

**REPORT TITLE:**

**HOSPITAL MANAGEMENT SYSTEM ANALYSIS**

**COURSE INFORMATION:**

**CST 2102 DATABASE ANALYTICS**

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## **ABSTRACT**

This report explores the optimization of hospital operations using data-driven insights. it outlines the methodology used to extract, analyze, and visualize data from the hospital database, focusing on improving departmental efficiency, understanding revenue drivers, and identifying operational bottlenecks. The findings include revenue trends, room utilization rates, appointment patterns, and prescription statistics, which provide actionable insights for improving hospital management.

# **INTRODUCTION**

## **BACKGROUND**

The hospital management system project aims to streamline hospital operations by analyzing complex datasets from various departments. challenges such as inefficient appointment scheduling, inconsistent revenue tracking, and underutilized resources prompted the need for this project.

## **OBJECTIVES**

- Analyze hospital operations.
- Optimize patient and departmental efficiency.
- Identify revenue trends and operational bottlenecks.

## **OVERVIEW OF METHODS**

The project leverages sql for data extraction and power BI for visualization to address business questions related to appointments, revenue, prescriptions, and room utilization.

# 1. METHODOLOGY

## DATABASE DESIGN

- Designed a conceptual and a physical diagram.

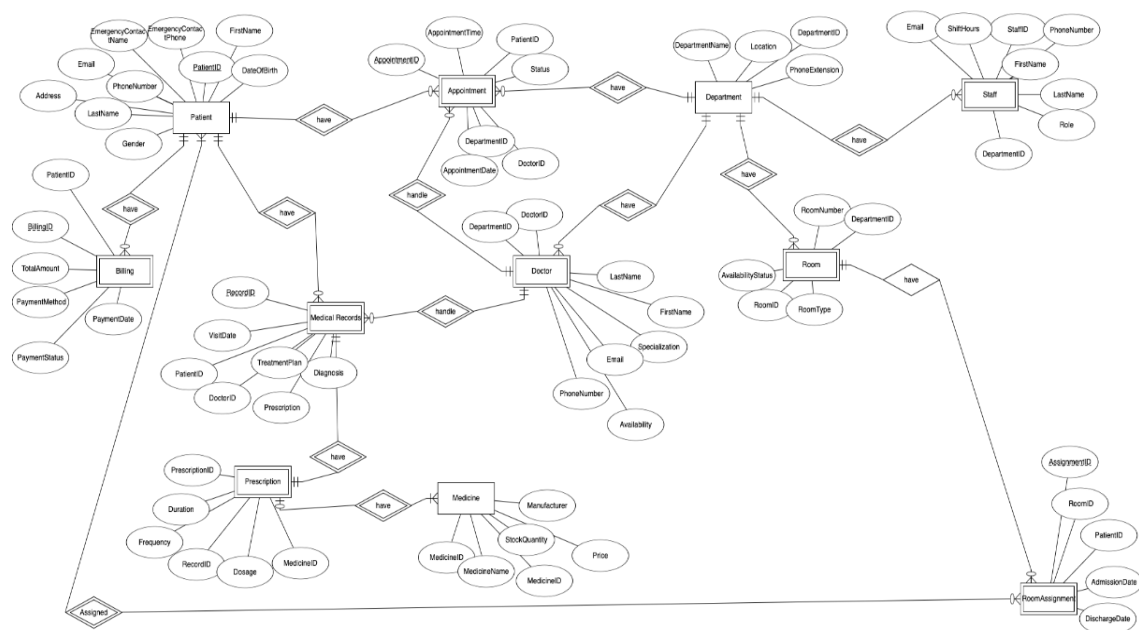


Figure 1.1: Hospital Management System Conceptual Diagram

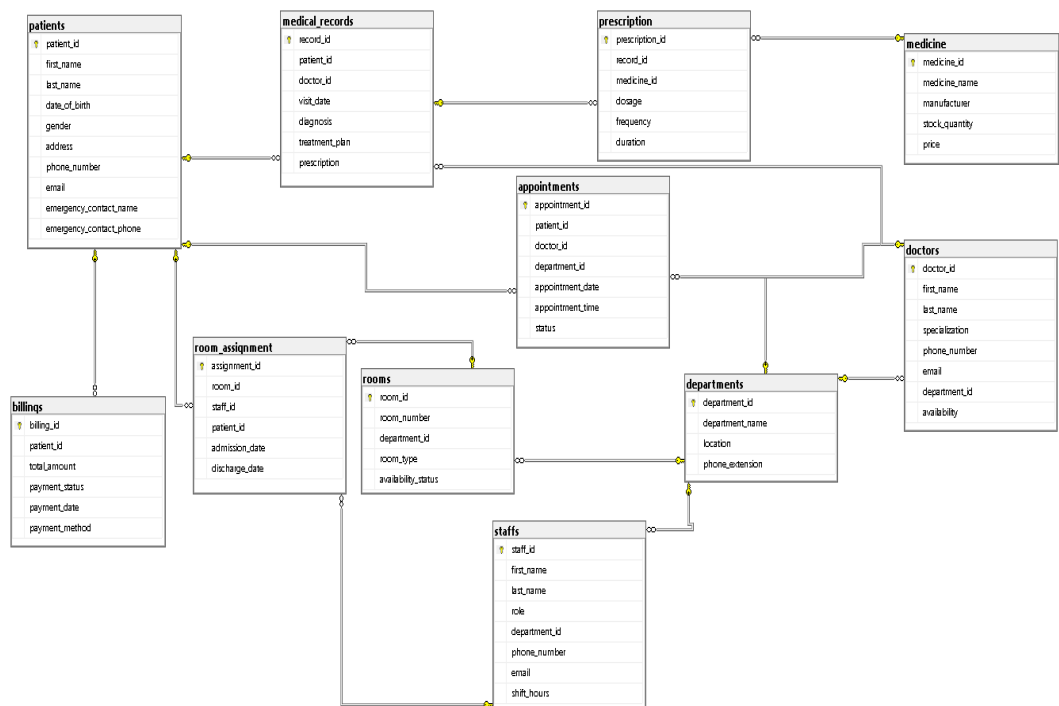


Figure 1.2: Hospital Management System Physical Diagram

- ensured data integrity through normalization and foreign key constraints.

## DATA EXTRACTION

- SQL queries were written to extract relevant data for analysis.
- aggregations and joins were optimized for performance.

## DATA VISUALIZATION

- Power bi was used to create dashboards and visuals, including card visuals, bar charts, line graphs, and pie charts.

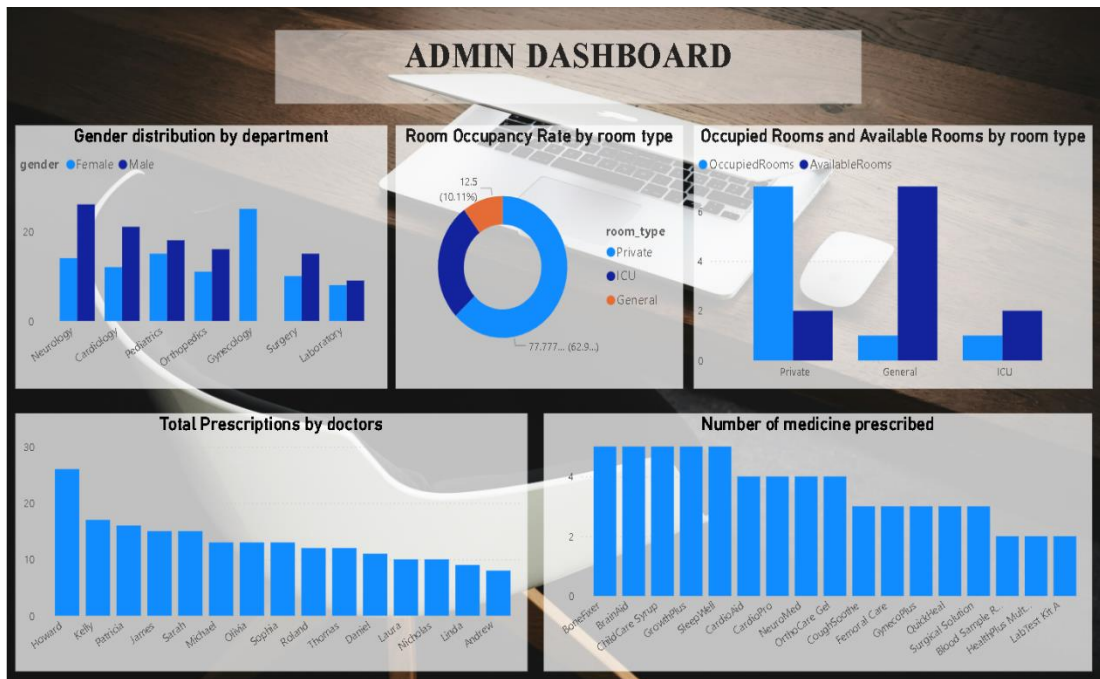


Figure 1.3: Administrative Dashboard

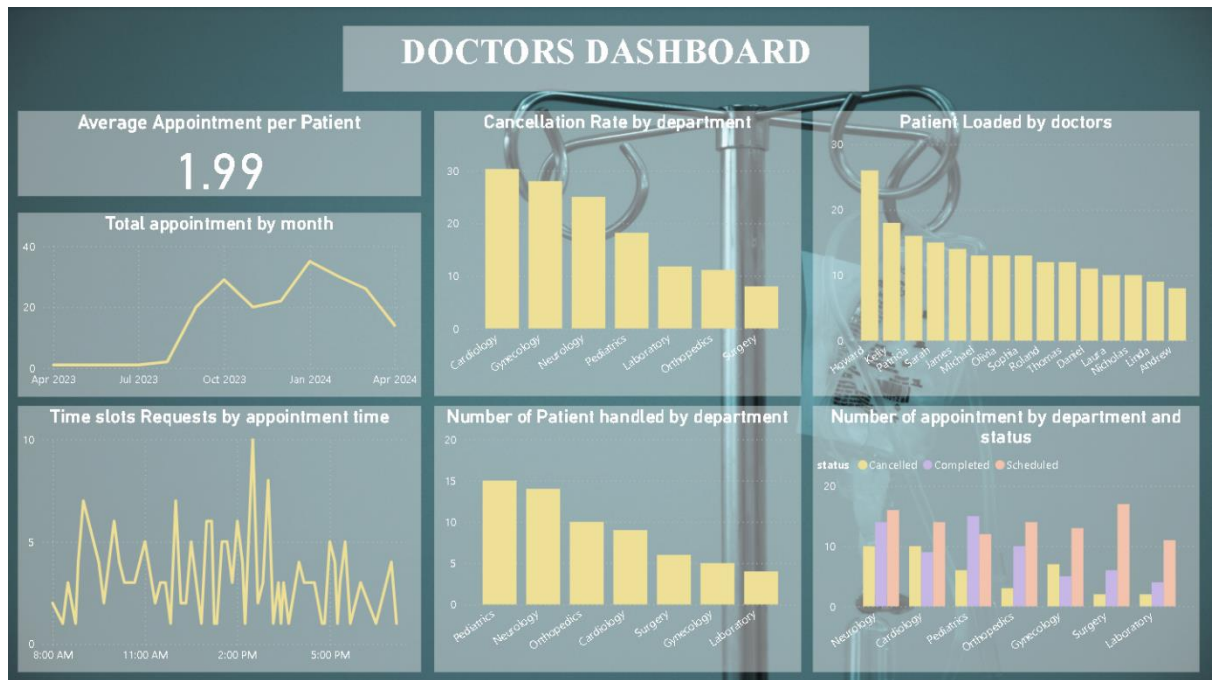


Figure 1.4: Doctors Dashboard

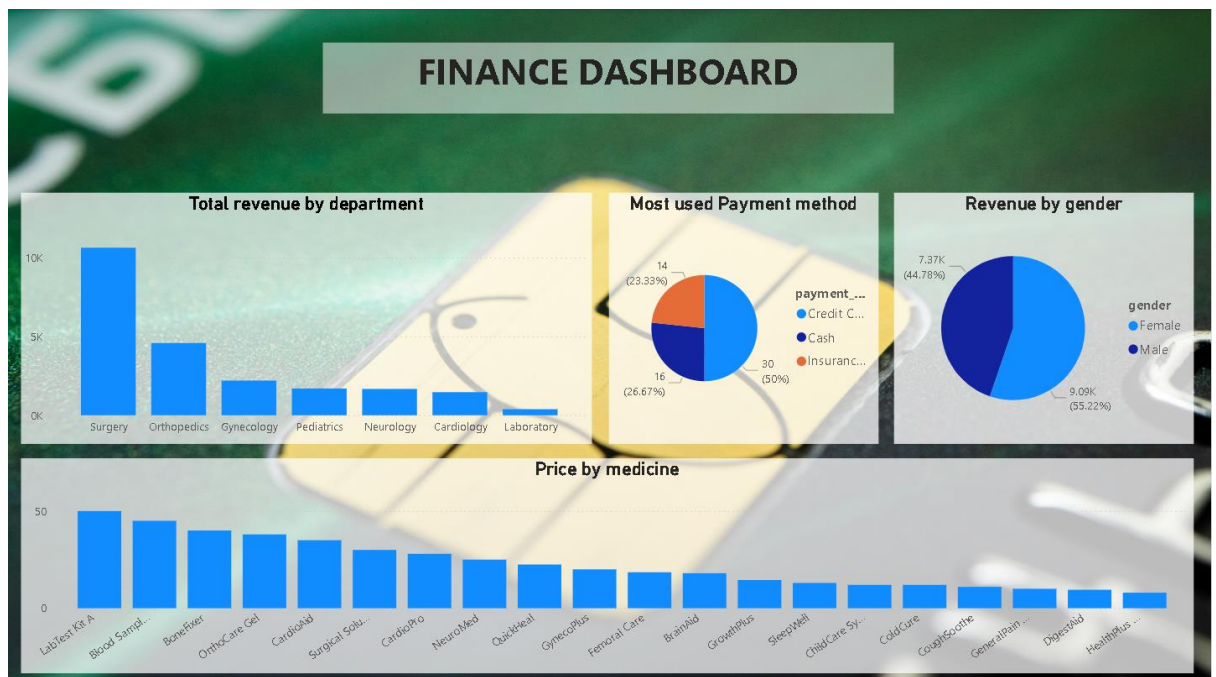


Figure 1.5: Finance Dashboard

- Measures:
  - Average Appointments Per Patient:
 
$$\text{AvgAppointmentsPerPatient} = \frac{\text{Total Appointments}}{\text{Total Patients}}$$

```

        CALCULATE(COUNT(appointments[appointment_id]),
        FILTER(Appointments, appointments[appointment_date] >=
        TODAY() - 540)),
        DISTINCTCOUNT(appointments[patient_id])
    )

```

- Average Cancellations:

```

    AvgCancellations =
    AVERAGEX(
        FILTER(Appointments, appointments[appointment_date] >=
        EDATE(TODAY(), -12) && appointments[status] = "Cancelled"),
        1
    )

```

- Average Revenue Per Patient:

```

    AvgRevenuePerPatient =
    DIVIDE(
        SUM(billings[total_amount]),
        DISTINCTCOUNT(appointments[patient_id])
    )

```

- Cancellation Rate:

```

    CancellationRate =
    DIVIDE(
        COUNTROWS(FILTER(appointments, appointments[status] =
        "Cancelled")),
        COUNTROWS(appointments)
    ) * 100

```

- Gender Count:

```

    genderCount = COUNT(appointments[patient_id])

```

- Revenue:

```

    Revenue = CALCULATE(SUM(billings[total_amount]),
    FILTER(appointments, appointments[status]="Completed"))

```

- Time Slot Request:

```

    TimeSlotRequests = COUNT(appointments[appointment_time])

```

- Total Appointment:

```

    Totalqpp =
    DISTINCTCOUNT(appointments[appointment_id])

```

- PaymentMethodCount:  

$$\text{PaymentMethodCount} = \text{COUNT}(\text{billings}[\text{payment\_method}])$$
- TotalRevenueLast:  

$$\text{TotalRevenueLast} = \text{CALCULATE}(\text{SUM}(\text{billings}[\text{total\_amount}]))$$
- Patient count:  

$$\text{PatientCount} = \text{COUNT}(\text{appointments}[\text{patient\_id}])$$
- PatientLoad:  

$$\text{PatientLoad} = \text{Count}(\text{appointments}[\text{patient\_id}])$$
- PrescriptionRate:  

$$\text{PrescriptionRate} = \frac{\text{COUNT}(\text{prescription}[\text{prescription\_id}])}{\text{DISTINCTCOUNT}(\text{appointments}[\text{patient\_id}])} * 100$$
- TotalPrescriptions:  

$$\text{TotalPrescriptions} = \text{COUNT}(\text{prescription}[\text{prescription\_id}])$$
- AvailableRooms:  

$$\text{AvailableRooms} = \text{COUNTROWS}(\text{FILTER}(\text{Rooms}, \text{rooms}[\text{availability\_status}] = \text{"Available"}))$$
- OccupiedRooms:  

$$\text{OccupiedRooms} = \text{COUNTROWS}(\text{FILTER}(\text{Rooms}, \text{rooms}[\text{availability\_status}] = \text{"Occupied"}))$$
- RoomOccupancyRate:  

$$\text{RoomOccupancyRate} = \frac{\text{COUNTROWS}(\text{FILTER}(\text{Rooms}, \text{rooms}[\text{availability\_status}] = \text{"Occupied"}))}{\text{COUNTROWS}(\text{Rooms})} * 100$$

## DATA ANALYSIS

Patterns and trends were analyzed to address key business questions, such as identifying the most profitable departments and busiest time slots.



**Tools used**

- SQL: for data storage, management, and querying.
- Power BI: for visualization and dashboard creation.

## 2. RESULTS AND DISCUSSIONS

### KEY FINDINGS

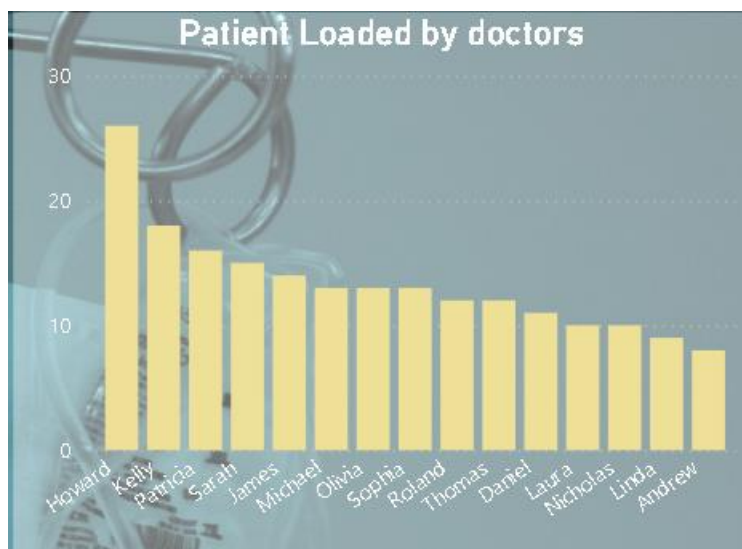
- Average number of appointments per patient:



*Figure 2.1: Average number of appointments per patient*

The average number of appointments per patient is approximately 1.99, therefore, in most cases the hospital should expect that a new patient will come more than once, insinuating that they enjoy the hospital's services.

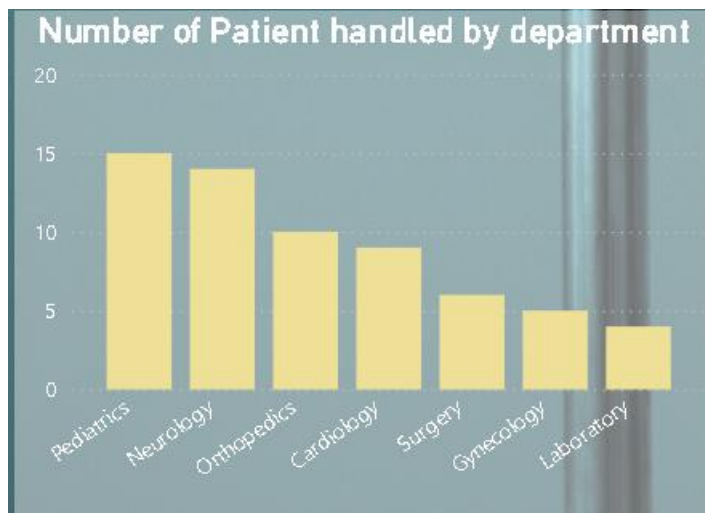
- Doctors with the highest patient load:



*Figure 2.2: Patient load by doctor*

This bar chart visualizes the patient load per doctor. The doctor, Howard, is handling a lot more patients than all the other doctors in the hospital. This could be a result of other doctors' unavailability in his department.

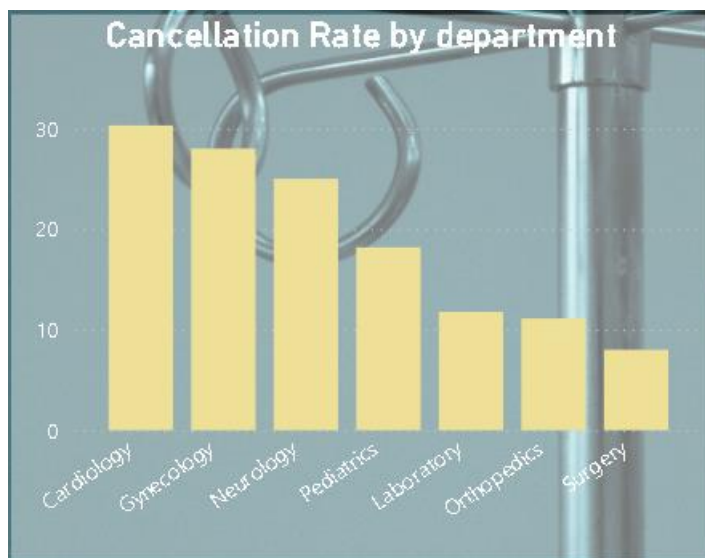
- Departments handling the most patients:



*Figure 2.3: Number of patients handled by department*

The department handling the most patients is the Pediatrics department. This shows that a good number of the hospital's patients are children. This can help the hospital provide more equipment and resources to this department to further their customer satisfaction. This visual also helps the hospital know which departments are lacking patients to come up with solutions to help attract customers.

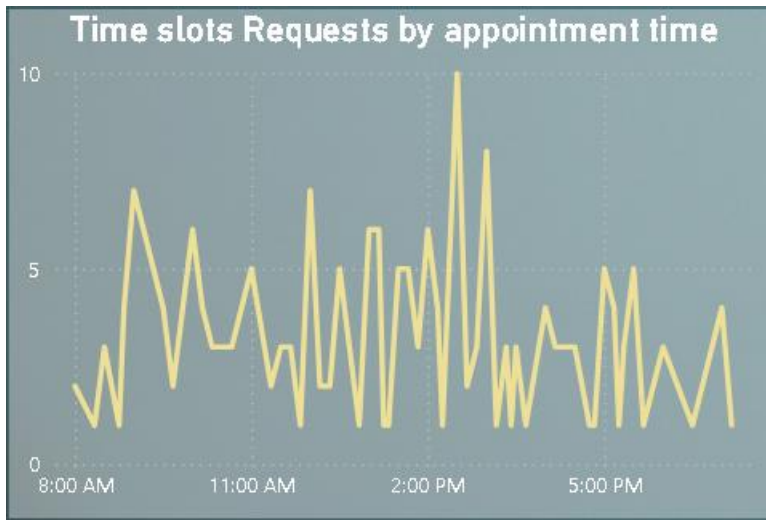
- Departments with the highest appointment cancellation rates:



*Figure 2.4: Cancellation rate by department*

The department with the highest cancellation rate is the Cardiology department. This could be a result of doctors' lack of availability from that department. We can also see some of the other departments, like Gynecology and Neurology, also having high values of cancellation rates. This visual shows that the hospital would need to provide more doctors in these departments to distribute workload.

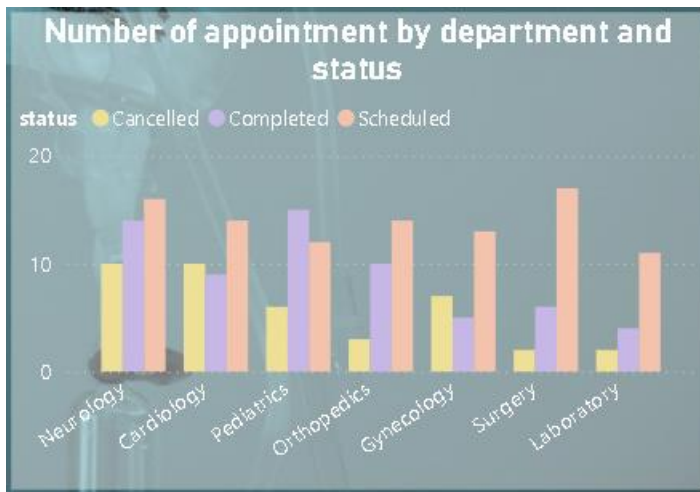
- Most requested time slots for appointments across all departments:



*Figure 2.5: Time slots requests for appointments*

This visual helps the hospital know what time of the day they are expecting a high patient load, to make decisions on the number of doctors to make available around certain times. The most requested time slot for appointments is 2:30 pm.

- Departments with highest appointment cancellation, completion, and scheduled rates:



*Figure 2.6: Number of appointments by department and status*

Most departments have a higher percentage of Scheduled appointments than Completed or Cancelled. This helps the hospital make decisions on which departments to provide more resources for. Surgery has the highest number of Scheduled appointments, and since surgery requires expensive tools, the hospital will know to invest in them.

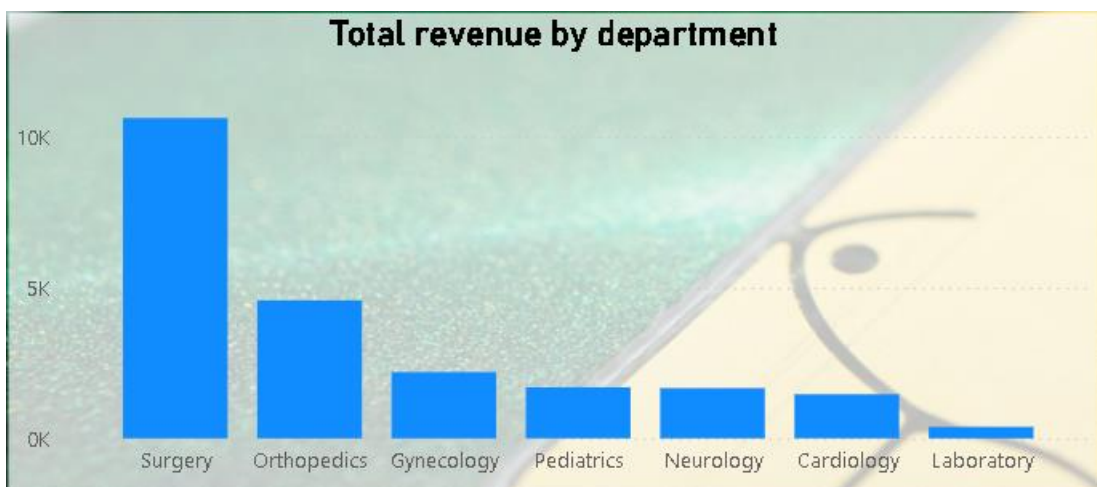
- Total appointments by month:



*Figure 2.7: Total appointments by month*

This visual shows that January has the highest number of patients, but in general, November, December, January and February seem to have the highest number of patients. These months are within the Christmas holiday period. This shows that doctors will need to be more available around this period.

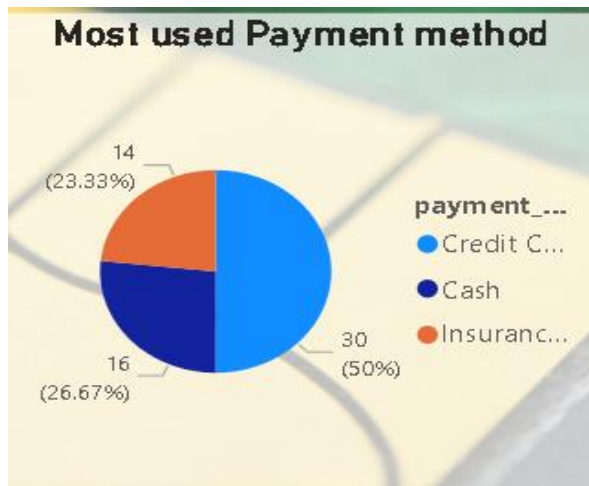
- Total revenue generated from different departments over the years:



*Figure 2.8: Total revenue by departments*

The Surgery department is generating the most revenue for the hospital. This will help the hospital make decisions on which departments to focus their budget and resources on, to maintain revenue. This visual also lets the hospital know which departments to provide more advertisements to attract more customers to them.

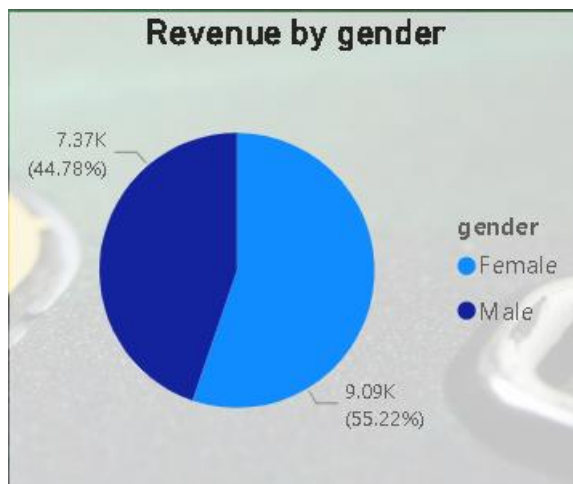
- Most used payment method:



*Figure 2.9: Most used payment method*

The most used payment method for patients is the credit card. This tells the hospital they would need more credit card related technology to cater for their high demand for card payments.

- Revenue by Gender:



*Figure 2.10: Revenue by gender*

This visual shows that Female patients are generating the most revenue for the hospital. This is possibly due to the Gynecology department as they only have female patients. Through this visual, the hospital can make decisions on advertisement targets.

- Price by Medicine:

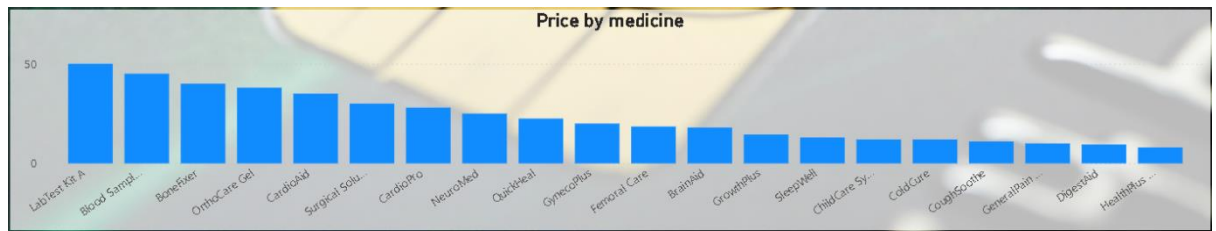


Figure 2.11: Price by medicine

Lab Test Kit A is the most expensive medicine related item. This shows the hospital which medicines they need to focus stock on. Since the Laboratory department is contributing the least to the hospital's revenue, it shows a lack of patients. This helps the hospital cut down on restocking Lab Test Kit A as it is expensive and underused.

- Gender distribution by department:

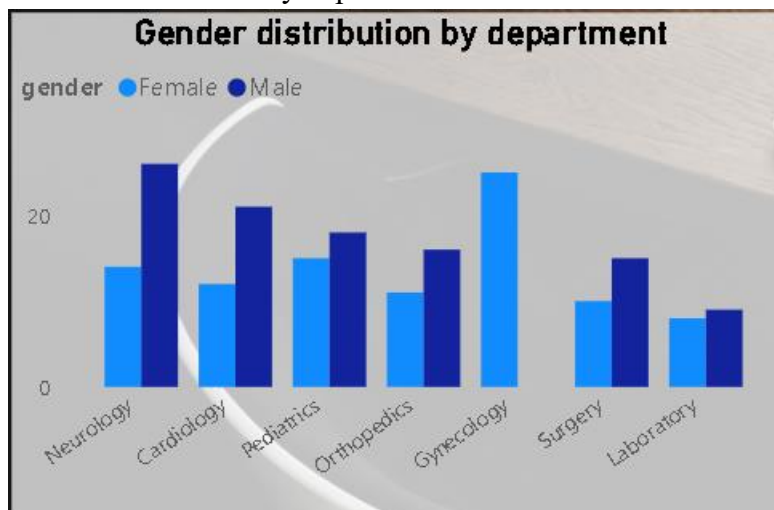
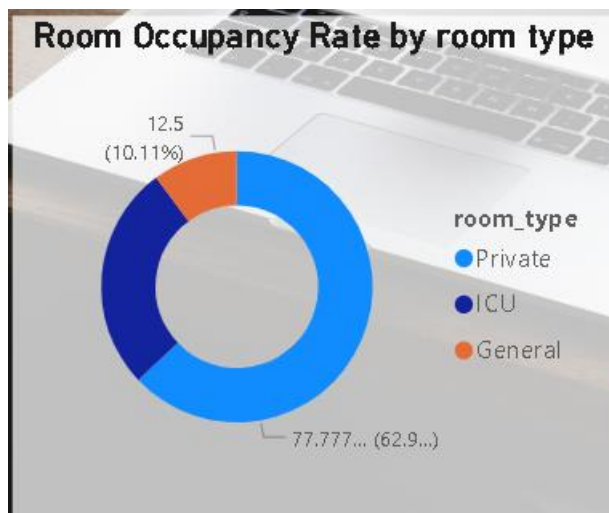


Figure 2.12: Gender distribution by department

This shows that in every department other than the Gynecology department, the number of male patients is higher than that of females.

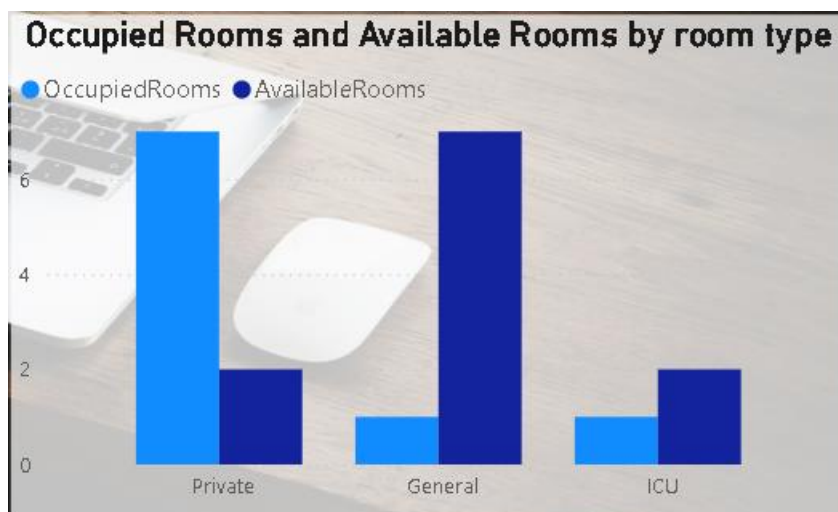
- Room occupancy rate by room type:



*Figure 2.13: Room Occupancy rate by room type*

This visual shows the distribution of room allocations between General, Private and ICU rooms. Private and ICU's high occupancy reflects its critical role, but the underutilization of general rooms suggests a need for better patient allocation.

- Occupied and Available rooms by room type:

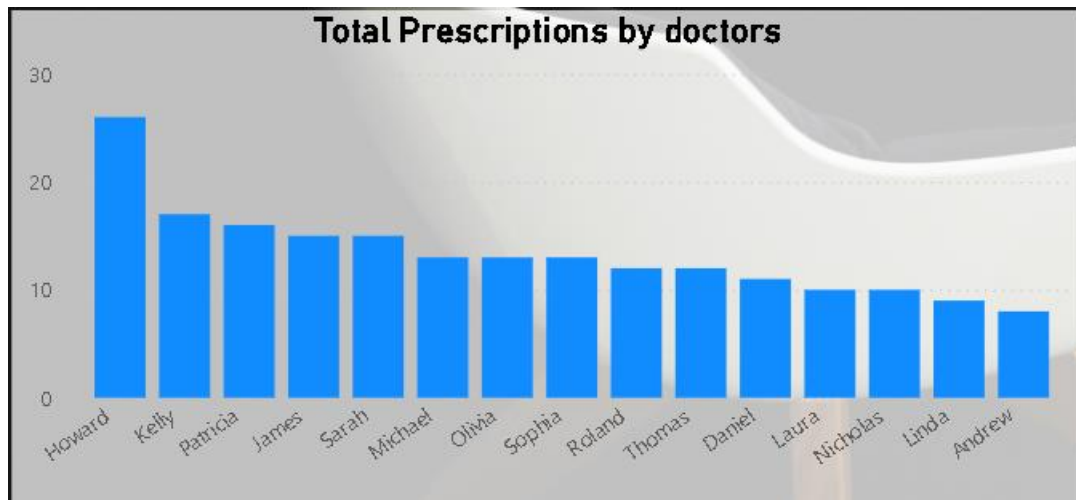


*Figure 2.14: Occupied and Available rooms by room type*

As in the above prior visual, this chart illustrates the allocation of rooms across General, Private, and ICU categories. The high occupancy rates in Private and ICU rooms highlight their critical importance, while the low utilization of General rooms points to potential inefficiencies in patient distribution.

- Total prescription by doctor:

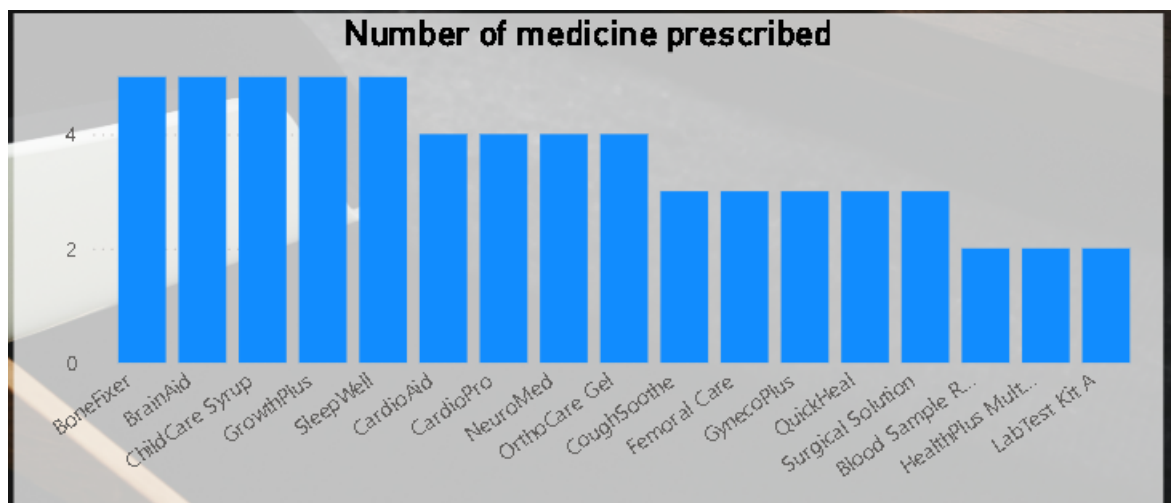




*Figure 2.15: Total prescription by doctors*

This chart illustrates the number of prescriptions each doctor has performed. This is most likely because he is the doctor with the highest patient load. However, there may be a little hint of overdosing habits which may need to be looked into further.

- Number of medicines prescribed:



*Figure 2.16: Number of medicines prescribed*

This chart shows the number of each medicine prescribed in general. BoneFixer, BrainAid, ChildCare Syrup, GrowthPlus, SleepWell and CardioAid are the most prescribed medicines. This helps the hospital know which medicines to prioritize for restocking and availability.

### **3. CONCLUSION**

#### **SUMMARY OF FINDINGS**

This analysis provided insights into hospital operations, highlighting areas for improvement in revenue management, resource allocation, and patient care. departments like radiology and cardiology drive significant revenue, while room utilization and appointment scheduling present optimization opportunities.

#### **IMPLICATIONS**

- Automating appointment scheduling can reduce cancellations and improve efficiency.
- Better room allocation policies can enhance utilization rates.
- Monitoring prescription trends can improve inventory management.

## APPENDIX

### CREATING ROLES AND USERS

-- Create admin users

```
CREATE LOGIN admin_user WITH PASSWORD = 'Lu12345*';
```

```
CREATE USER admin_user FOR LOGIN admin_user;
```

-- Grant full privileges to the admin user

```
ALTER ROLE db_owner ADD MEMBER admin_user;
```

-- Create role for doctors, and administrator

```
CREATE ROLE readonly;
```

-- Grant SELECT privileges to the readonly role

```
GRANT SELECT TO readonly;
```

-- Create role for Financial management

```
CREATE ROLE Financial_Management_role;
```

-- Grant SELECT privileges to the Financial\_Management\_role role

```
GRANT SELECT ON medicine TO Financial_Management_role;
```

```
GRANT SELECT ON billings TO Financial_Management_role;
```

-- Create role for Nurse

```
CREATE ROLE nurse_role;
```

-- Grant SELECT privileges to the Financial\_Management\_role role

```
GRANT SELECT ON rooms TO nurse_role;
```

```
GRANT SELECT ON room_assignment TO nurse_role;
```

-- Create normal users and add them to the roles

```
CREATE LOGIN Nicholas WITH PASSWORD = 'user_password1';
```

```
CREATE USER Nicholas FOR LOGIN Nicholas;
```

```
ALTER ROLE readonly ADD MEMBER Nicholas;
```

```
CREATE LOGIN Rachel WITH PASSWORD = 'user_password2';
```

```
CREATE USER Rachel FOR LOGIN Rachel;
```

```
ALTER ROLE readonly ADD MEMBER Rachel;
```

```
CREATE LOGIN Ahmad WITH PASSWORD = 'user_password3';
```

```
CREATE USER Ahmad FOR LOGIN Ahmad;
```

```
ALTER ROLE Financial_Management_role ADD MEMBER Ahmad;
```

```
CREATE LOGIN Frank WITH PASSWORD = 'user_password4';
```

```
CREATE USER Frank FOR LOGIN Frank;
```

```
ALTER ROLE Financial_Management_role ADD MEMBER Frank;
```

```
CREATE LOGIN Henry WITH PASSWORD = 'user_password5';
```

```
CREATE USER Henry FOR LOGIN Henry;
```

```
ALTER ROLE nurse_role ADD MEMBER Henry;
```

## **BUSINESS QUESTIONS, SQL QUERIES AND OUTCOMES**

---1---What is the average number of appointments per patient in the last 6 months?

```
SELECT  
    COUNT(a.appointment_id) / COUNT(DISTINCT a.patient_id) AS avg_appointments  
FROM  
    appointments a  
WHERE  
    a.appointment_date >= DATEADD(MONTH, -18, GETDATE());
```

---1---Average number of appointments per patient in the last 6 months

```

SELECT
    COUNT(a.appointment_id) / COUNT(DISTINCT a.patient_id) AS avg_appointments
FROM
    appointments a
WHERE
    a.appointment_date >= DATEADD(MONTH, -18, GETDATE());

```

100 %

Results Messages

	avg_appointments
1	1

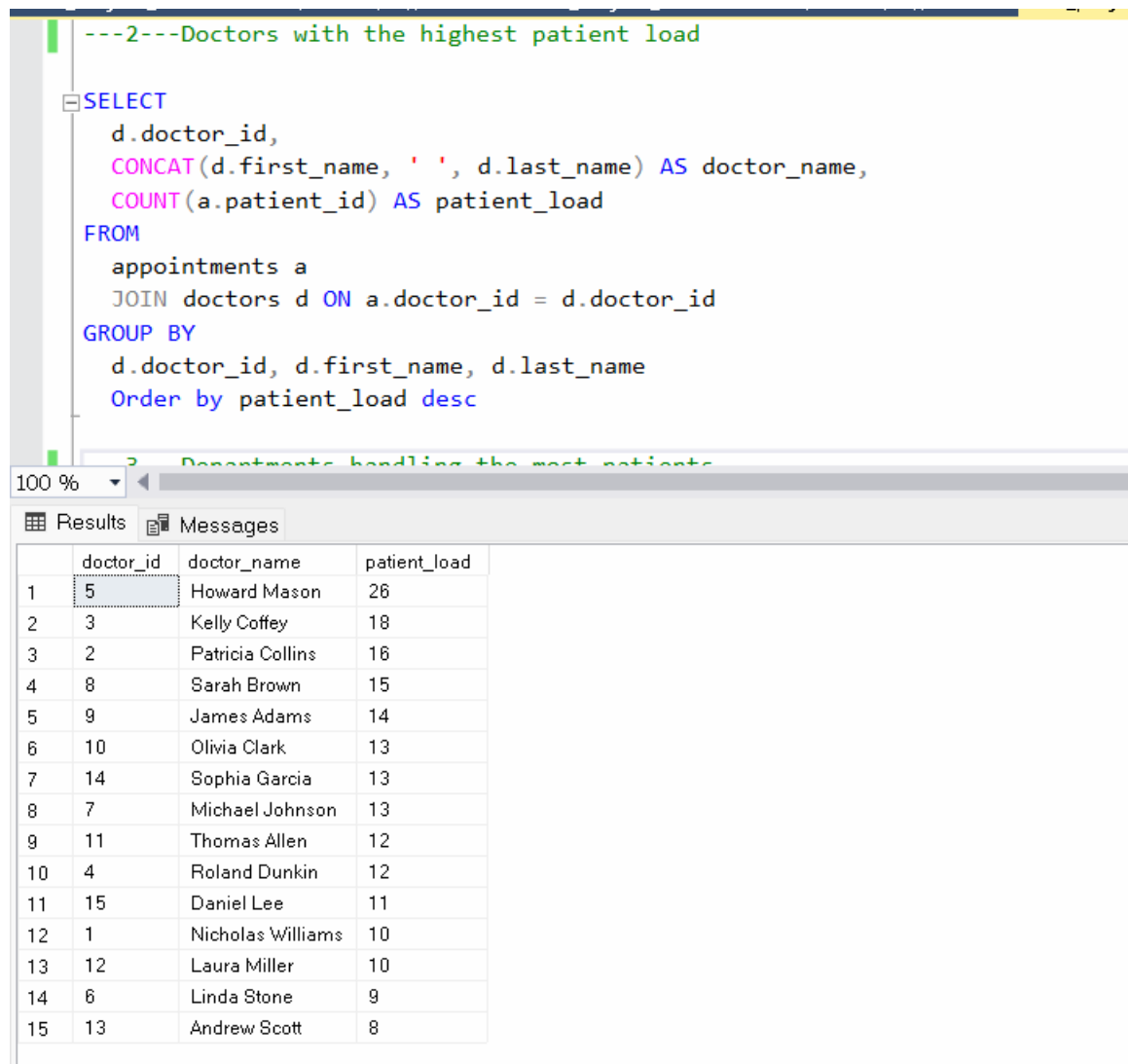
*Figure Appendix.1: Average number of appointments per patient in the last 6 months*

---2---Who are the doctors with the highest patient load?

```

SELECT
    d.doctor_id,
    CONCAT(d.first_name, ' ', d.last_name) AS doctor_name,
    COUNT(a.patient_id) AS patient_load
FROM
    appointments a
    JOIN doctors d ON a.doctor_id = d.doctor_id
GROUP BY
    d.doctor_id, d.first_name, d.last_name
Order by patient_load desc

```



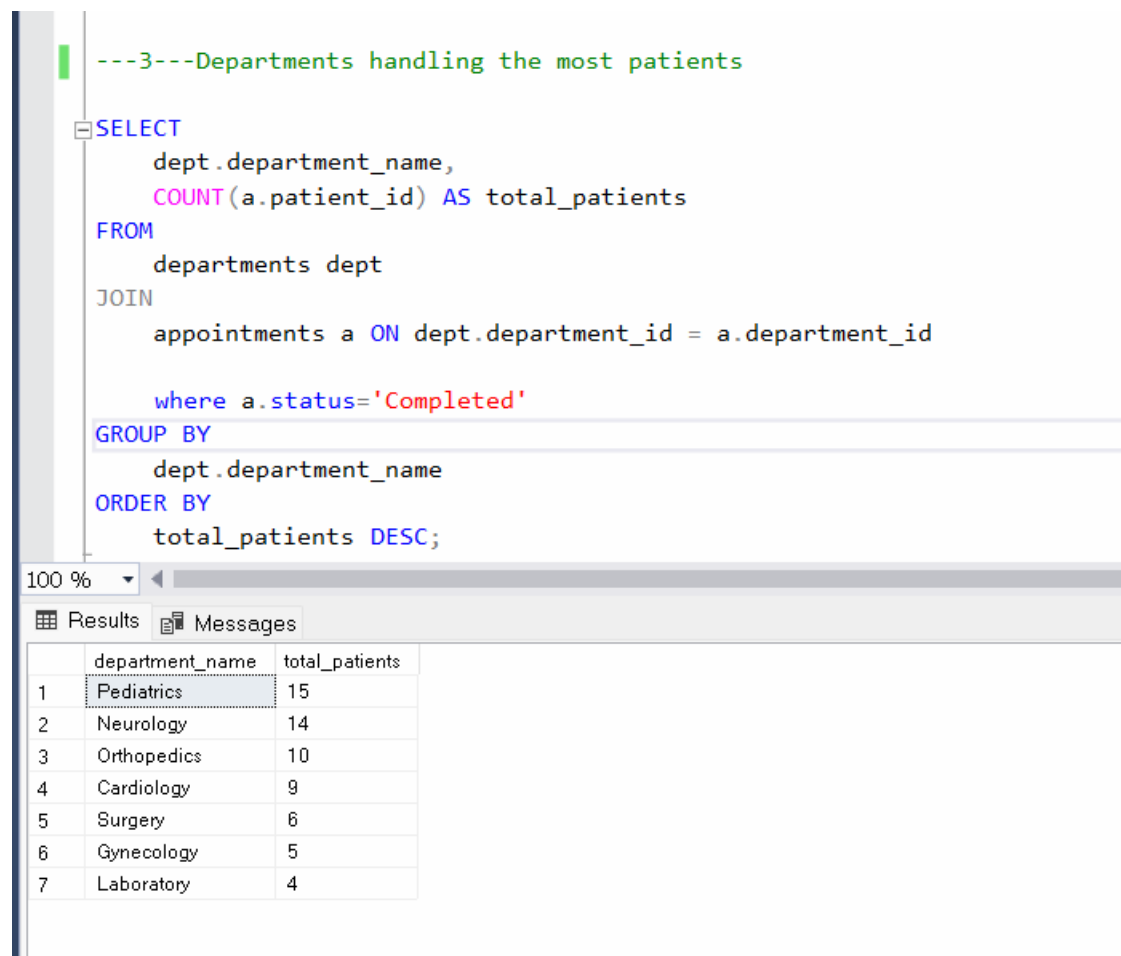
*Figure Appendix.2: Average number of appointments per patient in the last 6 months*

---3---Which departments handled the most patients?

```

SELECT
    dept.department_name,
    COUNT(a.patient_id) AS total_patients
FROM
    departments dept
JOIN
    appointments a ON dept.department_id = a.department_id
    where a.status='Completed'
GROUP BY
    dept.department_name
ORDER BY
    total_patients DESC;

```



*Figure Appendix.3: Departments handling the most patients*

--4---Which departments had the highest appointment cancellation rates?

```

SELECT
    dept.department_name,
    COUNT(a.appointment_id) AS total_appointments,
    SUM(CASE WHEN a.status = 'Cancelled' THEN 1 ELSE 0 END) AS cancellations,
    (CAST(SUM(CASE WHEN a.status = 'Cancelled' THEN 1 ELSE 0 END) AS FLOAT) /
    COUNT(a.appointment_id)) * 100 AS cancellation_rate
FROM
    appointments a
JOIN
    departments dept ON a.department_id = dept.department_id
GROUP BY
    dept.department_name
ORDER BY
    cancellation_rate DESC;

```

```
--4---Departments with the highest appointment cancellation rates
```

```
SELECT
    dept.department_name,
    COUNT(a.appointment_id) AS total_appointments,
    SUM(CASE WHEN a.status = 'Cancelled' THEN 1 ELSE 0 END) AS cancellations,
    (CAST(SUM(CASE WHEN a.status = 'Cancelled' THEN 1 ELSE 0 END) AS FLOAT) / COUNT(a.appointment_id)) * 100 AS cancellation_rate
FROM
    appointments a
JOIN
    departments dept ON a.department_id = dept.department_id
GROUP BY
    dept.department_name
ORDER BY
    cancellation_rate DESC;
```

	department_name	total_appointments	cancellations	cancellation_rate
1	Cardiology	33	10	30.3030303030303
2	Gynecology	25	7	28
3	Neurology	40	10	25
4	Pediatrics	33	6	18.1818181818182
5	Laboratory	17	2	11.7647058823529
6	Orthopedics	27	3	11.1111111111111
7	Surgery	25	2	8

*Figure Appendix.4: Departments with the highest appointment cancellation rates*

---5---What is the most requested time slots for appointments across all departments?

```
SELECT
    dept.department_name,
    CONCAT(DATEPART(HOUR, a.appointment_time), ':', RIGHT('00' +
    CAST(
    DATEPART(MINUTE, a.appointment_time) AS VARCHAR), 2)) AS time_slot,
    COUNT(a.appointment_id) AS total_appointments
FROM
    appointments a
JOIN
    departments dept ON a.department_id = dept.department_id
GROUP BY
    dept.department_name, CONCAT(
    DATEPART(HOUR, a.appointment_time), ':',
    RIGHT('00' + CAST(
    DATEPART(MINUTE, a.appointment_time) AS VARCHAR), 2))
ORDER BY
    total_appointments DESC;
```



```

---5---Most requested time slots for appointments across all departments

SELECT
    dept.department_name,
    CONCAT(DATEPART(HOUR, a.appointment_time), ':', RIGHT('00' + CAST(DATEPART(MINUTE, a.appointment_time) AS VARCHAR), 2)) AS time_slot,
    COUNT(a.appointment_id) AS total_appointments
FROM
    appointments a
JOIN
    departments dept ON a.department_id = dept.department_id
GROUP BY
    dept.department_name, CONCAT(DATEPART(HOUR, a.appointment_time), ':', RIGHT('00' + CAST(DATEPART(MINUTE, a.appointment_time) AS VARCHAR), 2))
ORDER BY
    total_appointments DESC;

```

	department_name	time_slot	total_appointments
1	Neurology	10:00	3
2	Surgery	10:00	3
3	Cardiology	12:00	3
4	Neurology	13:30	3
5	Orthopedics	14:30	3
6	Pediatrics	17:30	3
7	Cardiology	19:00	3
8	Pediatrics	8:30	2
9	Cardiology	9:00	2
10	Neurology	9:00	2
11	Orthopedics	9:00	2
12	Orthopedics	17:10	2
13	Orthopedics	17:00	2
14	Cardiology	15:00	2
15	Gynecology	15:00	2
16	Laboratory	15:00	2
17	Neurology	14:20	2

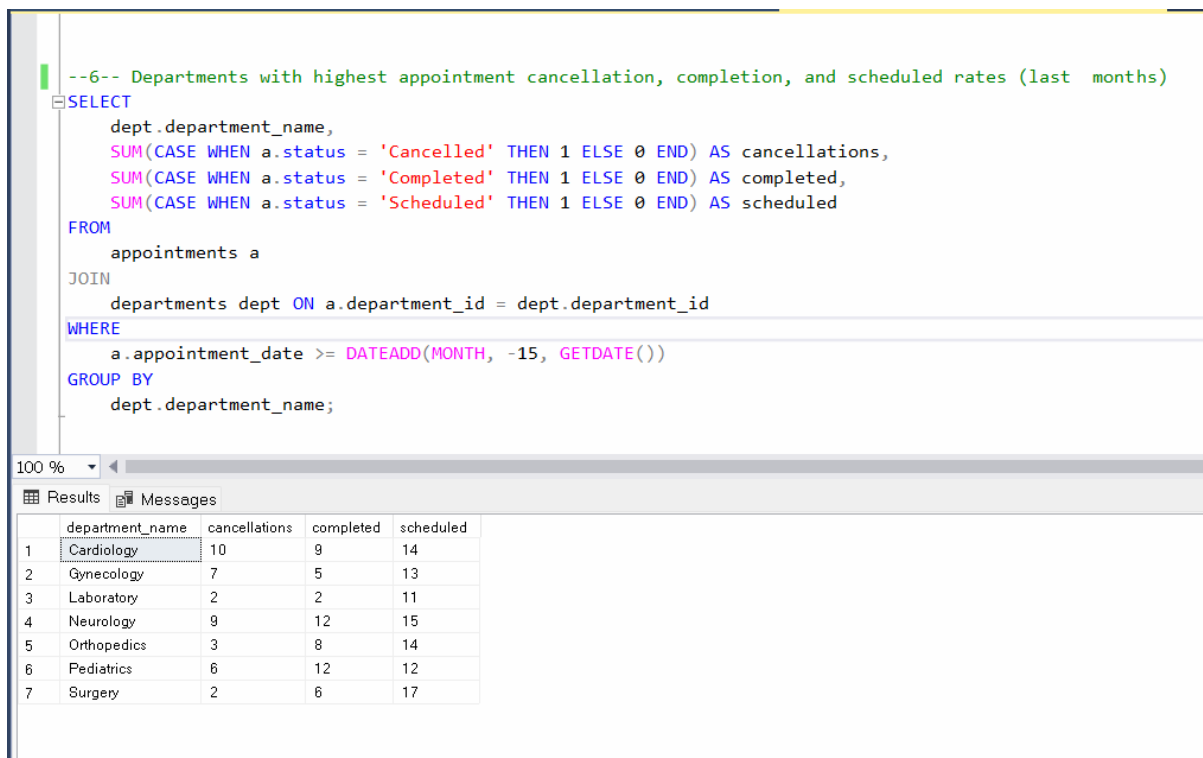
*Figure Appendix.5: Most requested time slots for appointments across all departments*

--6—Which departments have highest appointment cancellation, completion, and scheduled rates (last months)?

```

SELECT
    dept.department_name,
    SUM(CASE WHEN a.status = 'Cancelled' THEN 1 ELSE 0 END) AS cancellations,
    SUM(CASE WHEN a.status = 'Completed' THEN 1 ELSE 0 END) AS completed,
    SUM(CASE WHEN a.status = 'Scheduled' THEN 1 ELSE 0 END) AS scheduled
FROM
    appointments a
JOIN
    departments dept ON a.department_id = dept.department_id
WHERE
    a.appointment_date >= DATEADD(MONTH, -15, GETDATE())
GROUP BY
    dept.department_name;

```



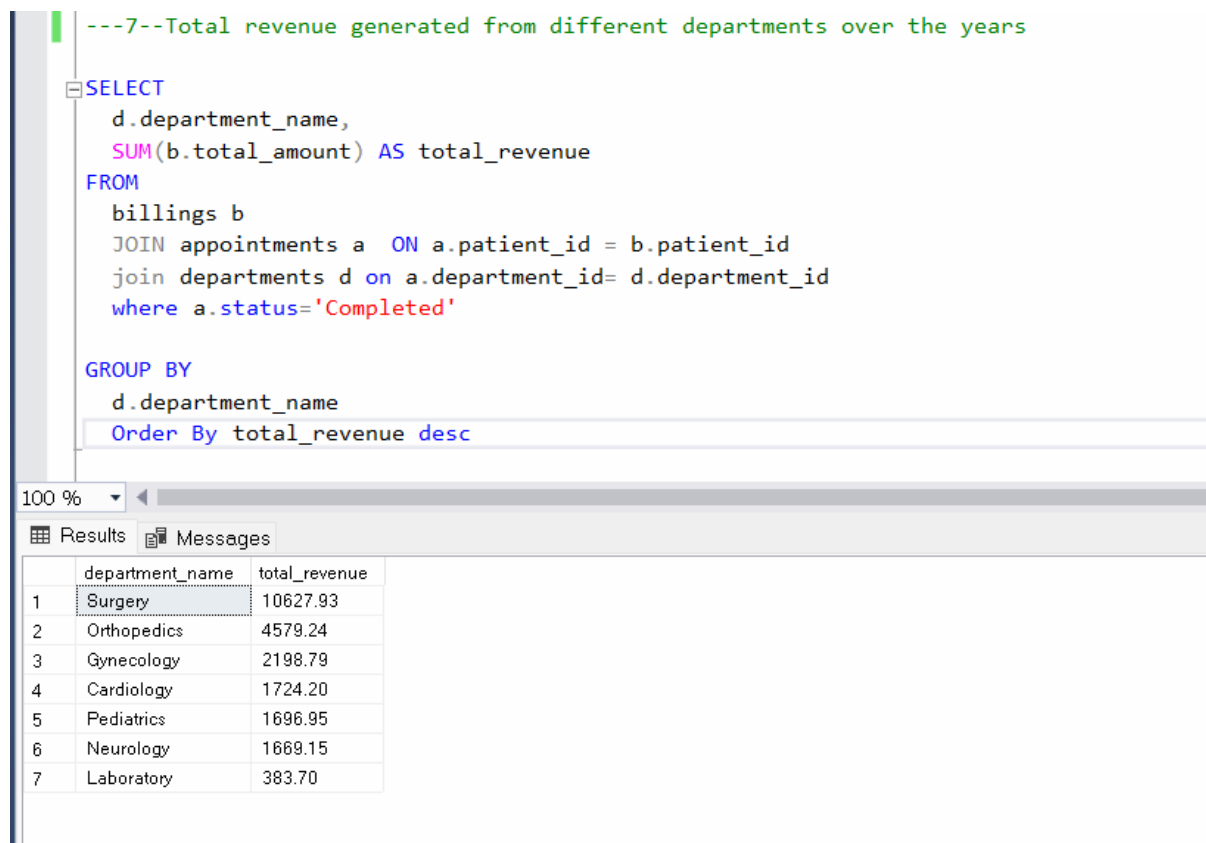
*Figure Appendix.6: Departments with highest appointment cancellation, completion, and scheduled rates (last months)*

---7---What is the total revenue generated from different departments over the years?

```

SELECT
    d.department_name,
    SUM(b.total_amount) AS total_revenue
FROM
    billings b
JOIN appointments a ON a.patient_id = b.patient_id
join departments d on a.department_id= d.department_id
where a.status='Completed'
GROUP BY
    d.department_name
Order By total_revenue desc

```



*Figure Appendix.7: Total revenue generated from different departments over the years*

---8---What are the top 5 most prescribed medicines?

```

SELECT TOP 5
    m.medicine_name,
    COUNT(p.prescription_id) AS prescription_count
FROM
    prescription p
    JOIN medicine m ON p.medicine_id = m.medicine_id
GROUP BY
    m.medicine_name
ORDER BY
    prescription_count DESC

```

```

---8---Top 5 most prescribed medicines
SELECT TOP 5
  m.medicine_name,
  COUNT(p.prescription_id) AS prescription_count
FROM
  prescription p
  JOIN medicine m ON p.medicine_id = m.medicine_id

GROUP BY
  m.medicine_name
ORDER BY
  prescription_count DESC

```

	medicine_name	prescription_count
1	BrainAid	5
2	BoneFixer	5
3	SleepWell	5
4	ChildCare Syrup	5
5	GrowthPlus	5

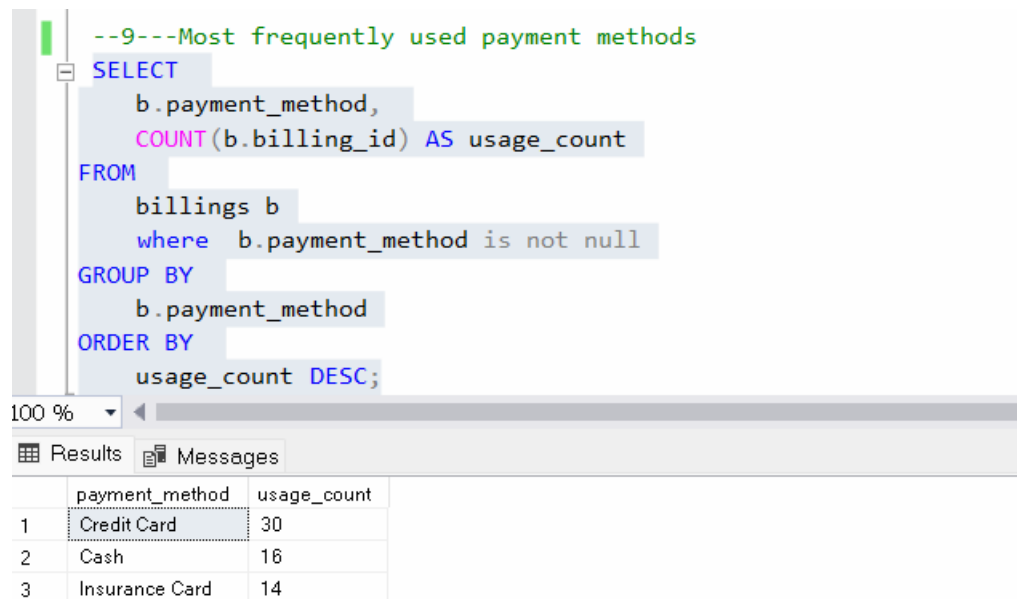
*Figure Appendix.8: Top 5 most prescribed medicines*

--9---What are the most frequently used payment methods?

```

SELECT
  b.payment_method,
  COUNT(b.billing_id) AS usage_count
FROM
  billings b
where b.payment_method is not null
GROUP BY
  b.payment_method
ORDER BY
  usage_count DESC;

```



*Figure Appendix.9: Most frequently used payment methods*

--10--What is the gender distribution of patients in each department?

```
SELECT
    d.department_name,
    p.gender,
    COUNT(p.patient_id) AS patient_count
FROM
    patients p
JOIN
    appointments a ON p.patient_id = a.patient_id
JOIN
    departments d ON a.department_id = d.department_id
GROUP BY
    d.department_name, p.gender
Order by d.department_name
```

```
--10--What is the gender distribution of patients in each department?
SELECT
    d.department_name,
    p.gender,
    COUNT(p.patient_id) AS patient_count
FROM
    patients p
JOIN
    appointments a ON p.patient_id = a.patient_id
JOIN
    departments d ON a.department_id = d.department_id

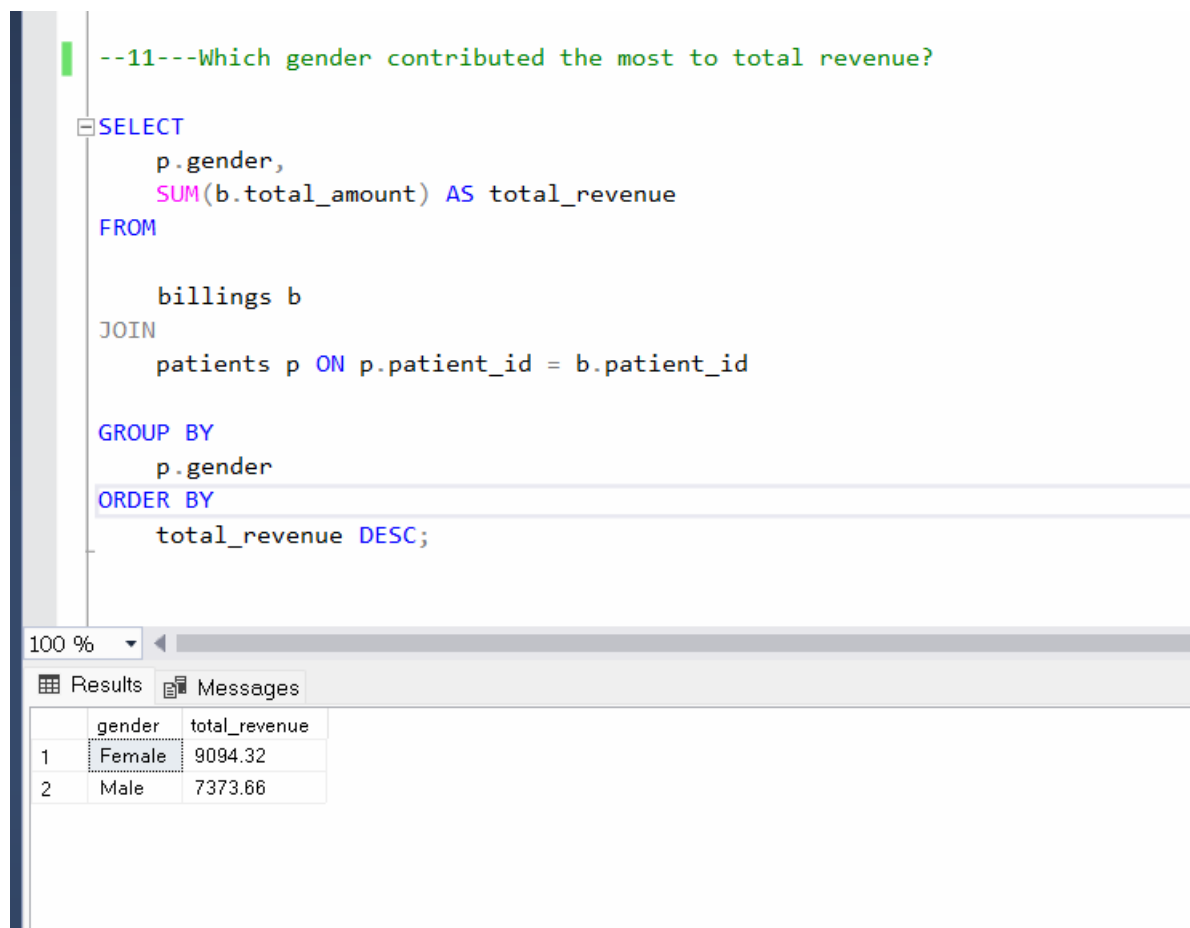
GROUP BY
    d.department_name, p.gender
Order by d.department_name
```

	department_name	gender	patient_count
1	Cardiology	Female	12
2	Cardiology	Male	21
3	Gynecology	Female	25
4	Laboratory	Female	8
5	Laboratory	Male	9
6	Neurology	Female	14
7	Neurology	Male	26
8	Orthopedics	Female	11
9	Orthopedics	Male	16
10	Pediatrics	Female	15
11	Pediatrics	Male	18
12	Surgery	Female	10
13	Surgery	Male	15

*Figure Appendix.10: The gender distribution of patients in each department*

--11---Which gender contributed the most to total revenue?

```
SELECT
    p.gender,
    SUM(b.total_amount) AS total_revenue
FROM
    billings b
JOIN
    patients p ON p.patient_id = b.patient_id
GROUP BY
    p.gender
ORDER BY
    total_revenue DESC;
```



*Figure Appendix.11: Gender contribution to total revenue*

---12---Which months have the highest appointment rates?

```
SELECT
    DATENAME(MONTH, a.appointment_date) AS appointment_month,
    COUNT(a.appointment_id) AS total_appointments
FROM
    appointments a
GROUP BY
    DATENAME(MONTH, a.appointment_date), MONTH(a.appointment_date)
ORDER BY
    total_appointments DESC;
```

---12---Which months have the highest appointment rates?

```

SELECT
    DATENAME(MONTH, a.appointment_date) AS appointment_month,
    COUNT(a.appointment_id) AS total_appointments
FROM
    appointments a
GROUP BY
    DATENAME(MONTH, a.appointment_date), MONTH(a.appointment_date)
ORDER BY
    total_appointments DESC;

```

100 %

Results Messages

	appointment_month	total_appointments
1	January	35
2	February	30
3	October	29
4	March	26
5	December	22
6	November	20
7	September	20
8	April	15
9	August	2
10	July	1

*Figure Appendix.12: Months with the highest appointment rate*

--13—What percentage of rooms (ICU, General, Private) are occupied?

```

SELECT
    r.room_type,
    SUM(CASE WHEN r.availability_status = 'Occupied' THEN 1 ELSE 0 END) AS
occupied_rooms,
    COUNT(r.room_id) AS total_rooms,
    (CAST(SUM(CASE WHEN r.availability_status = 'Occupied' THEN 1 ELSE 0 END) AS
FLOAT) / COUNT(r.room_id)) * 100 AS occupancy_percentage
FROM
    rooms r
GROUP BY
    r.room_type;

```



```
--13--Percentage of rooms (ICU, General, Private) occupied

SELECT
    r.room_type,
    SUM(CASE WHEN r.availability_status = 'Occupied' THEN 1 ELSE 0 END) AS occupied_rooms,
    COUNT(r.room_id) AS total_rooms,
    (CAST(SUM(CASE WHEN r.availability_status = 'Occupied' THEN 1 ELSE 0 END) AS FLOAT) / COUNT(r.room_id)) * 100 AS occupancy_percentage
FROM
    rooms r

GROUP BY
    r.room_type;
```

	room_type	occupied_rooms	total_rooms	occupancy_percentage
1	General	1	8	12.5
2	ICU	1	3	33.33333333333333
3	Private	7	9	77.77777777777778

*Figure Appendix.13: Percentage of rooms (ICU, General, Private) occupied*

---14---Which doctors prescribed the highest number of medicines?

```
SELECT
    CONCAT(d.first_name, ' ', d.last_name) AS doctor_name,
    COUNT(p.prescription_id) AS total_prescriptions
FROM
    doctors d
JOIN
    medical_records m ON m.doctor_id= d.doctor_id
JOIN
    prescription p ON m.record_id= p.record_id
GROUP BY
    d.first_name, d.last_name
ORDER BY
    total_prescriptions DESC;
```

```

---14--Doctors who prescribe the highest number of medicines
SELECT
    CONCAT(d.first_name, ' ', d.last_name) AS doctor_name,
    COUNT(p.prescription_id) AS total_prescriptions
FROM
    doctors d
JOIN
    medical_records m ON m.doctor_id= d.doctor_id
JOIN
    prescription p ON m.record_id= p.record_id
GROUP BY
    d.first_name, d.last_name
ORDER BY
    total_prescriptions DESC;

```

	doctor_name	total_prescriptions
1	Howard Mason	26
2	Kelly Coffey	17
3	Patricia Collins	16
4	James Adams	15
5	Sarah Brown	15
6	Olivia Clark	13
7	Sophia Garcia	13
8	Michael Johnson	13
9	Roland Dunkin	12
10	Thomas Allen	12
11	Daniel Lee	11
12	Laura Miller	10
13	Nicholas Williams	10
14	Linda Stone	9
15	Andrew Scott	8

*Figure Appendix.14: Doctors who prescribe the highest number of medicines*

---15-How many rooms are occupied vs. available?

```

SELECT
    r.room_type,
    SUM(CASE WHEN r.availability_status= 'Occupied' THEN 1 ELSE 0 END) AS
occupied_rooms,
    SUM(CASE WHEN r.availability_status = 'Available' THEN 1 ELSE 0 END) AS
available_rooms
FROM
    rooms r
GROUP BY
    r.room_type;

```

```

---15-How many rooms are occupied vs. available
SELECT
    r.room_type,
    SUM(CASE WHEN r.availability_status= 'Occupied' THEN 1 ELSE 0 END) AS occupied_rooms,
    SUM(CASE WHEN r.availability_status = 'Available' THEN 1 ELSE 0 END) AS available_rooms
FROM
    rooms r
GROUP BY
    r.room_type;

```

100 %

Results Messages

	room_type	occupied_rooms	available_rooms
1	General	1	7
2	ICU	1	2
3	Private	7	2

*Figure Appendix.15: Rooms occupied vs. available*

--16--Which is the most expensive medicine

```

SELECT
    m.medicine_name,
    SUM(price) AS Price
FROM
    medicine m
GROUP BY
    m.medicine_name
Order By SUM(price) DESC

```

```

--16--Which is the most expensive medicine
SELECT
    m.medicine_name,
    SUM(price) AS Price
FROM
    medicine m
GROUP BY
    m.medicine_name
Order By SUM(price) DESC

```

100 %

Results Messages

	medicine_name	Price
1	LabTest Kit A	50.00
2	Blood Sample Reagents	45.00
3	BoneFixer	40.00
4	OrthoCare Gel	38.00
5	CardioAid	35.00
6	Surgical Solution	30.00
7	CardioPro	28.00
8	NeuroMed	25.00
9	QuickHeal	22.50
10	GynecoPlus	20.00
11	Femoral Care	18.50
12	BrainAid	18.00
13	GrowthPlus	14.50
14	SleepWell	13.00
15	ColdCure	12.00
16	ChildCare Syrup	12.00
17	CoughSoothe	11.00
18	GeneralPain Relief	10.00

*Figure Appendix.16: Most expensive medicines*