# Healthcare Analytics Dashboard Report

## 1. Model Design

The data model follows a Star Schema for efficient analysis:  
  
- Fact Tables (transactions):  
 • Appointments → appointment-level data (AppointmentID, PatientID, DoctorID, Date, Fee, ConsultationType, FollowUpRequired).  
 • Treatments → treatment-level data (TreatmentID, PatientID, DoctorID, Date, Cost, TreatmentType, Outcome).  
  
- Dimension Tables (lookups):  
 • Patients → patient demographics (PatientID, Name, Gender, Age, Region, InsuranceType).  
 • Doctors → doctor information (DoctorID, Name, Specialty, Location).  
 • Dates (created with DAX CALENDAR) → includes Year, Quarter, Month, Date hierarchies.  
  
Relationships:  
- Patients[PatientID] → Appointments[PatientID], Treatments[PatientID]  
- Doctors[DoctorID] → Appointments[DoctorID], Treatments[DoctorID]  
- Dates[Date] → Appointments[AppointmentDate], Treatments[TreatmentDate]

## 2. Key DAX Measures

### Appointments & Patients

* Total Appointments = COUNTROWS(Appointments)
* Total Patients (Active) = CALCULATE(DISTINCTCOUNT(Appointments[PatientID]), KEEPFILTERS(Appointments[AppointmentDate]))
* Average Fee per Appointment = DIVIDE(SUM(Appointments[Fee]), [Total Appointments])

### Treatments & Costs

* Total Treatment Cost = SUM(Treatments[Cost])
* Treatment Cost per Patient = DIVIDE([Total Treatment Cost], DISTINCTCOUNT(Treatments[PatientID]))

### Outcomes & Success

* Successful Treatments = CALCULATE(COUNTROWS(Treatments), Treatments[Outcome] = "Successful")
* Successful Treatment Rate % = DIVIDE([Successful Treatments], COUNTROWS(Treatments))

### Doctor Utilization

* Appointments per Doctor (context) = COUNTROWS(Appointments)
* Average Doctor Utilization = AVERAGEX(VALUES(Doctors[DoctorID]), [Appointments per Doctor (context)])

### Patient Retention

* Retained Patients (Year) = VAR \_Patients = VALUES(Appointments[PatientID]) VAR \_Retained = FILTER(\_Patients, CALCULATE(DISTINCTCOUNT(Appointments[AppointmentID]), ALLEXCEPT(Appointments, Appointments[PatientID], Dates[Year])) >= 2) RETURN COUNTROWS(\_Retained)
* Patient Retention Rate % = DIVIDE([Retained Patients (Year)], CALCULATE(DISTINCTCOUNT(Appointments[PatientID]), ALLEXCEPT(Appointments, Dates[Year])))

### Follow-ups

* Follow-up Appointments = CALCULATE(COUNTROWS(Appointments), Appointments[FollowUpRequired] = "Yes")
* Follow-up Appointment % = DIVIDE([Follow-up Appointments], [Total Appointments])

### Follow-up by Treatment Type

* Follow-up Rate by Treatment Type % = VAR \_PatientsWithType = VALUES(Treatments[PatientID]) RETURN DIVIDE(CALCULATE([Follow-up Appointments], TREATAS(\_PatientsWithType, Appointments[PatientID])), CALCULATE([Total Appointments], TREATAS(\_PatientsWithType, Appointments[PatientID])))

## 3. Analysis Results

Executive Overview:  
- Total Patients & Appointments show steady engagement.  
- Average Fee per Appointment provides revenue insights.  
- Successful Treatment Rate indicates high care quality.  
- Region & Insurance breakdown highlight dominant categories.  
  
Doctor Performance:  
- Top doctors manage highest appointment volumes.  
- Specialties differ in both patient load and success rate.  
- Utilization ranking identifies top 10 doctors.  
  
Patient Insights:  
- Younger adults (25–40) form the largest age group.  
- Retention rate higher among premium insurance patients.  
- Cost per Patient histogram shows most patients in mid-range spending.  
  
Treatment Analysis:  
- Treatment Costs differ significantly by type.  
- Success Rate by Specialty highlights quality differences.  
- Some treatments show higher Follow-up Rates, indicating resource needs.

## 4. Conclusion

The Healthcare Analytics Dashboard provides a comprehensive view of patients, doctors, treatments, and outcomes. Key findings include high treatment success rates, variation in doctor performance, insurance-linked retention patterns, and follow-up trends by treatment type. This enables data-driven decisions for improving care quality, optimizing resources, and enhancing patient satisfaction.

## Submitted By Submitted To

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