Healthcare Appointment No-Show Prediction - Final Report

1. Executive Summary

Objective:

Predict whether patients will miss their healthcare appointments and optimize scheduling using machine learning and analytics.

Key Insights:

- Patients who didn't receive SMS reminders were 38% more likely to miss appointments.
- Longer waiting days between scheduling and appointment date increase no-show probability.
- Younger age groups (below 25) have a significantly higher no-show rate.
- Certain neighborhoods have disproportionately higher no-show patterns.

2. Dashboard Overview

A. Filters Panel (Top)

Power Query Cleaning Steps Applied:

- WaitingDays = Duration.Days([AppointmentDay] - [ScheduledDay])
- AppointmentWeekDay = Date.DayOfWeekName([AppointmentDay])
- No-show Binary = if [No-show] = "Yes" then 1 else 0

Interactive Filters:

1. Gender
2. AppointmentWeekDay
3. SMS Received
4. Scholarship
5. Age Group
6. Neighbourhood

B. Key Metrics (Top Cards)

DAX Measures:

- Total Appointments = COUNTROWS(appointments)
- No-Show Count = CALCULATE(COUNTROWS(appointments), appointments[No-show] = 1)
- No-Show Rate (%) = DIVIDE([No-Show Count], [Total Appointments], 0)
- Average Waiting Days = AVERAGE(appointments[WaitingDays])

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C. Main Visualizations

1. No-Show Rate by Weekday: Stacked Column (X: AppointmentWeekDay, Y: Count of No-show, Legend: No-show)

2. Age Group vs No-Show: Clustered Bar (X: AgeGroup, Y: Count, Legend: No-show)

3. SMS Effectiveness: 100% Stacked Column (X: SMS_received, Legend: No-show)

4. Neighborhood-wise Analysis: Bar or Map (X: Neighbourhood, Y: Count of No-show)

3. Technical Implementation

Data Preprocessing:

- Cleaned dataset from project_1dataset.csv
- Extracted WaitingDays, AppointmentWeekDay
- Encoded No-show as 0/1

Modeling Approach:

- Decision Tree Classifier
- Features: Age, SMS_received, WaitingDays, Scholarship, Hypertension, Diabetes
- Accuracy: 74%
- Evaluation: Classification report, confusion matrix

DAX Calculations:

- NoShowCount = CALCULATE(COUNT(appointments[No-show]), appointments[No-show] = 1)
- AppointmentCount = COUNT(appointments[No-show])

Dashboard Title:

- "No-Show Analysis for " & SELECTEDVALUE(appointments[AppointmentWeekDay], "All Days")

4. Actionable Recommendations

Immediate Actions:

1. Automate SMS reminders 24-48 hours before appointment.
2. Shorten waiting period between scheduling and appointment.
3. Educate high-risk neighborhoods through targeted outreach.

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Long-Term Solutions:

1. Use ML model in scheduling system.

2. Build patient profile scoring system.

3. Prioritize reliable patients for morning slots.

5. Appendix

Data Dictionary:

Field | Type | Description

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ScheduledDay | DateTime | Appointment scheduled date

AppointmentDay | DateTime | Actual appointment date

No-show | Text | Indicates if patient missed appointment

SMS_received | Integer | 1 if SMS sent, 0 otherwise

Neighbourhood | Text | Patient's residential area

Power BI File Structure:

- Pages: Executive Summary, Patient Behavior Analysis, Medical Conditions Breakdown, Technical Appendix

- Datasets: appointments (cleaned)

- Measures: No-Show Count, Total Appointments, No-Show Rate