OneHealth Data Analysis Report

Introduction

This report presents an in-depth analysis of pharmaceutical delivery data for OneHealth. The primary objectives of the analysis are to clean and prepare the data, perform descriptive and trend analyses, calculate performance metrics, evaluate Service Level Agreement (SLA) compliance, and provide actionable insights and recommendations to enhance delivery performance and efficiency.

Methodology

The analysis follows a structured approach:

1. Data Cleaning and Preparation:
   - Identify and handle missing, inconsistent, or outlier data.
   - Standardize date and time formats.
   - Calculate lead-time, considering specific conditions for orders created after 4 PM.
2. Descriptive Analysis:
   - Generate distribution plots for key variables.
3. Trend Analysis:
   - Identify and illustrate trends in delivery times and lead-times.
   - Analyze specific times or days where delivery times vary.
4. Performance Metrics:
   - Calculate average delivery time and lead-time.
   - Determine the proportion of prescriptions delivered on time versus late.
5. SLA Compliance Analysis:
   - Analyze and trend the average turnaround time per order.
   - Analyze SLA achievement trends per day and per hour.
   - Compare and trend actual lead-times against the target lead-time.
   - Assess and trend compliance with SLA requirements.
6. Insights and Recommendations:
   - Provide insights based on the analysis.
   - Make data-driven recommendations for improving delivery performance and efficiency

Data Cleaning and Preparation

Data cleaning involved converting date columns to datetime format and calculating the lead-time. The lead-time was adjusted to account for orders created after 4 PM by considering the creation time as 8 AM the next day if they were not delivered the same day. Additionally, rows with missing delivery times were dropped, and lead-time outliers were capped at the 95th percentile to ensure data integrity.

Descriptive Analysis

Descriptive analysis included generating summary statistics for key variables such as delivery times and lead-times. This provided a clear understanding of the data distribution and central tendencies. The findings indicated a wide range of delivery and lead-times, with noticeable peaks suggesting potential process bottlenecks.

Trend Analysis

Trend analysis focused on identifying patterns and fluctuations in delivery times and lead-times over time. The analysis revealed significant variability in lead-times on different days and hours. This variability highlighted specific periods where lead-times were consistently higher, indicating potential inefficiencies in the delivery process.

Performance Metrics

Performance metrics were calculated to evaluate overall delivery performance:

- Average Delivery Time: The average time from prescription creation to delivery.
- Average Lead-time: The average time considering specific conditions for orders created after 4 PM.
- On-Time vs Late Deliveries: The proportion of prescriptions delivered within the target lead-time versus those delivered late.

The average delivery time and lead-time were calculated to provide a benchmark for performance. The proportion of on time versus late deliveries highlighted the extent to which the delivery process meets the target lead-times.

SLA Compliance Analysis

SLA compliance analysis evaluated adherence to specific delivery time requirements:

SLA Requirements:

- Prescriptions created on or before 3 PM must be delivered the same day.
- Prescriptions created after 3 PM should be delivered by 12 PM the next day.

Trends and Patterns:

- Daily SLA Compliance: Trends in compliance rates over different days.
- Hourly SLA Compliance: Trends in compliance rates at different hours of the day.

The analysis revealed significant variability in SLA compliance, with lower compliance rates observed during specific hours and days. This indicated a need for better resource management and process optimization during these periods.

Insights and Recommendations

Insights from OneHealth Data Analysis:

1. Lead-time Variability

Observation: The analysis revealed significant fluctuations in lead-times across different days and hours.

Details:

- The daily average lead-time shows variability, with some days exhibiting notably higher lead-times.
- Hourly trends indicate that lead-times vary significantly across different hours of the day, with certain hours consistently showing longer lead-times.

Implications: This variability suggests potential inefficiencies in the delivery process and resource allocation issues that need to be addressed to achieve consistent performance.

2. Hourly Compliance

Observation: There is a noticeable difference in SLA compliance rates during different hours of the day.

Details:

- Compliance rates tend to be lower in the afternoon and evening compared to the morning hours.
- This trend indicates that the delivery team may be struggling to meet SLA requirements during peak hours or towards the end of the day.

Implications: The lower compliance rates during specific hours highlight the need for better resource management and perhaps an adjustment in staffing levels or work processes during these critical periods.

3. Daily Trends

Observation: Daily trends in delivery performance show inconsistent operational practices.

Details:

- The data indicates that some days have significantly higher lead-times and lower compliance rates than others.
- This inconsistency could be due to various factors such as varying daily workloads, differences in staffing levels, or other operational issues.

Implications: Inconsistent daily performance can lead to customer dissatisfaction and may indicate underlying issues in the daily operations that need to be addressed.

4. On-Time vs Late Deliveries

Observation: The proportion of on-time deliveries versus late deliveries provides insight into overall SLA compliance.

Details:

- A significant proportion of deliveries are not meeting the target lead-times, indicating challenges in adhering to SLA requirements.
- Understanding the specific reasons for late deliveries can help in implementing targeted improvements.

Implications: Consistently meeting delivery SLAs is crucial for maintaining customer satisfaction and trust. High rates of late deliveries can damage the company's reputation and lead to customer churn.

5. Resource Allocation and Staffing

Observation: The analysis suggests that resource allocation and staffing may not be optimal, particularly during peak hours and certain days.

Details:

- The lower compliance rates in the afternoon and evening suggest that there may be insufficient staffing or resources available during these times.
- Peak times may not be adequately planned for, leading to bottlenecks and delays in delivery.

Implications: Optimizing resource allocation and ensuring adequate staffing during peak hours and days can help improve overall delivery performance and SLA compliance.

Recommendations

1. Improve Lead-time Consistency

Action: Investigate the causes of lead-time fluctuations and address process bottlenecks.

Details:

- Conduct a detailed analysis of the days and hours with the highest lead-times to identify common issues.
- Implement process improvements to streamline operations and reduce delays.
- Optimize resource allocation during peak times to ensure consistent lead-times.

2. Enhance Afternoon and Evening Compliance

Action: Reallocate resources or increase staffing during afternoon and evening hours.

Details:

- Adjust staffing schedules to ensure more personnel are available during peak hours.
- Provide additional training for staff working during these critical periods to enhance efficiency.
- Establish monitoring mechanisms to quickly identify and address issues that arise during these times.

3. Stabilize Daily Compliance

Action: Implement daily review meetings to track and improve performance.

Details:

- Hold daily briefings to review the previous day's performance and identify areas for improvement.
- Implement continuous improvement practices to ensure operational consistency.
- Use data from daily trends to proactively manage potential issues and maintain high performance levels.

4. Implement Predictive Monitoring

Action: Use predictive analytics to anticipate periods of low compliance and adjust resources proactively.

Details:

- Develop predictive models to forecast periods of high demand or potential delivery delays.
- Set up automated alerts for when lead-times exceed thresholds or SLA compliance falls below acceptable levels.
- Use these insights to make proactive adjustments to staffing and resource allocation.

By implementing these recommendations, OneHealth can improve lead-times, enhance SLA compliance, and achieve greater operational efficiency. This will contribute to higher customer satisfaction and help maintain a competitive edge in the pharmaceutical delivery market.