**Vaccine Management Dashboard Documentation**

**1. Overview**

The **Vaccine Management Dashboard** provides a comprehensive view of vaccine distribution, administration, and overall progress. It helps stakeholders monitor key performance indicators (KPIs), identify trends, and ensure efficient vaccine management.

**2. Data Sources**

The data sources for this dashboard are generated using **Python scripts** and stored in a **SQL database**. The data is then retrieved from SQL and visualized in Power BI.

* **Python**: Used for data extraction, transformation, and loading (ETL) processes.
* **SQL Database**: Stores the processed and structured vaccine data.
* **Power BI**: Retrieves data from SQL and visualizes it through interactive dashboards.

**3. Dashboard Sections & Insights**

The dashboard consists of several key sections, each providing specific insights:

**3.1 Executive Dashboard**

The **Executive Dashboard** provides a high-level summary of various aspects of vaccine management. It offers an overview of the key performance indicators across different functional areas, enabling executives to quickly assess overall performance.

**Key Metrics**

* **Production & Manufacturing Score (3.99)**: Indicates efficiency and performance in vaccine production.
* **Quality Control & Assurance Score (0.17)**: Reflects the effectiveness of quality control measures.
* **Supply Chain & Inventory Score (1.70)**: Measures the efficiency of supply chain and inventory management.
* **Sales & Marketing Score (4.00)**: Represents the effectiveness of outreach and public awareness efforts.
* **Finance Score (4.08)**: Shows the financial stability and efficiency in managing vaccine-related expenditures.
* **Human Resources Score (4.92)**: Reflects workforce readiness and staffing effectiveness.

This dashboard allows executives to identify potential bottlenecks and make informed strategic decisions based on real-time data.

**3.2 Finance Dashboard**

Tracks the financial aspects of vaccine procurement and distribution:

* **Revenue Overview**: Displays total revenue generated and trends over time.
* **Capital Expenditure**: Shows distribution of financial resources across different plants.
* **Operating Expenses**: Breakdown of expenses associated with vaccine production and distribution.
* **Profit Margins**: Tracks the financial efficiency and profitability of operations.

**3.3 Human Resources Dashboard**

Monitors workforce involvement in the vaccination drive:

* Number of healthcare workers involved
* Training and certification status
* Staffing efficiency

**3.4 Production & Manufacturing Dashboard**

Focuses on vaccine production rates and efficiency:

* Total vaccines produced
* Manufacturing timelines
* Supply chain readiness

**3.5 Quality Control & Assurance Dashboard**

Ensures compliance with vaccine safety and quality standards:

* Batch testing results
* Quality control failure rates
* Compliance adherence

**Newly Added Insights:**

* **Production Distribution by Plants and Result**: Monitors product pass/fail rates across different plants.
* **Deviation Tracking**: Identifies critical, minor, and major deviations in quality.
* **Production Count Segmentation by CAPA Initiation Status**: Tracks the proportion of production issues requiring corrective actions.
* **Batch Quality Pass/Fail Rate**: Analyzes failure reasons such as contamination, material issues, and operator errors.
* **Production Rate Over Time**: Examines monthly trends in production output.

**3.6 Sales & Marketing Dashboard**

Tracks public awareness and outreach efforts:

* Campaign effectiveness
* Public engagement metrics
* Regional demand analysis

**Newly Added Insights:**

* **Sales Quantity Over Time by Plant**: Shows trends in vaccine sales across different manufacturing plants.
* **Sales Amount by Plant and Customer Feedback on Service**: Correlates sales performance with customer satisfaction levels.
* **Customer Feedback Distribution**: Visualizes customer sentiment categorized as Poor, Average, or Good.
* **Sales Quantity and Amount by Location**: Displays region-wise sales figures and performance.
* **Sales Density by Location**: Uses geographic heat maps to represent sales distribution.

**3.7 Supply Chain & Inventory Dashboard**

Monitors vaccine stock levels and distribution logistics:

* **Inventory Levels**: Displays plant-wise inventory status for different drugs.
* **Supplier & Drug License Expiry**: Tracks supplier agreements and license renewal dates.
* **Lead Time Trends**: Analyzes the lead time variations across different plants from 2020 to 2023.
* **Store & Drug Expiry**: Monitors expiry dates and quality control status for stored vaccines.

**4. Filters & Interactivity**

Users can interact with the dashboard through:

* **Date Range Filter**: Select specific timeframes to analyze vaccination trends.
* **Location Filter**: View vaccination progress across different regions.
* **Age Group Filter**: Analyze data based on demographic categories.
* **Vaccine Type Filter**: Compare different vaccine brands' administration rates.

**5. Usage Instructions**

**Navigating the Dashboard**

1. Open the Power BI dashboard.
2. Use the filters on the right-hand side to refine data views.
3. Click on charts to drill down into specific insights.
4. Hover over data points to view additional details.
5. Export reports by selecting the export option in Power BI.

**6. Technical Details**

**Power Query Transformations**

* **Data Cleaning**: Removing duplicates, handling missing values, and formatting dates.
* **Merging Data**: Combining multiple tables for a unified view.
* **Calculations**: Creating calculated columns for new insights.

**DAX Formulas**

* **Total Doses Administered:**

Total Doses = SUM(VaccineData[Administered Doses])

* **Vaccination Rate:**

Vaccination Rate = DIVIDE([Total Doses], [Total Population], 0)

* **Daily Vaccination Rate:**

Daily Rate = AVERAGEX(VALUES(VaccineData[Date]), [Total Doses])

**7. Conclusion**

This dashboard provides a powerful tool for monitoring and managing vaccine distribution. It enables stakeholders to make data-driven decisions and ensure efficient vaccine rollout.