ABC PHARMACEUTICAL SALES DATA ANALYSIS REPORT

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A comprehensive Data and Geospatial Analysis

on a Pharmaceutical dataset presented by

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December, 2024.

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Executive Summary

- **Project Goal:**

To develop a comprehensive data and geospatial analysis up to a granular level and these should result in revealing or solving cases of missed opportunities in targeting key customer segments and optimizing product distribution.

- **Key Outcomes:**

1. While statistically significant, the correlation between the prices and sales are negligible, indicating that price has minimal influence on sales Quantity. Other factors such as Product demand, marketing play a more significant role.

2. Sales performance differs slightly between Hospitals and Pharmacies, suggesting little to no difference in purchasing behaviours for each channel.

- Deliverables: Visualisations, Dashboards, Statistical reports and recommendation.

Problem Statement

- **Pain points**: Difficulty integrating diverse data sources and performing granular analysis that has led to missed opportunities in targeting key customer segments and optimizing product distribution.

- **Objective:**

1. Identify sales trends over time, including peak periods and dips.

2. Examine customer demographics and purchasing patterns.

3. Assess product performance, highlighting best – sellers and underperforming items.

4. Analyse geospatial impacts on sales to pinpoint high and low-performing regions.

5. Compare sales performance across various customer channels.

6. Optimise sales strategies using data-driven insights.

7. Enhance product offerings based on performance and customer preferences.

DATA SOURCE AND PREPARATION

- The Pharm Data used was shared on the 3signet platform and it initially contained 254,082 rows and 18 columns but after proper data cleaning the number of rows reduced to 254,078 rows and an extra column was created for the Urban and rural regions making it 19 columns in total.
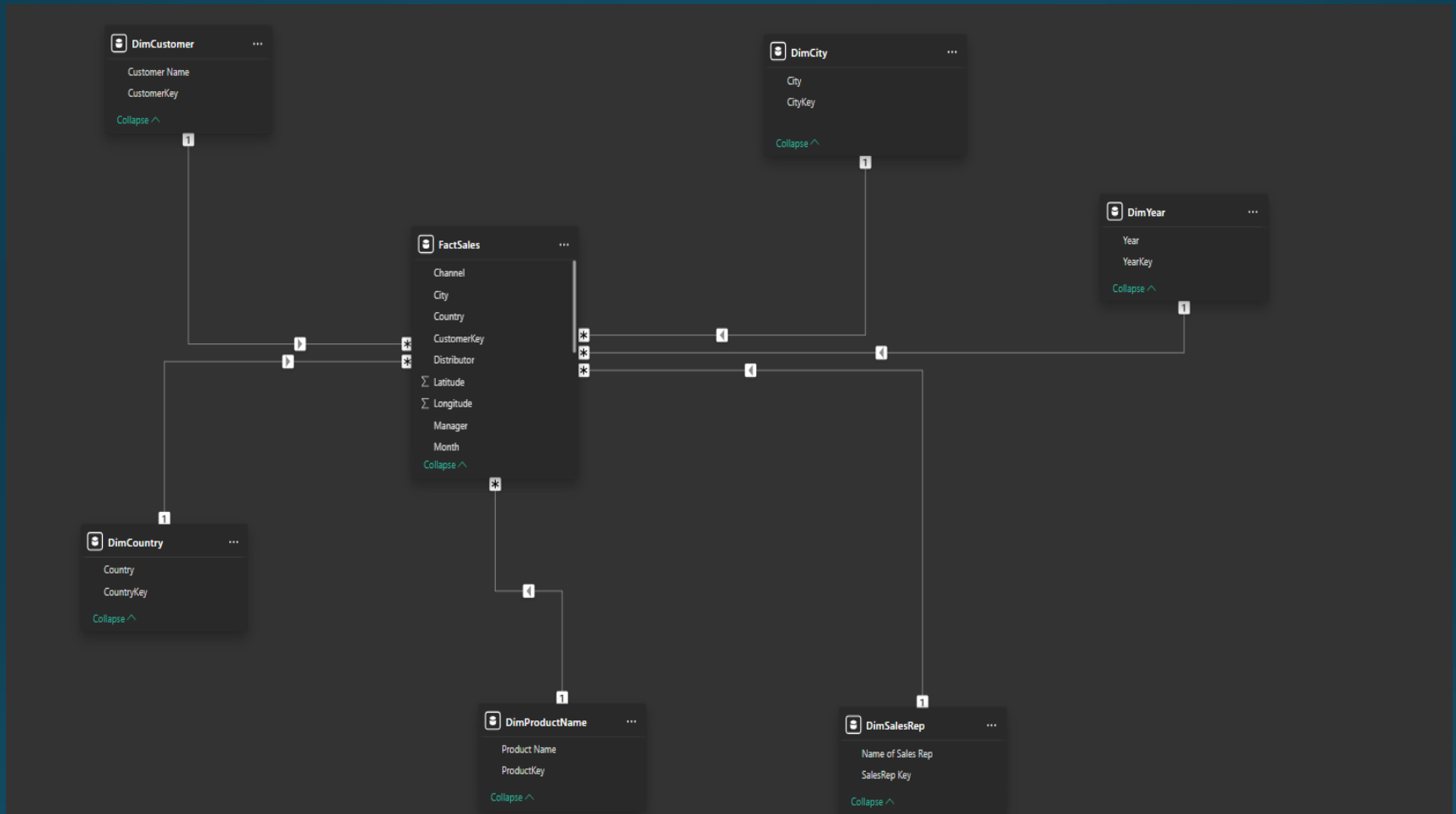
- ## **Data Preparation**

The tools used for this analysis are:

- Microsoft Excel.

- Python.

- Power BI.

- DB Browser (SQLite).

Data cleaning processes which includes removal of duplicates, conversion of datatypes and categorising the variables for analysis.
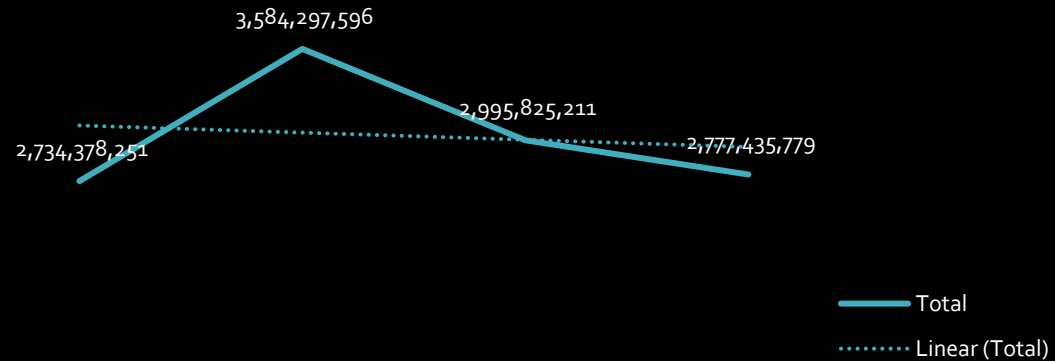
DATASET SCHEMA

Sales data over Time

Chart showing sales over the years

3,584,297,596

2,995,825,211

2,734,378,251

2,777,435,779

⎯⎯ Total

········· Linear (Total)

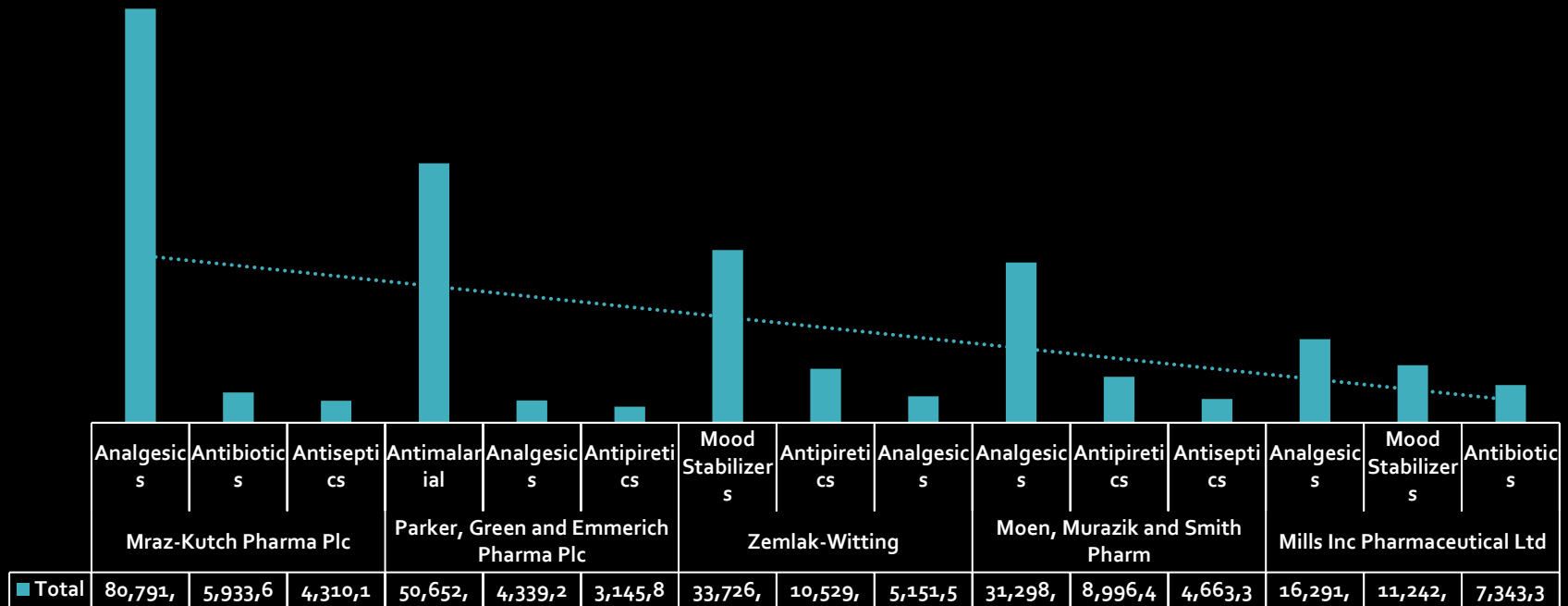|	2017	2018	2019	2020
⎯ Total	2,734,378,251	3,584,297,596	2,995,825,211	2,777,435,779

Key findings with Visualisations

- Using the Pareto's principle i.e. 80% of your sales come from 20% of your clients and 80% of profits come from 20% of your products or services. I took a sample size of the top ten customers and the specific product class they most frequently bought from, I found that the "Analgesics" product class was the most popular, appearing in the Top 3 seven times out of ten sample sizes.

Key Findings

- Given the steady demand for the products over the years, I will advise that the distributors to step up their efforts in supplying the "Analgesics Product" to both channels.

Total Sales by Product Class

|	Mraz-Kutch Pharma Plc			Parker, Green and Emmerich Pharma Plc			Zemlak-Witting			Moen, Murazik and Smith Pharm			Mills Inc Pharmaceutical Ltd		
	Analgesics	Antibiotics	Antiseptics	Antimalarial	Analgesics	Antipiretics	Mood Stabilizers	Antipiretics	Analgesics	Analgesics	Antipiretics	Antiseptics	Analgesics	Mood Stabilizers	Antibiotics
Total	80,791,	5,933,6	4,310,1	50,652,	4,339,2	3,145,8	33,726,	10,529,	5,151,5	31,298,	8,996,4	4,663,3	16,291,	11,242,	7,343,3

Key findings with Visualisations

Hypothesis 1: Higher product prices correlate with lower sales quantities.

Key Findings:

The relationship between the prices and sales quantity have no strong correlation, the flat regression line shows that other factors such as marketing, product demand, may have a greater influence on sales quantities.

Scatter Plot of Price vs. Sales Quantity
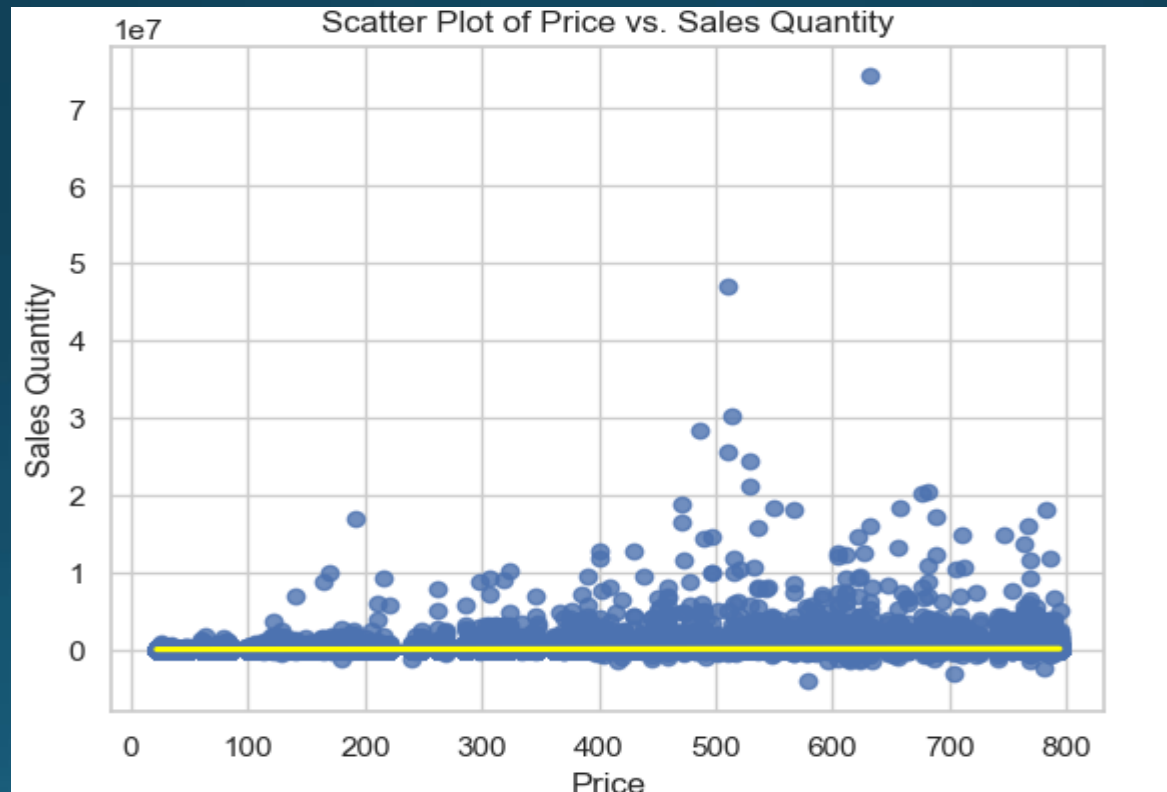
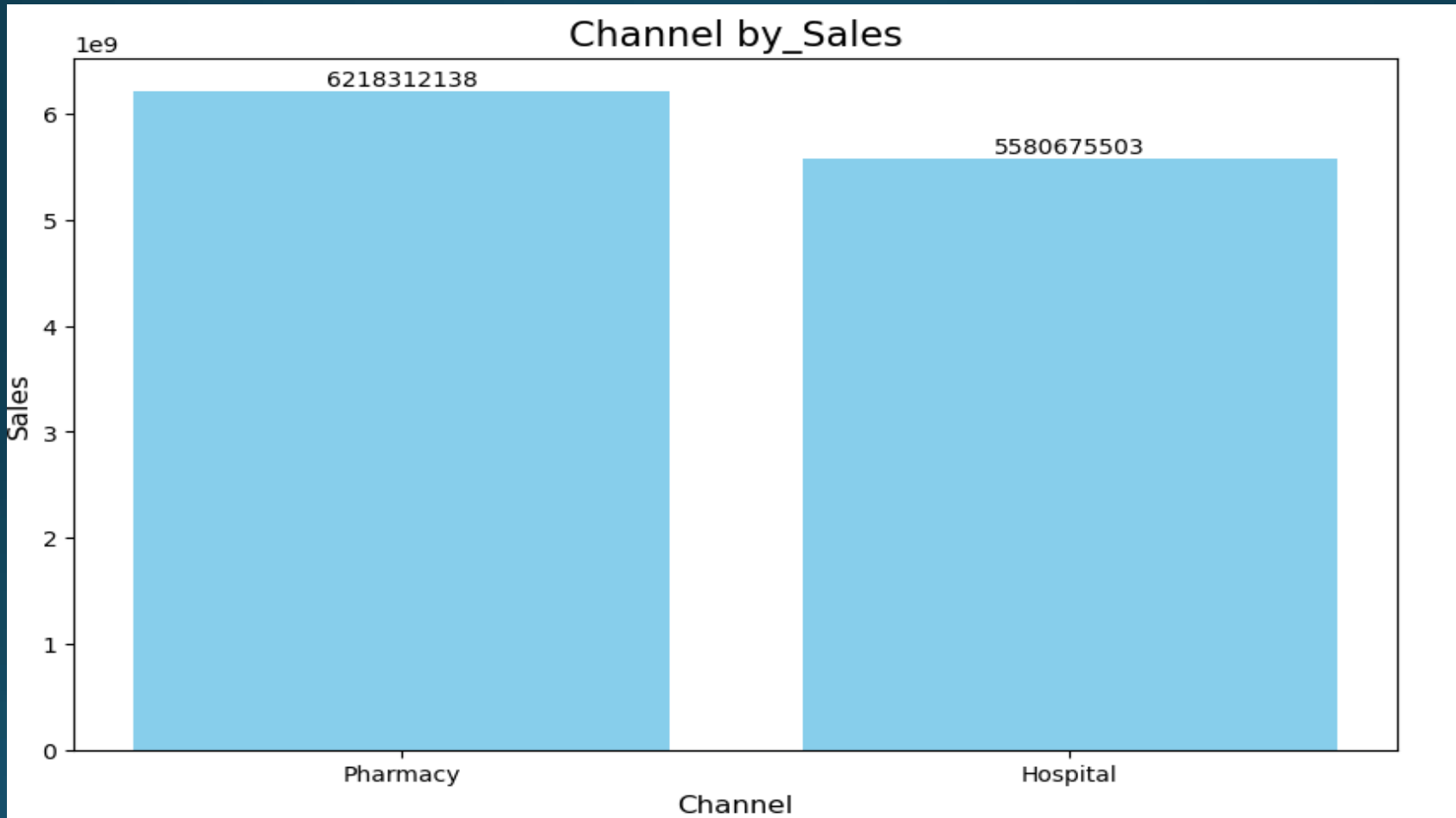# Key findings with Visualisations

- **Hypothesis 2:**
Sales performance varies significantly between customer channels (Hospital vs. Pharmacy).

- **Key Findings:**

After analysis, the Hospital and Pharmacy channels show comparable sales distribution for most of their sales, suggesting no significant difference between these channels.

Key findings with Visualisations

Channel by_Sales

Key findings with Visualisations

Hypothesis 3: Sales are higher in urban areas compared to rural areas due to population density and healthcare infrastructure.

Key Findings

The chart on the next page shows that while urban areas may have higher population density, the analysed dataset shows that sales in rural areas are influenced by other significant factors, such as targeted demand for certain products or services, less competition, and higher reliance on specific offerings.

It should come as no surprise that "Ionclotide," the most commonly used medication in rural areas, is used to treat constipation. This is because most rural areas have poor water quality, which leads to contaminated fruits and food that might cause cholera.

Meanwhile, one of the most commonly used drugs in the Urban areas is "Pulmogen Alitora" and this is used to aid respiration. This can be caused by air pollution in the environment due to a large number of factories/industries around and the intake of too much processed/junk food can lead to this too.

Key findings with Visualisations

Total sales by region chart

	Rural	Urban
Total	11,166,982,904.95	924,953,931.25
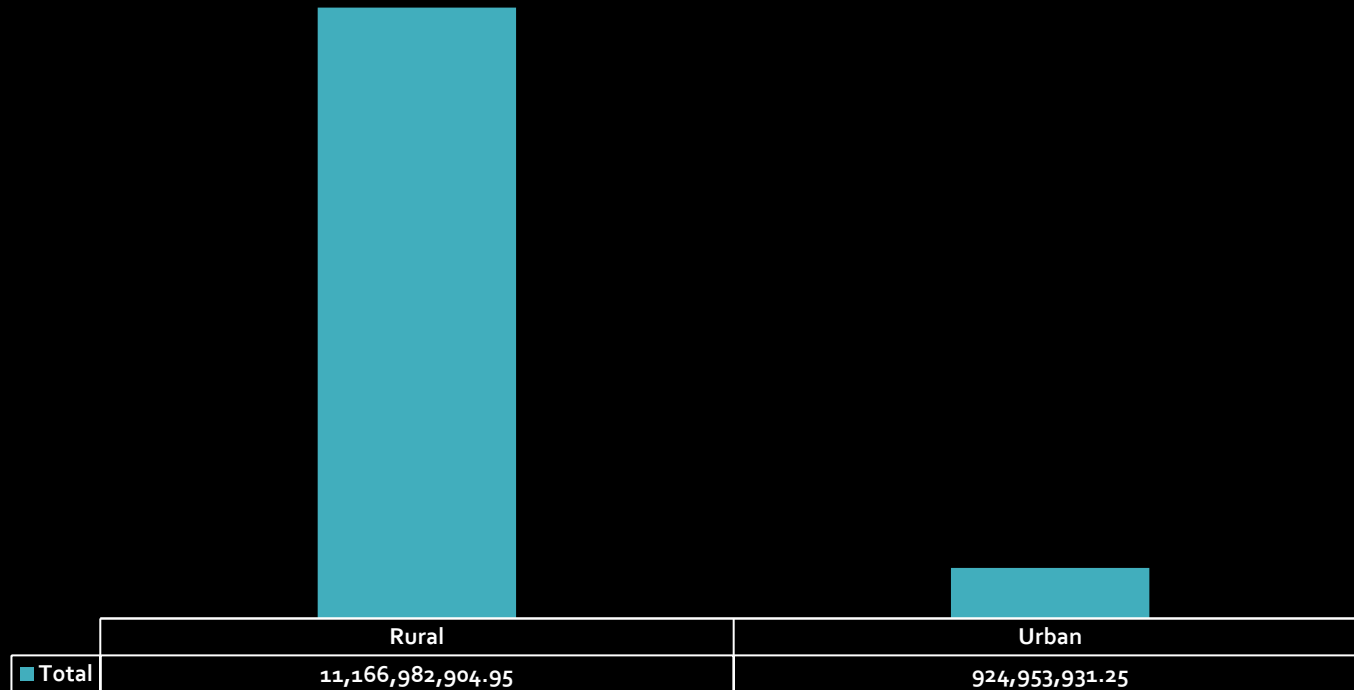
Key findings with Visualisations

Actionable Recommendations

- More distribution of products like Ionclotide to rural areas is necessary in order to increase sales and, more broadly, prevent cholera deaths.

- Additionally, as the poor turnover indicates that consumers prefer other competing anti-malaria medications over the ones mentioned above, I will recommend that low-performing medications like "Andrecetam Barazoxane" be stopped in their distribution.

- Manager "Britanny Bold" should be well compensated as she and her team generated more revenue for the Pharmaceutical company.