Healthcare Provide

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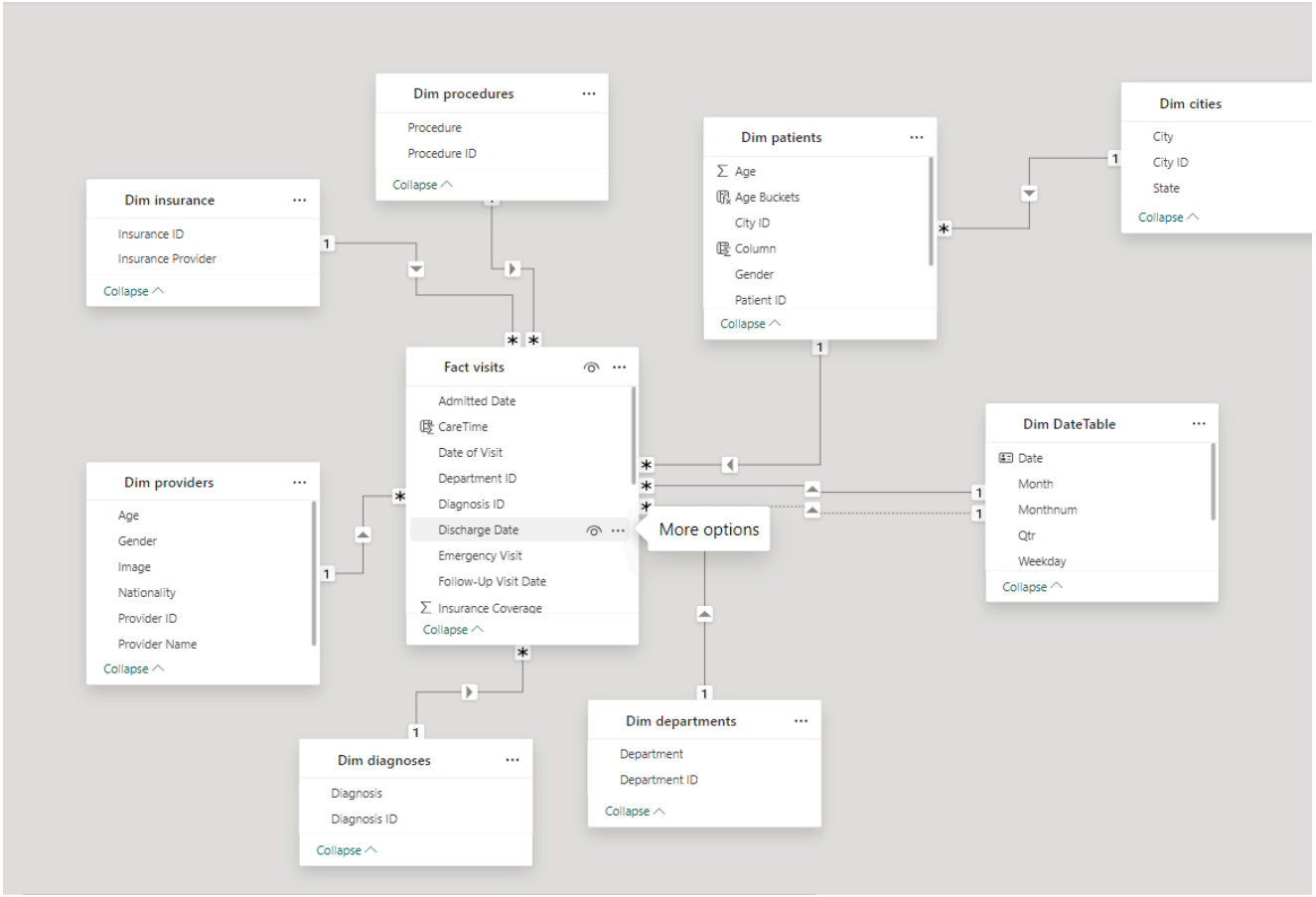
1. Business Intelligence (BI) Objectives:

Business Objective	Data Science Objective
1. **Improve hospital growth and financial stability** by increasing patient volume, optimizing resource allocation, and reducing outstanding payments over the next fiscal year. .	**Analyze patient demographics, service types, and payment trends** to identify growth opportunities, optimize department performance, and minimize pending payments. Specifically, track patient inflow across departments, monitor service growth trends, and assess the impact of unpaid bills on total revenue over a 12-month period.
2 Increase provider efficiency and improve patient care quality by enhancing performance metrics within the next **year**.	- **Evaluate the number of visits and procedures** performed by each provider to identify high- and low-performing providers, and aim for a **10% increase** in provider performance within **6 months**. - **Analyze patient satisfaction scores** linked to specific providers and treatment types, with the goal of increasing average satisfaction scores by **15%** within **12 months**.

3. Ensure resource efficiency by optimizing department usage and aligning resource allocation with patient demand within the next **year**	- **Analyze the volume of visits and types of services** (inpatient vs outpatient) handled by each department to optimize resource allocation, aiming for a **8% improvement** in resource utilization over **6 months**. - Identify cost patterns associated with different departments and service types to inform budgeting and resource planning.
4. Implement cost-saving measures for medical procedures while maintaining or improving patient care quality, targeting a **10% reduction** in procedure costs over the next **12 months**.	- **Determine the frequency of procedures performed and their associated costs** to identify potential cost-saving opportunities and reduce high-cost procedures by **15%** over the next **months**.
5. Increase insurance reimbursement rates and expand patient access to services by negotiating more favorable insurance contracts, aiming for a **5% improvement** in reimbursement rates over the next **12 months**.	- **Examine the distribution of visits by insurance provider** to assess market penetration and access, with the goal of improving patient access to care by **5%** over the next **year** **Analyze how different insurance coverages impact treatment costs** and service types to optimize negotiation strategies, reducing uncovered costs over the next **12 months**.

These objectives create a cohesive framework that aligns business goals with specific data-driven analytical efforts, ensuring that the healthcare provider can leverage its data to improve patient outcomes, optimize operations, and enhance financial performance.

2. Data Warehouse Model:



Justification : The Snowflake Model is ideal for the healthcare provider dataset because it normalizes data across multiple tables, reducing redundancy and optimizing storage. It allows detailed analysis of complex relationships between patients, providers, visits, diagnoses, and procedures. This model supports efficient querying, improves data integrity, and scales well with large and growing datasets, making it perfect for healthcare scenarios where precision and structure are crucial.

3. Identification of Decision Makers:

1. Hospital or Healthcare System Executives (CEO, COO, CFO)

- **Role**: These top-level executives are responsible for the overall strategic direction, financial health, and operational efficiency of the healthcare organization.
- **Decisions**:
    - Resource allocation across departments.
    - High-level decisions on expanding or scaling services based on performance metrics.

2. Medical Directors and Department Heads

- **Role**: These individuals oversee specific departments and clinical services, ensuring quality care delivery and managing staff within their departments.
- **Decisions**:
    - Staffing needs based on **provider performance**.
    - Equipment purchases based on **procedure frequency** and **cost** trends.
    - Identifying areas for improving **diagnostic accuracy** and treatment effectiveness.#####

3. Financial Managers

- **Role**: Financial managers focus on budgeting, cost control, and ensuring profitability without compromising quality of care.
- **Decisions**:
    - Budget allocations for each department based on **cost patterns**.
    - Strategic planning for cost control and revenue optimization.

4. Human Resources (HR)

- **Role**: HR is involved in recruitment, retention, and development of healthcare staff, ensuring the organization has the right personnel to meet patient needs.
- **Decisions**:
    - Staffing decisions based on **provider performance**.
    - Addressing gaps in care or identifying training needs for underperforming staff.

5. Insurance Liaison or Contract Managers

- **Role**: Manages relationships with insurance providers and ensures optimal reimbursement for healthcare services.
- **Decisions**:
    - Negotiating better contracts with insurance companies based on **insurance coverage** and **cost data**.
    - Optimizing care delivery models to improve insurance reimbursement rates.

4. List of KPIs:

- **Hospital or Healthcare System Executives:**

Objective:

- **KPIs:**

- **Service Growth**: The growth of services over time.
- **Number of Patients by Service Type**: Shows the breakdown of patients by different service types.
- **Average Satisfaction Score**: Shows the average patient satisfaction score.
- **Treatment Cost by Department**: The expenses by department.

- **Measures and DAX Calculations**:
- **TotalRevenue**
- **CountOfPendingPayments**
- **TotalRoomCharges**
- **CountPastFollowUpDates**
- **ServiceGrowth**

- **Medical Directors and Department Heads**

Objective: Identify high-performing and underperforming providers to optimize patient care and resource allocation.

- **KPIs**:
  - **Provider Performance**: Visits handled by each provider.
  - **Procedures per Provider**: Number of procedures performed by provider.
  - **Patient Satisfaction by Provider**: Satisfaction scores linked to providers.
  - **Total Patients per Provider**:The total number of unique patients seen by each provider

- **Measures and DAX Calculations**:
  - **AVG_Inssurance**
  - **AVG_Room Charge**
  - **AVG_Tratment Co**
  - **EmergencyVisitPercentage**
  - **FollowUpVisitRate**
  - **Patient_Count**
  - **Total_Visits**
  - **Age Group**

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- **Financial Managers**

Objective: Monitor procedure frequency and associated costs to control expenses while maintaining quality of care.

  - **KPIs**:
  - **Total Billing Amount** (by quarter, year, weekday vs weekend)
  - **Monthly Billing Amount** (with month-to-month variances and percentage changes)
  - **Weekly Billing by Department** (Orthopedics, Cardiology, General Surgery) with week-over-week changes and percentage variances

- **Measures and DAX Calculations**:
- **Total Billing Amount**, **Average Billing Amount per Visit:**
- **Billing Amount**
- **Treatment Cost**
- **Medication Cost**
- **Room Charges**
- **Total Treatment Cost**, **Average Treatment Cost**
- **Total Medication Cost**, **Average Medication Cost**
- **Total Room Charges**, **Average Room Charges**
- **Total Insurance Coverage**, **Average Insurance Coverage**
- **Total Out-of-Pocket**, **Average Out-of-Pocket Cost**
- **Billing by Procedure**
- **Billing by Diagnosis and Service Type**
- **Billing by Department**
- **Billing by Location (City/State)**

- **Insurance Liaison or Contract Managers**

Objective: Understand how insurance coverage impacts visit frequency, costs, and patient satisfaction.

- **KPIs**:
  - **Total Insurance coverage**: Part of Bill covered by insurance.
  - **Cost Coverage by Insurance Provider**: Percentage of costs covered.
  - **Patient Satisfaction by Insurance**: Satisfaction scores by insurance compared to total Billing amount.
  - **Service Type by Insurance**: Inpatient vs outpatient service breakdown by insurer.

- **Measures and DAX Calculations**:
- **Total Billing Amount**,
- **Treatment Cost**
- **Medication Cost**
- **Room Charges**
- **Total Treatment Cost**, **Average Treatment Cost**
- **Total Medication Cost**, **Average Medication Cost**
- **Total Insurance Coverage**, **Average Insurance Coverage**
- **Total Out-of-Pocket**, **Average Out-of-Pocket Cost**
- **Insurance coverage by Location (City/State)**
- **Insurance coverage by Departement/Procedure**
- **Number of patients by months**
- **Reimbursement rate by State and Insurance provider**

- **Human Resources**

Objective: Optimize resource allocation by evaluating provider-to-patient ratios and care time across departments to improve overall healthcare service delivery

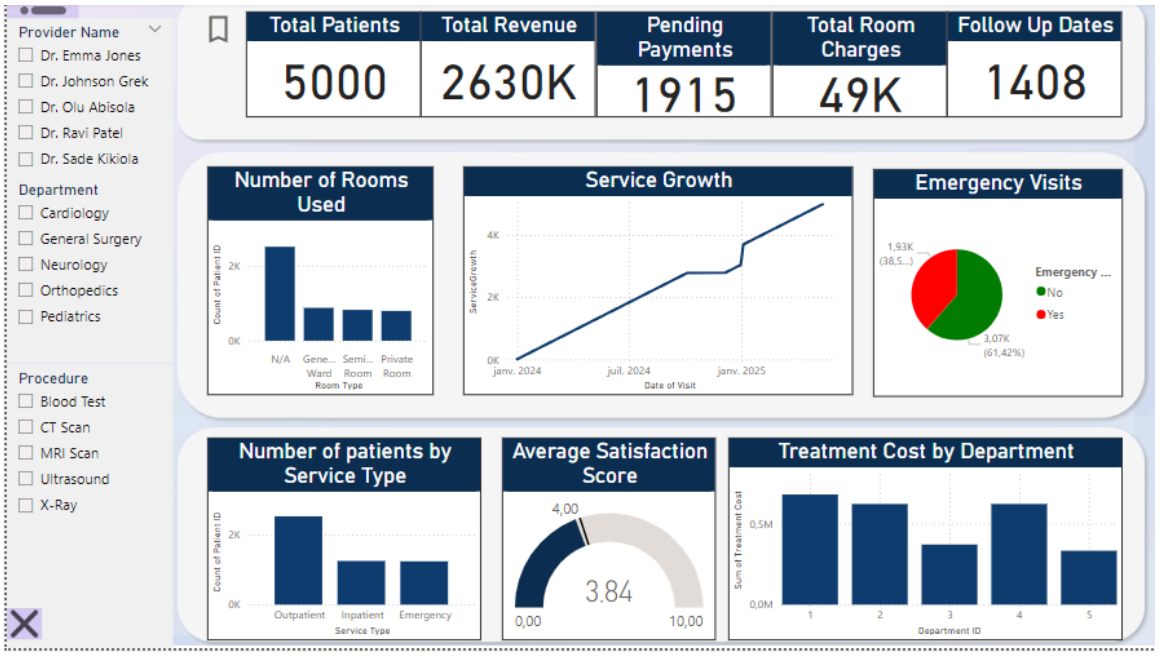
- **KPIs**:
- **Provider-to-Patient Ratio**
- **Patient Volume by Provider**
- **Departmental Patient Care Time**
- **Provider Performance Comparison by Procedure**

- **Measures and DAX Calculations**:
- **ProviderToPatientRatio**
- **Department**
- **PatientVolumeByProvider**
- **Procedures by Provider**
- **Patient Satisfaction Score**
- **Provider Name**

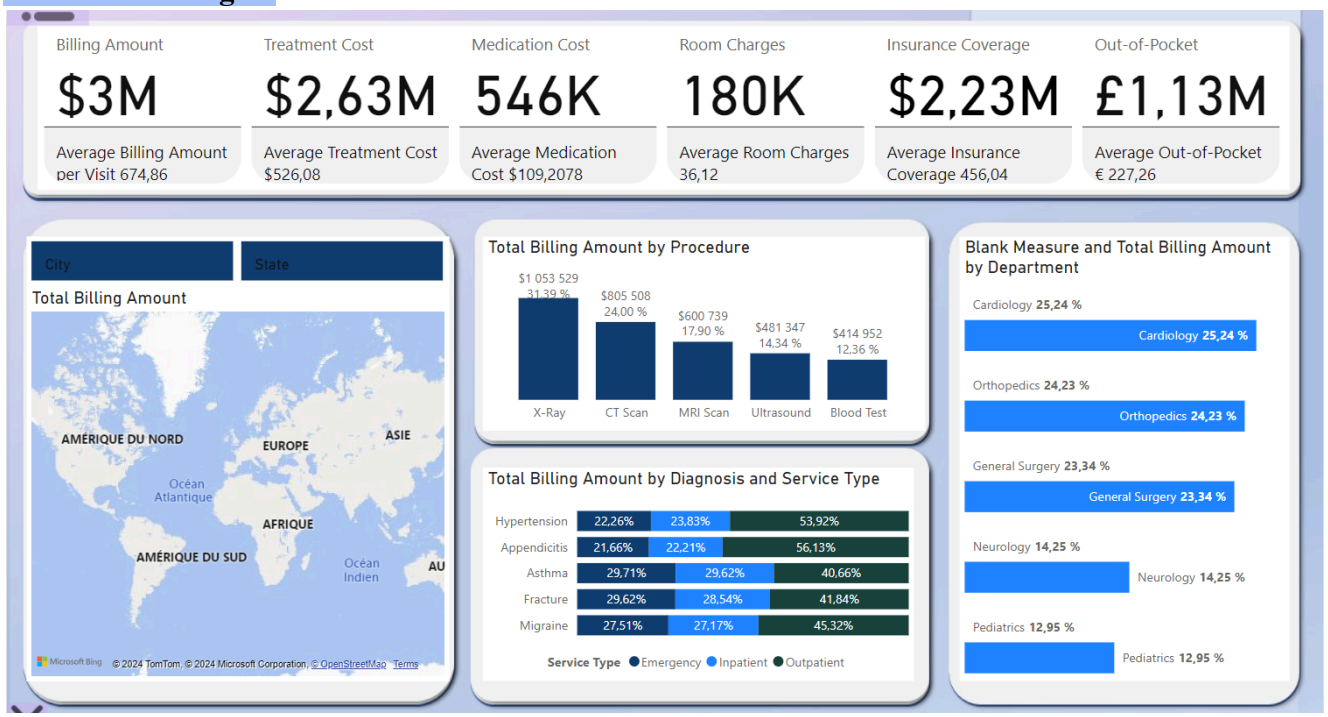
- **AvgCareTime**
- **ProceduresByProvider**
- **Procedure**

5. Dashboard:

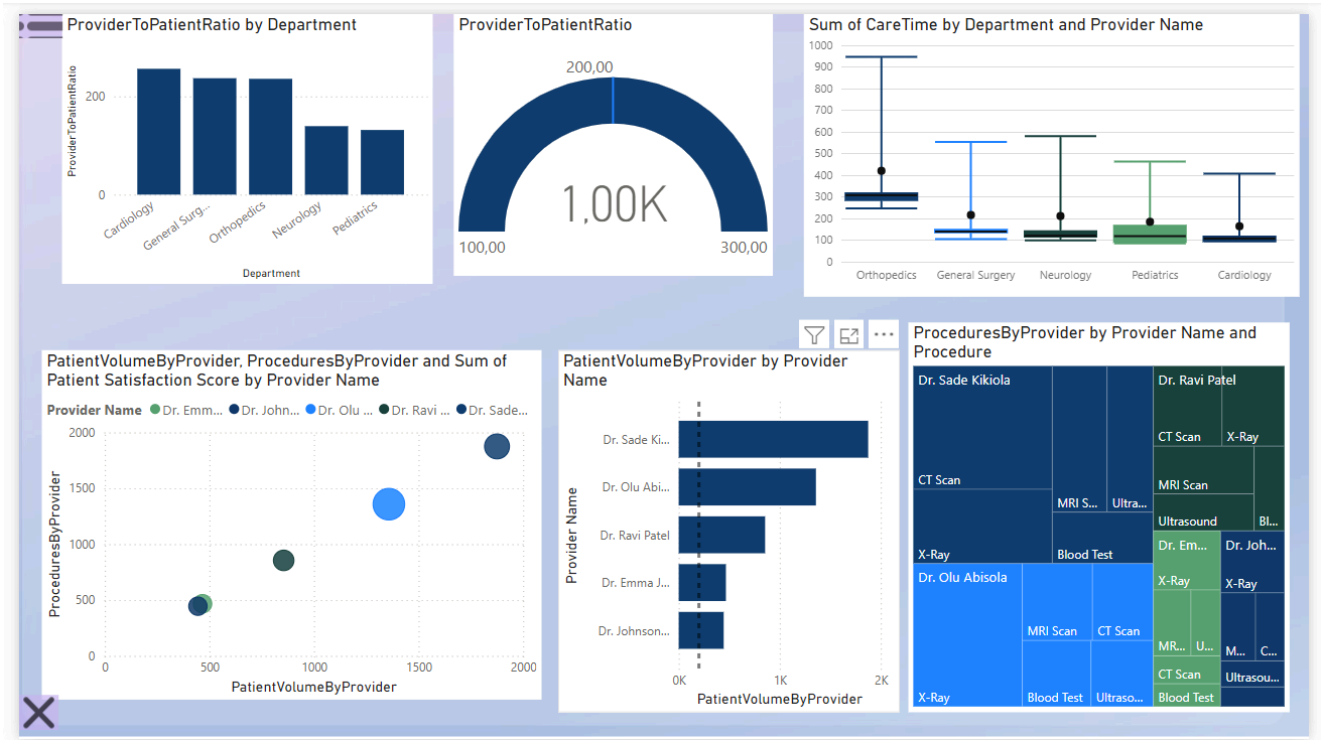
Hospital or Healthcare System Executives:



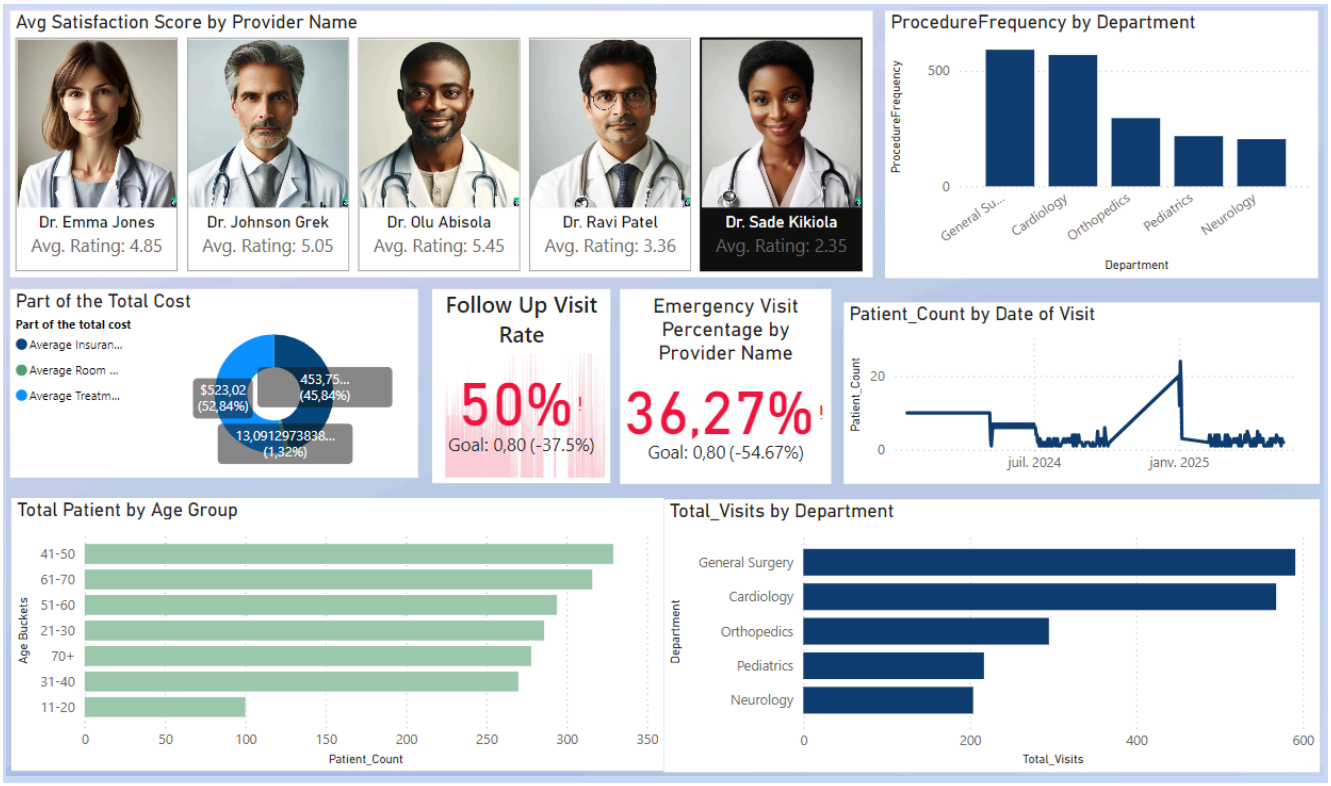
- **Financial Managers**



- **Human Resources**



○ Medical Directors and Department Heads



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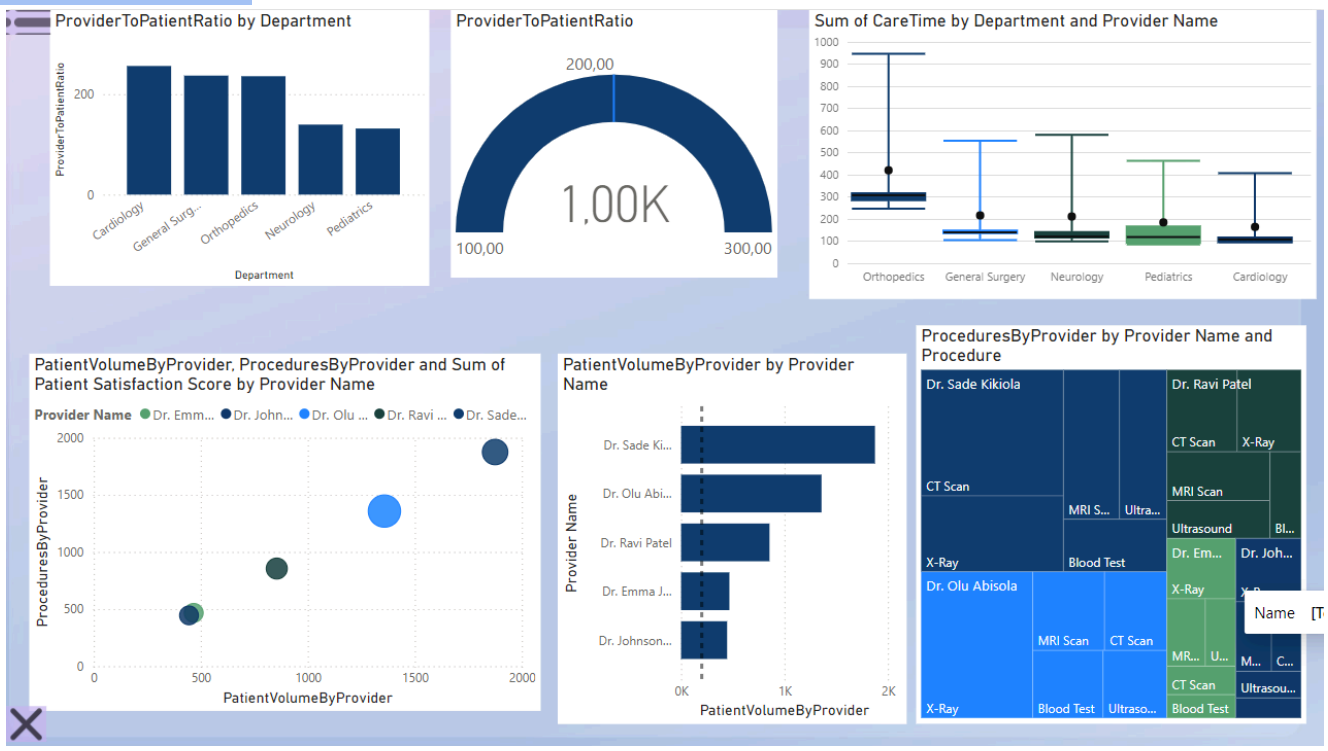
- **Human Resources**