School of Business

OPIM 5272 - Data Management and Business Process Modeling

Health Record & Patient Appointment Management System

25th April, 2023

UCONN

Agenda

- Introduction
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  b) Problem Statement
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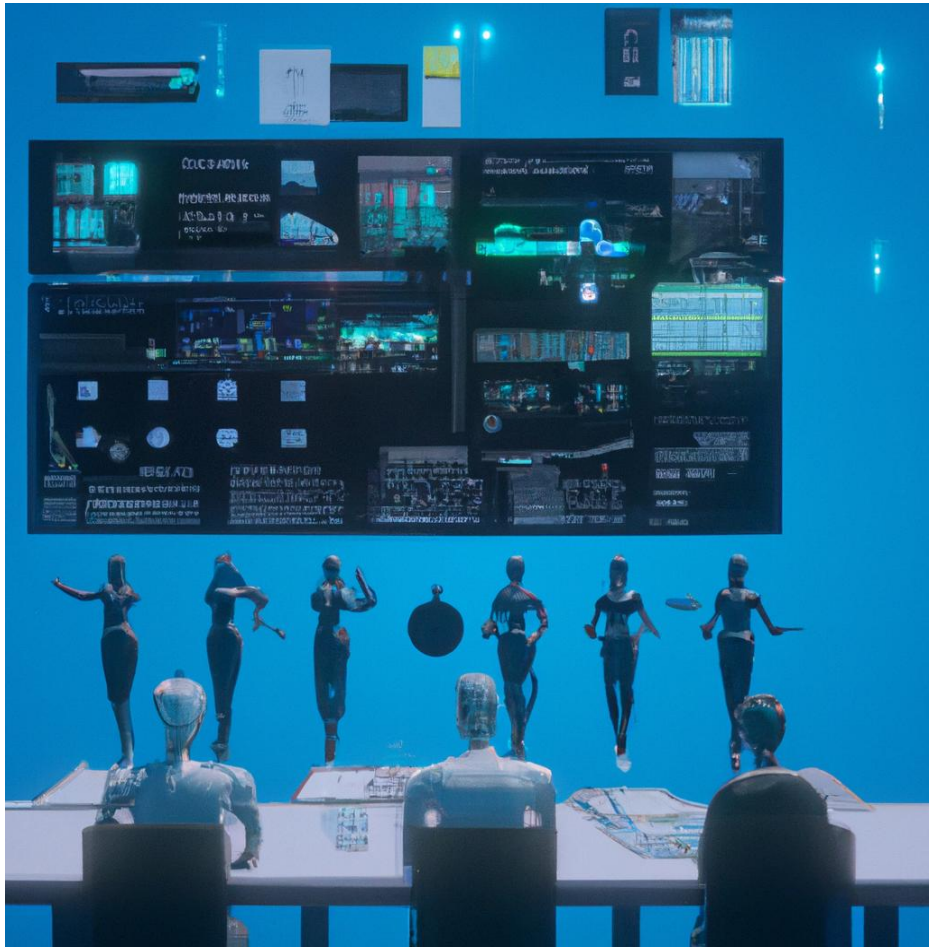
Background

- Traditionally, healthcare facilities relied on paper-based systems to store patient data, which made it difficult to access and share information across different departments. This led to delays in treatment and miscommunication between healthcare providers.
- With the advent of electronic health records (EHRs), healthcare facilities were able to transition from paper-based systems to digital platforms, making it easier to store, access, and share patient data. However, there are still challenges associated with EHRs, including interoperability issues, data security concerns, and lack of standardization.

Problem Statement

- Patient data is essential for providing quality healthcare. It must be accurate and up-to-date.
- Healthcare data is growing rapidly. It is essential to have a database system that can scale to meet the growing demands of healthcare data.
- Healthcare data must be compliant with all applicable laws and regulations. This is essential to protect patients' privacy and ensure that healthcare providers are following the law.



Objective

- Providing Organizations the required reports to organize and perform better
- Improve patient safety by reducing errors and duplications
- Support research and analysis related to population health management, disease prevention, and public health interventions.

Files Used

- Hospitals

  Address, doctors, treatment

- Doctors

  Name, Department, procedure

- Pharmacy

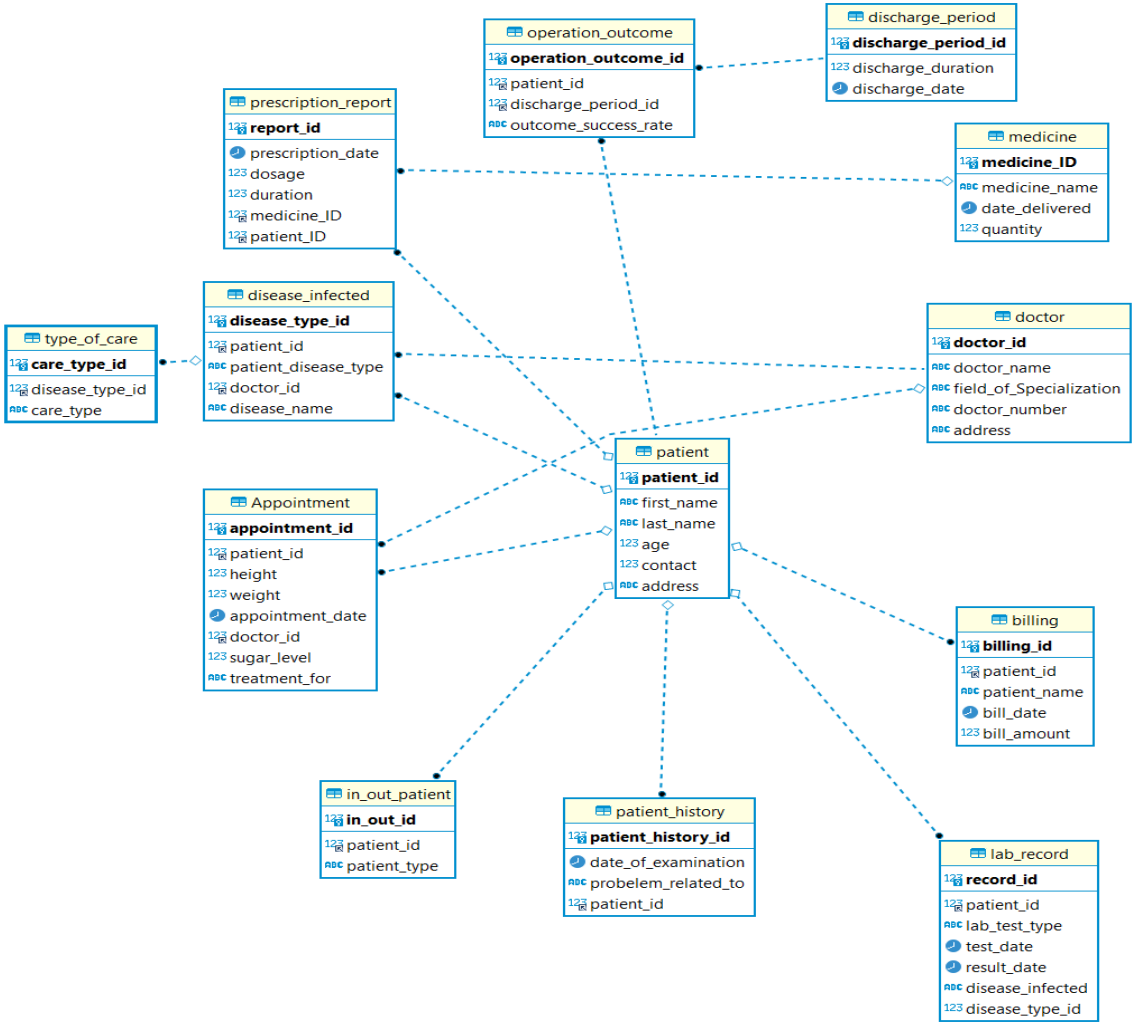
  Prescription, dosage

- Treatment Details

  Treatment for, Medication cost, disease infected

Entity Relationship Diagram

- Every entity is centered around the main table, towns.
- Star Schema



Report 1: Total no.of patients vs each doctor

- **Purpose -** This report helps to understand total number of patients seen by each doctor

```
SELECT d.doctor_id, d.doctor_name, COUNT(*) AS patient_count

FROM Appointment a

JOIN doctor d ON a.doctor_id = d.doctor_id

GROUP BY d.doctor_id, d.doctor_name
```

SQL Report 1

```
SELECT d.doctor_id, d.doctor_name, COUNT(*)
```

Enter a SQL expression to filter results (use Ctrl+Space)

	doctor_id	doctor_name	patient_count
1	100	Carlos	2
2	101	Michael	1
3	102	Stewart	2
4	104	Azmath	1
5	105	Skider	2
6	107	Tavia	1
7	108	Richardson	1
8	109	zenhyu	1
9	110	Joy Rollins	1
10	112	Klimek	1
11	113	Kunafa	1
12	114	Sophia	1
13	115	Punkaj	1
14	117	Amanda	1
15	118	Davina	1
16	119	Benjamin	2

The output of this query provides valuable insights to help the hospital administration to understand the workload of each doctor and assign resources accordingly.

Report 2: Patients with Most Prescriptions

- **Purpose -** This report help the healthcare provider to optimize medication management for these patients with appropriate dosages

```
SELECT p.patient_id, concat(p.first_name, ' ', p.last_name ) AS
patient_name,
COUNT(*) AS num_prescriptions
FROM patient p
INNER JOIN prescription_report pr
ON p.patient_id = pr.patient_id
GROUP BY p.patient_id, patient_name
ORDER BY num_prescriptions DESC
LIMIT 10;
```

SQL Report 2

```
SELECT p.patient_id, concat(p.first_name, ' ', p.l
```

Enter a SQL expression to filter results (use Ctrl+Space)

Grid | Text

	patient_id	patient_name	num_prescriptions
1	5	Abigal Komsoom	4
2	8	Mia Rodriguez	2
3	10	Glen Max	2
4	6	David Warner	2
5	7	Tim Southee	2
6	16	Alice Scott	1
7	24	Mia Khan	1
8	17	Emily Nguyen	1
9	9	Dhoni Mahi	1
10	21	Hannah Martinez	1

The output of this query provides medication dosage for each Patient type and the overall dosage trend of disease type.

Report 3: Patients with High Medical Costs

- **Purpose -** It Identifies the healthcare providers to optimize their resource allocation and financial management.

```
SELECT p.patient_id, concat(p.first_name, ' ', p.last_name ) as
patient_name,
SUM(b.bill_amount) AS total_medical_costs
FROM patient p
INNER JOIN billing b ON p.patient_id = b.patient_id
GROUP BY p.patient_id, patient_name
HAVING total_medical_costs > 100
ORDER BY total_medical_costs DESC
LIMIT 10;
```

SQL Report 3

```
SELECT p.patient_id, concat(p.first_name, ' ', p.l
```

Enter a SQL expression to filt

Grid | Text

	patient_id	patient_name	total_medical_costs
1	16	Alice Scott	90,000
2	9	Dhoni Mahi	30,000
3	19	Ava Brown	6,000
4	5	Abigal Komsoom	5,000
5	14	Xavier Lee	5,000
6	20	Oliver Flores	799
7	15	Liam Patel	598
8	18	Julian Jackson	300
9	17	Emily Nguyen	300
10	8	Mia Rodriguez	150

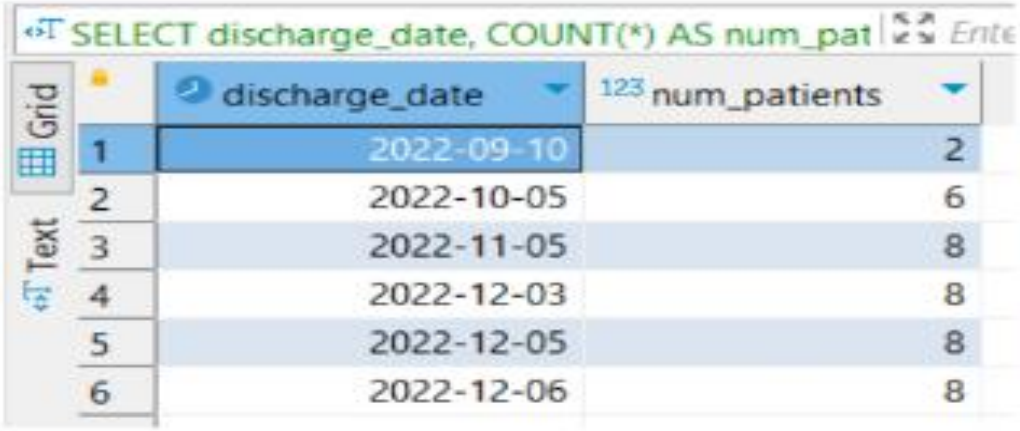
This query retrieves the total procedure cost for each patient, and then sorts the results in descending order of the average cost.

Report 4: Number of Patients Discharged on Each Day

- **Purpose** : It helps the hospital to monitor the number of patients being discharged each day

```
SELECT discharge_date, COUNT(*) AS num_patients
FROM (
SELECT discharge_date
FROM discharge_period
UNION ALL
SELECT appointment_date
FROM Appointment
WHERE height IS NOT NULL AND weight IS NOT NULL
AND treatment_for IS NOT NULL
) AS all_dates
GROUP BY discharge_date
```

SQL Report 4



	discharge_date	num_patients
1	2022-09-10	2
2	2022-10-05	6
3	2022-11-05	8
4	2022-12-03	8
5	2022-12-05	8
6	2022-12-06	8

This query retrieves the information of total number of patients discharged from the hospital on each day.

Report 5: Patients vs lab tests for all their diseases

- **Purpose** : It helps the hospital administration to monitor the quality of the medical care provided to patients and who need the lab testing process

```
SELECT p.patient_id, CONCAT(p.first_name ,' ',p.last_name ) AS full_name
FROM patient p
WHERE NOT EXISTS
(
SELECT di.disease_type_id
FROM disease_infected di
WHERE di.patient_id = p.patient_id
EXCEPT
SELECT lr.disease_type_id
FROM lab_record lr
WHERE lr.patient_id = p.patient_id
)
```

SQL Report 5

```
SELECT p.patient_id, CONCAT(p.first_name ,' ',p
```

Enter a SQL expression to filter results (use Ctrl+Space

	patient_id	full_name
1	5	Abigal Komsoom
2	6	David Warner
3	7	Tim Southee
4	8	Mia Rodriguez
5	9	Dhoni Mahi
6	10	Glen Max
7	11	Samuel Turner
8	12	Victoria Gonzalez
9	13	Sarah Lewis
10	14	Xavier Lee
11	15	Liam Patel
12	16	Alice Scott
13	17	Emily Nguyen
14	18	Julian Jackson
15	19	Ava Brown
16	20	Oliver Flores
17	21	Hannah Martinez
18	22	Blake Peterson
19	23	Bradd Pit
20	24	Mia Khan

This query retrieves the information on the patients who have had lab tests for all their diseases.

Challenges

- Inadequate data:

  The scarcity of adequate data posed difficulties in generating significant reports from the database. With only a limited amount of data to work with, we ended up with partial records and reduced accuracy in our reports.

- Inconsistent Datatypes

  Managing inconsistent data types within a database presents a formidable challenge, as it can compromise the integrity and reliability of the stored information.

- Difficulty in developing ERD :

  Creating an Entity-Relationship Diagram (ERD) for a database can be a complex task, as it requires a thorough understanding of the data structure and relationships among entities.

Recommendation

- Data security and privacy: Implement robust security measures to protect sensitive patient information, adhering to relevant regulations such as HIPAA.
- Integration with Electronic Health Records (EHR): Connect the appointment management system with EHRs to streamline patient information access and ensure up-to-date records.
- Scalability: Design the health database and appointment management system to accommodate growth in patient numbers and data volume, ensuring long-term viability.
- Establish a data dictionary: To address the challenges encountered during the project and enhance its future success, it is strongly recommended to create a data dictionary that standardizes and organizes data elements, ensuring consistency and clarity.

Conclusion

- Data is an important ally for the Health & Patient management process.
- The system will facilitate efficient management of patient health records, appointments, and medical histories, making it easier for healthcare professionals to provide high-quality care.
- The system will facilitate efficient management of patient health records, appointments, and medical histories, making it easier for healthcare professionals to provide high-quality care.
- The reporting feature of the system enables healthcare professionals to generate various reports related to patient records, appointments, and medical histories, providing valuable insights into the patient's health status and progress.

Thank you !!!