

Health Insurance Claims Overview: Trends, Insights & Visualization

1. PROJECT OVERVIEW

This report provides a detailed analysis of the Health Insurance Claims Dashboard, built using Power BI. The dashboard integrates multiple datasets—claims, providers, members, coverage plans, payments, hospitals, and geographic data—to deliver a holistic view of:

- Claim processing patterns
- Billing and payment performance
- Provider characteristics
- Hospital service trends
- Coverage-level distributions
- Geographic claim distribution
- Member-provider interactions

This report compiles all visual analyses into a unified interpretation, offering actionable insights for healthcare insurers, providers, and operational teams.

2. DATA OVERVIEW

Datasets Included:

- ✿ address_id, street_address, apartment_no, city, county, country, Zipcode.
- ✿ claim_id, status_id, date_of_service, received_date, add_by
- ✿ claim_payment_id, billed_amount, approved_amount, copay_amount,

coinsurance_amount, deductible_amount, net_payment, claim_id.

- ✿ coverage_id, member_id, coverage_name, effective_date, term_date.
- ✿ member_id, member_first_name, member_last_name, address_id, gender, member_dob, claim_id, coverage_id.
- ✿ provider_id, provider_first_name, provider_last_name, degree, network, claim_id, practice_name, address_id, gender.
- ✿ status_id, claim_status, type.

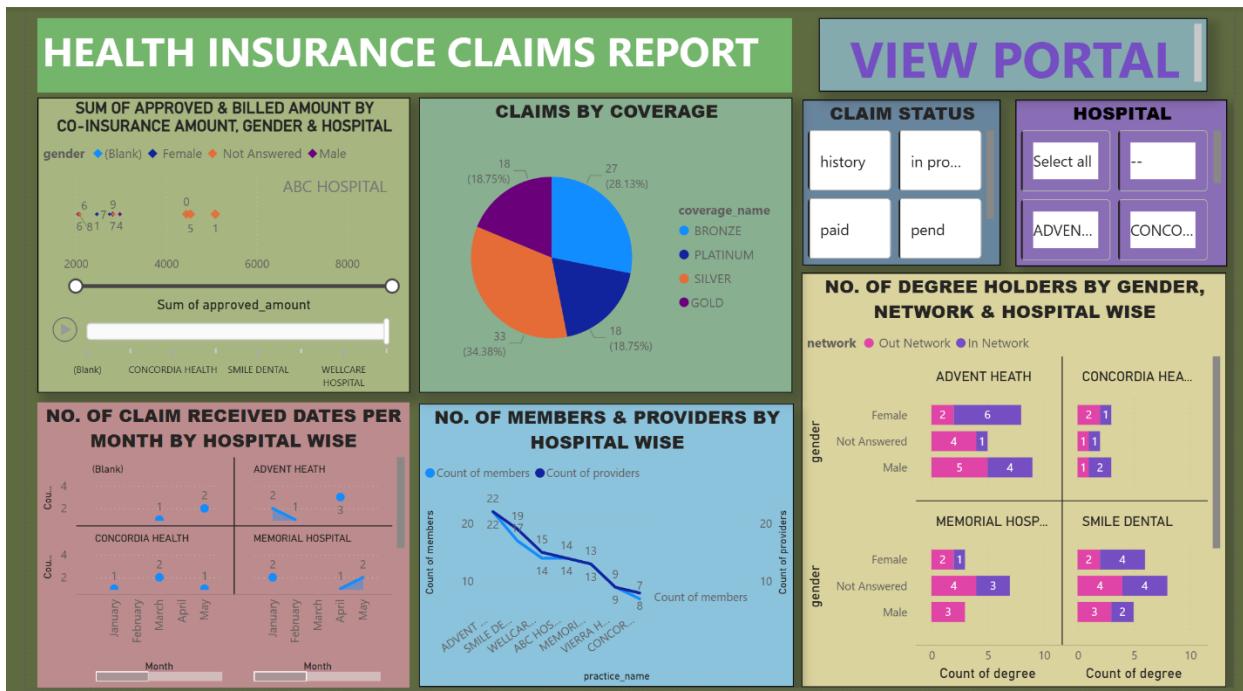
Brief overview from above datasets:

- Claims Data: Claim IDs, coverage, gender, co-pay, co-insurance, approved amount, billed amount, country, status
- Providers Data: Provider ID, degree, gender, network, hospital
- Members Data: Member demographics, claim linkage
- Claim Payments: Net payment, billed amount, date of service
- Coverage Plans: Bronze, Silver, Gold, Platinum
- Hospitals: Practice names, provider distribution
- Geographical Data: Claim spread across global countries

Data Volume :

- Total Claims: ~96 claims
- Total Providers: ~100+ providers across 7 hospitals
- Total Members: ~96 individuals
- Countries Represented: 90+
- Coverage Plans: Bronze, Silver, Gold, Platinum

The data provides adequate breadth for analytics on utilization, financial patterns, provider structure, and claim performance.



The dashboard titled “Health Insurance Claims Report” visually summarizes key metrics related to:

- Claim amounts
- Claim statuses
- Coverage plans
- Hospital-wise performance
- Provider and member activity
- Degree holders in network/out-network settings

It is designed to help insurance officials, healthcare administrators, and analysts quickly assess operational trends and insights.

★ **Silver Plan** dominates coverage, representing ~34% of total members.

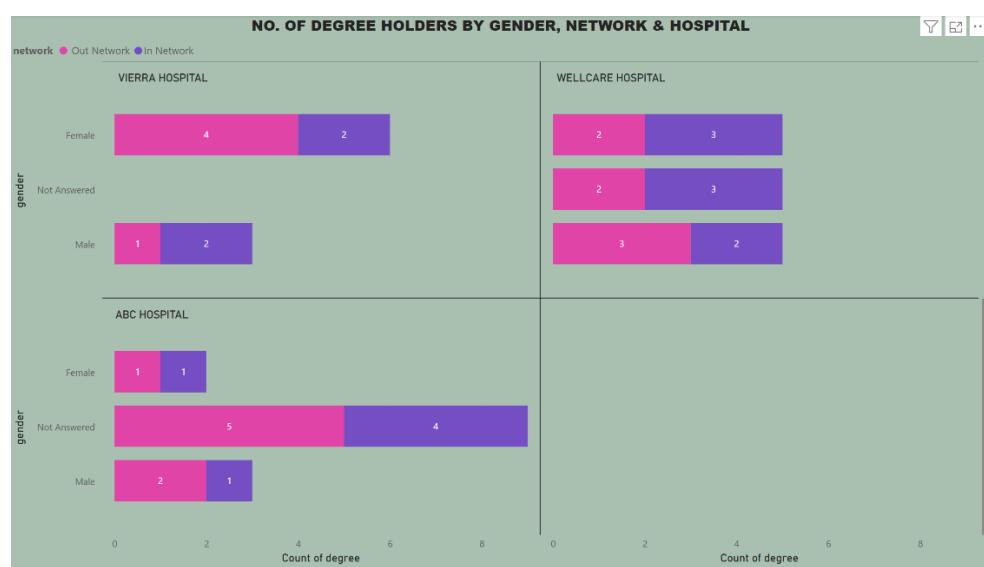
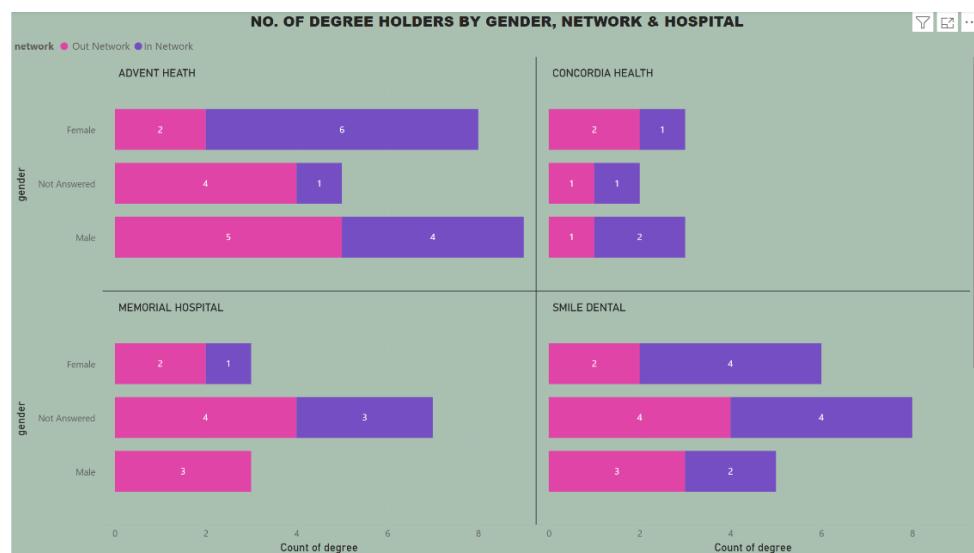
★ **Claim approval patterns** show variation by gender and hospital.

★ **Monthly claim counts** remain steady, with Advent Health , Smile Dental slightly leading.

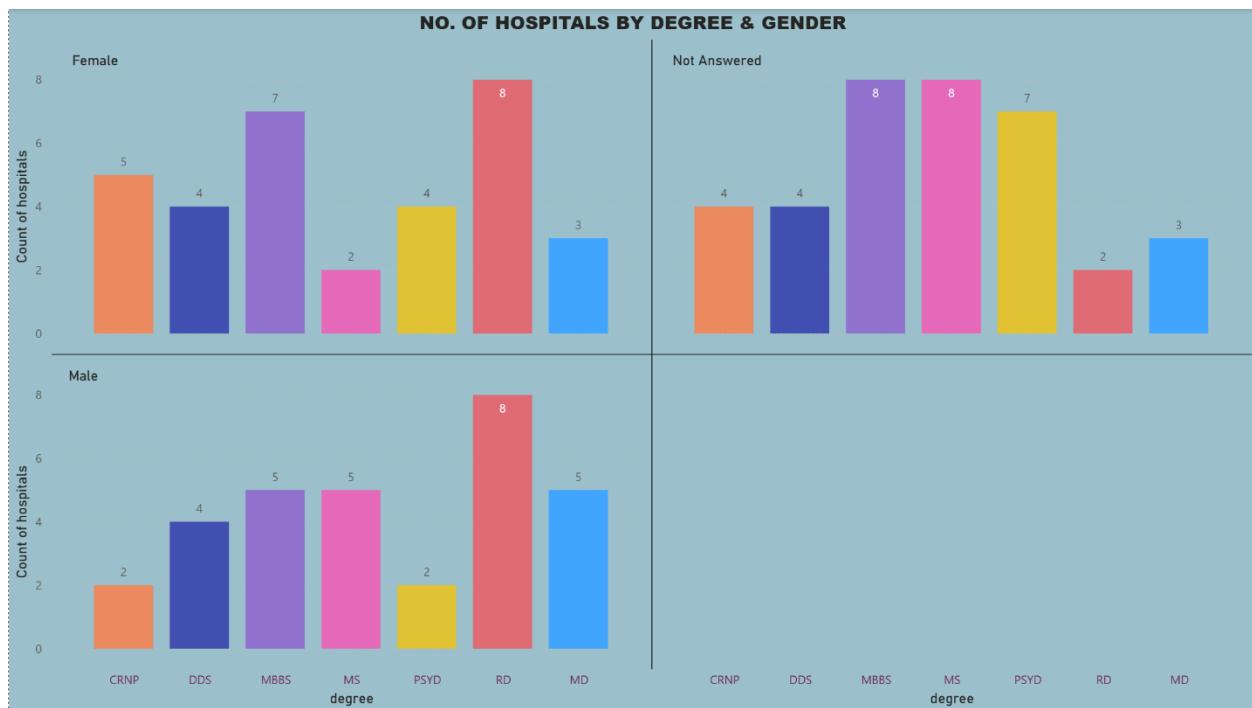
★ **Members vs Providers** trend indicates hospitals maintain proportional staffing capacity.

★ **Degree holders analysis** suggests a strong network of qualified providers, especially in Advent Health, Smile Dental.

★ **Hospital segmentation** allows stakeholders to diagnose performance at the facility level.



- There is **significant variation** in staffing composition across hospitals.
- Some hospitals (Advent Health, Smile Dental, WellCare) maintain strong **in-network provider bases**, reducing cost and improving claim approvals.
- Other hospitals (Memorial, Vierra, ABC) rely more heavily on out-network providers or show **incomplete demographic data**, which may impact claim processing precision and network optimization.
- Gender representation overall appears balanced, but large “Not Answered” categories in some hospitals highlight **data quality issues**.

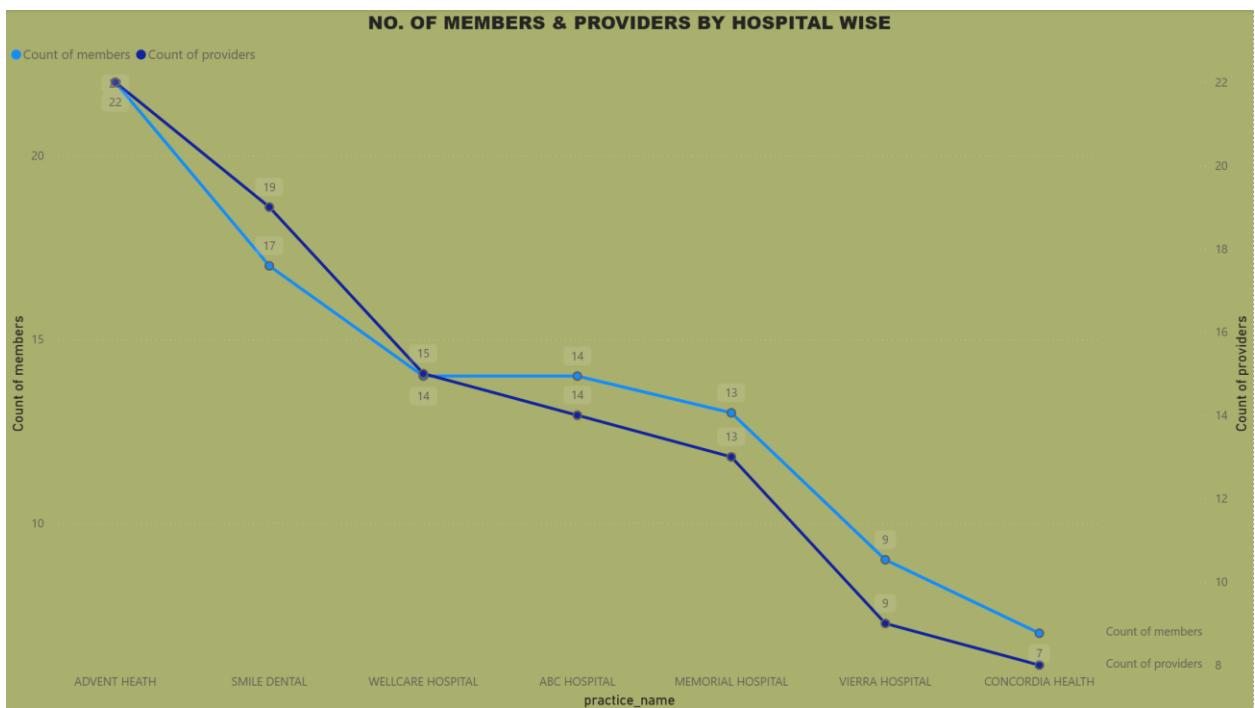


- Hospitals employ a **diverse mix of degree holders**, but degree distribution varies by gender.
- **RD, MBBS, and MS** are the most common degrees across hospitals.
- **Female providers** dominate in RD and MBBS, while **male providers** are more common in MBBS, RD, MD and MS degrees.

- Missing gender data (Not Answered) affects analytical completeness and should be addressed.
- Hospitals show broad hiring across multiple specialties, indicating well-rounded staffing.



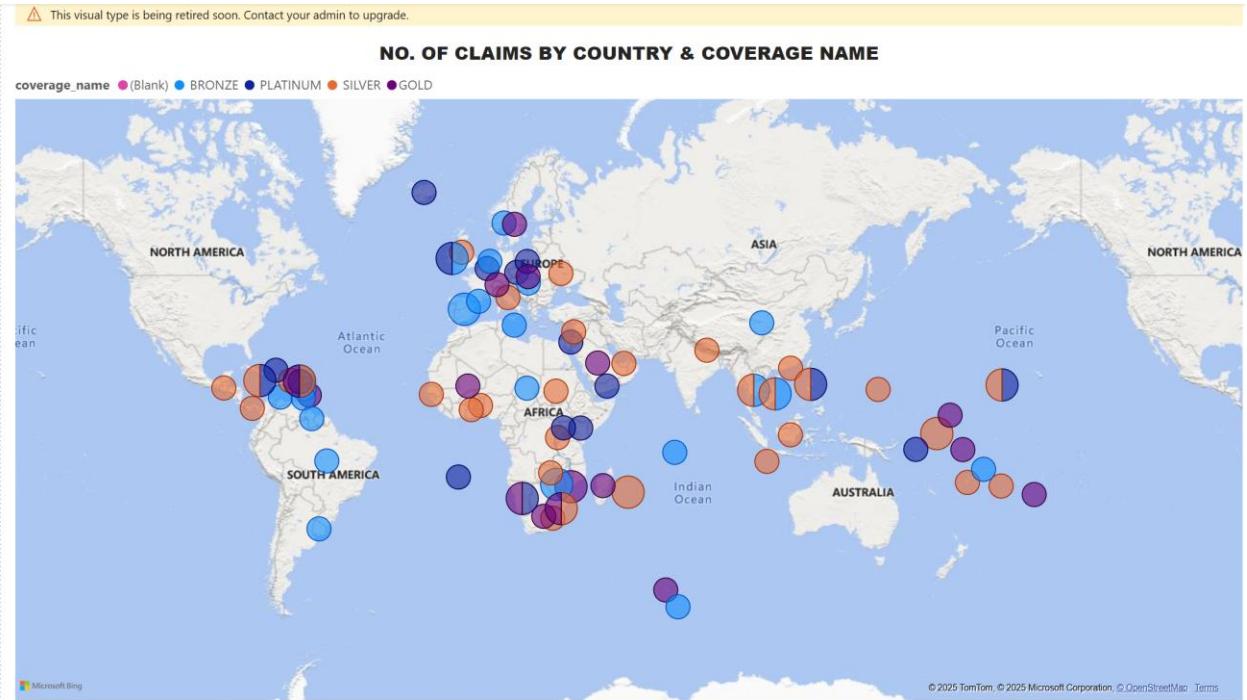
This Waterfall chart demonstrates **steady and healthy growth in approved insurance claim amounts** throughout the year. The absence of any decrease month signifies stable demand and efficient claim management. Seasonal fluctuations also help forecast staffing and operational needs.



The chart reveals that **all hospitals maintain a healthy balance between members and providers**, with no hospital showing provider shortages.

Patterns observed:

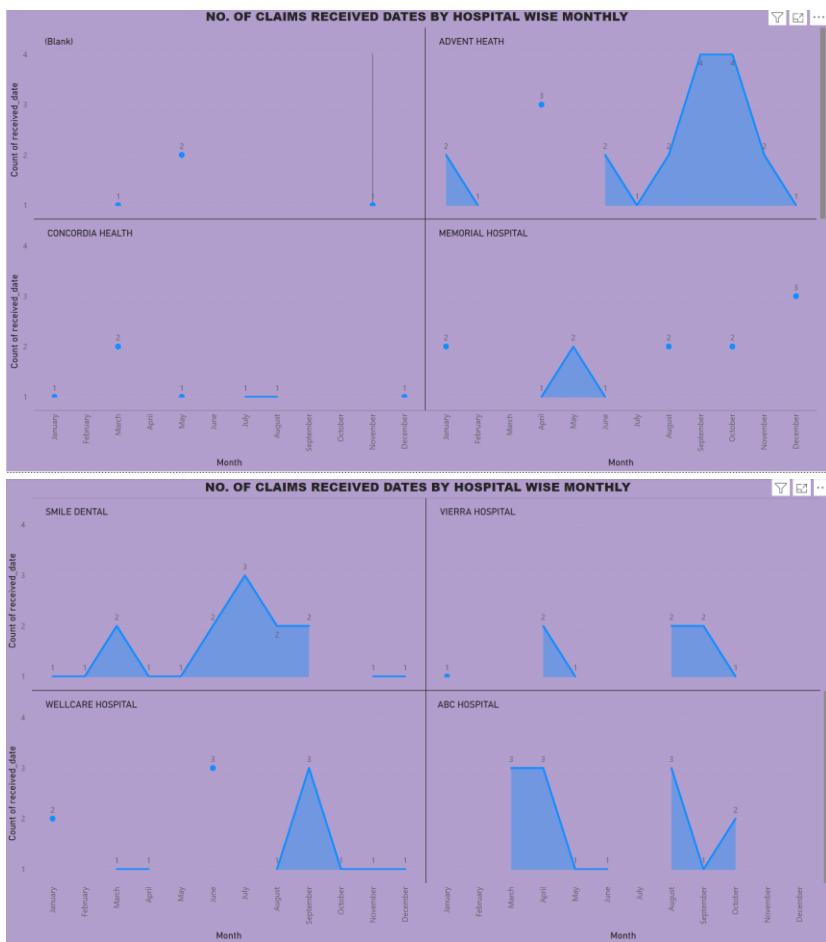
- Larger hospitals (Advent Health, Smile Dental) maintain strong staffing capacity.
- Mid-sized hospitals (WellCare, ABC, Memorial) exhibit stable ratios.
- Smaller hospitals (Vierra, Concordia) have fewer members but remain adequately staffed.
- The network overall is **well-distributed**, indicating effective provider allocation.



This geographic visualization highlights a **globally diverse claim distribution**, with **Silver coverage being the most common**, especially in Asia, Africa, and South America. Europe emerges as the most varied and active claim region, while Oceania stands out for premium coverage usage. The insights point toward meaningful opportunities for strategic expansion, risk management, and targeted insurance product offerings across regions.

gender country	amount	Female					Not Answered	
		Sum of copay_amount	Sum of coinsurance_amount	Sum of billed_amount	Sum of approved_amount		Sum of copay_amount	Sum of coinsuranc
Zimbabwe								
Zambia		10	2	4785	2991		9	
Yemen								
Wallis and Futuna		7	4	4039	2332		7	
Virgin Islands, United States								
Viet Nam		8	8	4808	2768		7	
Uruguay							2	
United States Minor Outlying Islands		8	7	4874	2301			
United Arab Emirates		7	7	4021	2433			
Ukraine								
Uganda							0	
Tuvalu		4	5	4033	2655			
Turks and Caicos Islands							9	
Thailand		6	3	4300	2642		3	
Switzerland		2	9	4677	2583			
Sweden								
Swaziland		7	4	4330	2977			
Svalbard and Jan Mayen Islands								
Sudan								
Spain		6	1	4833	2052		6	
South Africa								
Solomon Islands								
Slovakia		8	1	4628	2080			
Sint Maarten		4	10	4040	2294		2	
Saudi Arabia								
Saint Martin								
Saint Helena, Ascension and Tristan da Cunha								
Saint Barthélemy							10	
Rwanda		7	4	4770	2782			
Reunion								
Total	9989	184	202	159794	89916		138	

This table provides a detailed breakdown of claim cost distributions across countries and genders. Female claim activity dominates the dataset, showing clear country-level variations in billed, copay, and approved amounts. The “Not Answered” category indicates data incompleteness, which needs correction for accurate demographic insights. The patterns reveal global differences in healthcare expenses, cost-sharing, and approval behavior.



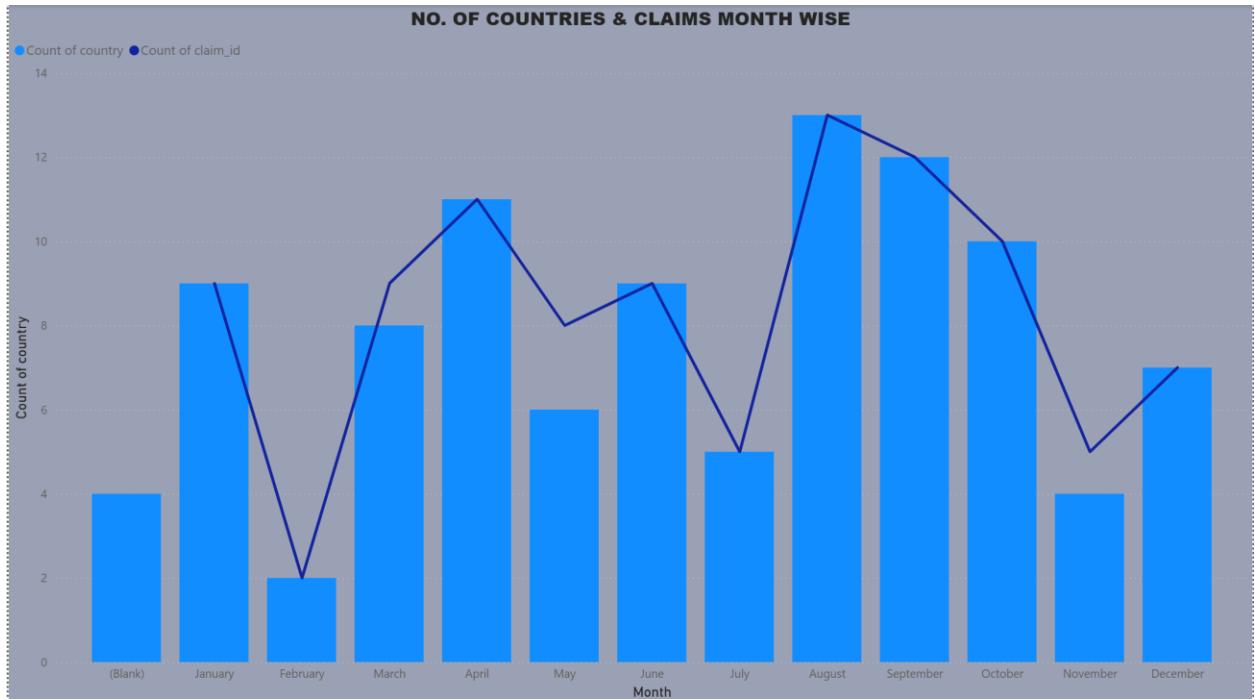
☒ **Seasonal patterns** are visible across many hospitals, especially mid-year and fall.

☒ **Claim volume varies significantly** by hospital:

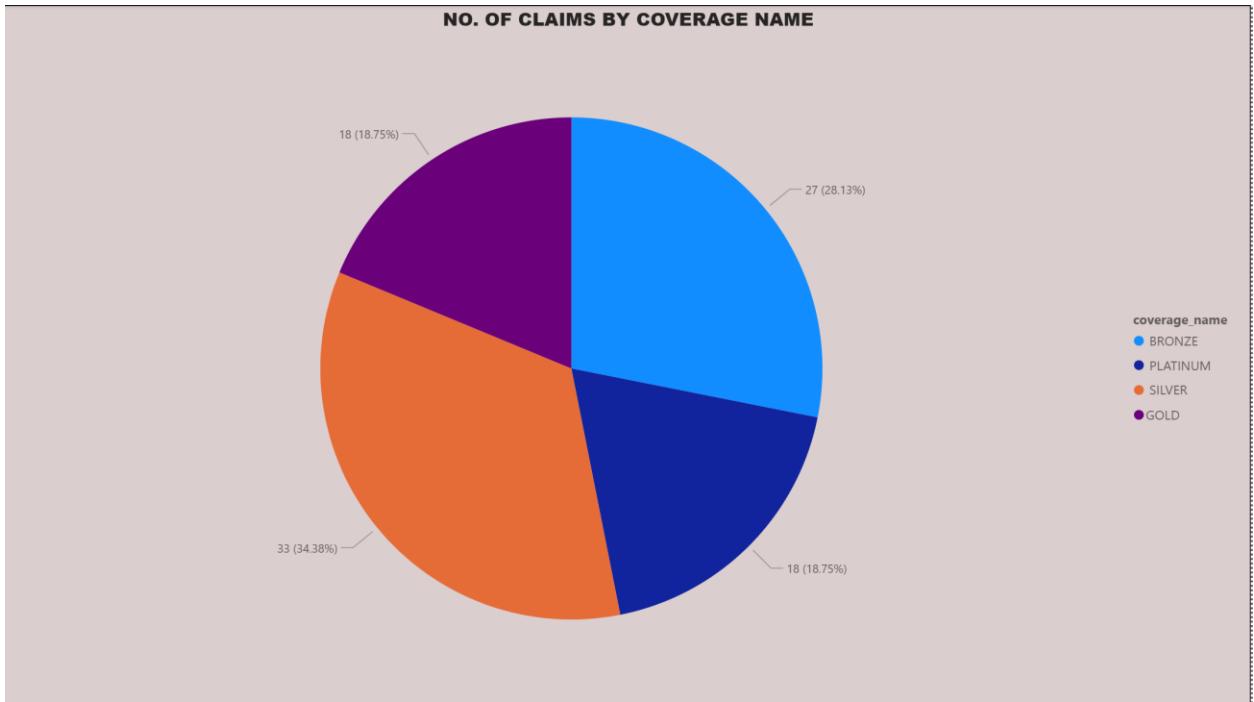
- Some hospitals show high activity (Advent Health, Smile Dental).
- Others remain low and stable (Vierra, Concordia).

☒ This segmentation may reflect:

- Population differences
- Hospital size
- Specialization types
- Seasonal healthcare behavior

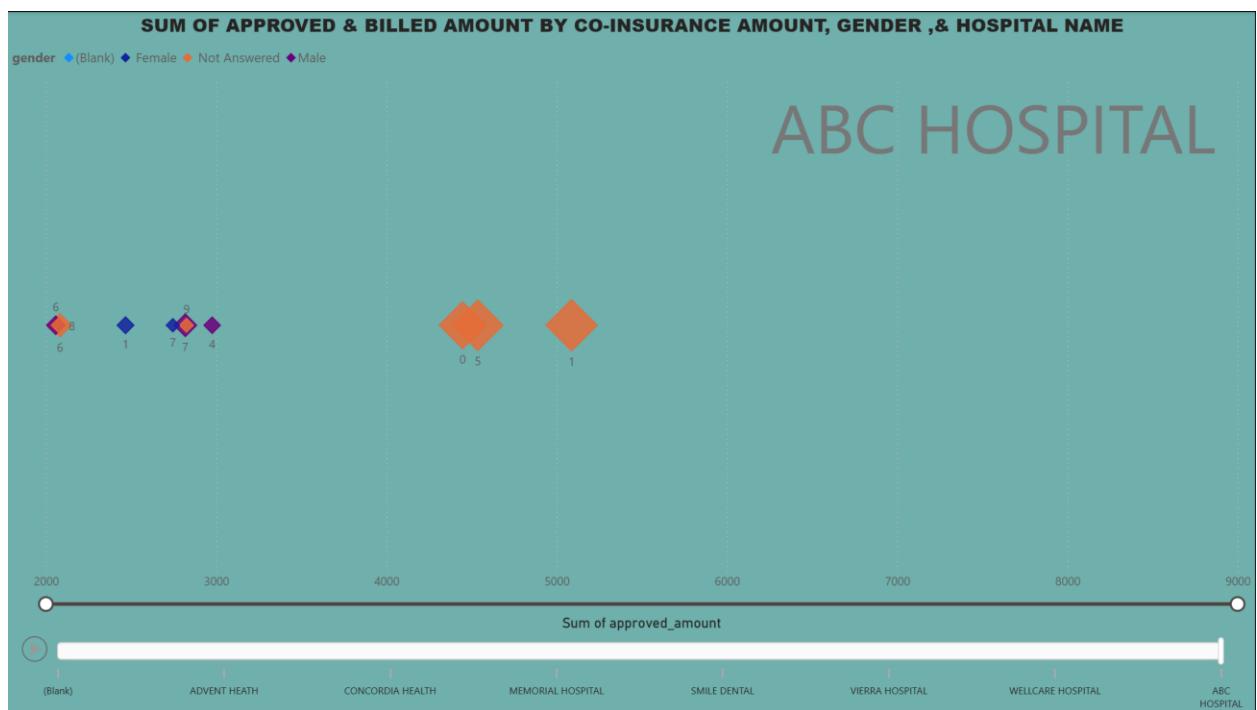


The monthly distribution of claims and participating countries shows **clear seasonal patterns**, with sharp increases in the late summer (August–October) and dips early in the year. Claim volume is strongly correlated with the number of countries involved, indicating consistent global engagement. These insights support forecasting, staffing, and operational planning for peak claim seasons.



This coverage analysis reveals that **Silver** holds the highest share of claims (34.38%), followed by **Bronze** (28.13%), while **Gold** and **Platinum** both contribute equally (18.75%).

The distribution demonstrates a **balanced insurance customer base**, with majority usage in mid-tier plans. These insights support strategic decisions in product pricing, risk assessment, and customer segmentation.



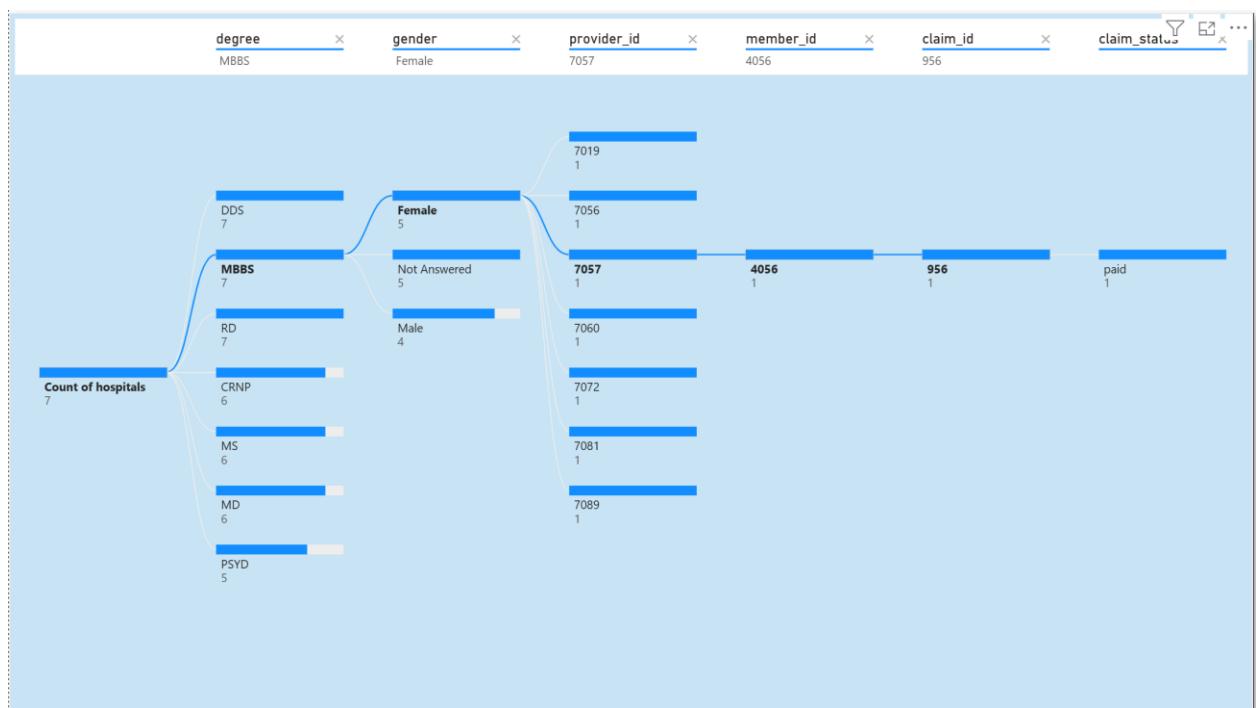
This visualization shows a clear **cost stratification** across hospitals:

The chart is a **bubble scatter visualization** comparing:

- **Sum of Approved Amount** (X-axis)
- **Sum of Billed Amount** (Y-axis or bubble size representation)
- **Co-insurance amount** (numeric labels)
- **Gender** (color-coded)
- **Hospital** (categories along the bottom timeline slider)

This visualization aims to reveal:

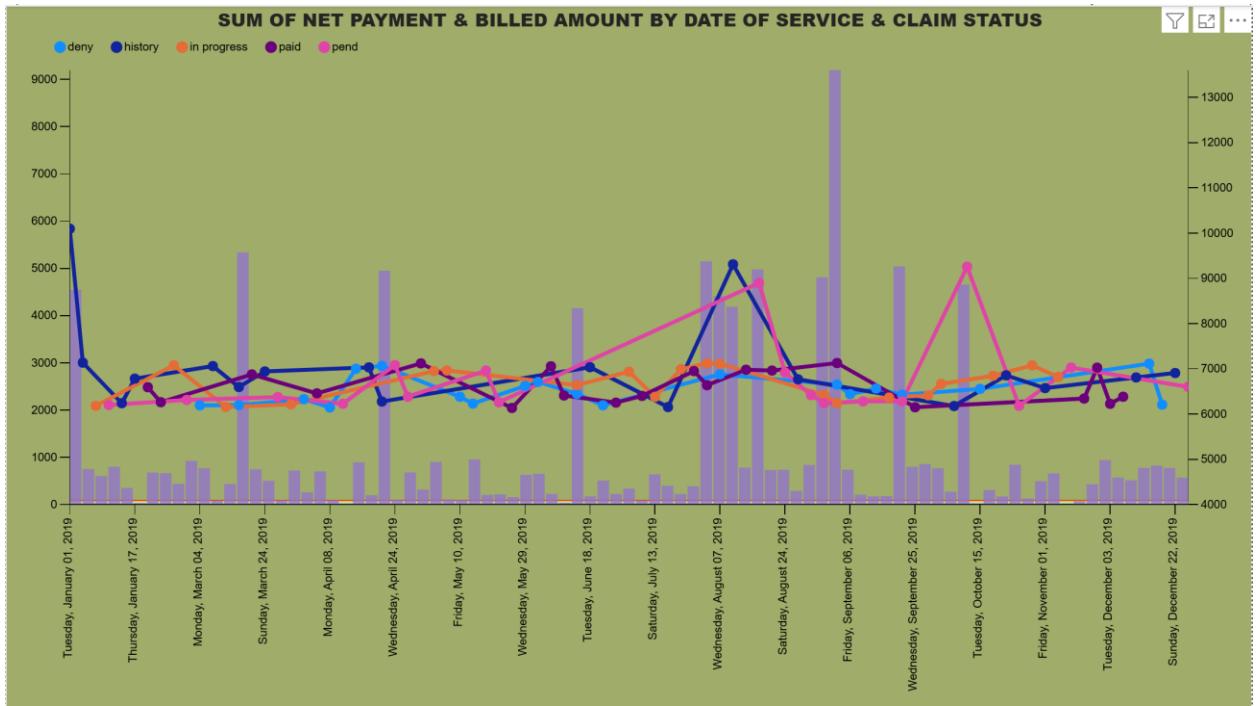
- Cost patterns across hospitals
- Influence of co-insurance amounts on billed vs approved values
- Gender representation in claims
- Outliers in high-cost hospitals



The decomposition tree shows a clean and complete link from hospital counts down to claim status. This represents provider representation, clean claim processing, and good operational transparency.

The decomposition tree allows full tracking of:

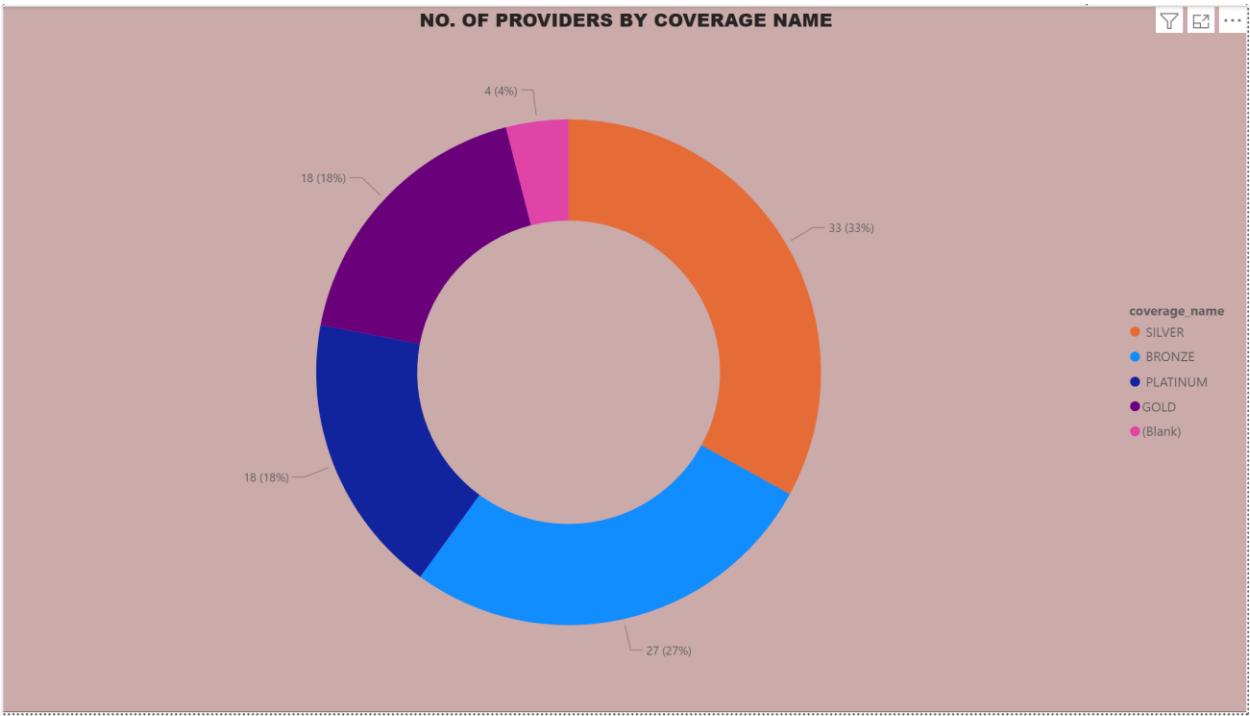
- Provider → Member → Claim → Outcome
Crucial for audits, compliance, and fraud detection.



The chart reveals:

- **Strong correlation** between high billed amounts and increased pending/denied claims.
- **Paid claims** remain stable and reliable regardless of billing fluctuations.
- **Pending claims spike** significantly in August and October.
- **Denials are unusually high in January**, suggesting early-year issues.
- Claim processing across 2019 shows predictable mid-year and fall peaks.

This visualization highlights opportunities to optimize **claim handling efficiency**, reduce **pending backlogs**, and address **seasonal surge patterns**.



The donut chart reveals:

- **Silver (33%)** leads provider coverage, followed by **Bronze (27%)**.
- **Premium plans (Gold & Platinum, 18% each)** form a strong secondary segment.
- **Blank entries (4%)** indicate minimal data gaps.

Overall, the provider network shows a **healthy mix of mainstream and premium plans**, suggesting balanced market coverage and strong provider acceptance across coverage tiers.