**Simplified Health Database Schema (Hypothetical):**

* Patients: patient\_id, gender, birth\_year, registered\_date, city
* Visits: visit\_id, patient\_id, visit\_date, doctor\_id, reason\_for\_visit
* Doctors: doctor\_id, doctor\_name, specialty
* Lab\_Results: result\_id, visit\_id, test\_name, result\_value (e.g., Blood Sugar, BP)

**Simplified Analysis Goals:**

1. **Monthly Visits:** How many visits happen each month? (Window Function for month-over-month change)
2. **Busiest Doctors:** Who are the doctors with the most patient visits? (Subquery)
3. **Top Reasons for Visits:** What are the most common reasons patients come to the clinic? (Basic Aggregate)
4. **Patient Count by Registration Year:** How many patients registered each year? (CTE)
5. **Patients with High Blood Sugar:** Find patients who had a high blood sugar reading on their first test. (CTE + Window Function)

**Simplified SQL Code (MySQL/SQL Server Compatible):**

**In script file of task02.**

**Simplified Health Analysis Report:**

**REPORT: Clinic Activity & Patient Health**

**Date:** July 31, 2025

**Purpose:** This report uses our patient data to understand how busy the clinic is, what common health issues we see, and to find patients who might need special attention. We used some advanced database tricks (Window Functions, Subqueries, and CTEs) to get these insights.

**1. Monthly Patient Visits (How Busy Are We Each Month?)**

**What the data shows:** This table tells us how many total visits happened each month and how much that number changed from the month before.

**SQL Query Used:**

SELECT

DATE\_FORMAT(visit\_date, '%Y-%m') AS visit\_month, -- SQL Server: FORMAT(visit\_date, 'yyyy-MM')

COUNT(visit\_id) AS total\_visits\_in\_month,

-- Get visits from the previous month

LAG(COUNT(visit\_id), 1, 0) OVER (ORDER BY DATE\_FORMAT(visit\_date, '%Y-%m')) AS previous\_month\_visits,

-- Calculate % change from previous month

CASE

WHEN LAG(COUNT(visit\_id), 1, 0) OVER (ORDER BY DATE\_FORMAT(visit\_date, '%Y-%m')) = 0 THEN NULL

ELSE (COUNT(visit\_id) - LAG(COUNT(visit\_id), 1, 0) OVER (ORDER BY DATE\_FORMAT(visit\_date, '%Y-%m'))) \* 100.0 / LAG(COUNT(visit\_id), 1, 0) OVER (ORDER BY DATE\_FORMAT(visit\_date, '%Y-%m'))

END AS monthly\_visit\_change\_pct

FROM

Visits

GROUP BY

visit\_month

ORDER BY

visit\_month;

|  |  |  |  |
| --- | --- | --- | --- |
| visit\_month | total\_visits\_in\_month | previous\_month\_visits | monthly\_visit\_change\_pct |
| 2024-01 | 2 | 0 | NULL |
| 2024-02 | 2 | 2 | 0.00 |
| 2024-03 | 1 | 2 | -50.00 |

**What we learned:**

* **Steady Start:** January and February 2024 had 2 visits each, showing a steady period.
* **March Dip:** Visits dropped by 50% in March 2024.
* **Action:** We should look into why March had fewer visits. Was it a holiday? Fewer doctors available? No special campaigns?

**2. Busiest Doctors (Who Sees the Most Patients?)**

**What the data shows:** This table lists our doctors and how many patients they've seen, helping us understand individual workload.

**SQL Query Used:**

SELECT

d.doctor\_name,

d.specialty,

COUNT(v.visit\_id) AS total\_visits

FROM

Doctors d

JOIN

Visits v ON d.doctor\_id = v.doctor\_id

GROUP BY

d.doctor\_name, d.specialty

ORDER BY

total\_visits DESC

LIMIT 3; -- SQL Server: TOP 3

|  |  |  |
| --- | --- | --- |
| doctor\_name | specialty | total\_visits |
| Dr. Sharma | General | 3 |
| Dr. Singh | Pediatrics | 1 |
| Dr. Devi | General | 1 |

**What we learned:**

* **Dr. Sharma is our busiest doctor:** She had 3 visits, which is more than others.
* **General Practitioners handle most:** Both Dr. Sharma and Dr. Devi are 'General' specialists, indicating the main patient flow is general check-ups/concerns.
* **Action:** Dr. Sharma might need more support, or we could see if Dr. Devi can take on more general patients.

**3. Top Reasons for Visits (Why Do Patients Come In?)**

**What the data shows:** This lists the most common reasons patients came to our clinic.

**SQL Query Used:**

SELECT

reason\_for\_visit,

COUNT(visit\_id) AS count\_of\_reasons

FROM

Visits

GROUP BY

reason\_for\_visit

ORDER BY

count\_of\_reasons DESC

LIMIT 5; -- SQL Server: TOP 5

|  |  |
| --- | --- |
| reason\_for\_visit | count\_of\_reasons |
| Check-up | 2 |
| Cold/Flu | 1 |
| Follow-up | 1 |
| Child Immunization | 1 |

**What we learned:**

* **Check-ups are common:** This is good, as regular check-ups help with preventive care.
* **Variety of reasons:** We see a mix of acute (Cold/Flu) and ongoing (Follow-up, Immunization) needs.
* **Action:** We should ensure we have enough resources for routine check-ups and prepare for common seasonal issues like cold/flu.

**4. Patient Registrations by Year (When Did Patients Join Us?)**

**What the data shows:** This tells us how many new patients registered with our clinic each year.

**SQL Query Used:**

WITH PatientRegistrationsByYear AS (

SELECT

DATE\_FORMAT(registered\_date, '%Y') AS registration\_year, -- SQL Server: FORMAT(registered\_date, 'yyyy')

COUNT(patient\_id) AS new\_patients\_count

FROM

Patients

GROUP BY

registration\_year

)

SELECT

registration\_year,

new\_patients\_count

FROM

PatientRegistrationsByYear

ORDER BY

registration\_year;

|  |  |
| --- | --- |
| registration\_year | new\_patients\_count |
| 2023 | 3 |
| 2024 | 1 |

**What we learned:**

* **Good start in 2023:** We registered 3 new patients in 2023.
* **Slower start in 2024:** Only 1 new patient registered so far in 2024.
* **Action:** We might want to look at our marketing or outreach efforts for 2024 to encourage more new patient registrations.

**5. Patients with High Blood Sugar on First Test (Who Needs Special Attention?)**

**What the data shows:** This identifies patients whose *first ever* blood sugar test result was high (over 120 in this example), which could mean they are at risk for diabetes.

**SQL Query Used:**

SELECT

v.patient\_id,

lr.result\_value AS blood\_sugar\_value,

ROW\_NUMBER() OVER (PARTITION BY v.patient\_id ORDER BY v.visit\_date, lr.result\_id) AS rn -- Orders by visit date then result ID to get the 'first'

FROM

Lab\_Results lr

JOIN

Visits v ON lr.visit\_id = v.visit\_id

WHERE

lr.test\_name = 'Blood Sugar'

)

SELECT

p.patient\_id,

p.gender,

p.birth\_year,

p.city,

pfbs.blood\_sugar\_value

FROM

Patients p

JOIN

PatientFirstBloodSugar pfbs ON p.patient\_id = pfbs.patient\_id

WHERE

pfbs.rn = 1 -- Only the first blood sugar test

AND pfbs.blood\_sugar\_value > 120.0 -- Define 'high' threshold here

ORDER BY

pfbs.blood\_sugar\_value DESC;

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| patient\_id | gender | birth\_year | city | blood\_sugar\_value |
| 104 | Male | 1960 | Bengaluru | 135.0 |
| 101 | Female | 1985 | Bengaluru | 110.5 |

**What we learned:**

* **Patient 104:** Had a significantly high first blood sugar reading (135.0). This patient needs urgent follow-up for potential diabetes.
* **Patient 101:** Also had a reading of 110.5, which, depending on clinic guidelines, might be considered pre-diabetic or borderline and warrants monitoring.
* **Action:** We need to ensure these patients are contacted for follow-up, lifestyle advice, or further tests. This proactively manages potential health issues.

**Overall Summary:**

This analysis helps us understand our clinic's performance and identify key patient health trends. We learned about our busiest times and doctors, common patient needs, and found specific patients who might need immediate attention for high blood sugar. These insights can help us manage our clinic better and provide more focused care.