



Driving Data Informed Healthcare Decisions

A Deep Dive Into Patient Analytics

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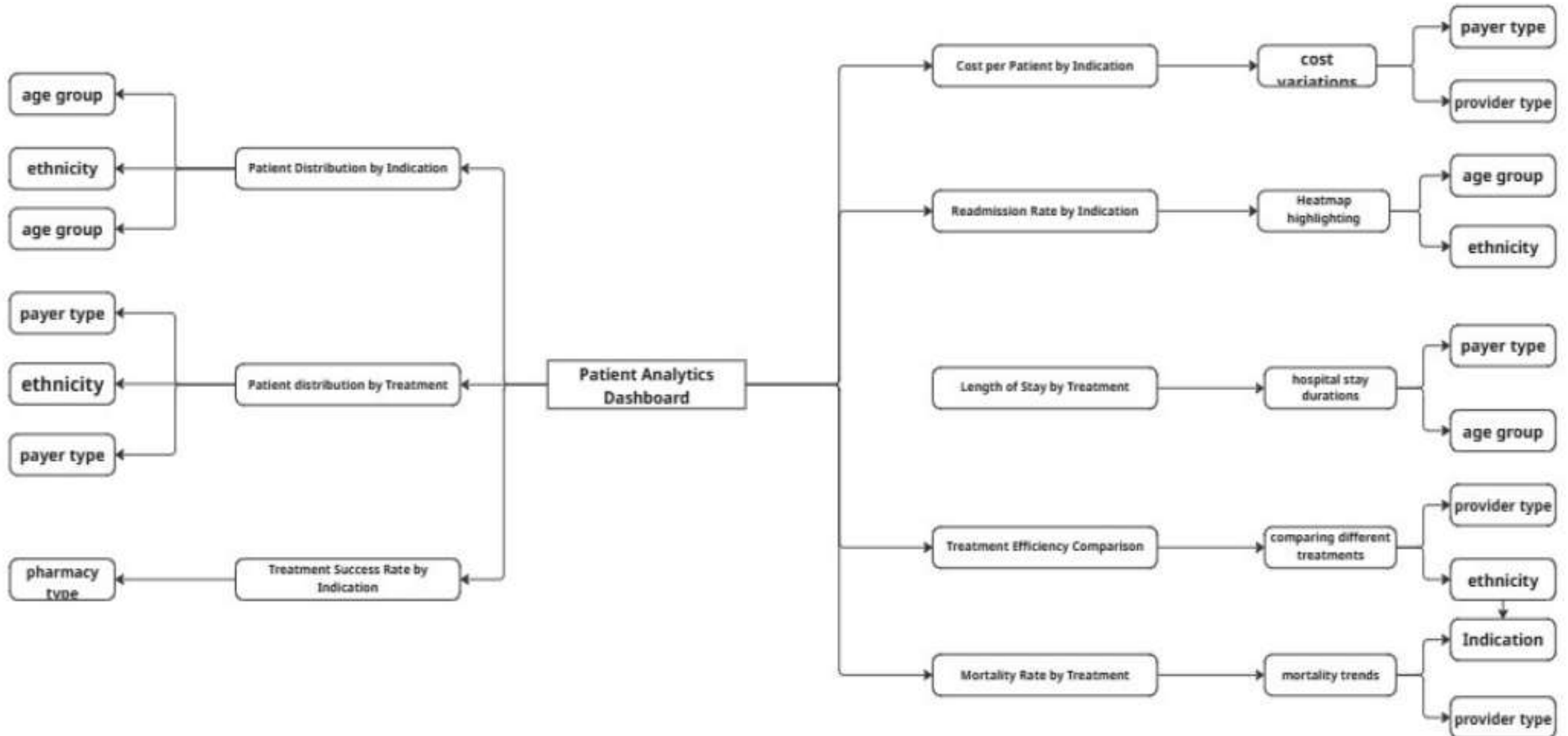
Problem Statement

Develop a patient analytics dashboard with the following views/ KPIs using dummy data. Please feel free to create mock data for the above KPIs and then proceed to creating the dashboard. Let me know if you face any issues or have any questions while creating the dataset.

1. **Patient Distribution by Indication** – by age group, ethnicity, and payer type.
2. **Patient distribution by treatment for a given indication** - same filters as above
3. **Treatment Success Rate by Indication** – visualization comparing success rates across different treatments, filtered by pharmacy type.
4. **Cost per Patient by Indication** – visualization to show cost variations, with filters for payer type and provider type.
5. **Readmission Rate by Indication** – Heatmap highlighting conditions with high readmission risks, filtered by age group and ethnicity.
6. **Length of Stay by Treatment** – showing hospital stay durations, filtered by payer type and age group.
7. **Treatment Efficacy Comparison** – comparing different treatments, with filters for provider type and ethnicity
8. **Mortality Rate by Treatment** – displaying mortality trends, filtered by indication and provider type.

Problem Statement

To illustrate the initial thought process and requirement breakdown.



Project Objective

Our objective was to transform raw patient data into actionable insights, enabling us to:

1. Better understand our patient population.
2. Identify trends in treatment effectiveness and costs.
3. Improve patient outcomes and operational efficiency.
4. Support strategic decision-making for resource allocation and service improvement.



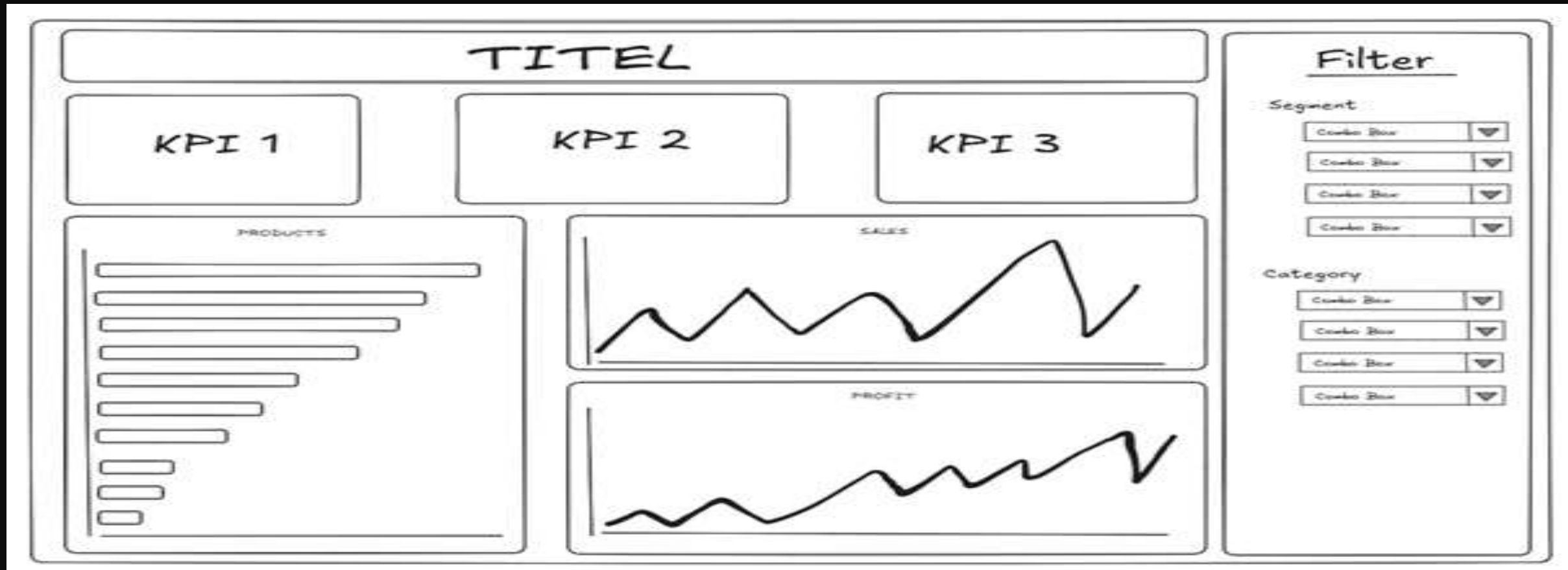
Roadmap Plan

- Proposed roadmap outlining the key milestones, structured with an **agile approach** to ensure iterative progress and flexibility.
- Our immediate focus for **Sprint 1** is completing core dashboard development within the next two days

Activity ID	Key Milestone	Detailed Activities	Estimated Time (Hours)	Target Completion	Status
A1	Data Connection & Preparation	Connect to dummy data source, perform initial data cleaning and shaping within Tableau.	4	End of Day 1 (June 2)	Completed
A2	Data Model & Relationships	Define relationships between tables, create calculated fields for initial data transformation.	1	End of Day 1 (June 2)	Completed
A3	Core Measures & Dimensions	Identify and set up key measures and dimensions	2	End of Day 1 / Start of Day 2	Completed
A4	Calculated Fields & Parameters	Develop complex calculated fields for KPIs	2	End of Day 2 (June 3)	Completed
A5	Dashboard Design & Visualizations	Create all required dashboard sheets, build appropriate chart types apply filters and actions.	5	End of Day 2 (June 3)	Completed
A6	Performance Tuning & User Experience	Optimize workbook performance, refine dashboard layouts	1	End of Day 2 (June 3)	Completed
A7	Publishing & Sharing	Prepare workbook for local demonstration	1	Morning of Day 3 (June 4)	Completed
A8	Case Study Discussion & Demo	Present the Tableau dashboard and discuss insights.	N/A	Day 3 (June 4)	Scheduled

Dashboard Overview

- I developed an interactive Tableau dashboard to visualize critical patient data across several key areas.
- This dashboard provides a dynamic view of our patient population, allowing us to drill down into specific segments for deeper understanding.



Data Connection & Preparation

- Connect to dummy data source, perform initial data cleaning and shaping within Tableau.
- To achieve our analytical objectives in this dashboard, we effectively prepared and structured our dataset

KPI/ Views	Attributes Used
Patient Distribution by Indication	PatientID, Indication, Ethnicity, PayerType, DateOfBirth
Patient distribution by treatment	PatientID, Indication, Treatment, Ethnicity, PayerType, DateOfBirth
Treatment Success Rate by Indication	Indication, Treatment, PharmacyType, TreatmentOutcome
Cost per Patient by Indication	PatientID, Indication, Cost, PayerType, ProviderType
Readmission Rate by Indication	PatientID, Indication, Ethnicity, IsReadmissionFlag, DateOfBirth
Length of Stay by Treatment	Treatment, Payer Type, Admission Date, Discharge Date, DateOfBirth
Treatment Efficacy Comparison	Treatment, ProviderType, Ethnicity, TreatmentOutcome
Mortality Rate by Treatment	Treatment, Indication, ProviderType, PatientDisposition

Data Connection & Preparation

- To ensure clarity and understanding, summarize the key data attributes and their structure, including their data type and description, before integration into our analysis tool.

Attribute Name	Description	Data Type
PatientID	A unique number for each patient.	Numeric
Indication	The main health condition a patient has.	String/Text
DateOfBirth	The patient's birth date.	Date&Time
Ethnicity	The patient's ethnic background.	String/Text
PayerType	How the patient's care is paid for	String/Text
Treatment	The specific care or medication given to the patient.	String/Text
PharmacyType	Where the patient's prescriptions were filled.	String/Text
ProviderType	The type of place or specialist that provided care.	String/Text
AdmissionDate	The date the patient entered the facility for this visit.	Date&Time
DischargeDate	The date the patient left the facility for this visit.	Date&Time
Cost	The total expense for this patient's treatment episode.	Numeric Currency
TreatmentOutcome	The result of the treatment	String/Text
PatientStatus	The patient's status when discharged	String/Text
IsReadmissionFlag	TRUE if the patient was readmitted shortly after a previous discharge.	Boolean

Data Connection & Preparation

For efficient, secure data handling is crucial for large-scale data:

1. Prepare csv file
2. Create tables in SQL
3. Import csv file into SQL

For the Current Project:

1. To focus on analytical
2. Directly integrated a flat file
3. Quick setup and demonstration

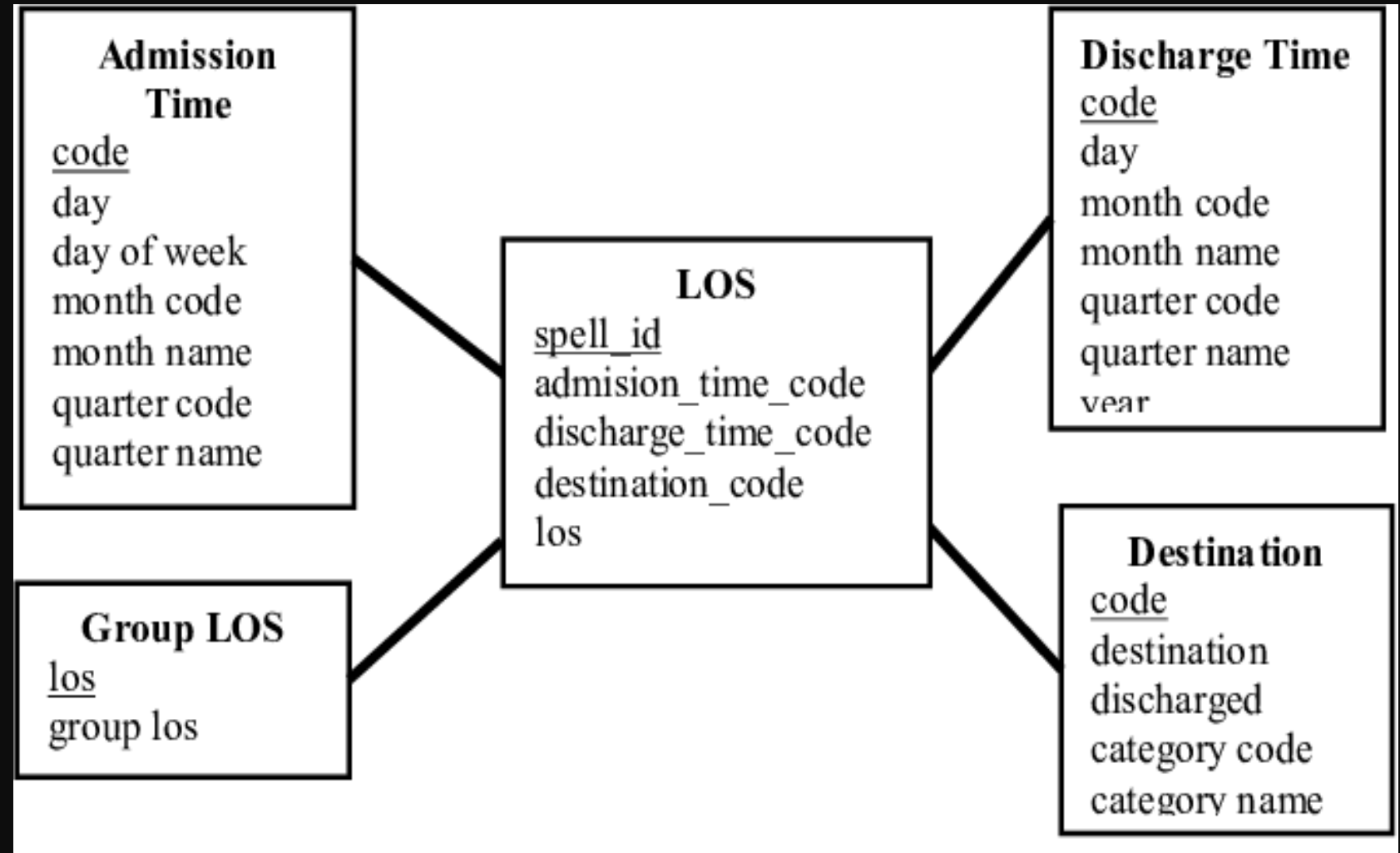


Data Output	Messages	Notifications
COPY 10108		
Query returned successfully in 82 msec.		

Data Model & Relationships

Data modeling is the process of creating the conceptual representation of the data and its relationships in order to facilitate the organization, management, and analysis of information.

- Tables are linked using primary and foreign keys, establishing clear relationships
- For this dashboard, dummy data conceptually aligns with a simplified relational model, structured to support the KPIs directly.



Core Measures & Dimensions

- Identify and set up key measures and dimensions

KPI/Views	Measures
Patient Distribution by Indication	Patient Count, Top Indication
Patient distribution by treatment	Average Age, Top Treatment
Treatment Success Rate by Indication	Success Rate
Cost per Patient by Indication	Average Cost per patient, Total Cost of Care
Readmission Rate by Indication	Readmission Rate
Length of Stay by Treatment	Average Length of Stay
Treatment Efficacy Comparison	Treatment Success Rate, Top Performing Tratment
Mortality Rate by Treatment	Mortality Rate Rate, Lowest Mortality Treatment

Core Measures & Dimensions

Total Patients 35	Average Age 47.80	Top Indication Diabetes	Top Treatment Pills
Total Cost of Care \$123.98K	Avg Cost Per Patient \$3542	Avg Length of Stay 4.8	Readmission Rate 22.86%
Treatment Success 85.71%	Top Performing Treatment Insulin	Mortality Rate 14.29%	Lowest Mortality Treatment Bypass Surgery

Calculated Fields & Parameters

- Identify and set up key measures and dimensions
- Indicates the key metrics or numbers we are tracking and quantifying

KPI/Views	Calculated Fields
Patient Distribution by Indication	Select Breakdown, Breakdown Dimension, Dynamic Title
Patient distribution by treatment	Select Breakdown, Breakdown Dimension, Dynamic Title
Treatment Success Rate by Indication	Treatment Success Rate , Dynamic Title
Cost per Patient by Indication	Select Breakdown, Breakdown Dimension, Dynamic Title
Readmission Rate by Indication	Select Breakdown, Breakdown Dimension, Dynamic Title
Length of Stay by Treatment	Select Breakdown, Breakdown Dimension, Dynamic Title
Treatment Efficacy Comparison	Select Breakdown, Breakdown Dimension, Dynamic Title
Mortality Rate by Treatment	Select Breakdown, Breakdown Dimension, Dynamic Title

Calculated Fields & Parameters

Edit Parameter [01_Select Breakdown]

Name

01_Select Breakdown

Properties

Data type

String

Display format

Select Breakdown

Current value

Select Breakdown

Value when workbook opens

Current value

Allowable values

☐ All

☒ List

☐ Range

Value	Display As
AgeGroup	AgeGroup
Ethnicity	Ethnicity
Payer Type	Payer Type
Select Breakdown	Select Breakdown
Click to add	

☒ Fixed

☐ When workbook opens

Add values from

01_Breakdown Dimension

```
CASE [01_Select Breakdown]
WHEN "AgeGroup" THEN [AgeGroup]
WHEN "Ethnicity" THEN [Ethnicity]
WHEN "Payer Type" THEN [Payer Type]
END
```

The calculation is valid.

16 Dependencies

Apply

OK

Title_Indication

```
IF [01_Select Breakdown] = "Select Breakdown"
THEN "Patient Distribution by Indication"
ELSE "Patient Distribution by Indication (by " + [01_Select Breakdown] + ")"
END
```

The calculation is valid.

3 Dependencies

Apply

OK

Calculated Fields & Parameters

AgeGroup

```
IF DATEDIFF('year', [Date Of Birth], TODAY()) >= 0
    AND DATEDIFF('year', [Date Of Birth], TODAY()) <= 17 THEN "Minor"
ELSEIF DATEDIFF('year', [Date Of Birth], TODAY()) >= 18
    AND DATEDIFF('year', [Date Of Birth], TODAY()) <= 40 THEN "Adult"
ELSEIF DATEDIFF('year', [Date Of Birth], TODAY()) >= 41
    AND DATEDIFF('year', [Date Of Birth], TODAY()) <= 60 THEN "Middle-Aged"
ELSEIF DATEDIFF('year', [Date Of Birth], TODAY()) > 60 THEN "Senior-Citizen"

ELSE "Unknown"

END
```

The calculation is valid.

19 Dependencies ▼

Apply

OK

SuccessRate

```
SUM(IF [Treatment Outcome] = 'Success' THEN 1 ELSE 0 END) / COUNT([Patient ID])
```

MortalityRate

```
SUM(IF [Patient Status] = 'Expired' THEN 1 ELSE 0 END) / COUNT([Patient ID])
```

Age

```
DATEDIFF('year', [Date Of Birth], TODAY())
```

ReadmissionRate

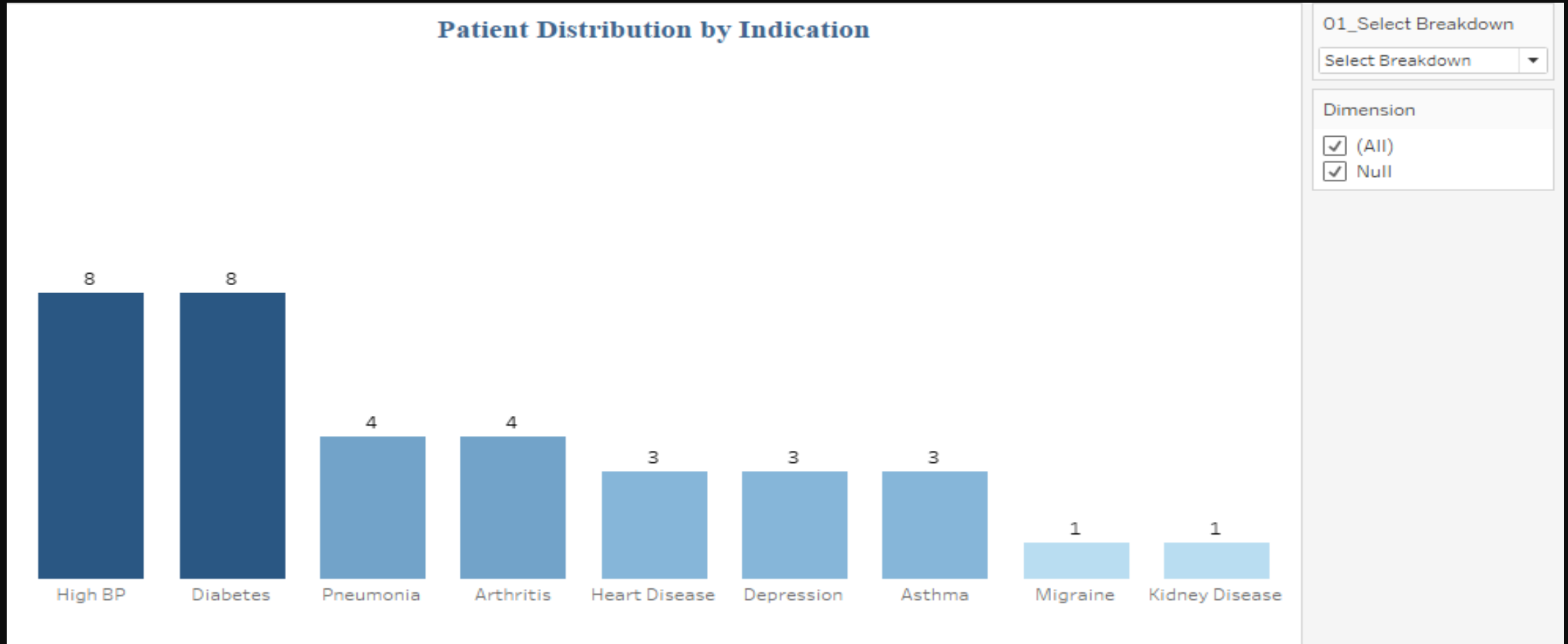
```
SUM(IF [Is Readmission Flag] = 'Yes' THEN 1 ELSE 0 END) / COUNT([Patient ID])
```

LengthOfStayDays

```
DATEDIFF('day', [Admission Date], [Discharge Date])
```

Dashboard Design & Visualizations

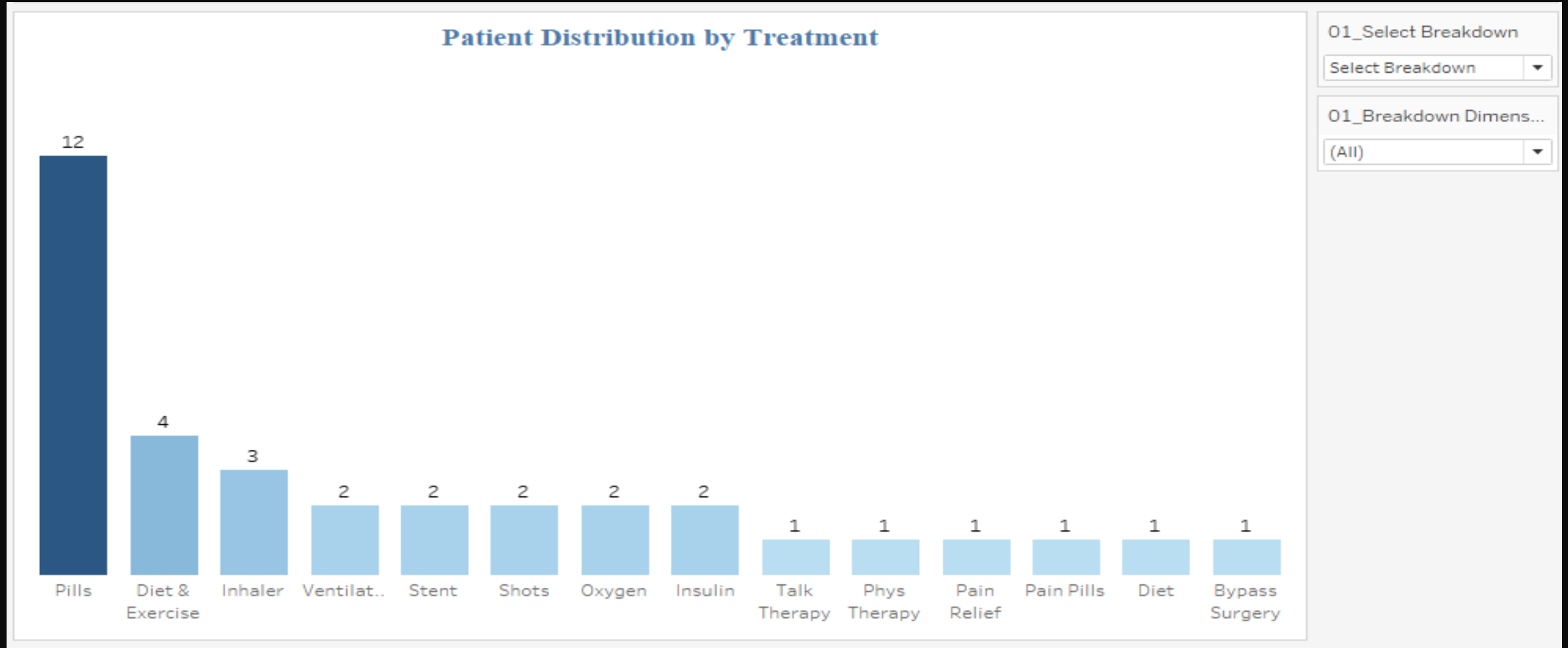
- Patient Distribution by Indication – by age group, ethnicity, and payer type.



- Key Insight: High Blood Pressure and Diabetes are our most common patient indications

Dashboard Design & Visualizations

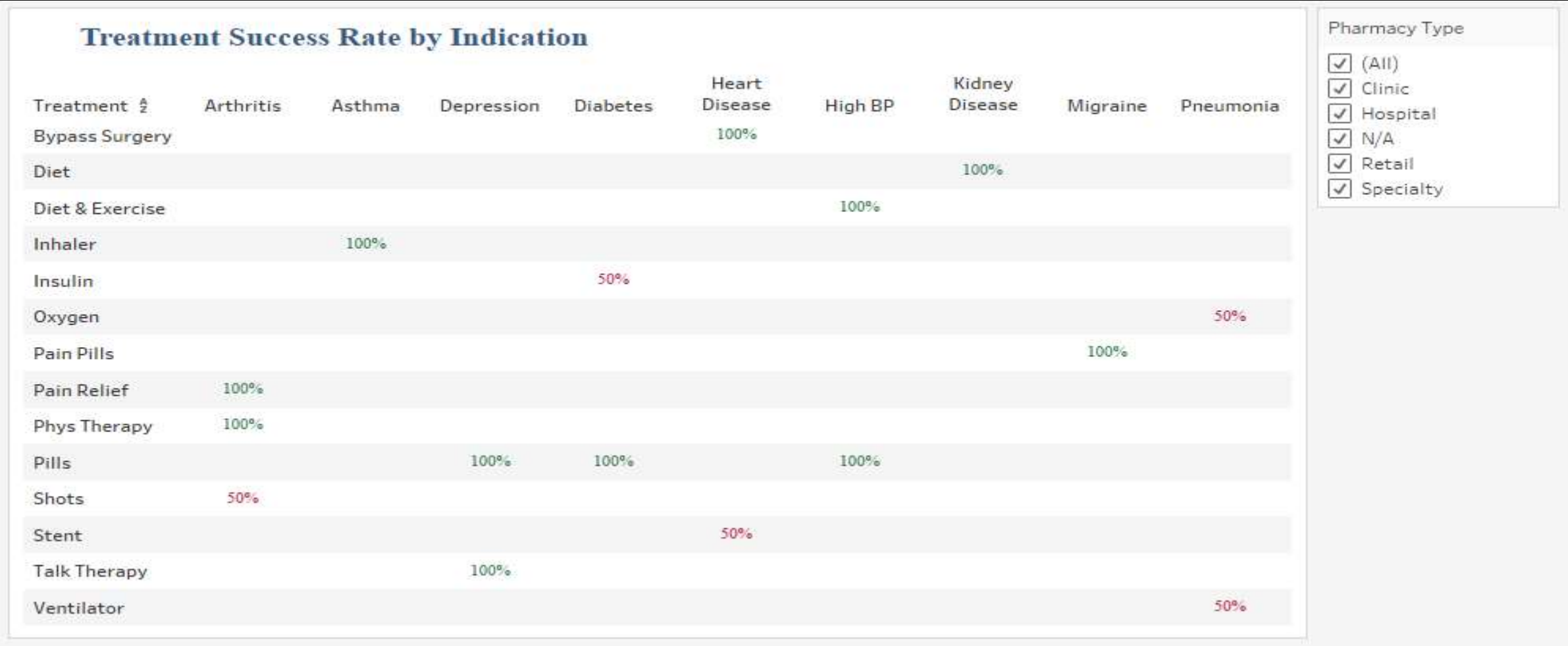
- Patient distribution by treatment -by age group, ethnicity, and payer type.



- Key Insight: Pills are the most common treatment.

Dashboard Design & Visualizations

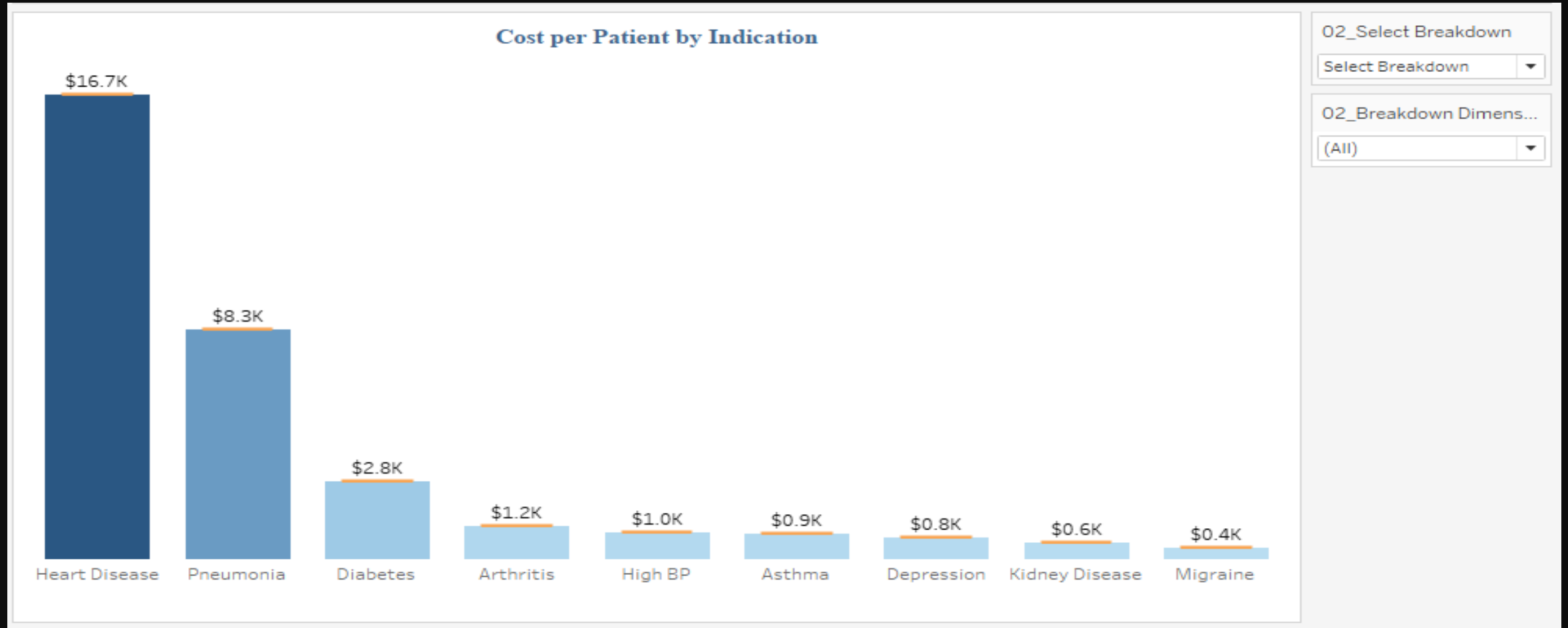
- Treatment Success Rate by Indication – comparing success rates across treatments, filtered by pharmacy type.



- Key Insight:** Treatment success rates vary significantly by both treatment and indication, with several showing 100% success

Dashboard Design & Visualizations

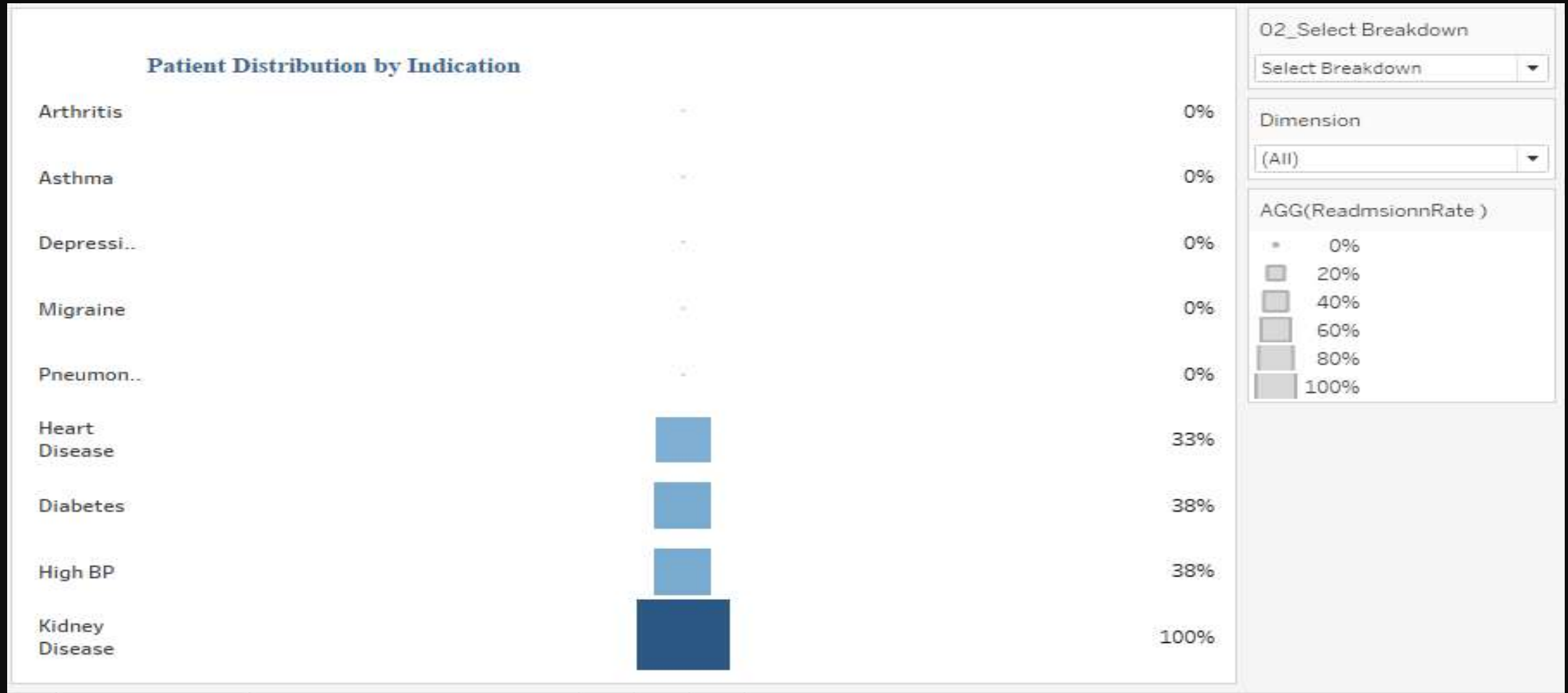
- Cost per Patient by Indication
 - show cost variations, with filters for payer type and provider type



- Key Insight: Treating Heart Disease costs us the most per patient.

Dashboard Design & Visualizations

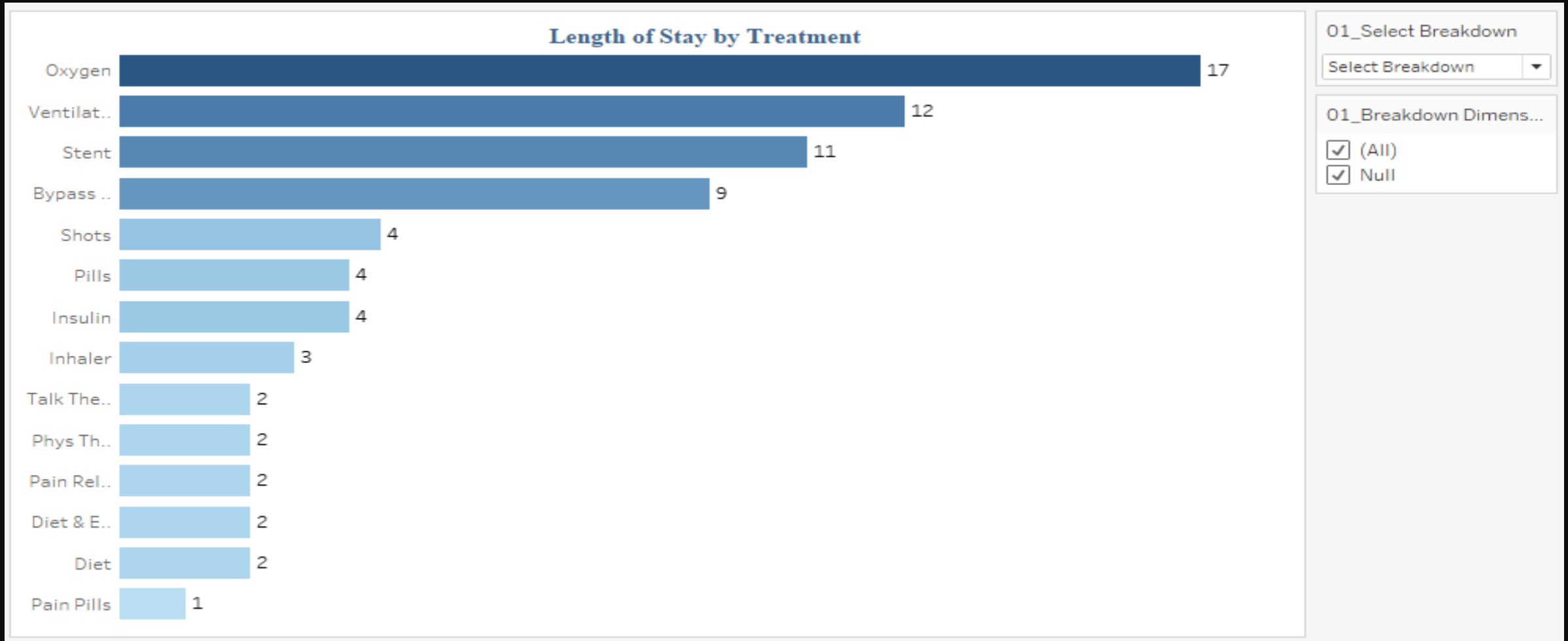
- Readmission Rate by Indication – Heatmap, filtered by age group and ethnicity.



- Key Insight: Kidney Disease accounts for 100% of the patient distribution.

Dashboard Design & Visualizations

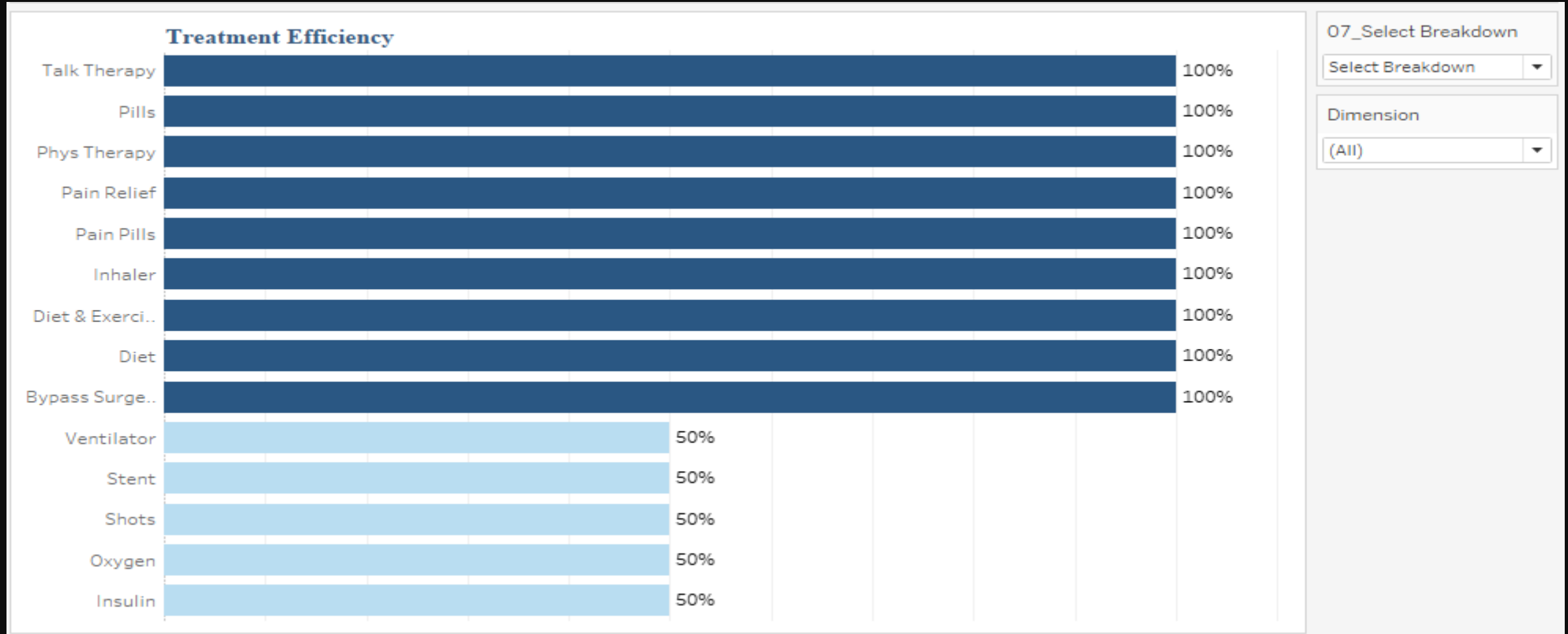
- Length of Stay by Treatment – showing hospital stay durations, filtered by payer type and age group.



- Key Insight:** Oxygen therapy & Ventilation are associated with longer average lengths of stay

Dashboard Design & Visualizations

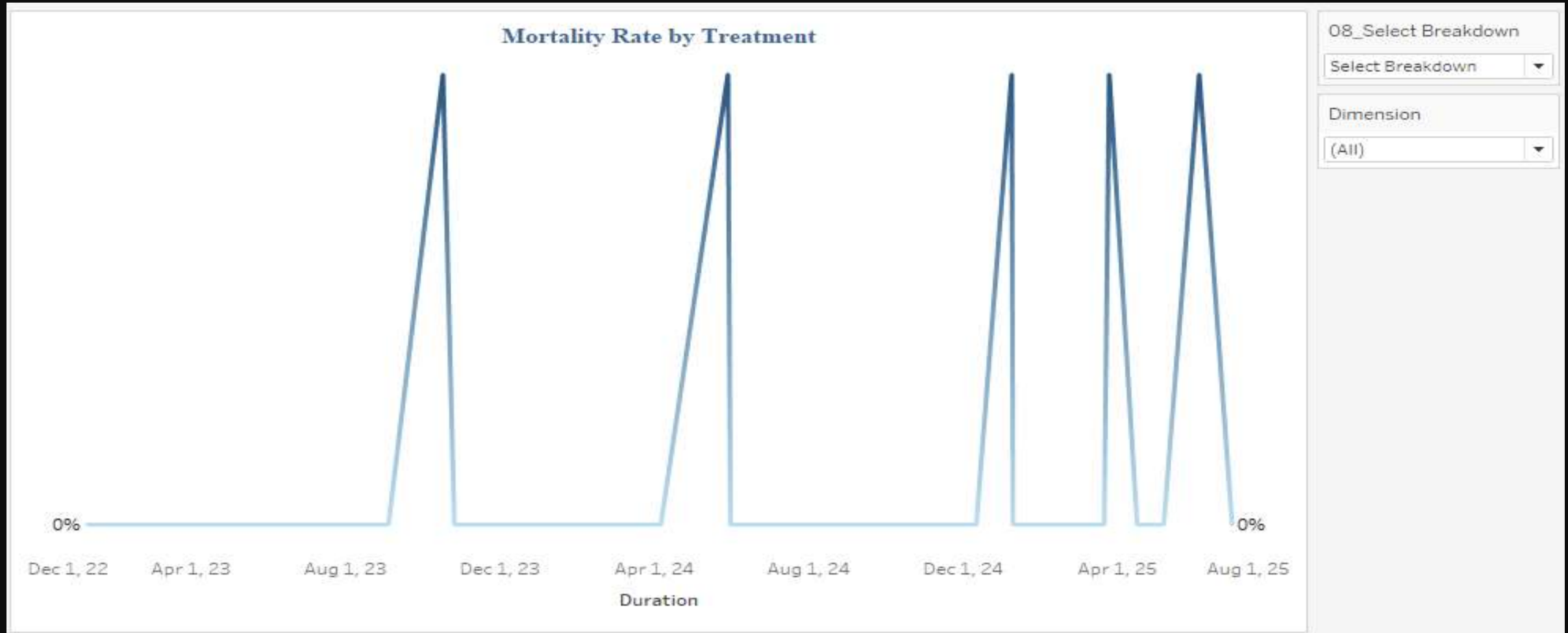
- Treatment Efficacy Comparison – comparing different treatments, with filters for provider type and ethnicity.



- Key Insight: Most treatments show 100% efficiency

Dashboard Design & Visualizations

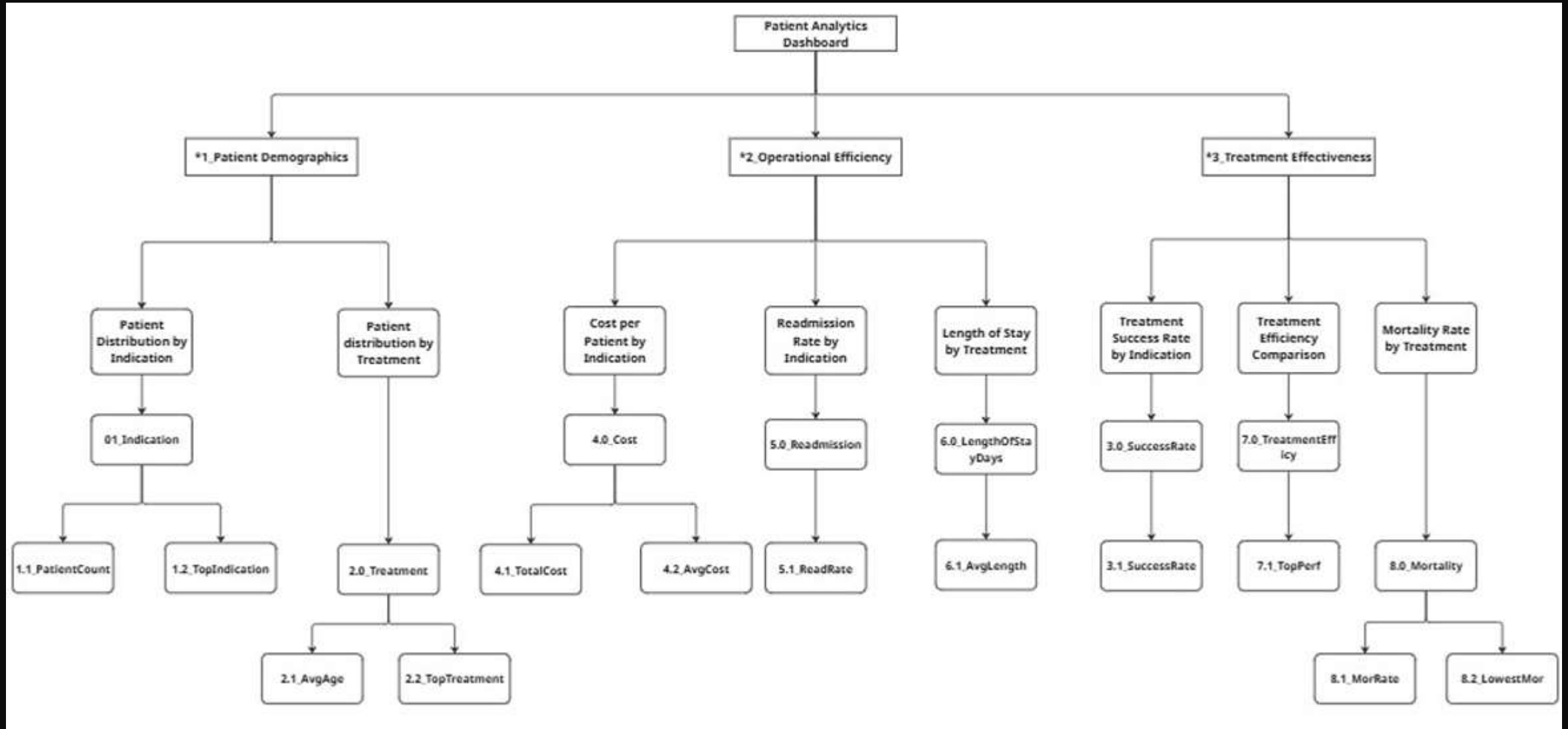
- Mortality Rate by Treatment – displaying mortality trends, filtered by indication and provider type.



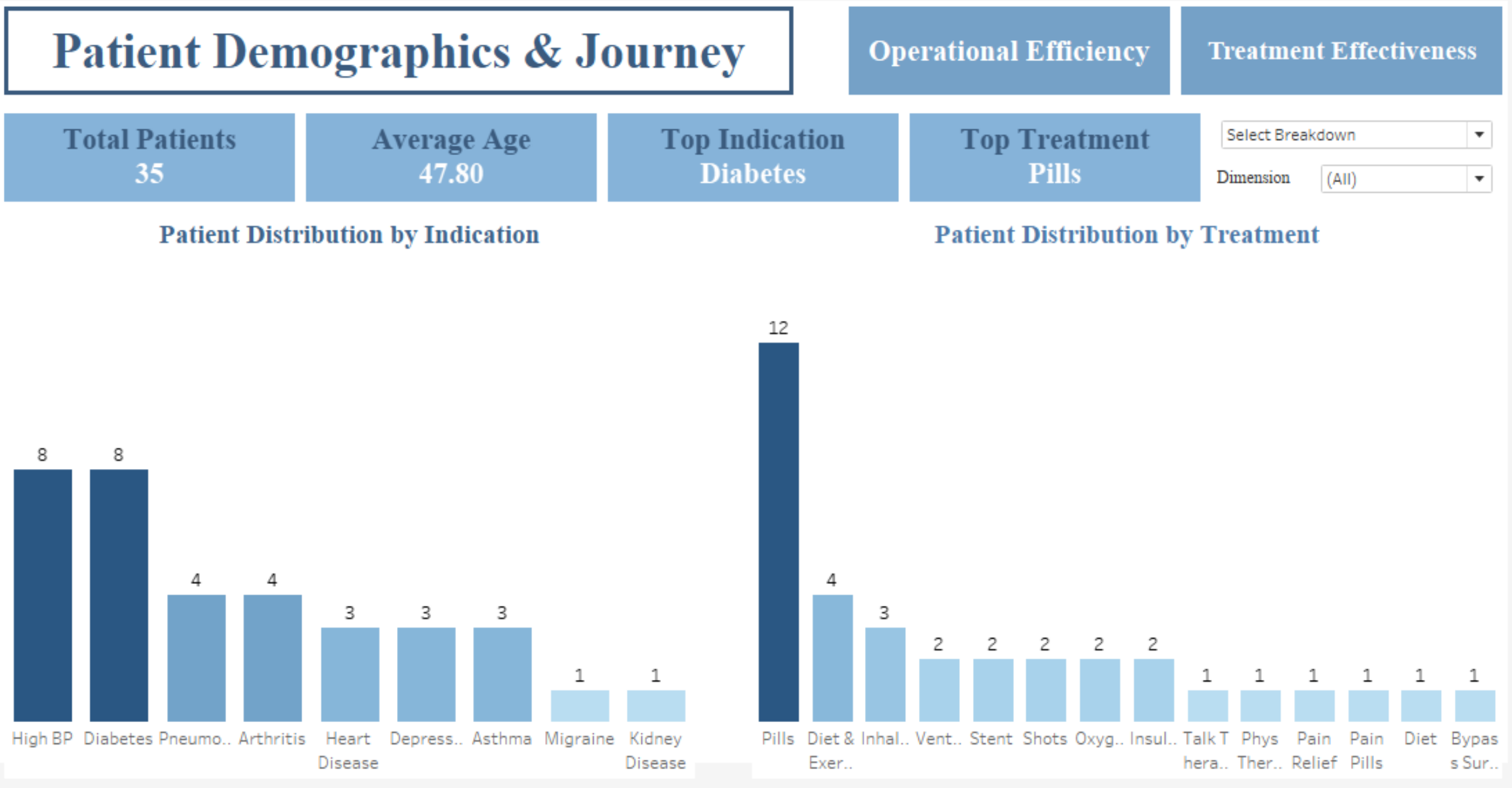
- Key Insight: Mortality rates are generally 0% over time, with sudden spike comes

Dashboard Design & Visualizations

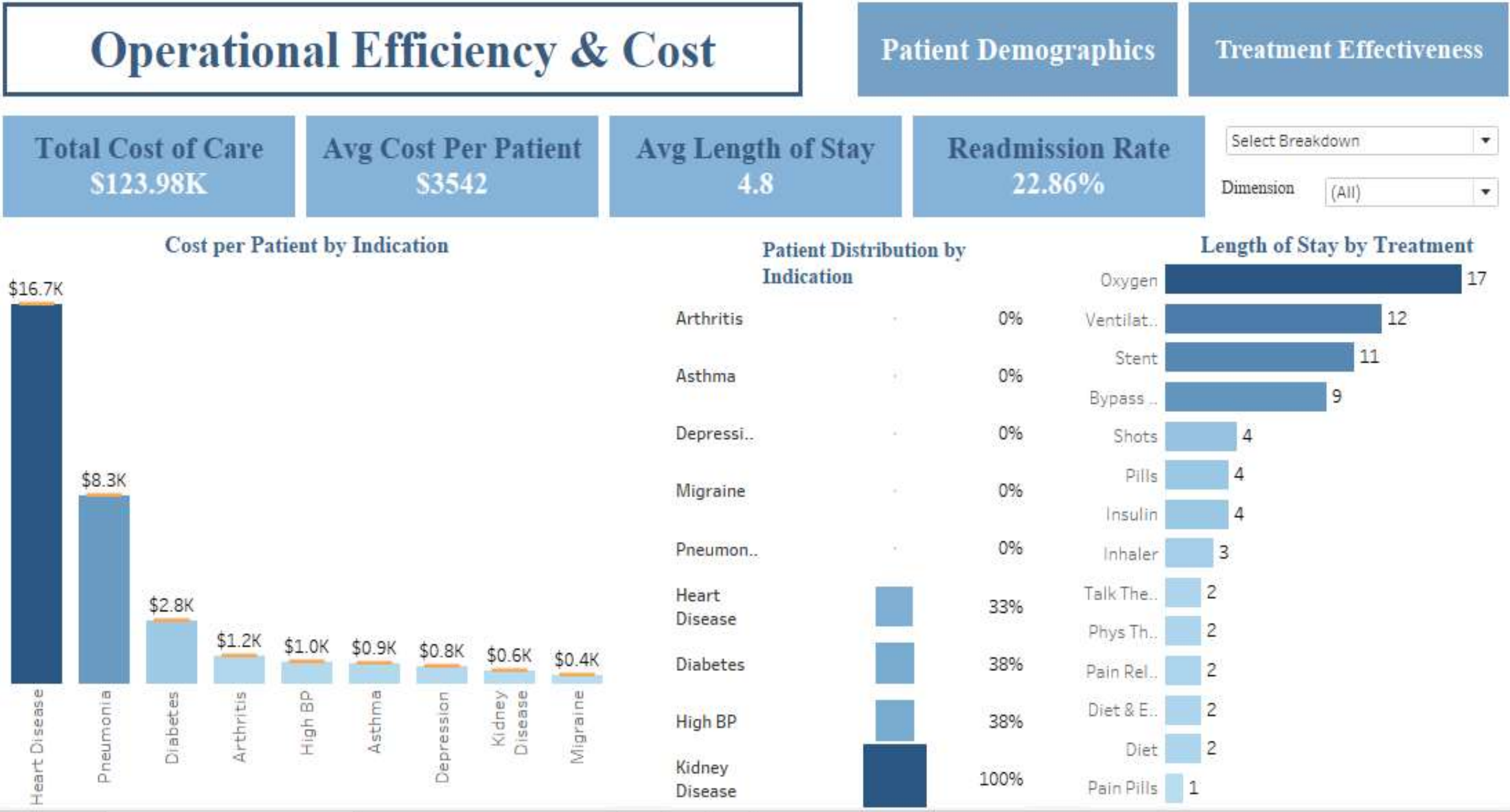
- This shows dashboard's structure, mapping main performance indicators directly to the different sections built in Tableau, and highlighting the numbers that give us key insights



Dashboard Design & Visualizations



Dashboard Design & Visualizations



Dashboard Design & Visualizations

Treatment Effectiveness & Outcomes

Patient Demographics

Operational Efficiency

Treatment Success

85.71%

Top Performing Treatment

Insulin

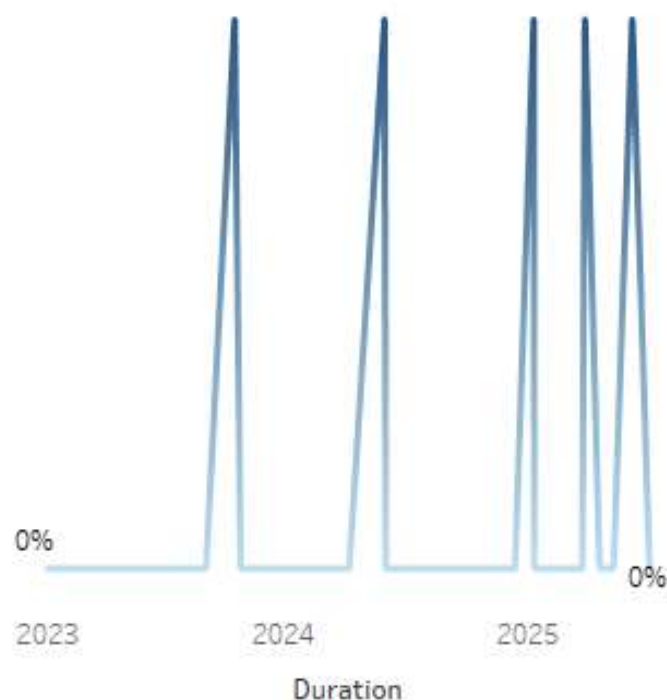
Mortality Rate

14.29%

Lowest Mortality Treatment

Bypass Surgery

Mortality Rate by Treatment



Select Breakdown Dimension (All)

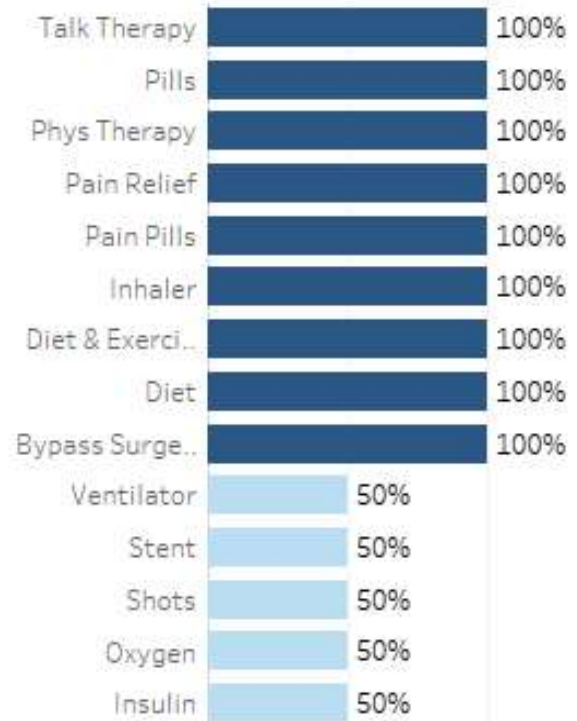
✕ Treatment Success Rate by Indication

Pharmacy Type

(All)

Treat..	Arth..	Asth..	Depr..	Diab..	Heart Dise..	High BP	Kidney Dis..	Migr..	Pneu..
Bypass Sur..					100%				
Diet							100%		
Diet & Exer..						100%			
Inhaler		100%							
Insulin				50%					
Oxygen									50%
Pain Pills								100%	
Pain Relief	100%								
Phys Thera..	100%								
Pills			100%	100%		100%			
Shots	50%								
Stent					50%				
Talk Therapy			100%						
Ventilator									50%

Treatment Efficiency



Select Breakdown Dimension (All)

Performance Tuning & User Experience

The Tableau Performance & Best Practices

1. Ensure your data is in a clean, tabular format
2. Choose the Right Chart Type
3. Start with high-level summaries
4. Remove unused worksheets
5. Avoid low-value graphics, excessive images



Publishing & Sharing

- Publishing our Tableau dashboards is the crucial final step that transforms static analysis into accessible, interactive, and shareable insights for stakeholders.



Case Study Discussion & Demo

Thanks!

Do you have any questions?

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