Medical Appointments 2016

Presented by: **Omer Metwally**

Last Updated: **10.th January 2026**

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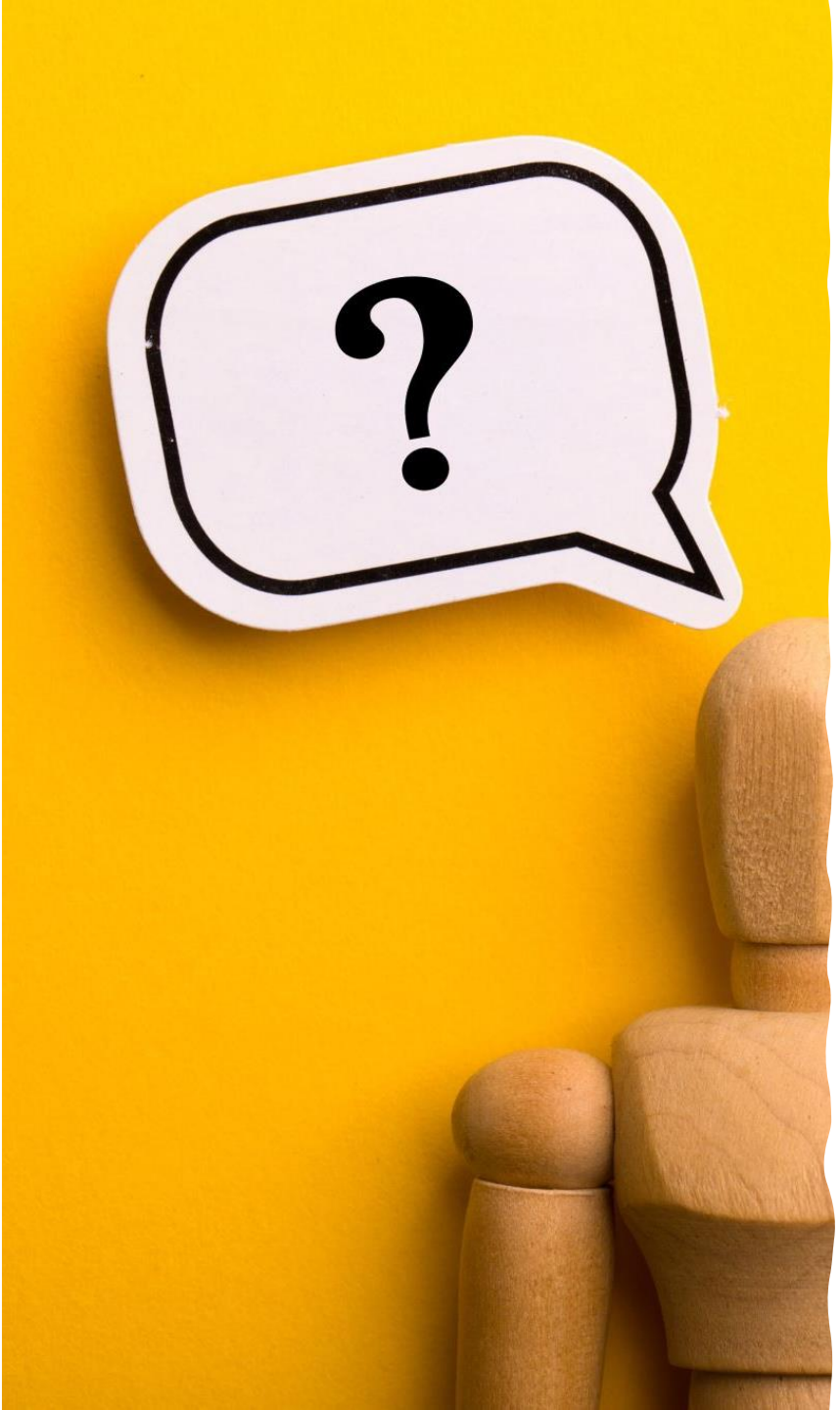
Healthcare Operations

Objective



What are we talking about?

To analyze and visualize **medical appointment data** to identify **key drivers of missed appointments**, **waiting time patterns**, and **patient behavior trends**, helping healthcare providers reduce no-show rates, improve scheduling efficiency, and enhance overall patient experience.

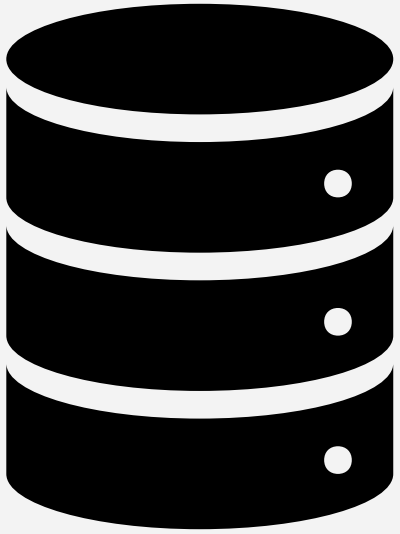
Business Task

The healthcare provider aims to analyze patient appointment data to identify where and how no-show behavior and revenue leakage are concentrated across different clinic locations, patient demographics, and scheduling logistics.

The analysis focuses on answering key business questions to uncover:

1. Analyze Appointment Data across clinic locations, patient profiles, and scheduling timeframes.
2. Identify High-Risk Segments and underperforming clinics based on missed appointment volume and lost revenue.
3. Determine Logistical Priorities by ranking the impact of wait times and SMS communication gaps on attendance.
4. Examine Attendance Trends to detect weekly patterns, such as significant operational waste occurring on Fridays.
5. Provide Data-Driven Insights to support strategic scheduling, resource optimization, and financial recovery decisions.

Data source



Data set

- The dataset used in this analysis comes from the **Medical Appointment No Show** — available on Kaggle

License: Open dataset provided for educational and analytical purposes.
The data has been used strictly for **learning and non-commercial analysis**.

- **Data License:**
© Motivate International Inc. | Public data used for educational purposes only.

Data cleaning summary

Data cleaning

- ✓ **Removed duplicates**
  - ✓ Ensured each appointment record is unique to prevent double-counting of patient visits.
- ✓ **Handled missing values**
  - ✓ Checked for missing **patient demographics, clinic locations, or appointment outcomes**.
  - ✓ Imputed or excluded records with missing critical fields to ensure statistical accuracy in influencer analysis.
- ✓ **Standardized formats**
  - ✓ Converted **Scheduled Day and Appointment Day** into standardized date formats for time-series analysis.
  - ✓ Unified **SMS received and Status** (Show/No-Show) into consistent binary formats for metric calculation.
  - ✓ Calculated and categorized **Waiting Days** into logical groups (Same Day, Short, Medium, Long).

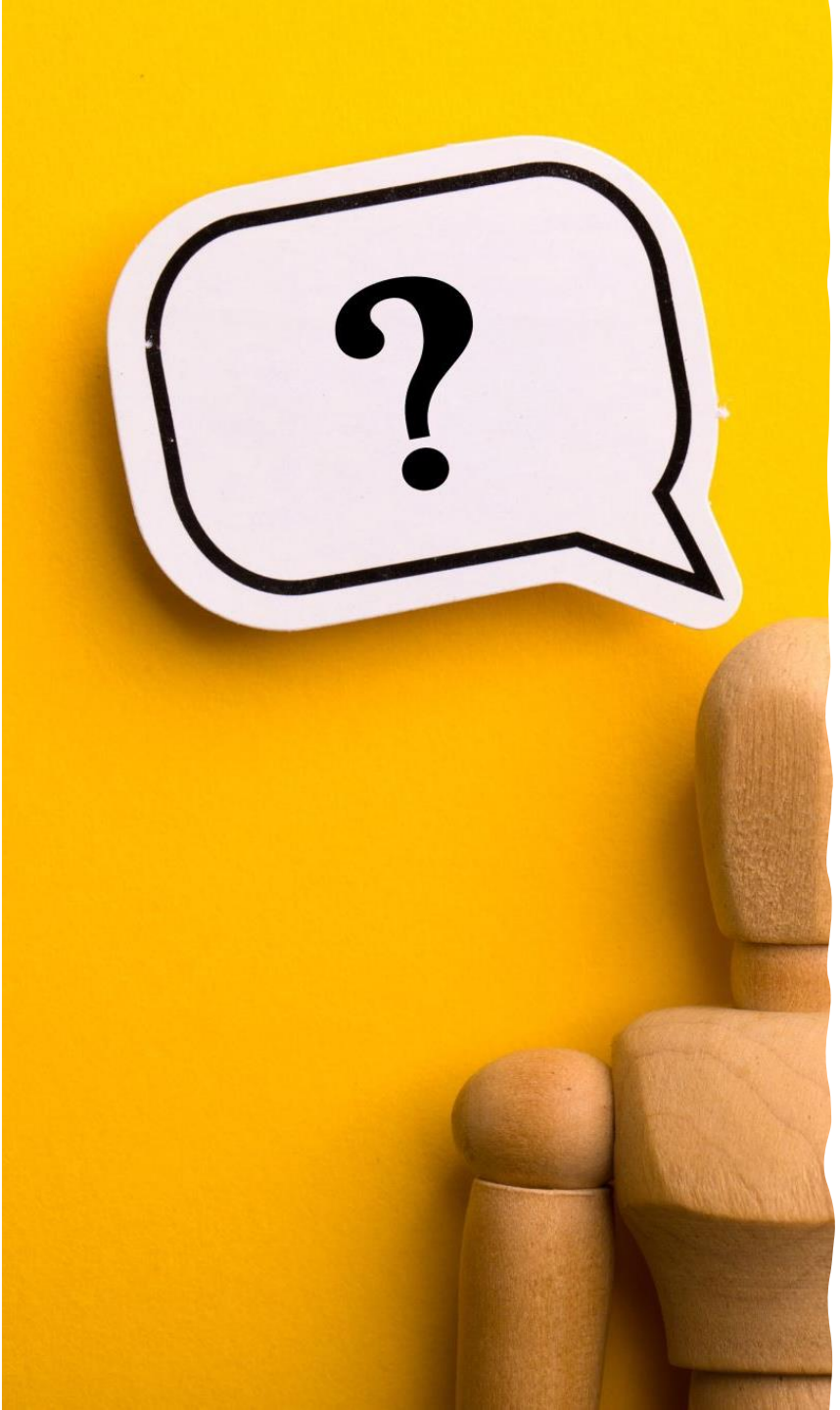
Data cleaning

- ✓ **Validated data types**
  - ✓ Ensured numeric columns such as **Age and Waiting Days** are correctly typed for mathematical calculations.
  - ✓ Checked that binary medical flags (e.g., **Diabetes, Hypertension**) are properly formatted as Boolean types.
- ✓ **Filtered irrelevant data**
  - ✓ Removed records with **negative Waiting Days** where scheduling dates occurred after the appointment date.
  - ✓ Filtered out test records or appointments with incomplete clinical data to focus purely on valid patient behavior.

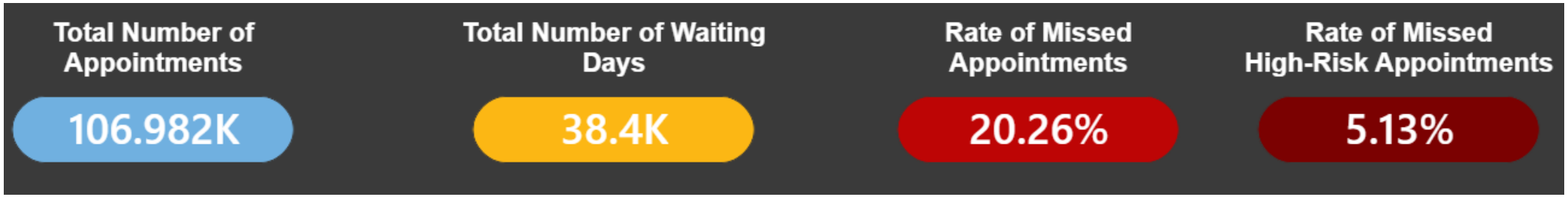
✅ **Result:**

Clean and structured dataset ready for identifying no-show drivers and creating the Operational Efficiency dashboard..

The story with Data



Identify The Highest Volume Of Missed Appointments.



- In May alone, 78K appointments were recorded—nearly three times more than April and June combined—with the majority not receiving SMS notifications.

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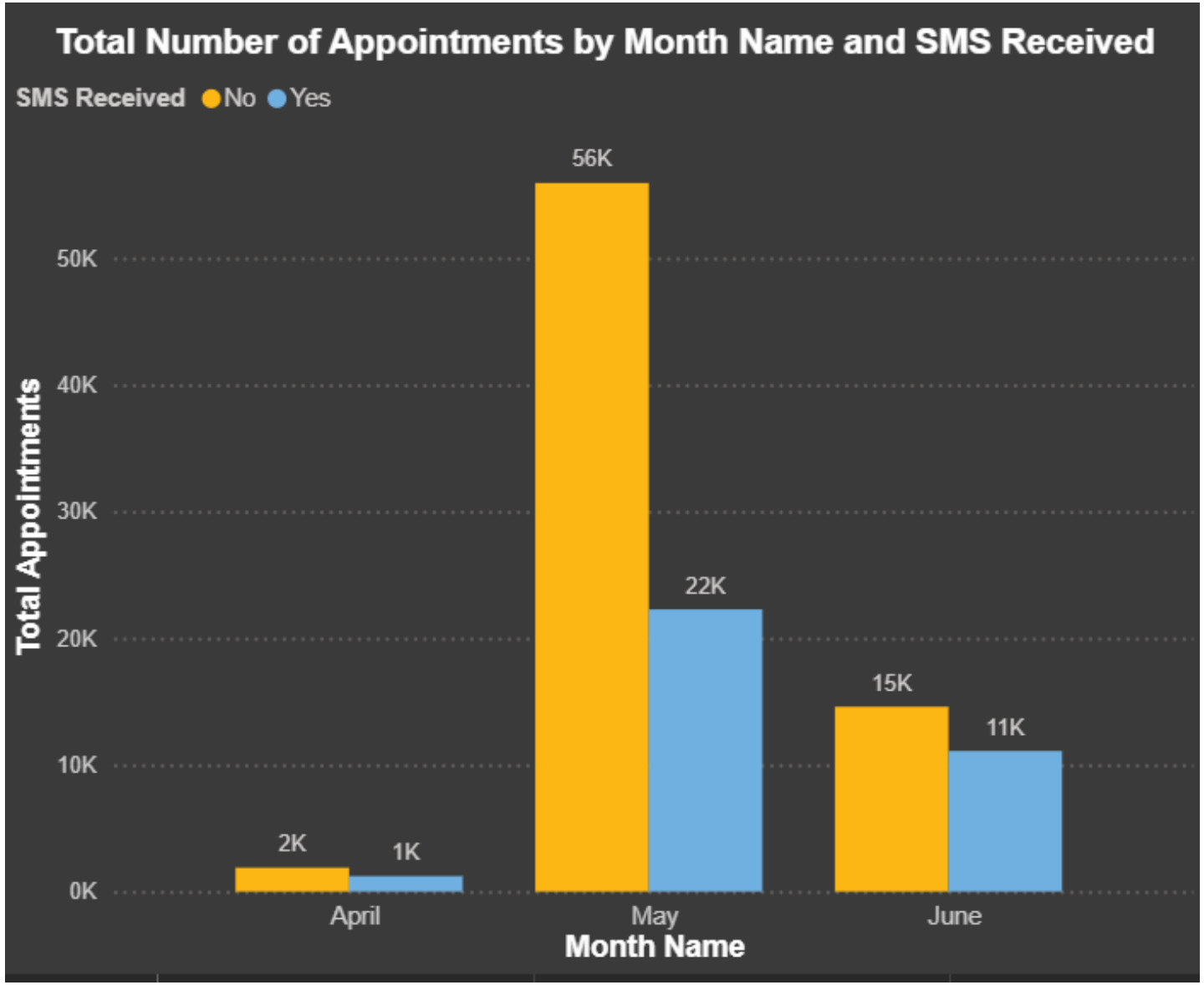
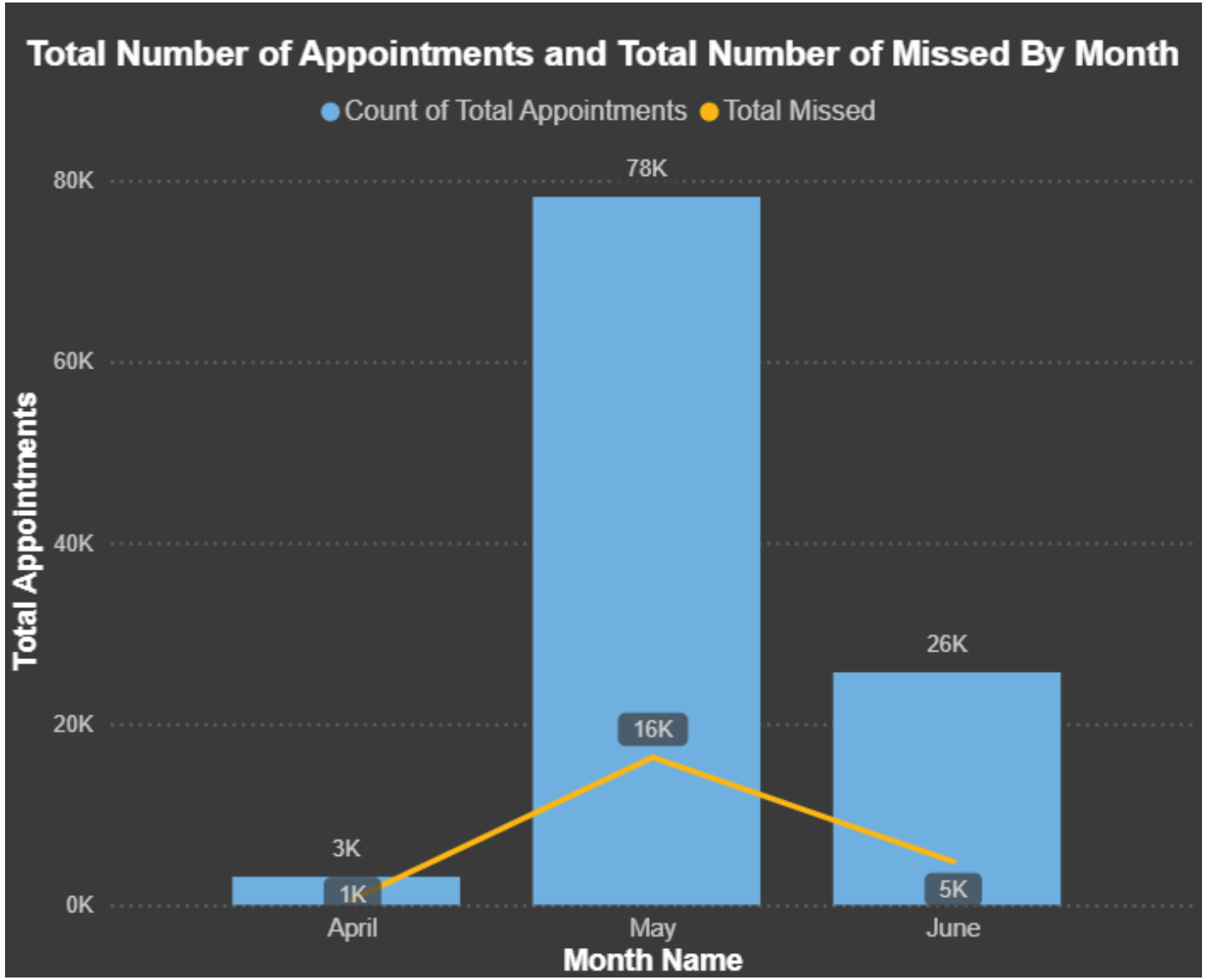
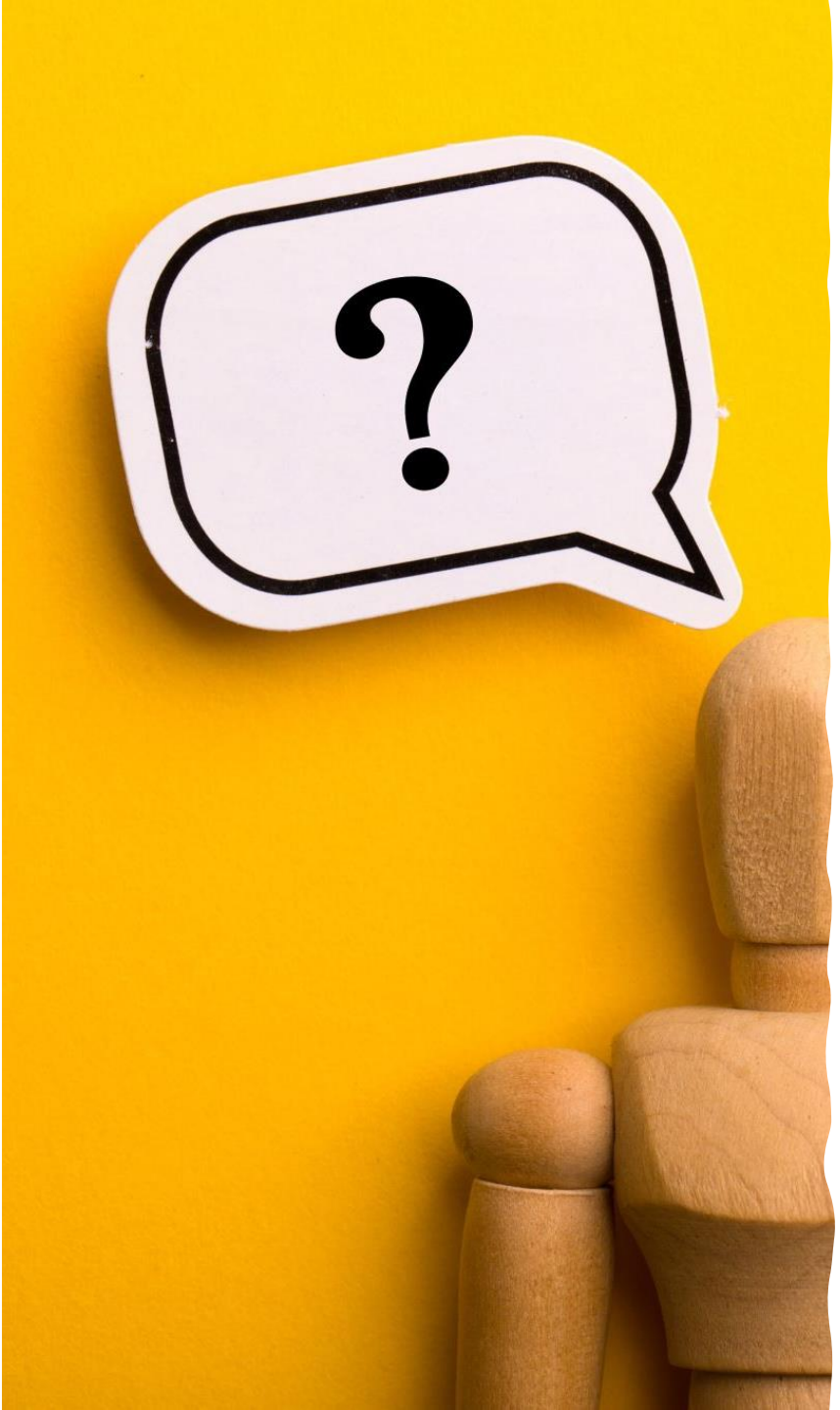
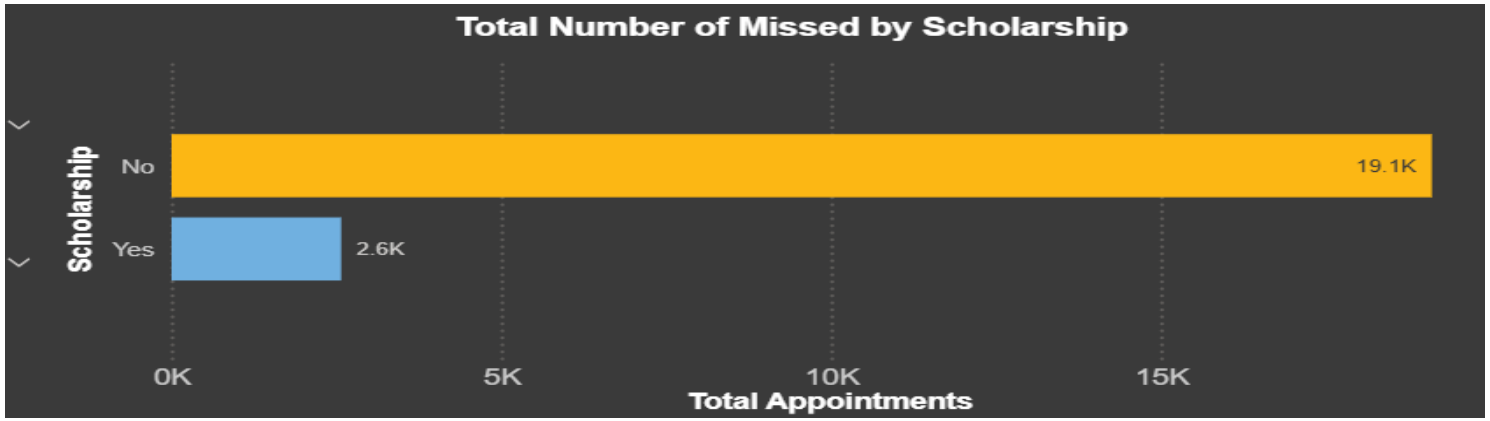


May saw a dramatic surge with 78K appointments and 16K missed, far outpacing April and June combined.



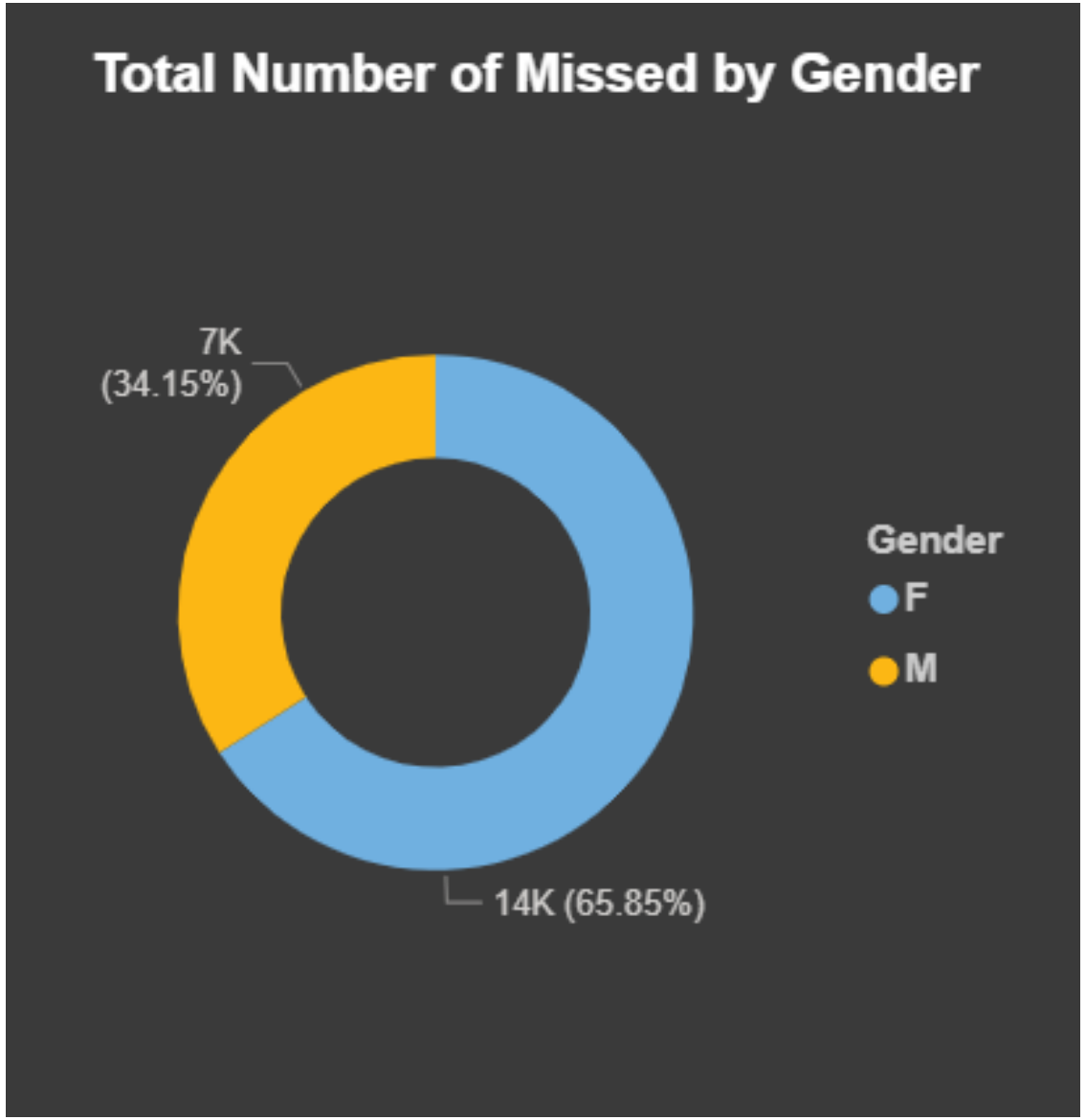


Identify Which Groups Are Causing The Highest Volume Of Missed Appointments.

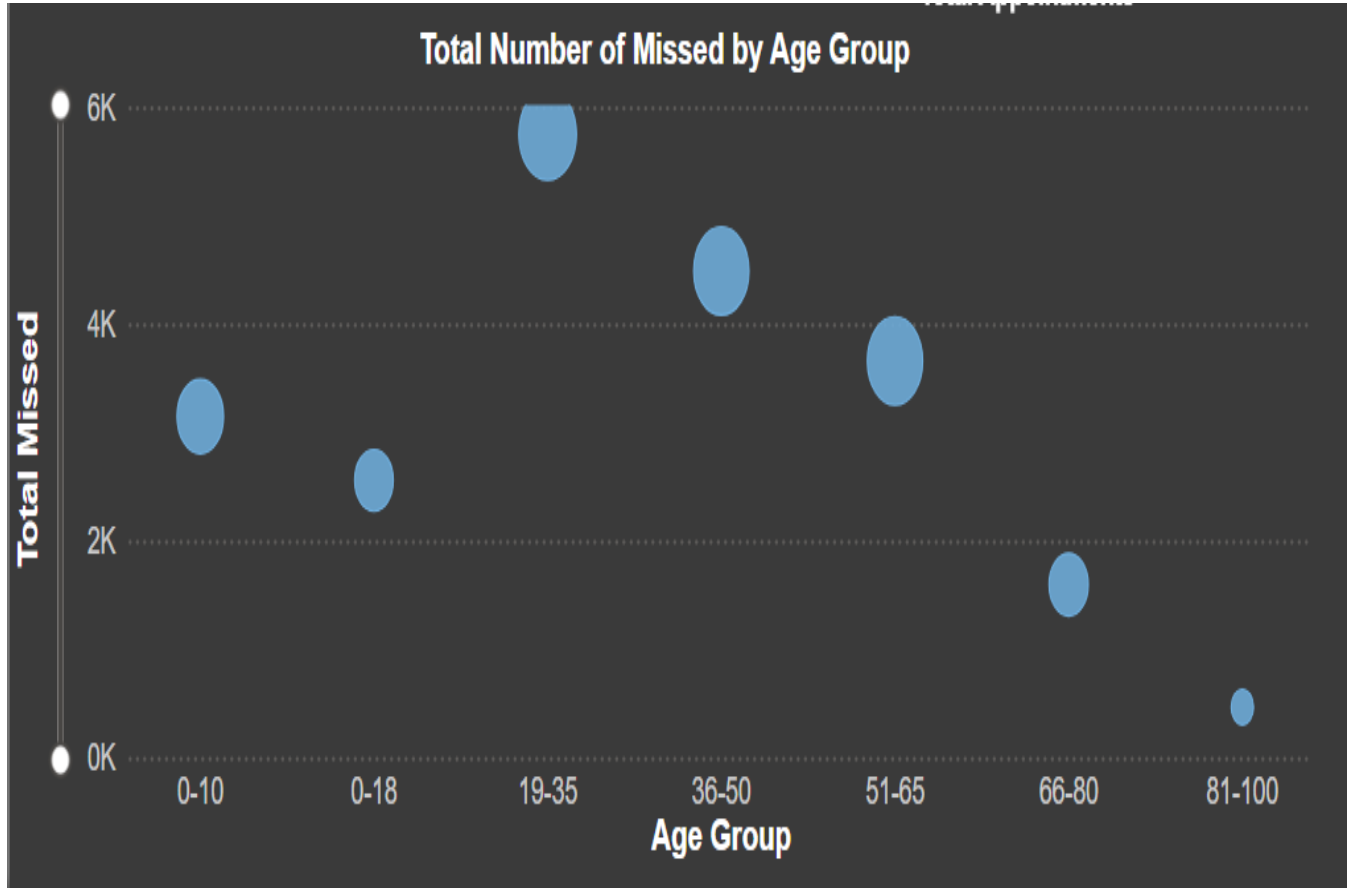


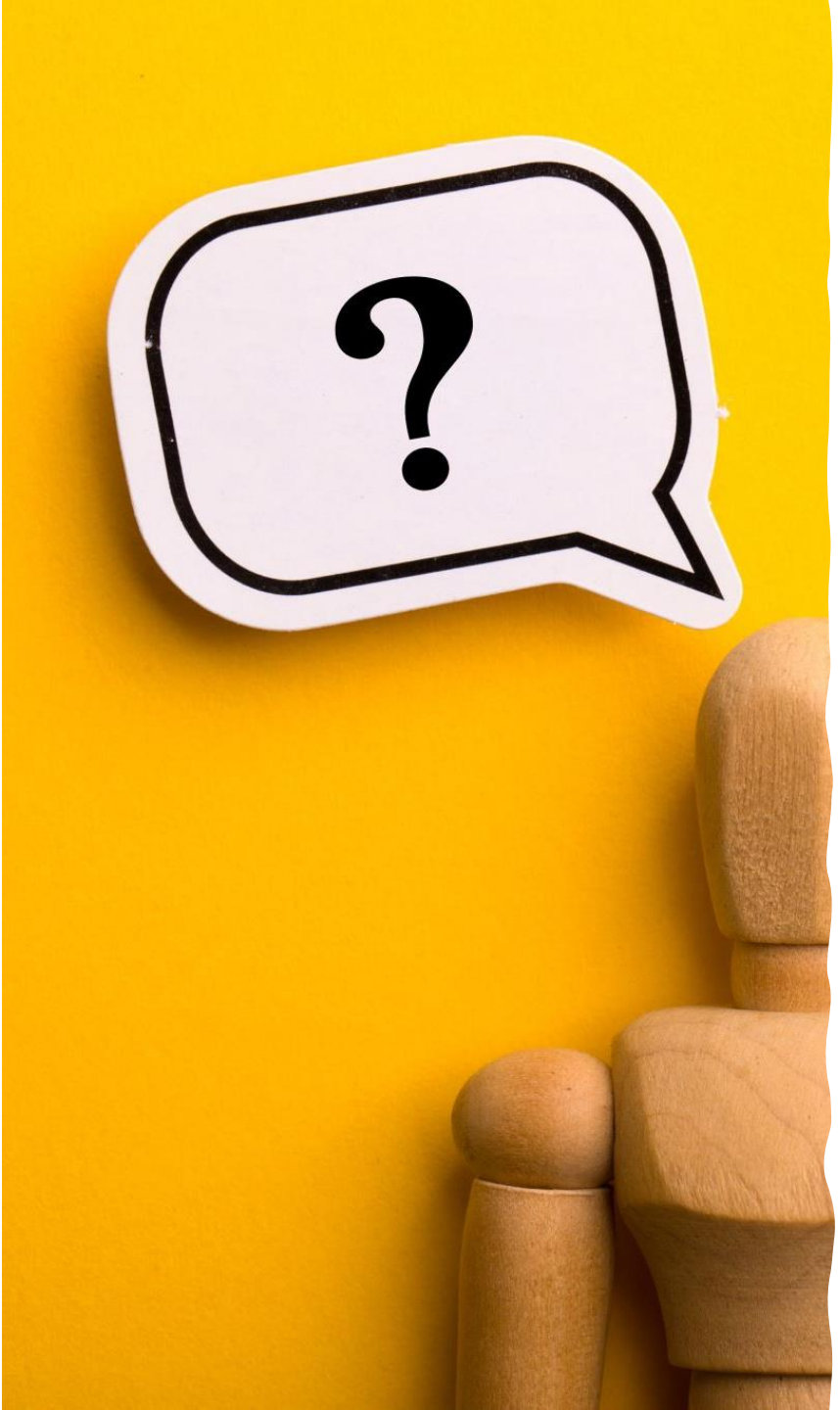
Individuals without scholarships missed 19.1K appointments—over seven times more than those with scholarships.

Females accounted for nearly two-thirds of missed appointments, totaling 14K compared to 7K for males.



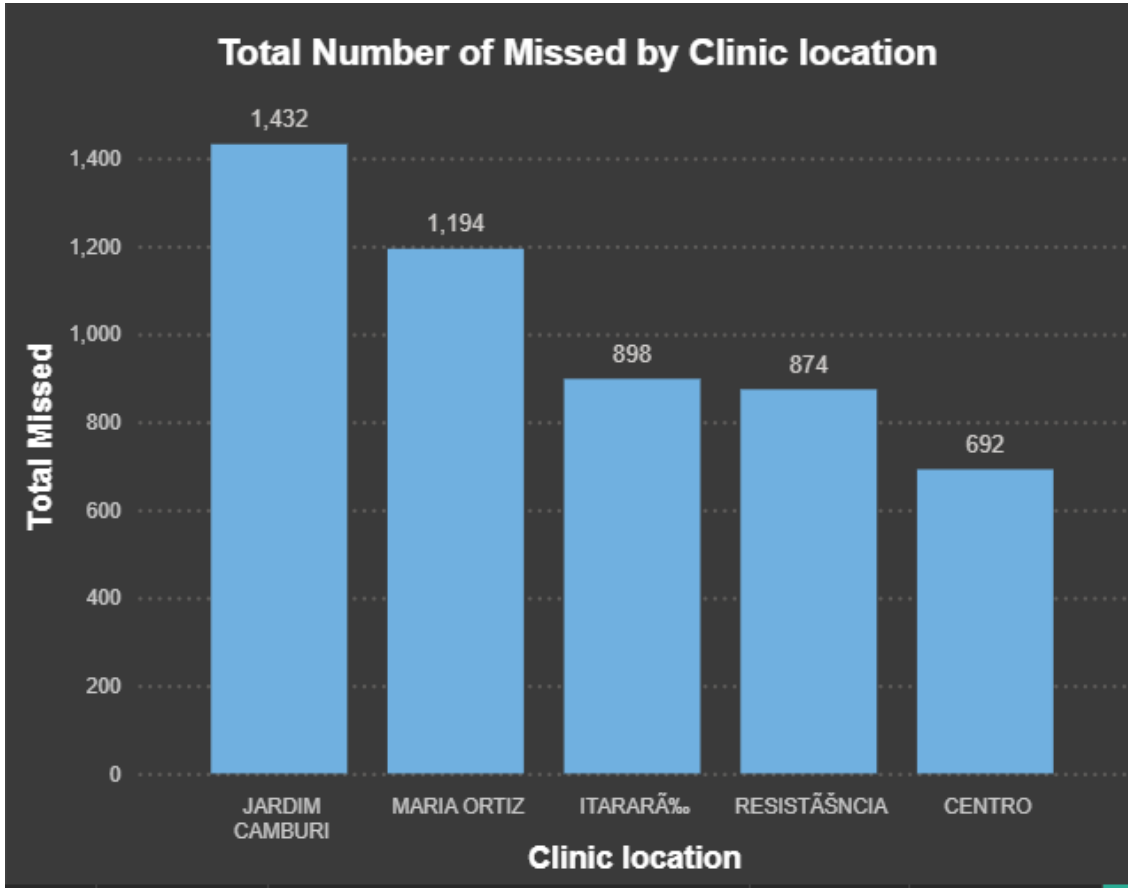
Adults aged 36–50 missed the most appointments, significantly outpacing all other age groups.



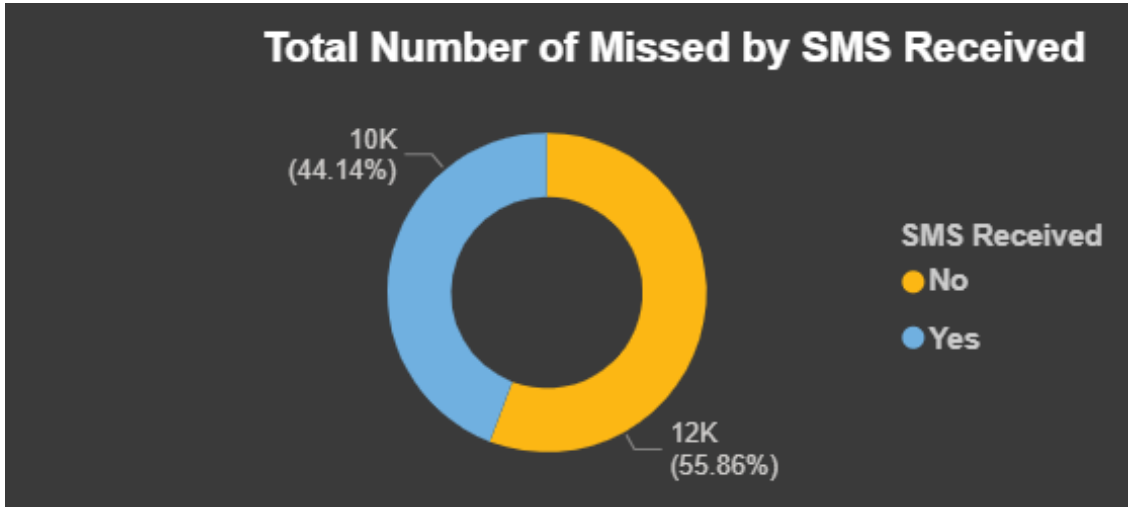


Identify Reasons That Are Ca using The Highest Volume Of Missed Appointments.

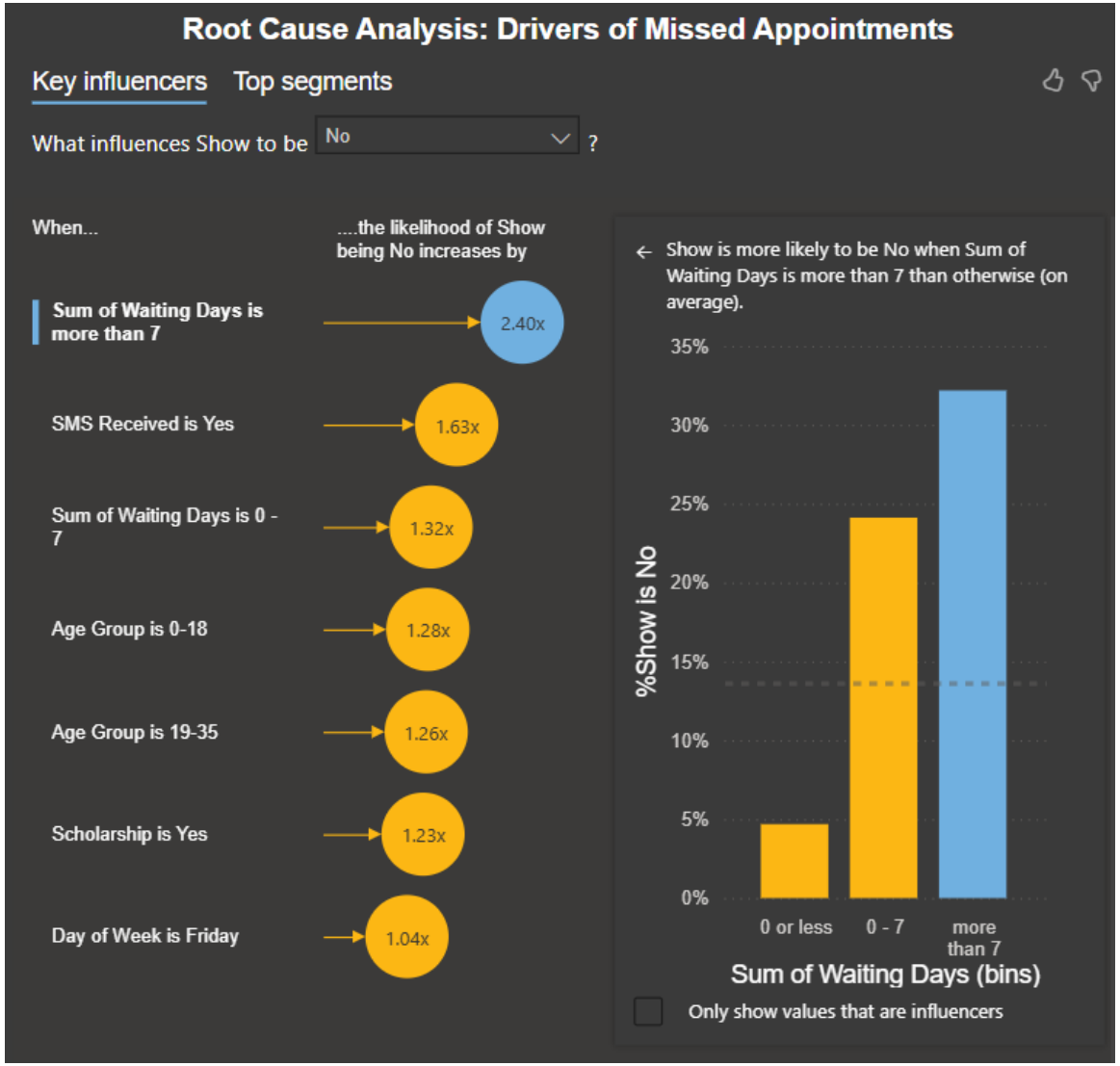
Jardim Camburi had the highest number of missed appointments (1,432), leading all five clinics in no-shows.



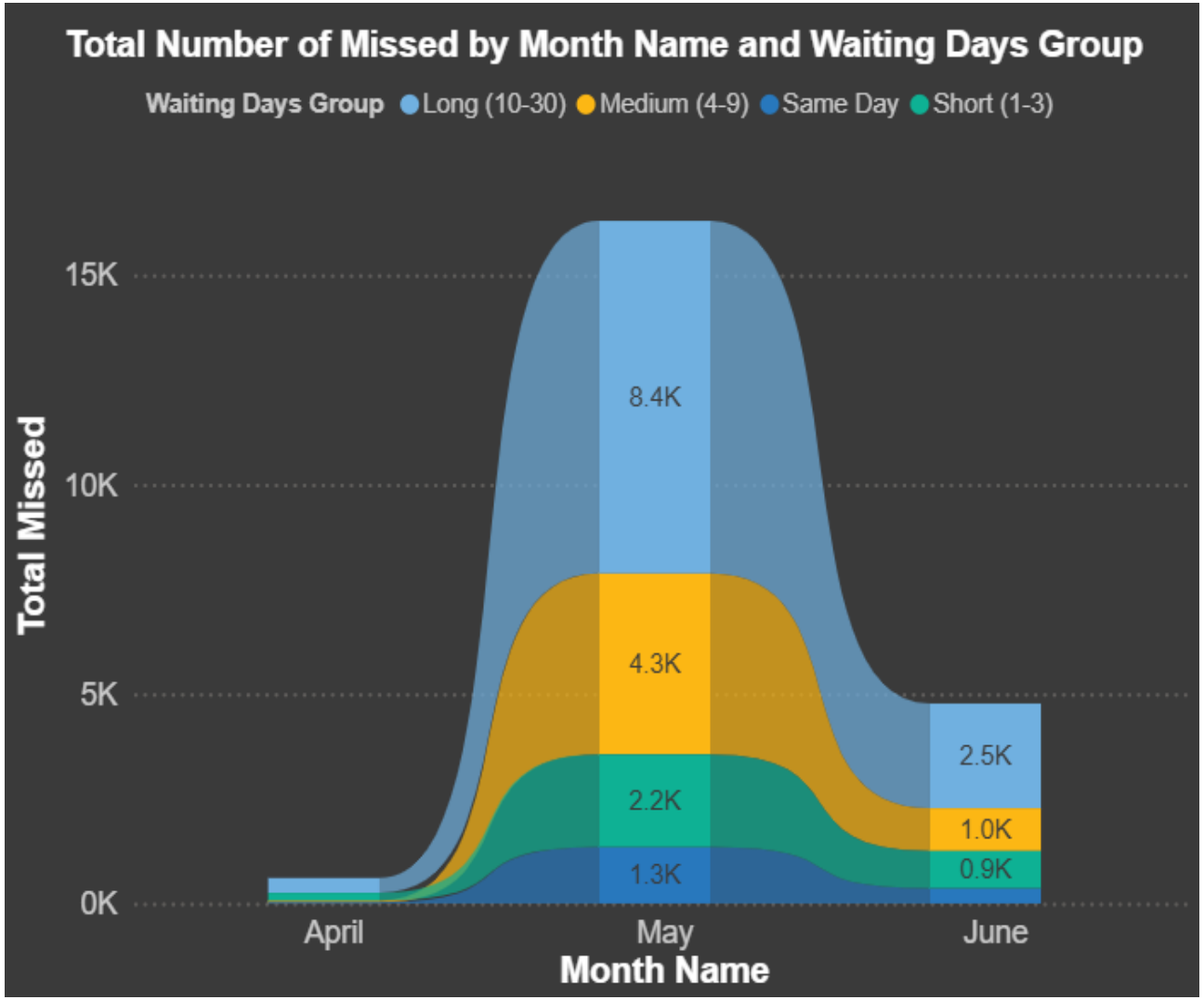
More missed appointments occurred when no SMS was received (12K), making up 55.86% of the total.



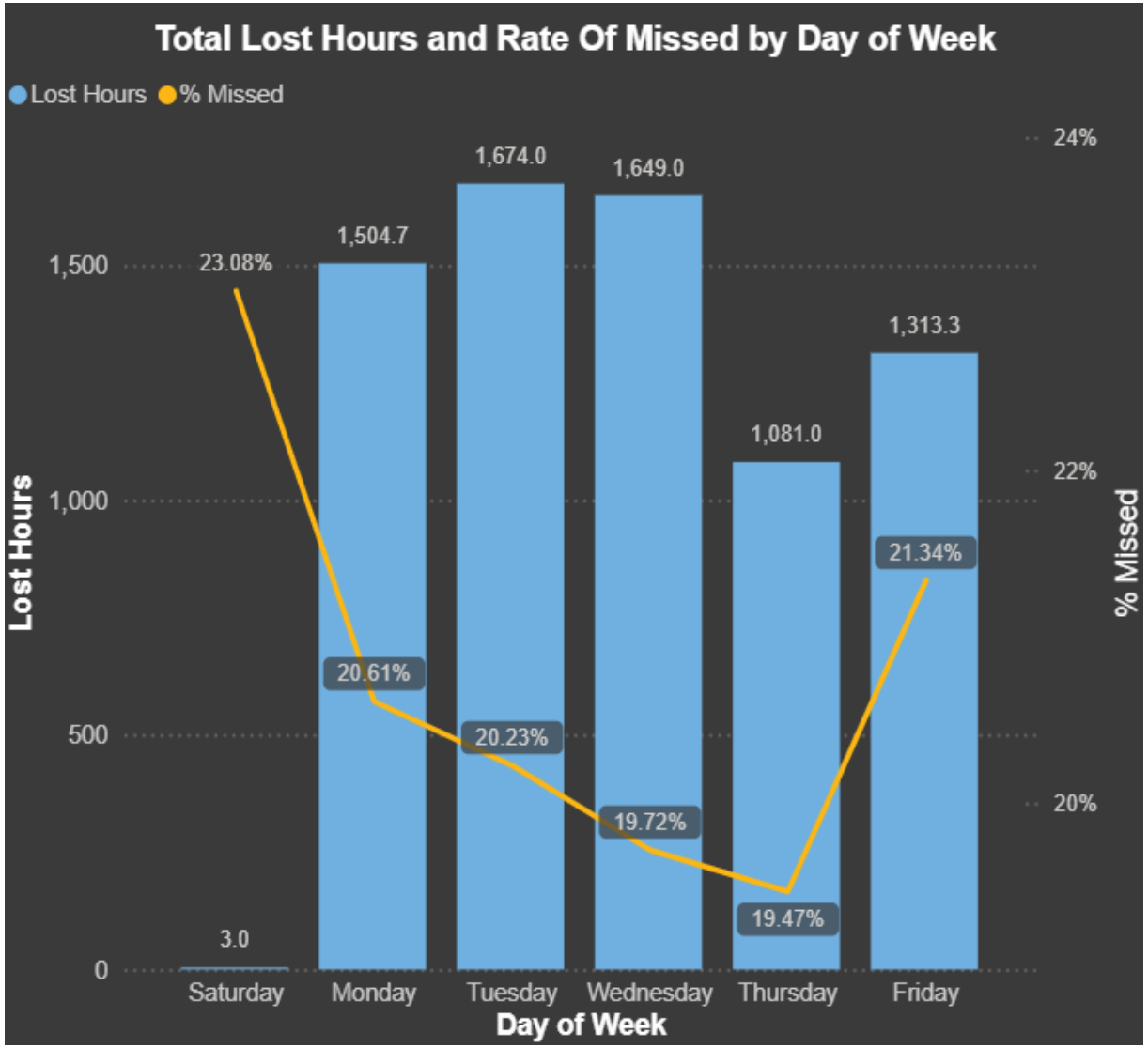
Long waiting times (over 7 days) are the strongest driver of missed appointments, increasing no-show likelihood by 2.4x.

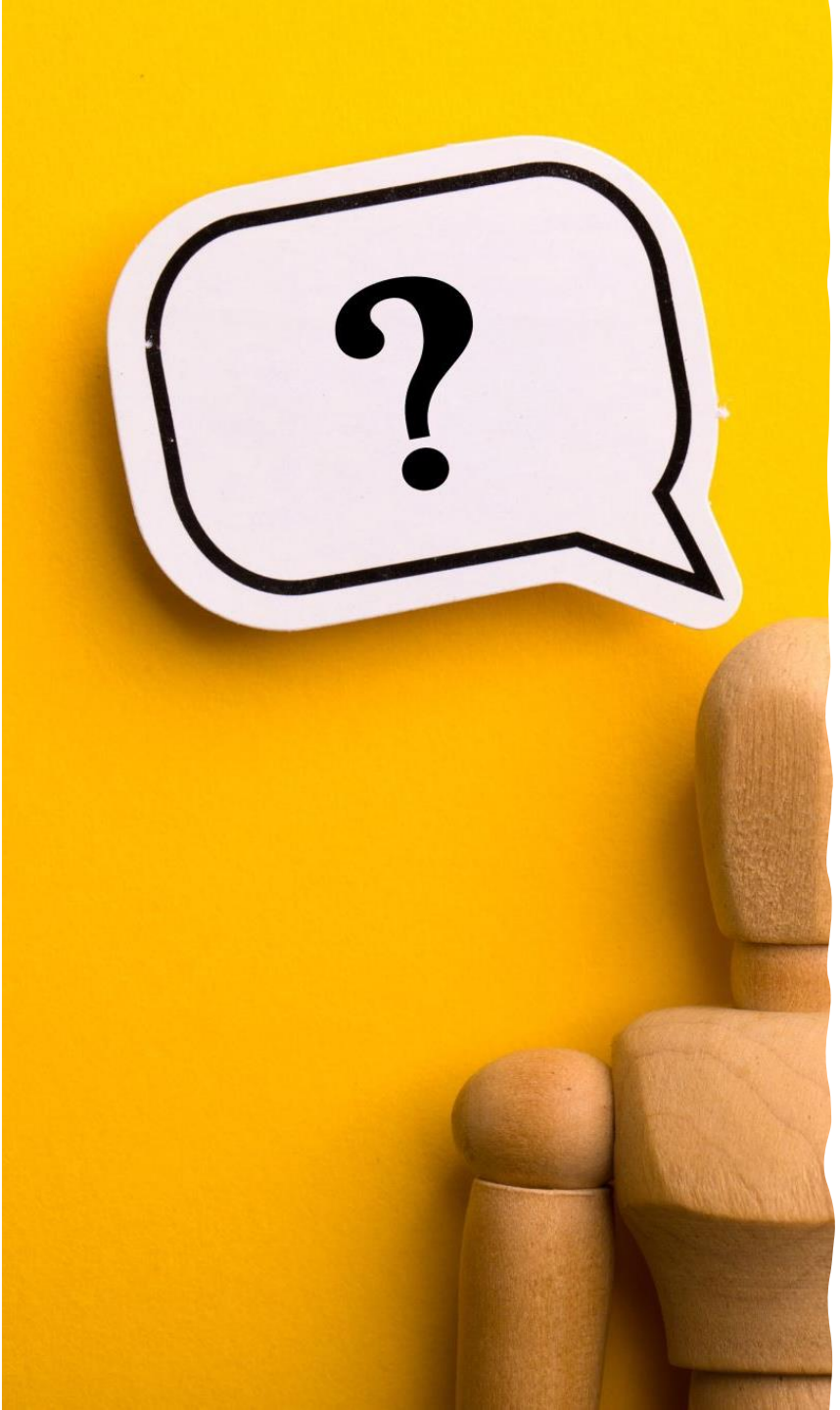


In May, missed appointments peaked at 16K, driven mostly by long waiting times of 10–30 days.



Tuesday had the highest lost hours (1,674), while Saturday showed the highest missed rate at 23.08% by missed (9) of total (39) appointments.

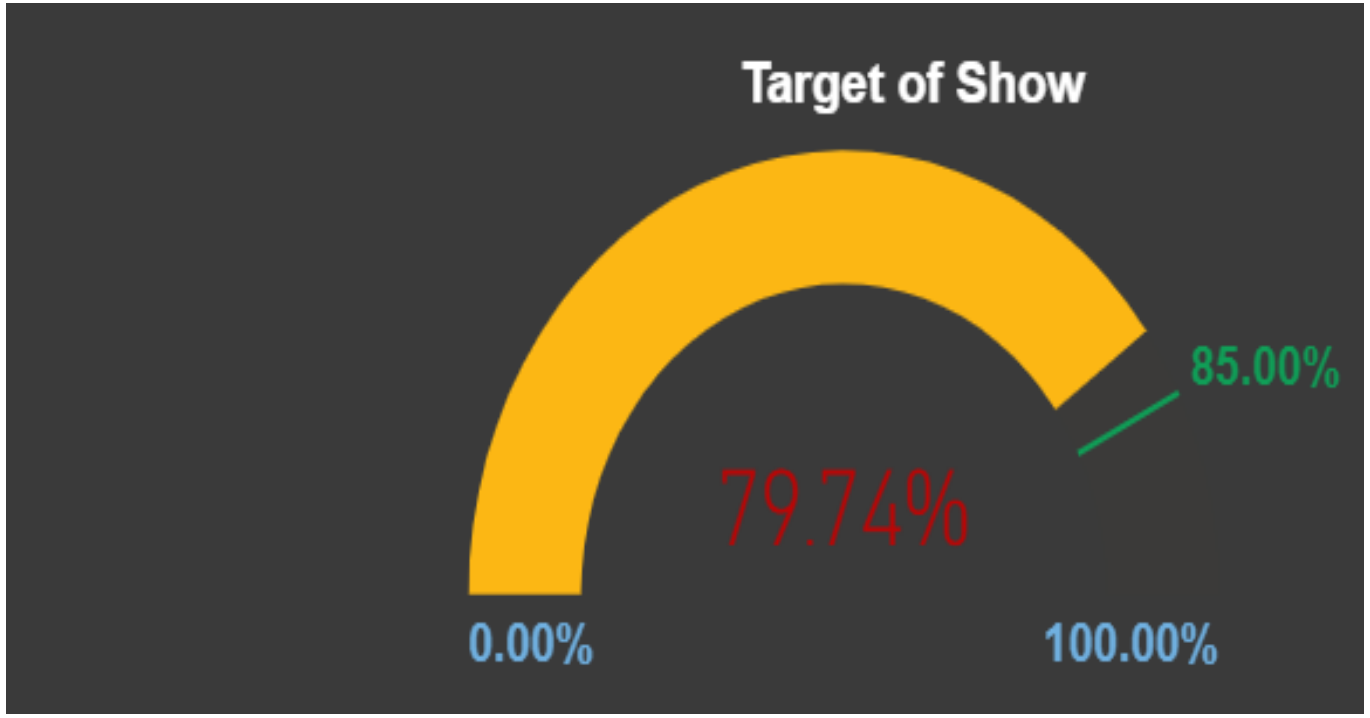




Appointments Efficiency & Resource Waste Analysis.

- Long waiting times contributed to over half of the 22K missed appointments, driving 7.2K lost hours and $1M in lost revenue.

The current show rate stands at 79.74%, falling short of the 85% target. We need 5.26% more to reach target rate of show

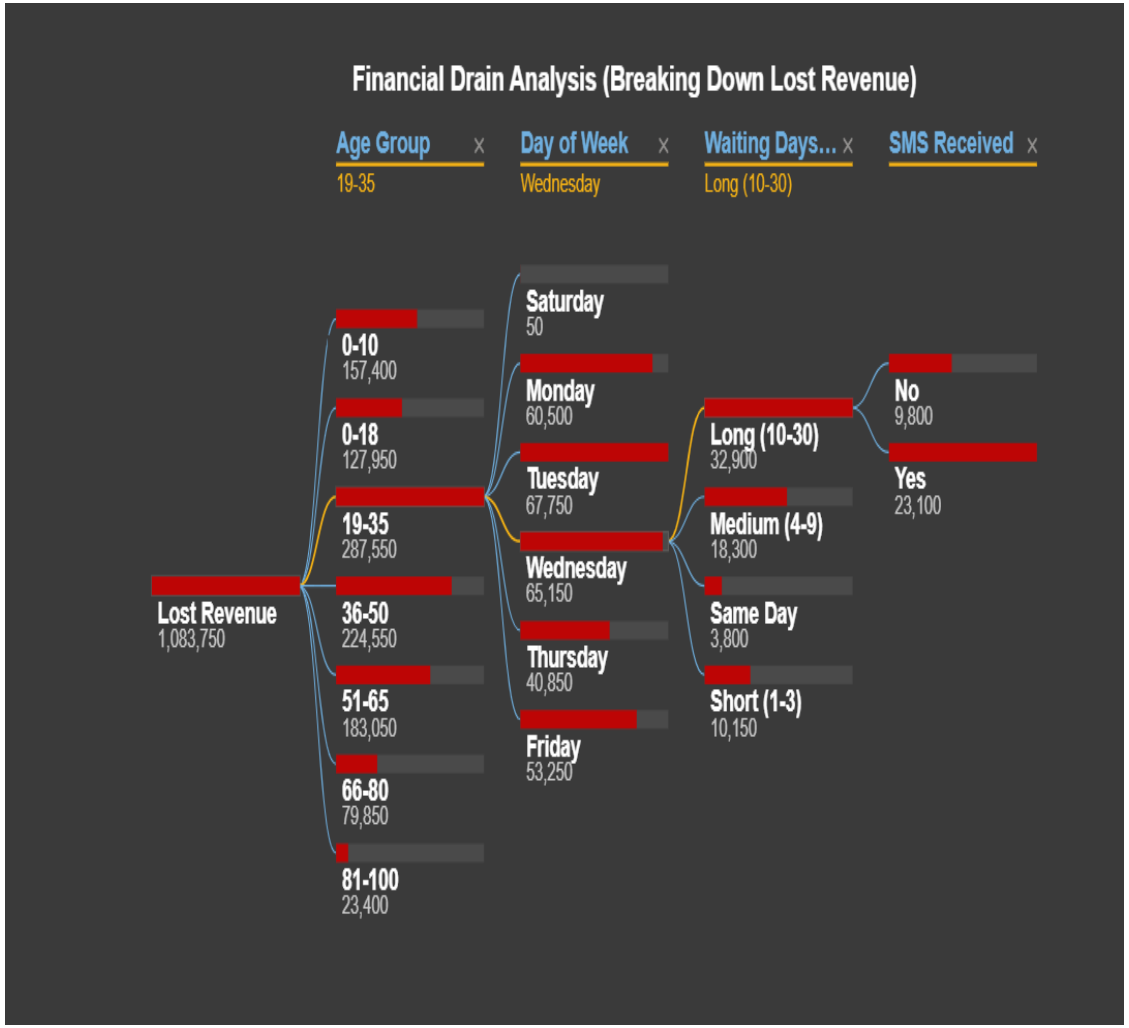


Jardim Camburi leads in revenue leakage with $71,600 lost, contributing to a total clinic loss of $403,350 from missed appointments averaging 20.76%.

Clinic Performance:(Ranking Revenue Leakage)

Clinic location	% Missed	Lost Hours	Lost Revenue
JARDIM CAMBURI	18.88%	477.3	71,600
MARIA ORTIZ	21.46%	398.0	59,700
ITARARÃ‰	26.32%	299.3	44,900
RESISTÃŠNCIA	20.64%	291.3	43,700
CENTRO	21.08%	230.7	34,600
JESUS DE NAZARETH	24.86%	225.3	33,800
JARDIM DA PENHA	16.28%	209.0	31,350
CARATOÃ□RA	23.54%	195.3	29,300
TABUAZEIRO	18.26%	183.7	27,550
BONFIM	19.89%	179.0	26,850
Total	**20.76%**	**2,689.0**	**403,350**

largest financial losses stem from patients aged 19–50, especially on Wednesdays, with long waiting times (10–30 days) and even among those who received SMS reminders.



Conclusion

Strategic Insights.

1

The "7Day Risk": [High Priority] Patient s waiting more than 7 days are **2.48x** more likely to miss their appointment.

2

SMS Communication Gap: [Quick Win] Currently, **32.33%** of appointments are not receiving SMS reminders

3

Friday Operational Waste: [Strategic Adjustment] Fridays show the highest no-show rate at **21.34%** causing the most significant "idle time“ for staff.

Strategic Insights.

4

Geographic Focus: [Critical Local Action] The **ITARARÃ** clinic alone accounts for **$44,900** in lost revenue with a 26.17% no-show rate.

5

Low-Risk "Reliable" Profiles: [Resource Optimization] Patients with hypertension or diabetes show lower no-show rates (~ 17-18%)..

6

Scholar-Status Risk: [Social Support Action] Patients with "Scholarship" status are **1.23x** more likely to miss appointments.

Recommendations

Recommendations Summary

1

Implement an automated "Confirmation Call“ for any appointment booked more than 1 week in advance.

2

Expand SMS coverage to 100% of patients; historical data shows a significant drop in missed appointments when reminders are received.

3

Consider a "Friday Overbooking“strategy (5-10%) or moving staff meetings to Friday afternoons to maximize resource utility.

Recommendations Summary

4

Launch a pilot "Direct Outreach" program at this location to identify local barriers (e.g., transportation or access).

5

Prioritize these patients for high-value specialist slots to ensure maximum revenue stability.

6

Investigate if transportation vouchers or community health worker follow-ups can remove barriers for this specific socio-economic group.

Thank You!

- **Omer Metwally | Aspiring Data Analyst**
- Tools Used:
  - Excel
  - Power Bi
    - Power Query
    - DAX
    - AI-Powered Visuals, Interactive Reporting Tools
- Last Updated: **10.th January 2026**