



HOSPITAL PATIENT ENCOUNTER ANALYSIS (Metabase + PostgreSQL)

Project Overview

This project analyzes a simulated hospital Electronic Health Record (EHR) dataset sourced from Maven Analytics, consisting of **27,891 patient encounters**. The primary goal was to uncover key insights related to hospital operations, patient behavior, and financial patterns using **PostgreSQL for data querying** and **Metabase for visualization**.

The analysis explores a wide range of factors, including:

- Patient demographics
- Encounter frequency and types
- Insurance and payer coverage
- Encounter costs and claim trends
- Seasonal and time-based visit patterns

The findings provide a comprehensive understanding of healthcare utilization, average patient load, insurance dynamics, and cost distribution empowering hospital administrators and analysts to make data-driven decisions.

Project Objective

The core objectives of this analysis were to:

- 1. Quantify Patient Engagement**
 - Measure total and unique patient encounters
 - Track average number of encounters per patient
- 2. Understand Encounter Dynamics**
 - Analyze encounter classes and types across frequency, cost, and duration
 - Identify top reasons and types of encounters driving cost
- 3. Evaluate Financial Impact**
 - Compare encounter costs, claim amounts, and out-of-pocket expenses
 - Assess insurance coverage rate and trends across payers
- 4. Segment Patient Demographics**
 - Break down visits by gender, marital status, race, country, and city
 - Analyze average encounter cost across demographic segments
- 5. Analyze Trends Over Time**
 - Discover weekly, monthly, and seasonal visit patterns
 - Identify year-over-year (YoY) shifts in encounter volume and cost

ANALYSIS SUMMARY

Hospital Patient Analysis Dashboard

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Summary

Encounter Details

Payer Analysis

Cost Analytics

Patient Demographics

Trend

📅 Date ▼

27,891

Encounters

974

Unique Patients

\$101.5M

Encounter Cost

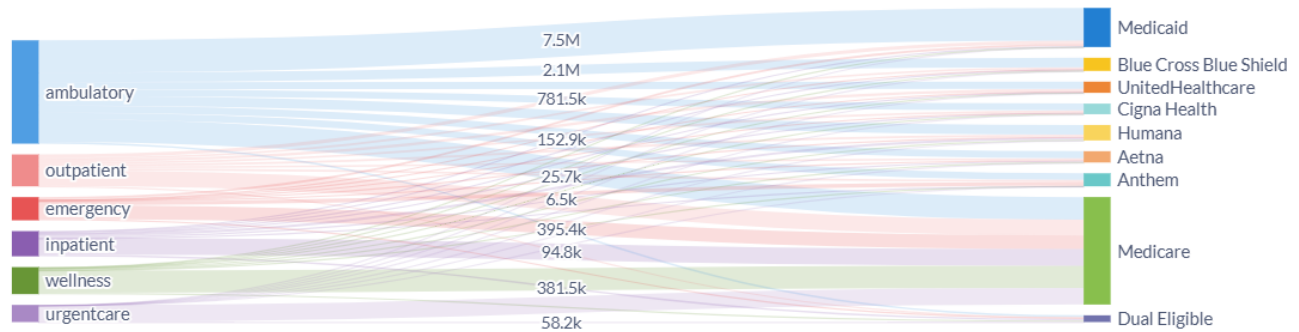
\$31.1M

Insurance Coverage

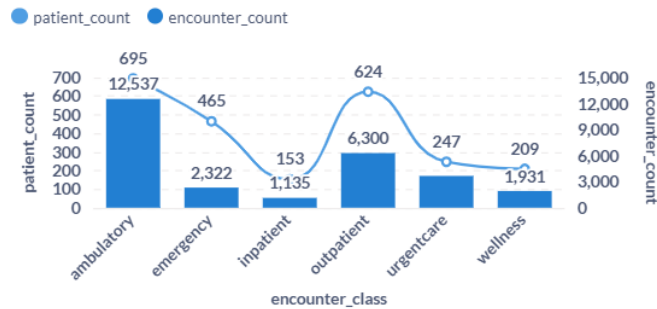
31%

Coverage (%)

Combination Between Encounter Class & Payer (Insurance)



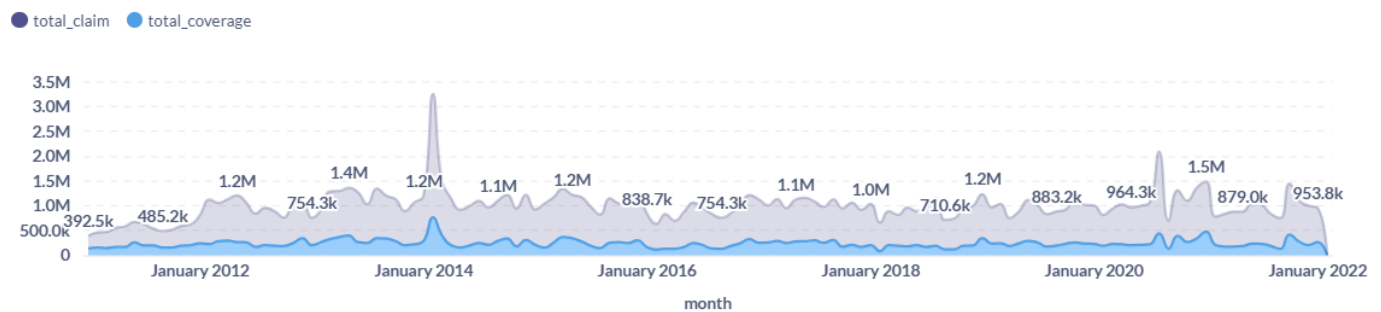
Encounter Class Wise Frequency & Patient Count



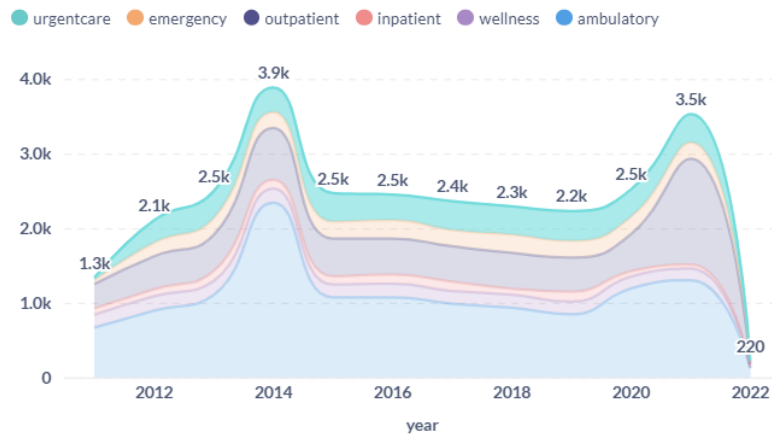
How has the total number of encounters changed over time? (Week)



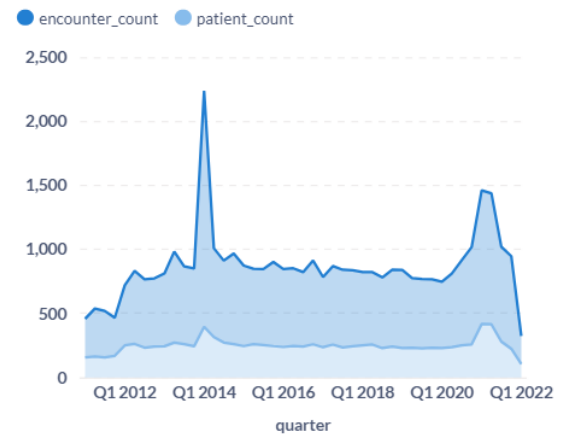
Cost Vs Claim Trend Over Time



Year and Encounter Class Wise Encounter Count



Quarter Wise Patient Vs Encounters



Year and Class Wise Encounter Count Ratio (%)

year	ambulatory_ratio	wellness_ratio	inpatient_ratio	outpatient_ratio	emergency_ratio	urgentcare_ratio
2011	50%	13%	6%	24%	4%	2%
2012	42%	9%	4%	21%	9%	14%
2013	44%	7%	5%	19%	9%	14%
2014	60%	5%	3%	18%	6%	8%
2015	43%	7%	4%	20%	9%	15%
2016	44%	7%	5%	20%	10%	14%

12 rows

ENCOUNTER DETAILS

Hospital Patient Analysis Dashboard

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Summary **Encounter Details** Payer Analysis Cost Analytics Patient Demographics Trend

📅 Date ▼ T Encounter Class ▼

27,891

Encounters

\$101.5M

Encounter Cost

29.94

Encounters with Reason (%)

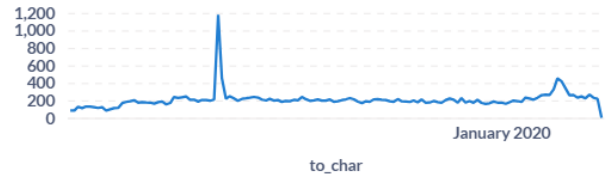
28.64

Encounters Per Patient

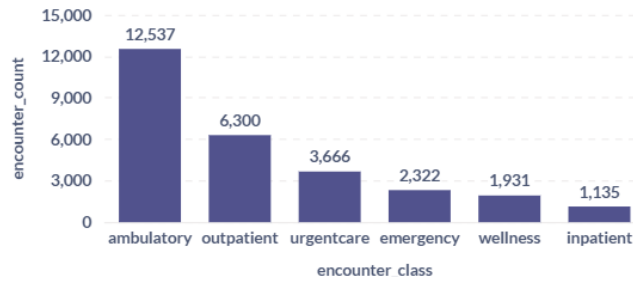
YoY Encounter Trend



What is the monthly trend of encounters over the past year?



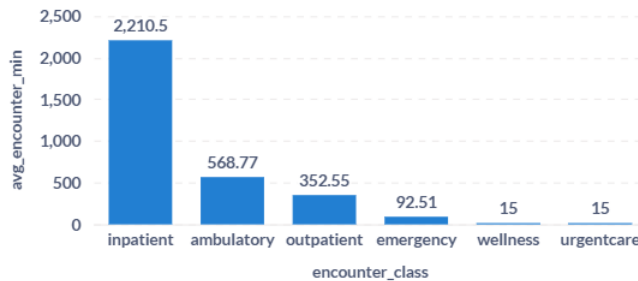
Which encounter classes (e.g., emergency, inpatient) are most frequent?



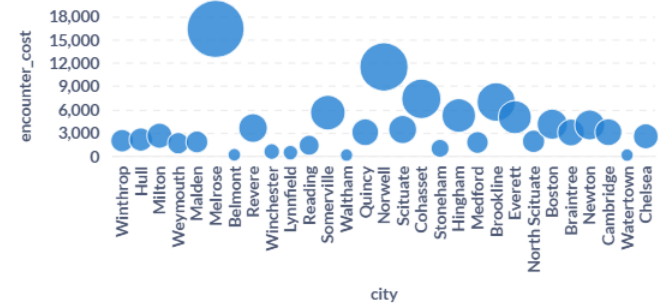
What is the YOY average number of encounters per patient?



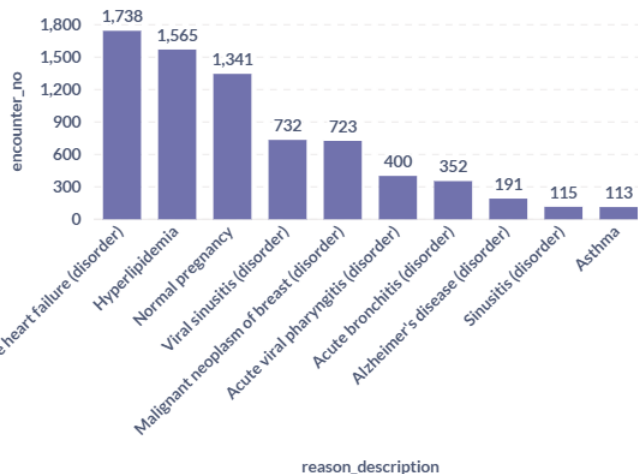
Encounter Class Wise Average Duration (In Minutes)



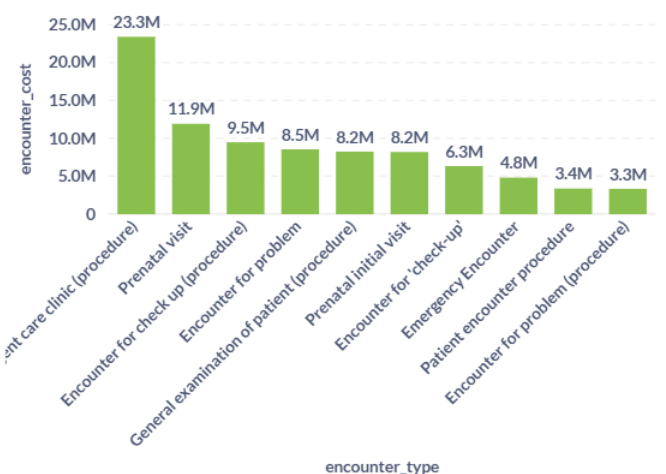
What is the average encounter cost per city?



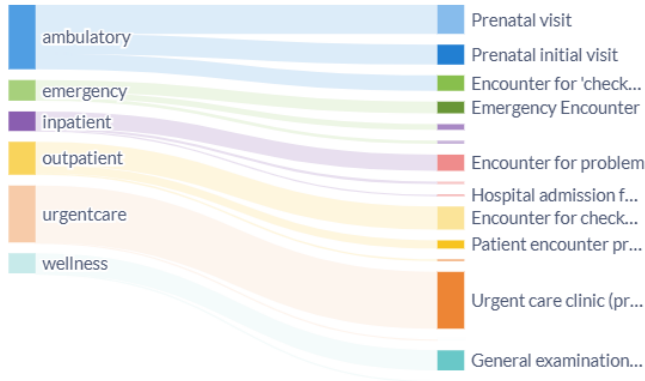
Top 10 Reason for Encounters



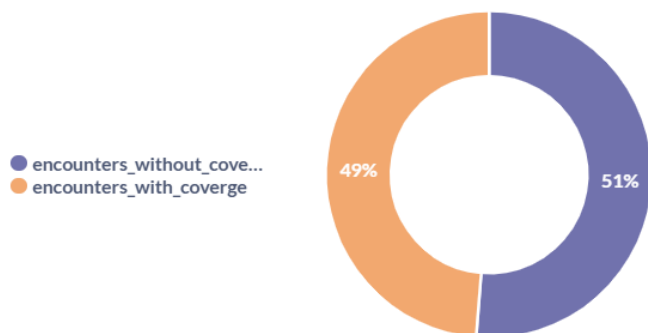
Top 10 Encounter Type by Cost



Top 3 Encounter Type from Encounter Class



How many encounters had zero payer coverage, and what percentage of t...



Encounter Type Ranking

encounter_type	encounter_cost	ranking
Urgent care clinic (procedure)	23,330,409	1
Prenatal visit	11,889,119	2
Encounter for check up (procedure)	9,461,215	3
Encounter for problem	8,527,338	4
General examination of patient (procedure)	8,227,432	5
Prenatal initial visit	8,175,369	6
Encounter for 'check-up'	6,333,169	7
Emergency Encounter	4,811,800	8
Patient encounter procedure	3,373,896	9
Encounter for problem (procedure)	3,334,724	10
Emergency room admission (procedure)	2,350,801	11
Patient encounter procedure (procedure)	1,961,951	12
Stroke	1,301,634	13
Encounter for symptom	1,112,416	14
Admission to intensive care unit (procedure)	1,017,008	15
Follow-up visit (procedure)	706,459	16

Day and Hour Wise Encounter Count

day_name	12 AM	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM
Sunday	61	126	184	109	134	329	95	385	88	357	110	335	99
Monday	78	184	138	96	94	224	113	503	84	359	67	195	77
Tuesday	108	96	171	151	121	241	218	173	167	133	112	146	151
Wednesday	84	120	558	121	106	142	103	174	460	127	68	154	105
Thursday	272	156	508	114	123	98	86	182	113	123	122	78	116
Friday	135	102	320	318	82	284	94	248	122	185	283	127	258
Saturday	117	107	154	98	97	105	307	160	176	146	134	135	99

7 rows

PAYER ANALYSIS

Summary Encounter Details Payer Analysis Cost Analytics Patient Demographics Trend

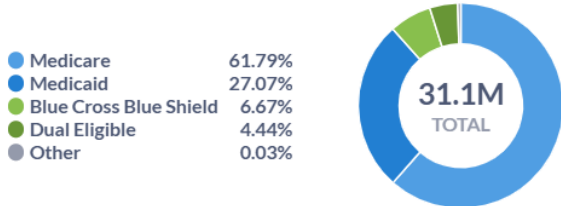
9

Number of Payers

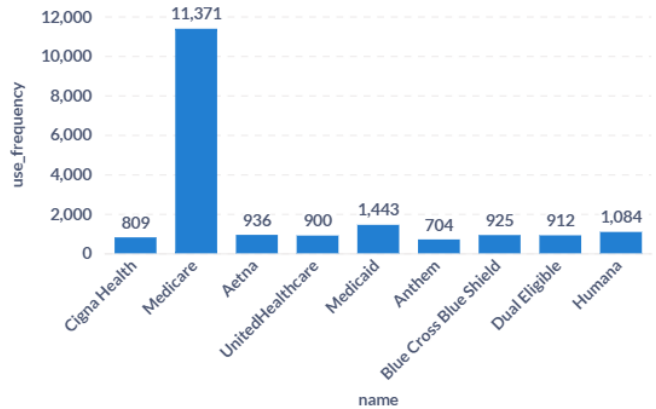
\$31.1M

Insurance Coverage

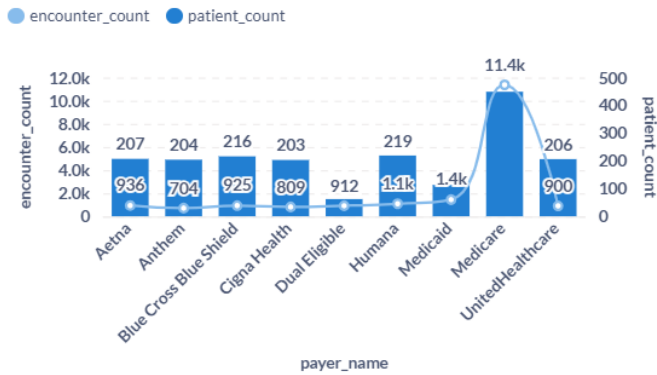
Payer Wise Coverage



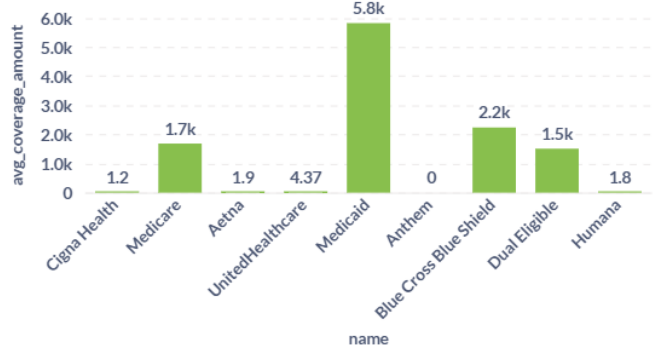
Which payers are used most frequently?



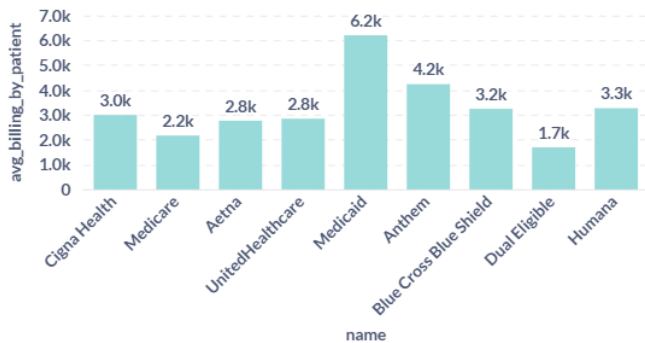
Payer Wise Patient and Encounter Count



What is the average coverage amount by payer?



Average Billing Level Per Payer



COST ANALYSIS

Hospital Patient Analysis Dashboard

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Summary Encounter Details Payer Analysis Cost Analytics Patient Demographics Trend

\$3,640

Average Total Claim Cost

\$116

Average Base Encounter Cost

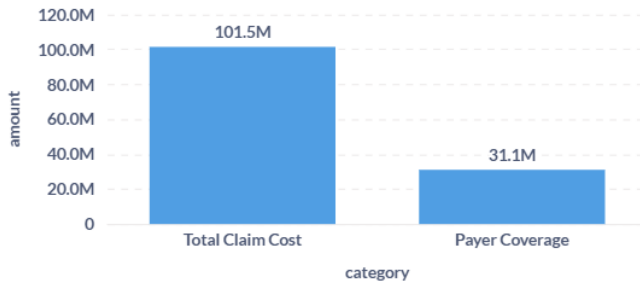
31%

Coverage (%)

\$2,525

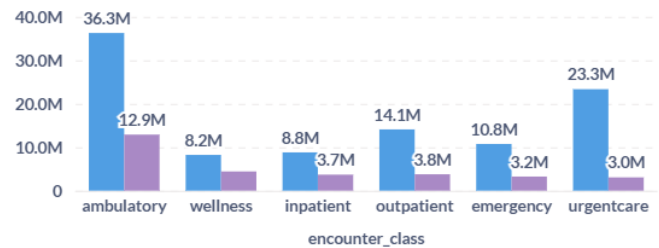
Average out of pocket expense

What is the total cost Vs Payers coverage

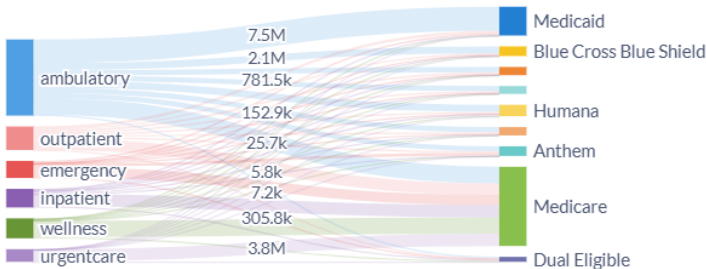


Total Cost vs Payer Coverage by Encounter Class

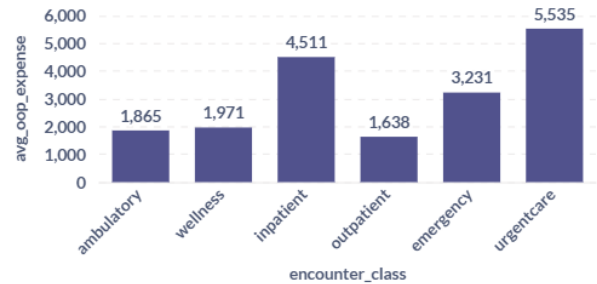
total_cost payer_coverage



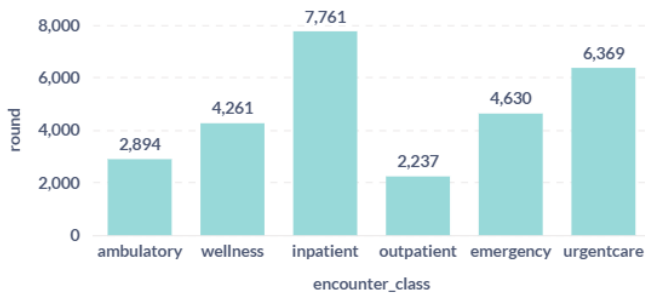
Combination Between Encounter Class & Payer (Insurance)



Encounter class wise average out of pocket expense



What is the average cost per encounter class?



Top 10 most frequent procedures performed with average base cost

encounter_type	encounter_count	avg_base_cost
Encounter for problem (procedure)	4,308	86.2
Urgent care clinic (procedure)	3,633	142.58
Encounter for check up (procedure)	2,950	85.55
General examination of patient (proc...	1,880	136.8
Patient encounter procedure (proce...	1,059	142.58
Administration of vaccine to produce...	1,003	142.58
Emergency room admission (procedu...	472	146.18
Postoperative follow-up visit (proced...	290	142.58
Follow-up encounter (procedure)	263	85.55
Follow-up visit (procedure)	73	85.55

PATIENT DEMOGRAPHICS

Hospital Patient Analysis Dashboard

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Summary Encounter Details Payer Analysis Cost Analytics **Patient Demographics** Trend

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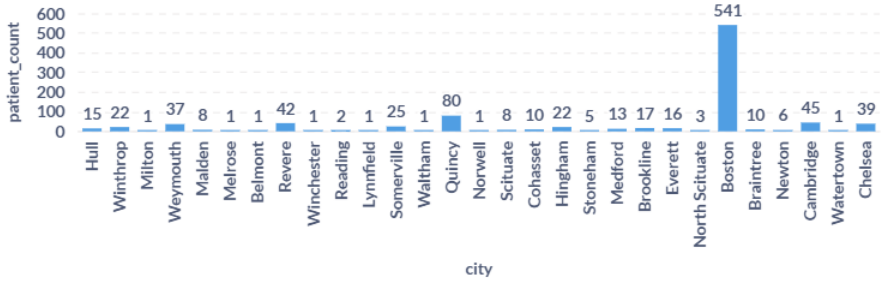
974

Unique Patients

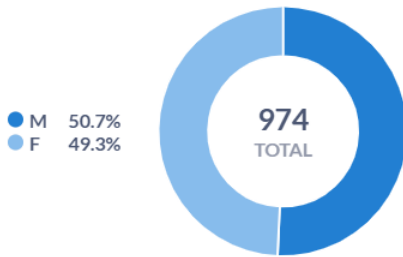
206

Patients Readmitted Within 30 Days of First Encounter

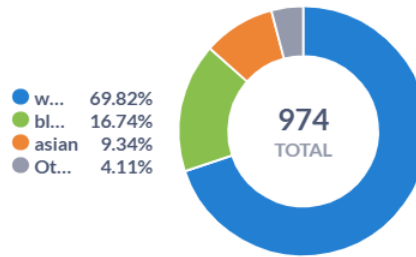
City Wise Patient



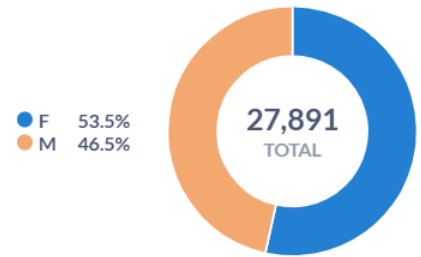
Gender Wise Patient Count



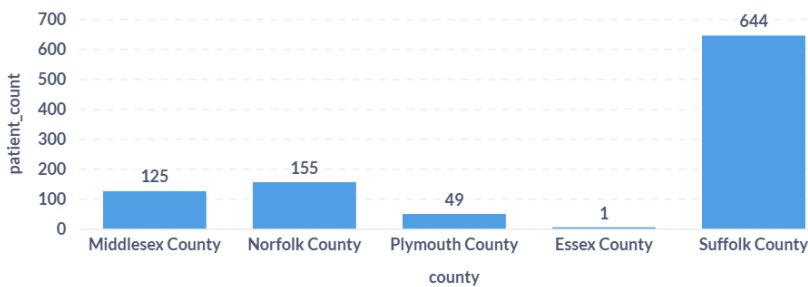
Racial Patient Breakdown



Gender Wise Visit



County Wise Patients



Which patients had the most readmissions?

patient_name	readmission_count
Buster609	18
Elmer371	18
Mariano761	12
Damian46	9
Connie24	9

201 rows

TREND ANALYSIS

Hospital Patient Analysis Dashboard

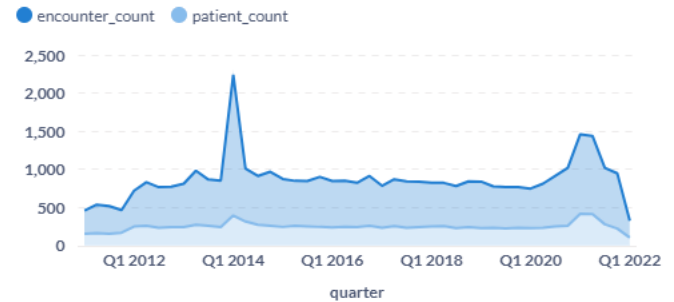
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Summary Encounter Details Payer Analysis Cost Analytics Patient Demographics **Trend**

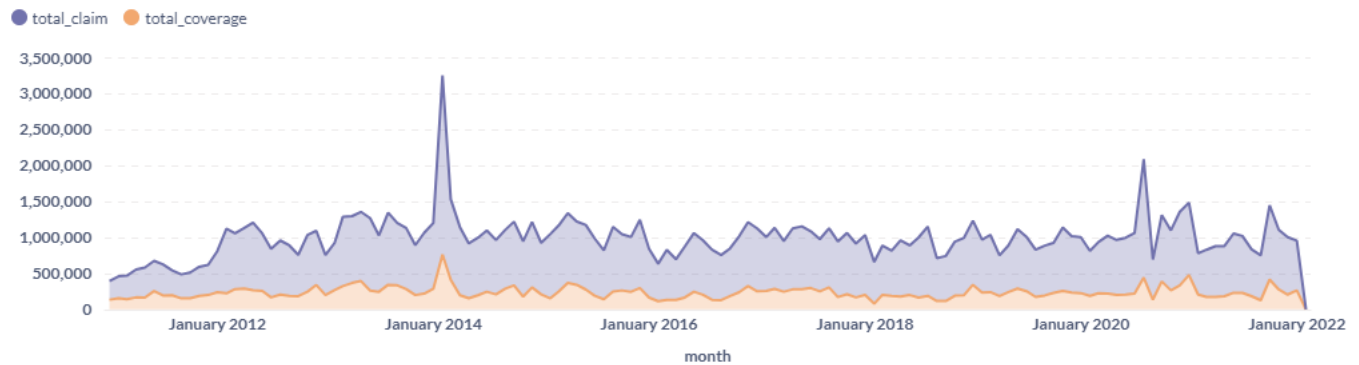
What is the average encounter cost per quarter?



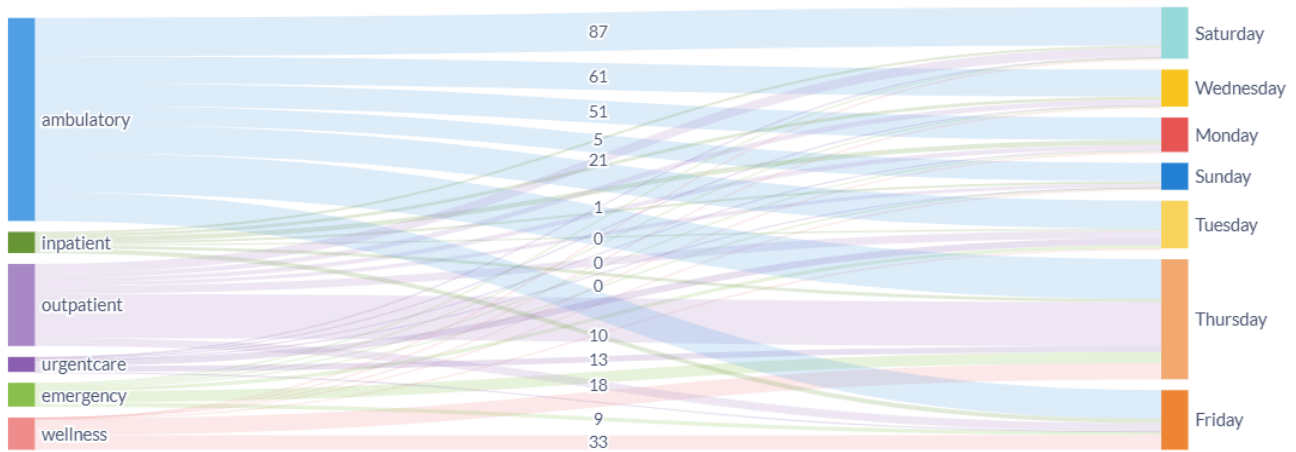
Quarter Wise Patient Vs Encounters



Claim Vs Coverage Trend Over Time



Encounter Class Wise Day and Hourly Encounter Trend



Are there seasonal trends in emergency or inpatient visits?

ambulatory emergency inpatient outpatient urgentcare wellness

