SQL PROJECT REPORT

HANIYA MAHNOOR

Introduction

This report provides a detailed analysis of hospital data covering patients, appointments, prescriptions, doctors, departments, and hospital capacities. The SQL dataset spans multiple dimensions of healthcare delivery, offering insights into patient demographics, treatment trends, workload distribution, and resource allocation. By examining monthly and weekly appointment patterns, reasons for visits, prescription habits, and hospital staffing levels, the report identifies both strengths and gaps in the system.

Patient Demographics

The patient records span a wide demographic range, from the oldest patient, Autumn Robinson (90 years, born 1934), to the youngest, Douglas Allen (1 year, born 2023). This shows the hospital system's role in treating geriatric, adult, and pediatric patients alike. Pediatric patients such as Dana Nguyen (9 years) and James Stone (5 years) require specialized care, while geriatric patients like Faith Cabrera (74 years) and Melanie Johnson (84 years) demonstrate the need for long-term elderly care facilities.
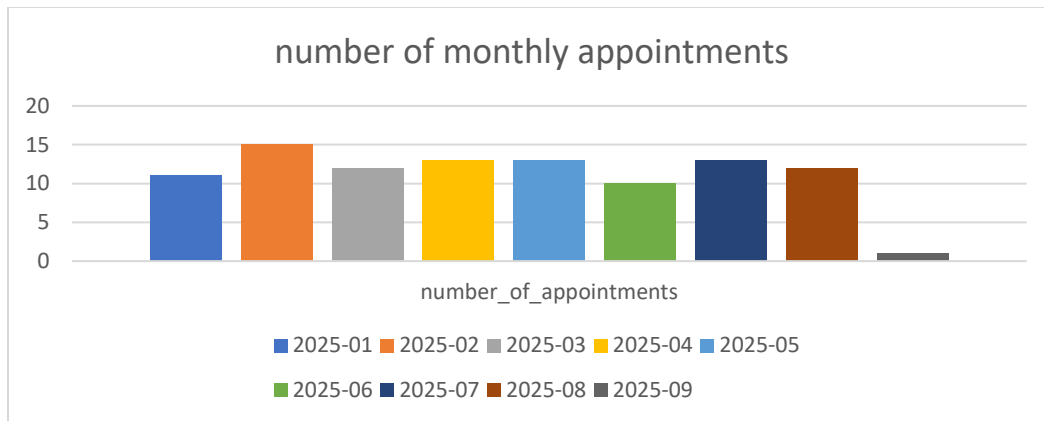
Prescriptions and Medication Trends

Prescription data indicates patients often receive treatment from multiple doctors. For example, patient ID 5 received Amitriptyline from Dr. David Scott in April 2025 and Aspirin from Dr. Andre Dubois in July 2025. This illustrates collaborative care across specialties.
Commonly prescribed medications include pain relievers (Aspirin, Ibuprofen, Naproxen), antibiotics (Ciprofloxacin, Azithromycin, Doxycycline, Clindamycin), and chronic treatment drugs (Gabapentin, Amitriptyline). Simvastatin, Lisinopril, Donepezil, Carbamazepine, Salbutamol, and Bupropion were each prescribed 3 times, showing repeated use for cardiovascular, neurological, and respiratory conditions.

Appointment Analysis by Month and Week

Appointments in 2025 varied significantly. **February 2025 recorded the highest number of appointments (15)**, while **September had the lowest (1)**. Steady months such as April, May, and July each had 13 appointments. This suggests strong patient engagement in the first half of the year but a sharp decline later, possibly due to incomplete data or seasonal effects.
Weekly trends mirrored this, with peaks of 5 appointments in weeks 5 and 7, and lows of just 1 appointment in weeks 0, 11, and 17.
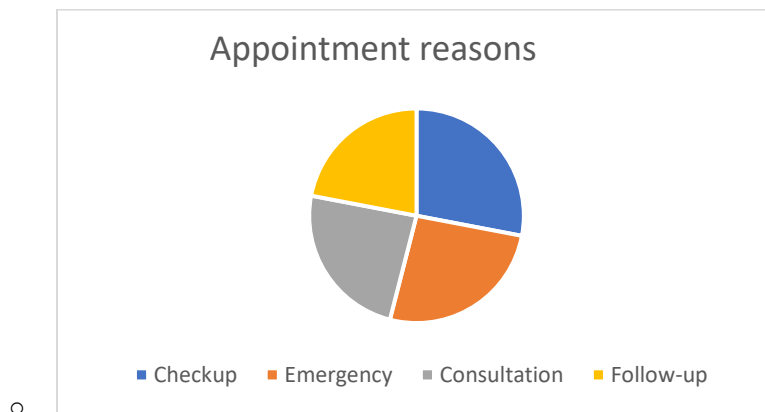
number of monthly appointments

Appointment Reasons

Analysis of 100 recorded appointments shows a balanced distribution:

- **Checkups**: 28%
- **Emergencies**: 26%
- **Consultations**: 24%
- **Follow-ups**: 22%

  This balance indicates that hospitals are equally focused on preventive care (checkups), acute care (emergencies), and ongoing treatment (consultations and follow-ups).

Appointment reasons
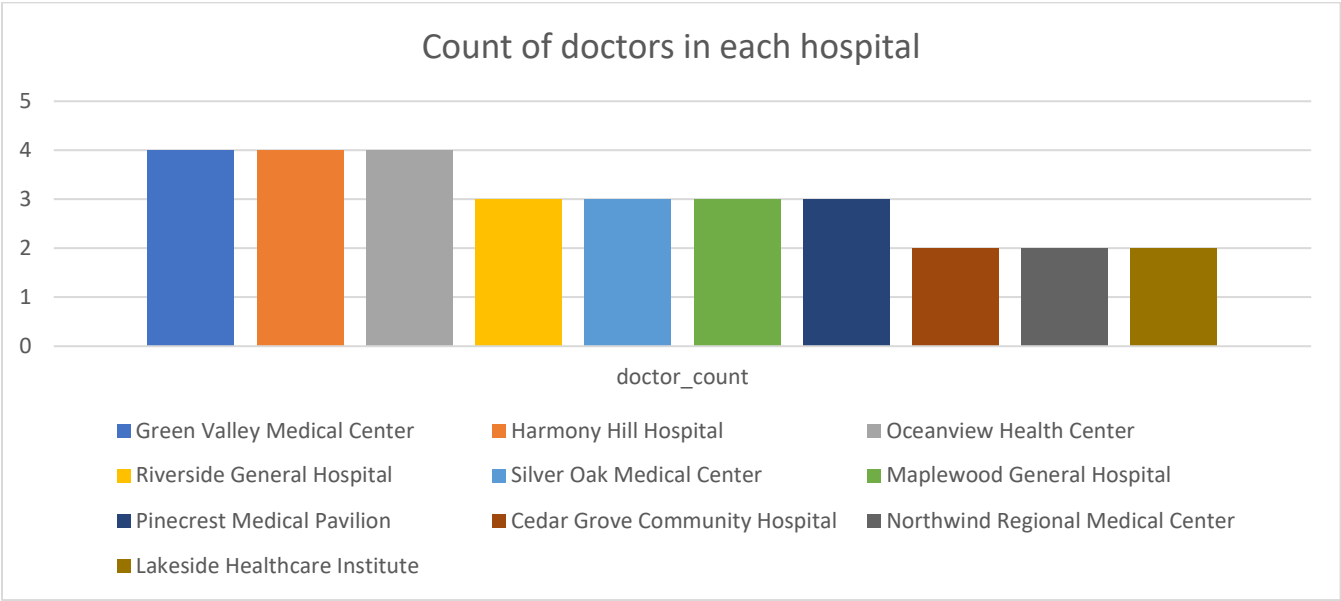
  o

Notable Appointment Clusters

August 2025 saw several clustered appointments: Jesse Sparks and Dana Nguyen both visited on 02/08, while Michelle Kelley and Barbara Sanders were seen on 24/08. The highest single-day concentration

occurred on 24 August 2025 with multiple patients consulting doctors. This suggests peak workloads on certain days that may require additional staffing.
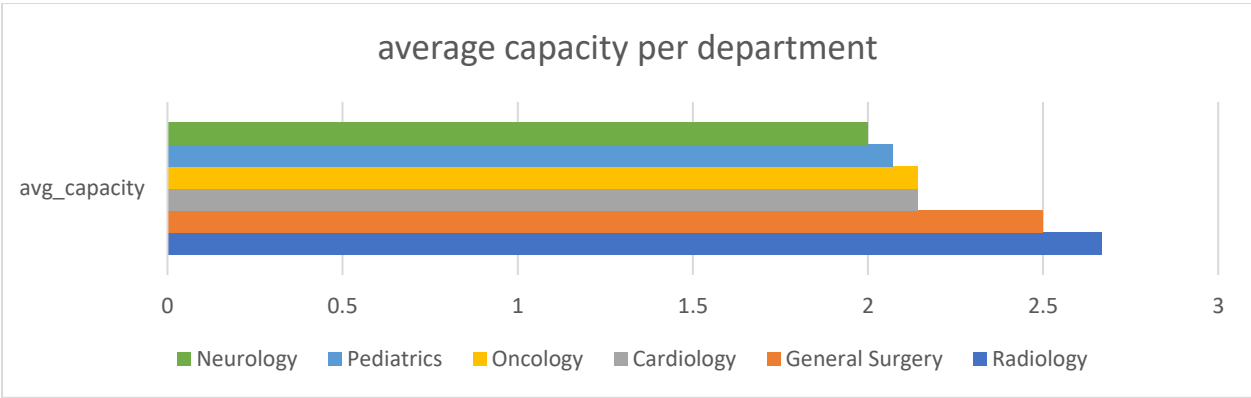
Doctor and Hospital Distribution

Doctor allocation across hospitals is uneven. Green Valley, Harmony Hill, and Oceanview each employ 4 doctors, while Cedar Grove, Northwind, and Lakeside have only 2. This highlights disparities in staffing that may impact patient access.

Specialties cover essential areas — Cardiology, Pediatrics, Neurology, Oncology, Psychiatry, Dermatology, and Emergency Medicine — ensuring a wide range of healthcare services. However, Psychiatry is limited to only a few hospitals, potentially restricting mental health support.

Count of doctors in each hospital

doctor_count

- Green Valley Medical Center
- Harmony Hill Hospital
- Oceanview Health Center
- Riverside General Hospital
- Silver Oak Medical Center
- Maplewood General Hospital
- Pinecrest Medical Pavilion
- Cedar Grove Community Hospital
- Northwind Regional Medical Center
- Lakeside Healthcare Institute

Department Capacities

Capacity distribution shows Radiology leading with an average of **2.67 beds per department**, followed by General Surgery at 2.5. Cardiology and Oncology each average 2.14, while Pediatrics and Neurology trail with 2.07 and 2 respectively.

average capacity per department

avg_capacity

0   0.5   1   1.5   2   2.5   3

■ Neurology ■ Pediatrics ■ Oncology ■ Cardiology ■ General Surgery ■ Radiology

Patient Recurrence and Care Continuity

Patients such as Robin Lopez and William Roberts appear repeatedly in appointment logs across emergencies, checkups, and follow-ups. This indicates continuity of care and the management of chronic conditions rather than one-off treatments.

Key Insights

1. February 2025 had the **highest monthly appointments** (15), while September had only 1.

2. **Weekly peaks** occurred in weeks 5 and 7 (5 appointments), while the lowest weeks had just 1 appointment.

3. **Balanced healthcare demand**: 28% checkups, 26% emergencies, 24% consultations, 22% follow-ups.

4. **Medication trends**: chronic drugs like Simvastatin, Lisinopril, and Donepezil appear consistently.

5. **Staffing disparities**: Green Valley, Oceanview, and Harmony Hill have 4 doctors each, but Cedar Grove, Northwind, and Lakeside have only 2.

6. **Capacity gaps**: Radiology leads with the highest average capacity (2.67), but Cardiology shows uneven distribution.

7. **Demographics**: coverage ranges from infants (1 year) to the elderly (90 years), requiring specialized pediatric and geriatric care.

8. **Care continuity**: recurring patients highlight the importance of long-term treatment strategies.

Conclusion

The hospital data shows a balanced mix of preventive, emergency, and follow-up care. Patients range from infants to the elderly, highlighting the need for both pediatric and geriatric services. While the system covers most specialties, some hospitals face staff shortages and limited departmental capacity, especially in Cardiology. Overall, the hospitals are meeting diverse healthcare needs but require better resource distribution to improve efficiency and patient access.