🏥 Hospital Data Analysis Summary

1. Total Number of Patients

- **Query**: Sums the `Patients_Count` column from the `hospital_data` table.
- **Purpose**: Measures the total patient load handled by all hospitals combined.
- **Insight**: Helps gauge the overall healthcare demand or system burden.

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2. Average Number of Doctors per Hospital

- **Query**: Calculates the average (`AVG`) of `Doctors_Count`.
- **Purpose**: Understands staffing levels across hospitals.
- **Insight**: Can be used to evaluate if hospitals are adequately staffed relative to their patient load.

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3. Top 3 Departments with Highest Number of Patients

- **Method A – Basic Aggregation**:
    - Uses `GROUP BY Department` and `SUM(Patients_Count)` to total patient numbers by department.
    - Orders by descending patient count and limits to top 3.
- **Method B – Using Ranking (`RANK()` Function)**:
    - Creates a Common Table Expression (CTE) with departments ranked by total patients.
    - Selects only the top 3 ranked departments.
- **Purpose**: Identifies which departments are most utilized.

- **Insight**: Highlights key areas of medical focus or patient need.

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4. Hospital with Highest Medical Expenses

- **Subsection A – Highest Single Expense Entry**:
    - For each hospital, returns the highest single recorded `Medical_Expenses` value.
    - Uses `MAX(Medical_Expenses)` with `GROUP BY Hospital_Name`.
- **Subsection B – Highest Total Expenses**:
    - Sums up all `Medical_Expenses` per hospital.
    - Orders by total and selects the top one.
- **Purpose**: Tracks hospital cost intensity from both single high-cost events and cumulative spend.
- **Insight**: Useful for identifying hospitals with resource-heavy patients or treatments.

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5. Average Daily Medical Expenses by Hospital

- **Query**: Uses `AVG(Medical_Expenses)` grouped by `Hospital_Name`.
- **Purpose**: Calculates how much is typically spent per day per hospital.
- **Insight**: Supports cost-efficiency analysis and comparisons between hospitals.

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6. Patient with Longest Stay

- **Query**: Calculates `Discharge_Date - Admission_Date` to determine length of stay for each record.

- **Orders**: Results by duration in descending order; selects the top one.
- **Purpose**: Identifies the case with the longest hospitalization.
- **Insight**: Could indicate a complex or severe medical condition requiring extended care.

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7. Total Number of Patients Treated per City

- **Query**: Sums `Patients_Count` grouped by `Location`.
- **Orders**: By total patients in descending order.
- **Purpose**: Understands geographical distribution of healthcare needs.
- **Insight**: Helps in regional planning, infrastructure allocation, or policy targeting.

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8. Average Patient Stay per Department

- **Query**: Averages the duration of stay per department using `AVG(Discharge_Date - Admission_Date)`.
- **Orders**: Departments by average stay in descending order.
- **Purpose**: Reveals which departments generally require longer patient care.
- **Insight**: May indicate treatment complexity, critical care, or recovery periods.

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9. Department with the Least Number of Patients

- **Query**: Uses `MIN(Patients_Count)` grouped by department and selects the lowest.
- **Purpose**: Detects under-utilized or low-traffic departments.
- **Insight**: Could point to specialties with lower demand, staffing issues, or efficiency problems.

10. Monthly Medical Expenses

- **Query**: Groups records by formatted `Admission_Date` and sums `Medical_Expenses`.
- **Purpose**: Intended to show expense trends over time.
- **Insight**: Enables financial planning and monthly budget tracking.

✅ General Observations

- The script covers **operational**, **financial**, and **departmental** metrics.
- It uses advanced SQL concepts like:
    - Window functions (`RANK()`),
    - CTEs (`WITH`),
    - Aggregations (`SUM`, `AVG`, `MAX`, `MIN`),
    - Date calculations,
    - Sorting and limiting results.
- There are some **minor issues**:
    - Typos in aliases (e.g., `Avrage_docter`),
    - Hidden characters in column names (e.g., `ï»¿Hospital_Name`),
    - Improper date formatting for monthly grouping.

🛠️ Operational & Strategic Takeaways

- **Workforce Planning**: Use doctor-patient ratio insights for hiring decisions.
- **Capacity Planning**: Match bed availability and treatment capacity with high-demand departments and cities.
- **Financial Oversight**: Focus on high-cost hospitals and departments for efficiency audits.

- **Policy & Budget Allocation**: Use data-driven patient volumes and department usage for fair and effective resource distribution.

- **Expansion Decisions**: Support data-driven decisions on where and which departments to expand, replicate, or consolidate.