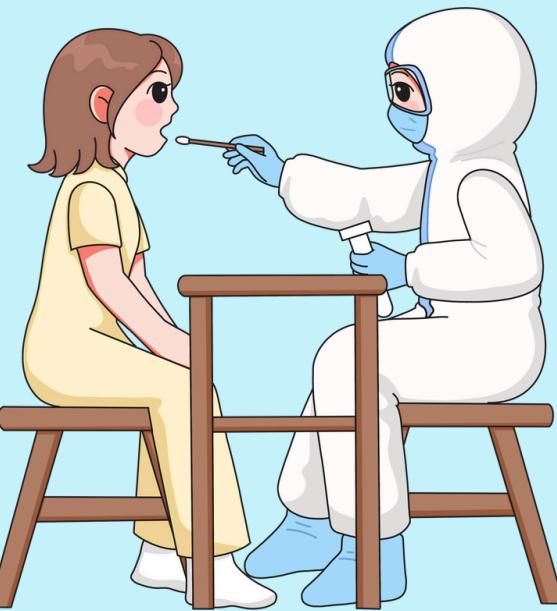
1. Claims Overview

Visuals:

- Total Reimbursement (Inpatient vs. Outpatient)
- Distribution of Claims Amount (e.g., histogram or boxplot)

KPIs:

- Total Claims
- Average Claim Amount
- Inpatient vs. Outpatient Claims Count



Page 2

2. Provider Analysis

Visuals:

- Top 5 Providers (by Claim Count or Reimbursement Amount)
- Highlight Providers with High-Value Claims (>\$10,000 in 2009)

KPIs:

- Number of Providers
- Total Reimbursement by Providers



Page 3

3. Demographic Insights

Visuals:

- Beneficiary Gender and Race Breakdown (pie charts or bar graphs)
- Chronic Condition Prevalence (e.g., diabetes)

KPIs:

- Number of Beneficiaries
- Average Deductible Amount for Beneficiaries Aged 65+



Page 4

4. Trends Over Time

Visuals:

- Monthly/Quarterly Trends of Claims Count and Reimbursement Amount
- Comparison of Inpatient and Outpatient Claims Over Time

KPIs:

- Average Claim Amount (Monthly)
- Highest Claiming Month/Quarter

Healthcare Claims Management

Company Dashboard

Claims Overview

The **Claims Overview** page provides key metrics and visuals, including total reimbursements for inpatient vs. outpatient claims, claim amount distribution, and KPIs such as total claims, average claim amount, and claim counts by category, offering a quick overview for further analysis.

Provider Analysis

The **Provider Analysis** page shows the top 5 providers based on claim count or reimbursement, highlights providers with claims over \$10,000 in 2009, and provides KPIs like the total number of providers and total reimbursement by them.

Demographic Insights

The **Demographic Insights** page presents the breakdown of beneficiaries by gender, race, and chronic conditions (e.g., diabetes). It also includes KPIs like the total number of beneficiaries and the average deductible for beneficiaries aged 65+.

Trends Over Time

The **Trends Over Time** page highlights monthly/quarterly trends in claims count and reimbursement, comparing inpatient vs. outpatient claims. KPIs include average claim amounts per month and the highest claiming month/quarter.

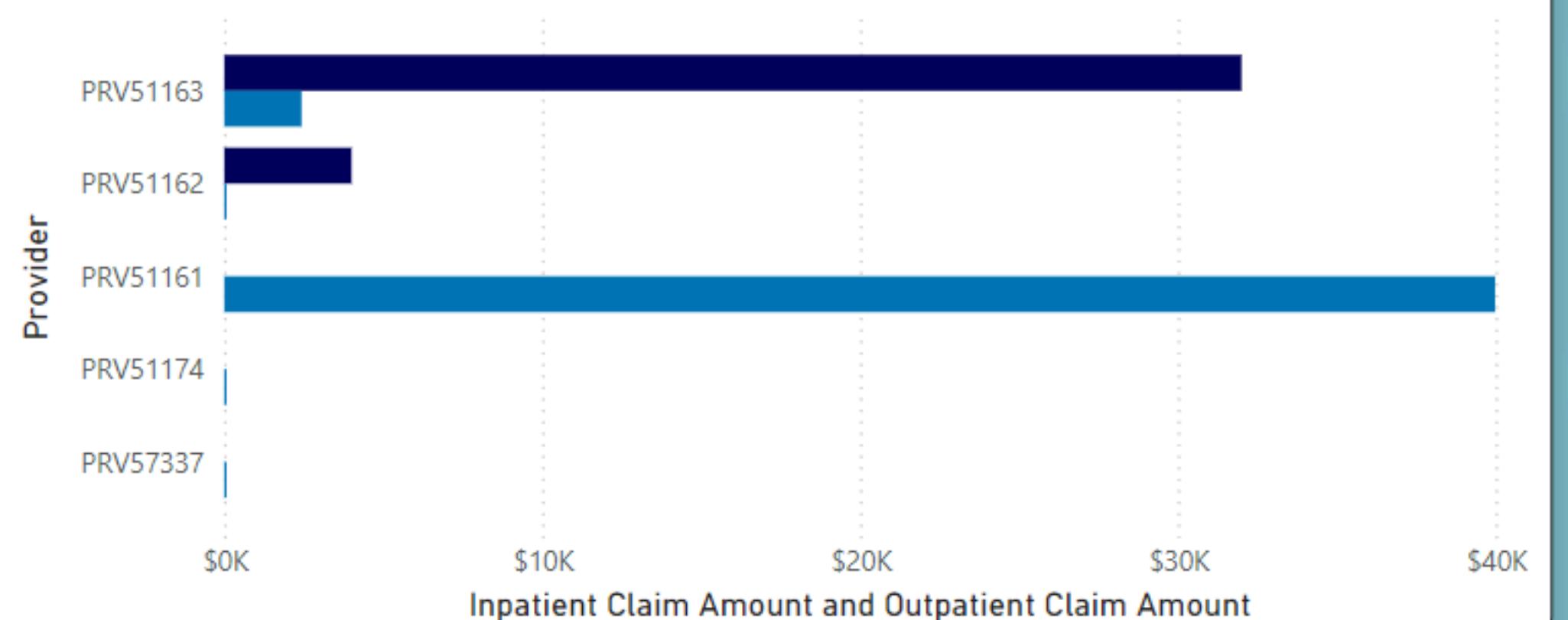


Created By : Avinash Rai

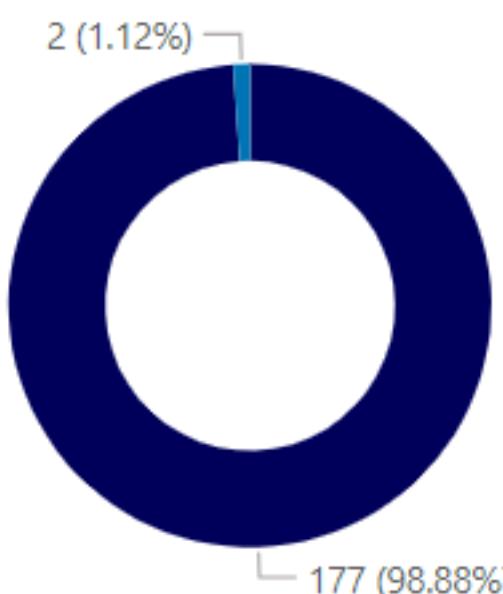
[Home](#)[Claims Overview](#)[Provider Analysis](#)[Demographic Insights](#)[Trends Over Time](#)

Distribution of Claims Amount

● Inpatient Claim Amount ● Outpatient Claim Amount

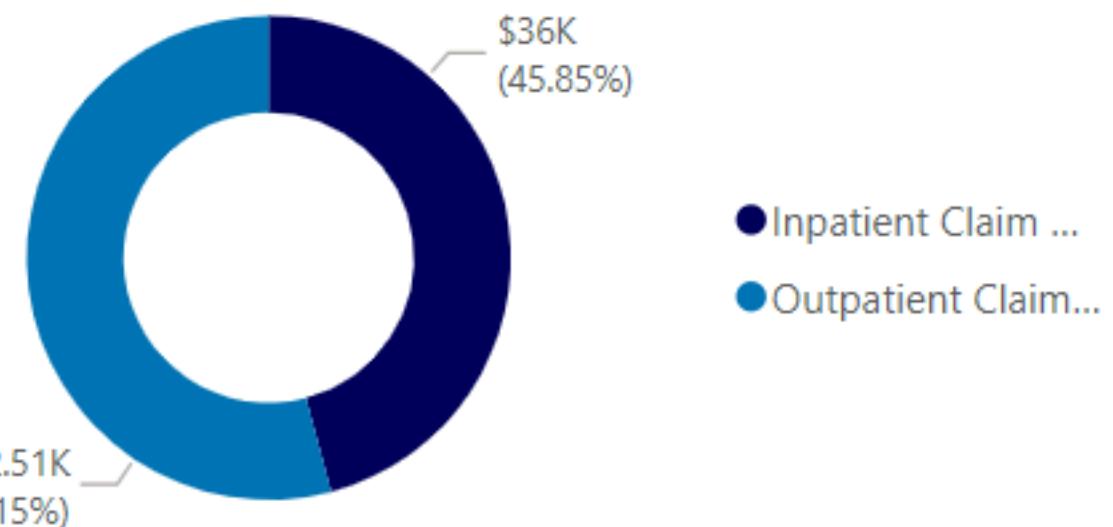


Inpatient vs. Outpatient Claims Count



● Outpatient Clai...
● Inpatient Claims ...

Total Reimbursement Amount (Inpatient vs. Outpatient)



● Inpatient Claim ...
● Outpatient Claim...

Gender

Female

Male

County

120

State

3

Average Claim Amount
(Inpatient)

\$18K

Average Claim Amount
(Outpatient)

\$240.17

Total Reimbursement Amount

\$78.51K

Total Claims Count

179

Average Claim Amount

\$438.60

Total Reimbursement Amount
(Inpatient)

\$36K

Total Reimbursement Amount
(Outpatient)

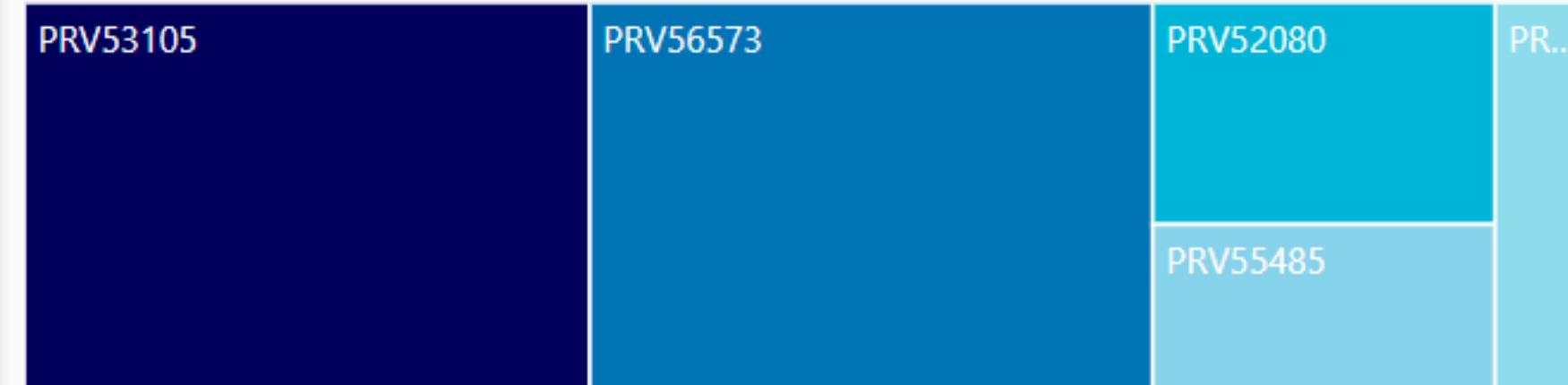
\$42.51K

[Home](#)[Claims Overview](#)[Provider Analysis](#)[Demographic Insights](#)[Trends Over Time](#)

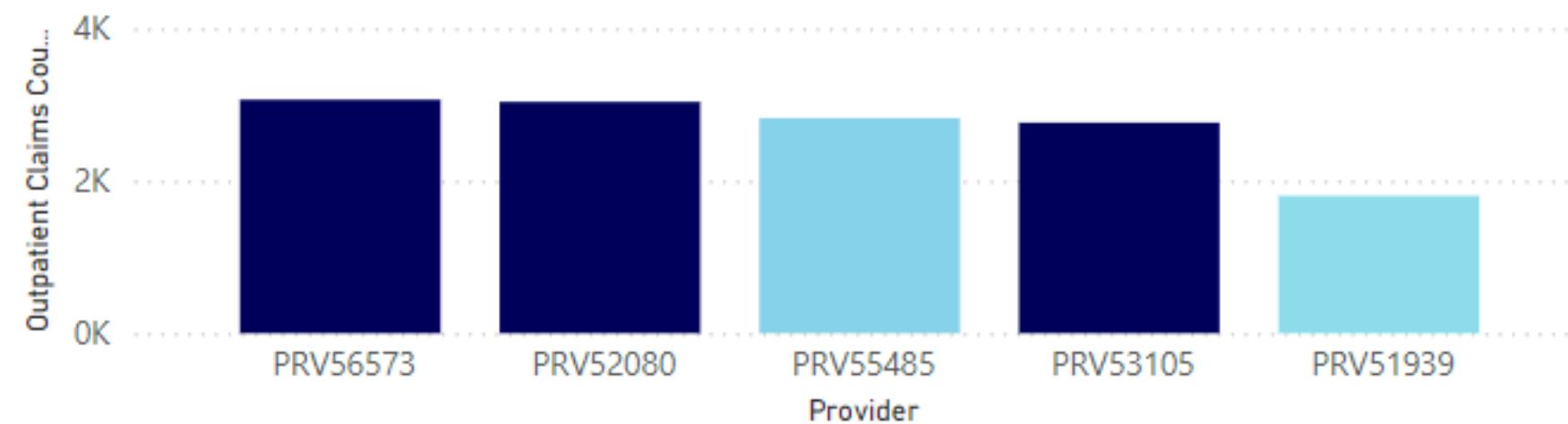
Providers with High Value Claims (>10000\$)

Provider	Total Reimbursement Amount
PRV51002	\$53,790
PRV51006	\$30,720
PRV51009	\$27,230
PRV51010	\$64,580
PRV51018	\$61,620
PRV51019	\$3,590
PRV51020	\$24,110
PRV51022	\$141,580
PRV51028	\$1,490
PRV51033	\$7,740
PRV51034	\$7,670
PRV51039	\$277,100
PRV51050	\$91,240
PRV51051	\$133,870
PRV51069	\$298,950
PRV51073	\$1,035,020
PRV51079	\$104,380
PRV51080	\$117,590
PRV51085	\$42,770
PRV51087	\$5,550
PRV51088	\$124,880
PRV51092	\$8,840
PRV51094	\$16,450
PRV51095	\$12,770
PRV51099	\$37,000

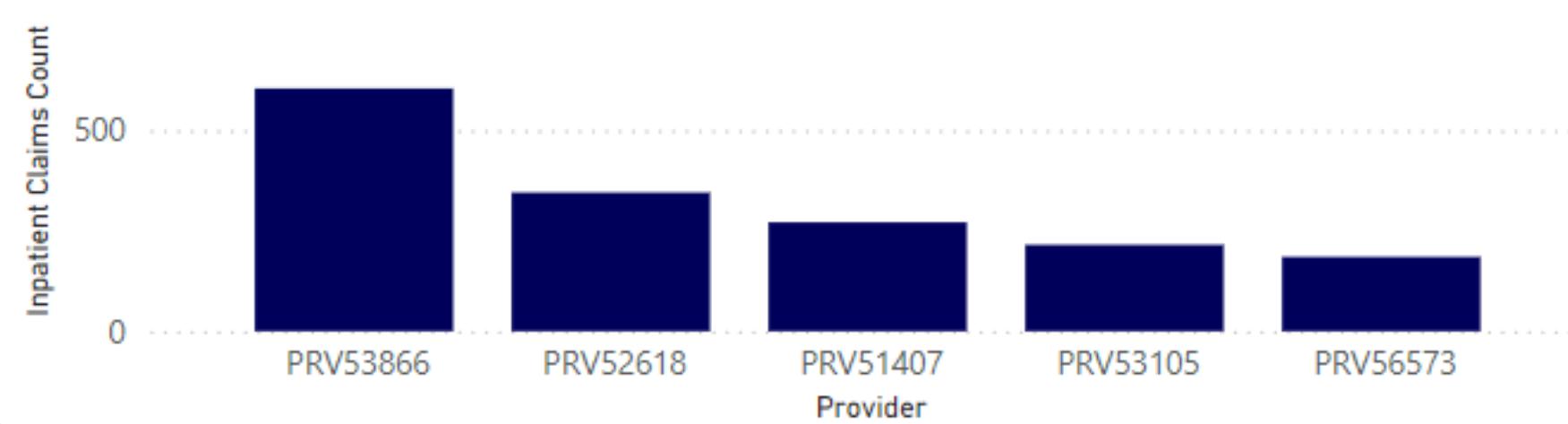
Top 5 Providers (by Reimbursement Amount)



Top 5 Providers by Claim Count (Outpatient)



Top 5 Providers by Claim Count (Inpatient)



State

All

Total Reimbursement by Providers

\$132.85M

Total Number of Providers

1353

Provider With Highest Claim Amount

PRV53866

\$6,097,440

Providers With Lowest Claim Amount

PRV56085

\$0

PRV56097

\$0

[Home](#)[Claims Overview](#)[Provider Analysis](#)[Demographic Insights](#)[Trends Over Time](#)

Chronic Condition Prevalence

Sum of IschemicHeart 45.89K	Sum of Heartfailure 34.71K	Sum of Kidn... 23.09K	Sum of O... 18.93K
Sum of Diabetes 41.79K	Sum of Depression 25.14K	Sum of Rheumat... 18.06K	Sum ... 8.79K
	Sum of Alzheimer 23.50K	Sum of ObstrPul... 17.52K	Sum ... 5.79K

Gender

[Female](#)[Male](#)

County

[All](#)

BenID

[All](#)

State

[All](#)

Beneficiaries with no HeartFailure, Cancer or Diabetes

BenID	Gender	Race	Heartfailure	Cancer	Diabetes
BENE100001	Male	1	0	0	0
BENE100002	Female	2	1	0	1
BENE100004	Female	1	1	0	1
BENE100010	Male	1	1	1	1

Total

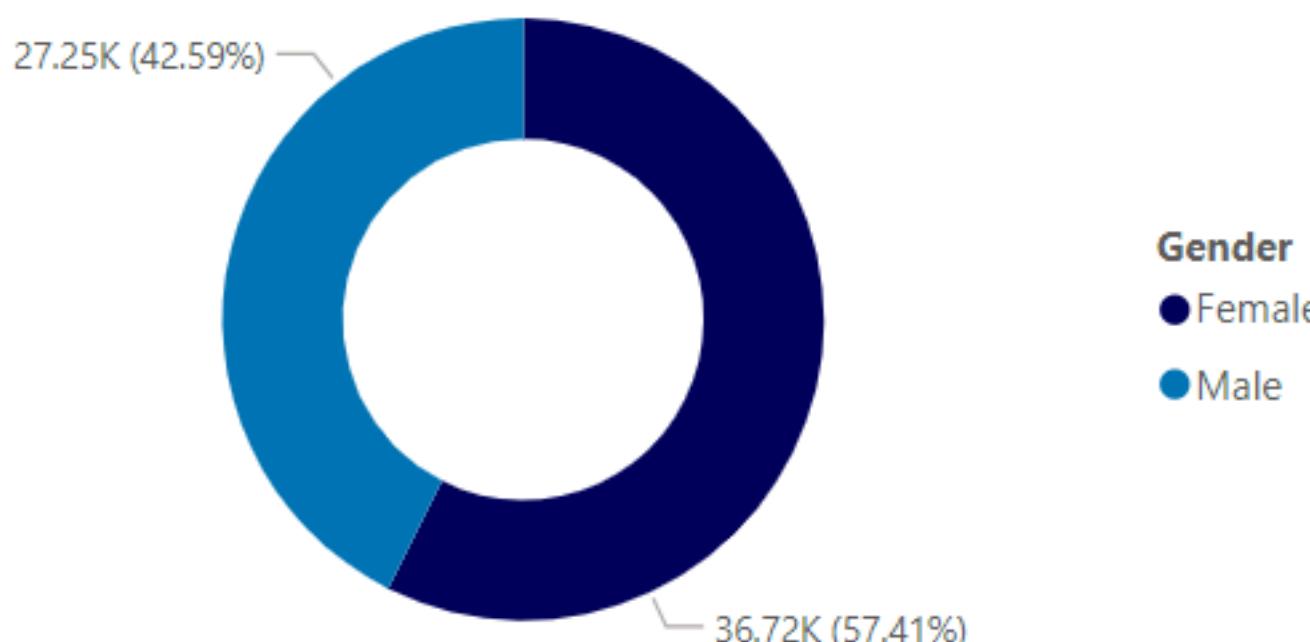
Total Count of Beneficiaries

64K

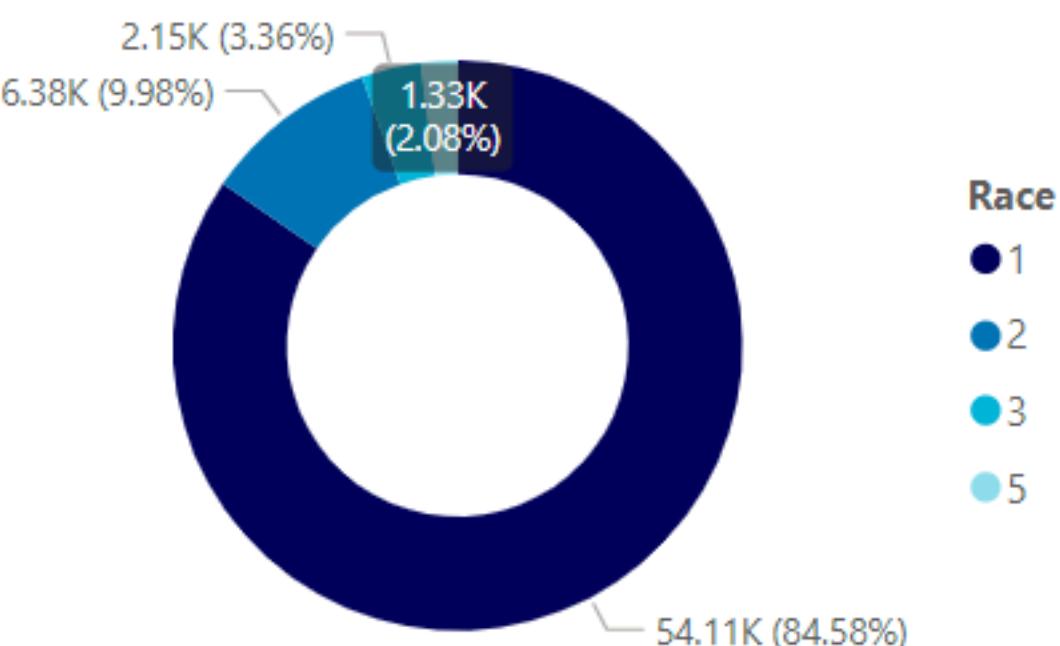
Beneficiary Count (Aged 65+)

60K

Beneficiary Gender Breakdown



Beneficiary Race Breakdown



Total Deductible Amount

\$62.45M

Total Deductible Amount (Aged 65+)

\$58.82M

Average Deductible Amount (Aged 65+)

\$972.55

[Home](#)[Claims Overview](#)[Provider Analysis](#)[Demographic Insights](#)[Trends Over Time](#)**Highest Claiming Month**

February

Highest Claiming Quarter

Qtr 1

State

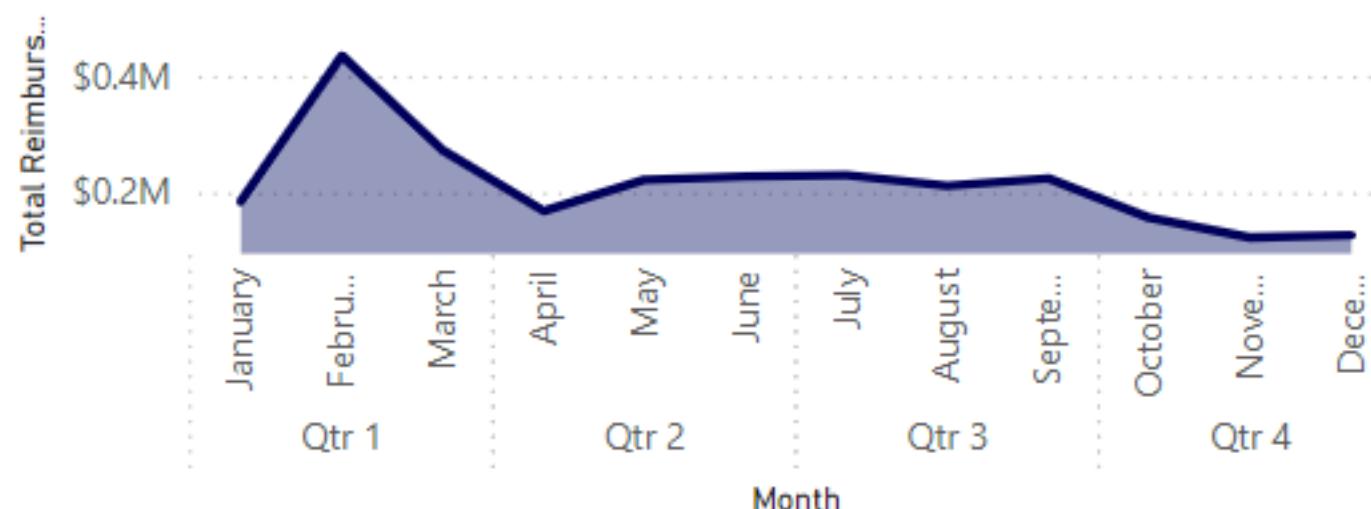
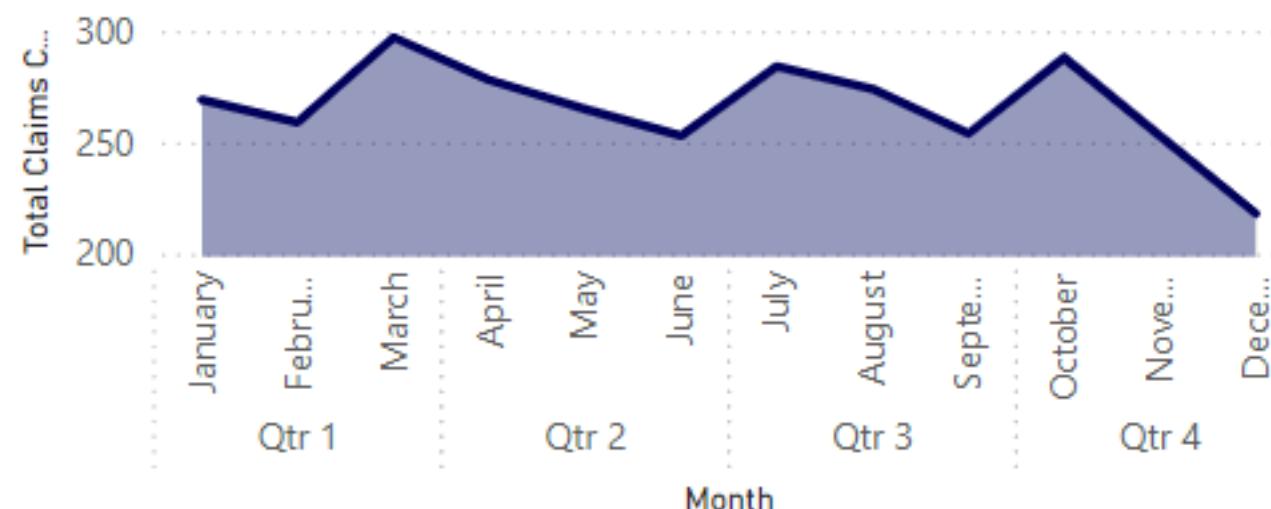
1

Quarter

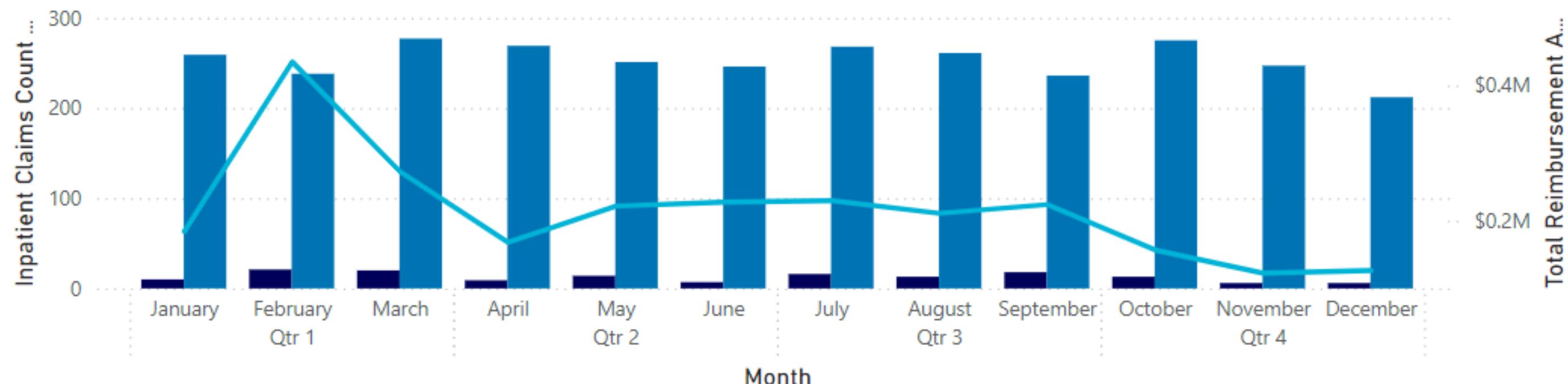
All

Month

All

Total Reimbursement Amount by Quarter and Month**Total Claims Count by Quarter and Month****Average Deductible Amount (Aged 65+)****\$214.94K****Outpatient Claim Amount****\$931.51K****Comparison of Inpatient, Outpatient Claims & Reimbursement Amount Over Time**

- Inpatient Claims Count
- Outpatient Claims Count
- Total Reimbursement Amount

**Inpatient Claim Amount****\$1.65M****Outpatient Claims Count****3039****Inpatient Claims Count****153**

SQL Analysis

Insights Report

1. Claims Analysis:

The analysis revealed that Provider '**PRV53866**' received the **highest total reimbursement for inpatient claims**, amounting to **\$6,006,500**. Other top providers include '**PRV52618**' with **\$3,383,180** and '**PRV51407**' with **\$2,827,400**.

2. Provider Insights:

Providers '**PRV56573**', '**PRV52080**', '**PRV55485**', '**PRV53105**', and '**PRV51939**' had the **highest number of outpatient claims**, with '**PRV56573**' topping the list at **3,065** claims.

3. Chronic Conditions:

A total of **41,786** beneficiaries have claims associated with **diabetes**, highlighting a significant presence of this chronic condition in the dataset.

4. Gender-Based Analysis:

The **average reimbursement for inpatient claims** is fairly consistent across genders. For gender '**2**', the average is **\$10,112.53**, while for gender '**1**', it is **\$10,095.74**.

5. Beneficiary History:

The claims history for beneficiary '**BENE21203**' shows multiple claims, including one with a start date of **2008-12-12** and reimbursement of **\$1,000**, and another on **2009-08-02** with reimbursement of **\$10**.

6. High-Value Claims:

Providers with **high-value claims (>\$10,000) in 2009** include '**PRV55825**', '**PRV52338**', and '**PRV57214**'. The highest amount was **\$19,000** on multiple occasions.

7. Demographic Analysis:

Inpatient Beneficiaries aged **65 and older** have an **average annual deductible amount of \$1,858.99**, indicating the financial burden on senior citizens.

8. Physician Involvement:

Claims involving more than one physician (attending, operating, or other) were identified. Examples include a claim with '**PRV52117**' and reimbursement of **\$19,000**, demonstrating collaboration among healthcare providers for certain cases.

Dashboard Insights Report

Claims Overview [All the insights are Filtered by Gender(Male), County(120), and State(3)]

1. Claims Distribution:

- Providers: The provider with ID **PRV51161** has the highest inpatient claim amount (~\$40K), significantly higher than others.
- Outpatient Claims: These are minimal compared to inpatient claims for most providers, with **PRV51162** showing the largest outpatient claim (~\$10K).

2. Claims Count:

- Inpatient vs. Outpatient:
 - Inpatient Claims dominate, accounting for **98.88% (177 claims)** of the total claims.
 - Outpatient Claims represent only **1.12% (2 claims)**.

3. Reimbursement Amount:

- Total Reimbursement: The combined inpatient and outpatient claims amount to **\$78.51K**.
- Breakdown:
 - Inpatient: **\$36K (45.85% of the total)**.
 - Outpatient: **\$42.51K (54.15% of the total)**.

4. Average Claim Amount:

- Inpatient: **\$18K** per claim, reflecting significantly higher claim amounts due to more extensive treatments or services.
- Outpatient: **\$240.17** per claim, indicative of less resource-intensive procedures.

5. Overall Averages:

- Average Claim Amount (Combined): **\$438.60**.



Provider Analysis

1. Total Reimbursement Overview:

- Total reimbursement by providers is **\$132.85M** across 1,353 providers.
- The provider with the highest claim amount is **PRV53866**, with **\$6,097,440**.
- Providers with the lowest claim amounts (zero reimbursement) include **PRV56085** and **PRV56097**.

2. High-Value Providers:

- Providers reimbursed over **\$10,000** are highlighted, with **PRV1073** topping the list at **\$1,035,020**.

3. Claim Distribution:

- Top 5 providers by reimbursement include **PRV56573**, **PRV52080**, and others, displayed through a treemap.
- Outpatient claims are predominantly handled by **PRV56573**, while **PRV53866** leads in inpatient claims.

Demographic Insights

1. Beneficiary Profile:

- Total beneficiaries: **64,000**, with **60,000** aged **65+**.
- Average deductible amount (aged 65+): **\$972.55**, contributing to a total deductible of **\$62.45M**.

2. Chronic Conditions Prevalence:

- Leading conditions include **Ischemic Heart (45.89K cases)**, **Diabetes (41.79K cases)**, and **Heart Failure (34.71K cases)**.
- Other notable conditions: **Depression, Alzheimer's, and Kidney Disease**.

3. Demographic Breakdown:

- Gender: **57.41% Female, 42.59% Male**.
- Race: Majority classified under **Race 1 (84.58%)**, followed by **Race 2 (9.98%)**.

4. Special Beneficiary Segment:

- Beneficiaries without Heart Failure, Cancer, or Diabetes are tracked, with data segmented by gender and ID.

Trends Over Time [All the Insights are filtered by State(1)]

1. Peak Claiming Periods:

- Highest claiming month: **February**.
- Highest claiming quarter: **Q1**.

2. Reimbursement & Claim Trends:

- Total reimbursement amount peaks in February and declines toward mid-year.
- Claims count mirrors the reimbursement trend, with steady activity across months.

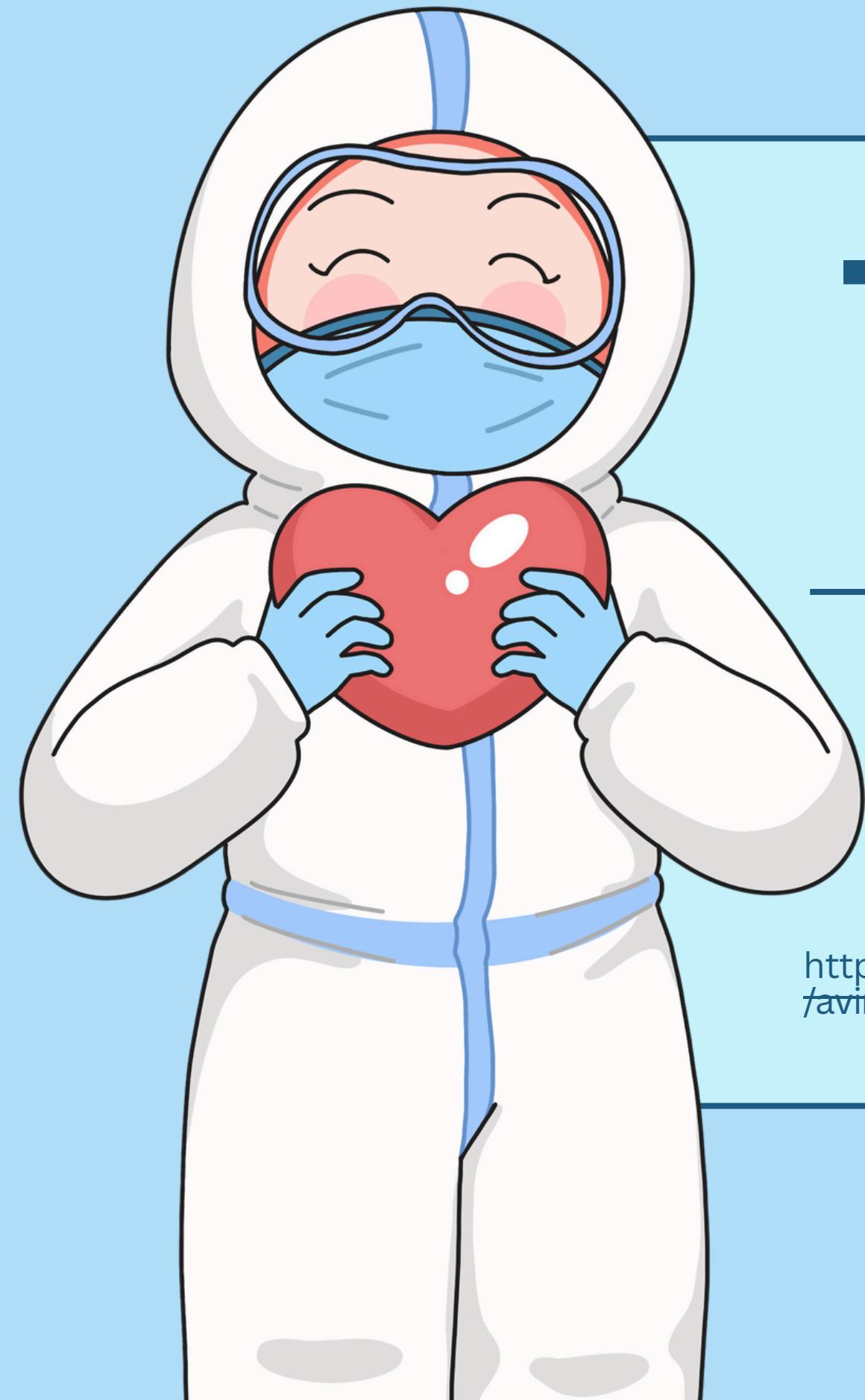
3. Inpatient vs. Outpatient:

- Outpatient claims dominate with **3,039** claims totaling **\$931.51K**.
- Inpatient claims are lower at **153** claims, totaling **\$1.65M**.

4. Average Deductible:

- Average deductible amount for aged 65+ stands at **\$214.94K**, with consistent trends over quarters.





THANK YOU!

Connect With Me



AVINASH RAI



<https://www.linkedin.com/in/avinashanalytics/>



masteravinashrai@gmail.com



<https://github.com/AVinashAnalytics>