Phase 5: Independent Exploration

1. Are there seasonal patterns in admissions?

Admissions per Month

```
select YEAR(Treatment_Date) as Year, MONTH(Treatment_Date) as Month,
DATENAME(month, Treatment_Date) as Month_Name,
COUNT(*) as Admissions
from TreatmentRecords_Cleaned
Group by YEAR(Treatment_Date), MONTH(Treatment_Date),
DATENAME(month, Treatment_Date)
Order by Year, Month
```

Admissions per Quarter

```
select YEAR(Treatment_Date) as Year, DATEPART(quarter, Treatment_Date) as
Quarter,
Count(*) as Admissions
from TreatmentRecords_Cleaned
Group by YEAR(Treatment_Date), DATEPART(quarter, Treatment_Date)
Order by Year, Quarter
```

Finding Monthly index and Comparing with Avg Admissions

```
with monthly_adm as (
select YEAR(Treatment_Date) as Year, MONTH(Treatment_Date) as Month,
DATENAME(month, Treatment_Date) as Month_Name,
Count(*) as Admissions
from TreatmentRecords_Cleaned
Group by YEAR(Treatment_Date), MONTH(Treatment_Date),
DATENAME(month, Treatment_Date)
),
Avg_monthly_adm as (
select AVG(Admissions * 1.0) as Avg_Adm
from monthly_adm
)
select M.Year, M.Month, M.Month_Name, M.Admissions,
ROUND(M.Admissions/A.Avg_Adm,3) as Monthly_Index
from monthly_adm as M CROSS JOIN Avg_monthly_adm as A
Order by M.Year, M.Month, M.Month_Name
```

2. Which doctors treat the most complex cases successfully?

```
with complex_cases as (
select Record_ID, Doctor_ID, Outcome, Treatment_Duration_Days,
Treatment_Cost,
Case
when Outcome = 'Critical' OR Treatment_Duration_Days > 10 OR
Treatment_Cost > 100000
then 1 else 0 end as complex_cases
from TreatmentRecords_Cleaned
),

Doctor_Stats as (
select Doctor_ID,
sum(complex_cases) as Total_complex_cases,
sum(Case when complex_cases = 1 AND Outcome = 'Recovered' then 1
else 0 End) as Successful_complex_cases
from complex_cases
Group by Doctor_ID
)

select D.Doctor_ID, D.Name, D.Years_Of_Experience,
S.Total_complex_cases, S.Successful_complex_cases,
Round(Cast( S.Successful_complex_cases as Float) /
Nullif(S.Total_complex_cases,0),3) as Complex_Case_SuccessRate
from
DoctorDetails_Cleaned as D INNER JOIN Doctor_Stats as S
on
D.Doctor_ID = S.Doctor_ID
Order by Complex_Case_SuccessRate Desc
```

3. Can we cluster patients by treatment patterns?

```
with Patient_summary as (
select Patient_ID,
AVG(Treatment_Cost) as Avg_Cost,
AVG(Treatment_Duration_Days) as Avg_Days,
Count(*) as Total_Treatments,
SUM(Case when Outcome = 'Recovered' then 1 else 0 end) as
Successful_Treatments
from TreatmentRecords_Cleaned
Group by Patient_ID
),
```

```
Clusters as (
select Patient_ID, Avg_Cost, Avg_Days, Total_Treatments,
Successful_Treatments,
Case
when Avg_Cost < 2000 AND Avg_Days < 5 Then 'Low Cost Cases'
when Avg_Cost BETWEEN 2000 AND 5000 AND Avg_Days BETWEEN 5 AND
10 Then 'Medium Cost Cases'
Else 'High Cost Cases' End as Patient_Cluster
from Patient_summary
)

Select Patient_Cluster, Count(*) As Total_Patients from Clusters
Group by Patient_Cluster
Order by Total_Patients Desc
```

4. Build a model (optional stretch) to predict readmission likelihood.

```
with Visit_history as (
select Patient_ID, Count(*) as Total_visits
from TreatmentRecords_Cleaned
Group by Patient_ID
),

Model_inputs as (
select
T.Record_ID, T.Patient_ID, T.Treatment_Date, T.Treatment_Duration_Days,
T.Outcome, VH.Total_visits,
Case
When T.Outcome = 'Critical' Then 1 else 0 End as Critical_case,
Case
When T.Treatment_Duration_Days > 10 Then 1 else 0 End as Long_duration
from
TreatmentRecords_Cleaned as T LEFT JOIN Visit_history as VH
on
T.Patient_ID = VH.Patient_ID
),

Risk_model as (
select *,
(Critical_case * 3) +
(Long_duration * 2) +
(Case when Total_visits > 1 then 5 else 0 End) as Risk_score
from Model_inputs
)
```

```
Select Record_ID, Patient_ID, Outcome, Treatment_Duration_Days,
Total_visits, Risk_score,
Case
When Risk_score >= 6 Then 'High Readmission Risk'
When Risk_score BETWEEN 3 AND 5 Then 'Medium Risk'
Else 'Low Risk' End as Predicted_Readmission_Risk
from Risk_model
Order by Risk_score Desc
```