**Info & Knowledge Management**

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**Diagram:**

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| --- | --- |
| **Medication** | |
| Field Name | Data Type |
| \*Medication\_id | Number |
| Medication\_name | Text |
| Medication\_dose | Text |
| Medication\_route | Text |
| Medication\_frequency | Text |
| Start\_date | Date & Time |
| Stop\_date | Date & Time |
| Patient\_id | Number |

|  |  |
| --- | --- |
| **Patient** | |
| Field Name | Data Type |
| \*Patient\_id | Number |
| First\_name | Text |
| Last\_name | Text |
| Gender | Text |
| Date\_of\_birth | Date |
| Address | Text |
| Phone | Text |
| Social\_security\_  Number | Text |
| Email | Text |
| Insurance | Text |

|  |  |
| --- | --- |
| **Home Health** | |
| Field Name | Data Type |
| \*Patient\_id | Number |
| Visit\_id | Number |
| Visit\_date | Date & Time |
| Nurse\_name | Text |
| Visit\_type | Text |
| Facility\_name | Text |
| Facility\_address | Text |

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| --- | --- |
| **Outpatient Clinic** | |
| Field Name | Data Type |
| \*Appointment\_id | Number |
| Patient\_id | Number |
| Appointment\_date | Date & Time |
| Clinic\_name | Text |
| Provider\_name | Text |

|  |  |
| --- | --- |
| **Medication Administration Error** | |
| Field Name | Data Type |
| \*Error\_id | Number |
| Patient\_id | Number |
| Medication\_id | Number |
| Error\_date | Date & Time |
| Error\_type | Text |

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| --- | --- |
| **Inpatient Areas** | |
| Field Name | Data Type |
| \*Admission\_id | Number |
| Patient\_id | Number |
| Department\_id | Number |
| Department\_name | Text |
| Admission\_date | Date & Time |
| Discharge\_date | Date & Time |
| Ward | Text |
| Bed\_number | Number |
| Facility\_name | Text |
| Facility\_address | Text |

|  |  |
| --- | --- |
| **Adverse Event** | |
| Field Name | Data Type |
| \*Event\_id | Number |
| Patient\_id | Number |
| Event\_date | Date & Time |
| Event\_Type | Text |

There are seven tables I have proposed for the database based on scenario one. When we look at the patient table, patient\_id is the primary key that is related to the Adverse Event table where patient\_id is the foreign key. Along with this, tables like Medication Administration Error, Inpatient Areas, and Outpatient Areas have the field patient\_id as a foreign key.

**Scenario**

You are working in risk management and need to track medication administration errors and adverse events for patients over 6 months. You are receiving information from the inpatient areas, outpatient clinics, and home health.

**Introduction**

It can be a challenge to design healthcare interventions that can guarantee the best outcomes by using the limited resources available. Among different methods and theories applied in health care the most common approaches used are data and theory-driven which focuses on empirical data observation to form theory and the application of existing theory on the premise to understand the data. (Sekhon et al., 2017)

**How the diagram articulates planned design.**

The main goal of any database is to accurately retrieve data when needed, there can be problems in data storage affecting data accuracy and retrieval in a bad design making it very difficult to achieve the goal mainly when we are not aware that a problem exists, therefore we need a good design from the start.

The diagram I have presented represents a relational database with relational algebra making the design relationally complete. Relational algebra that is fundamental to database design operations includes restrict, project, join, union, and difference. (Harrington,2016) We can design relational databases without knowing relational algebra, but we might find it hard to formulate efficient and effective queries to help us resolve relational database designs that are difficult. (Harrington,2016)

**Principles behind selecting key fields and defining relationships.**

In a database based on common attributes, when tables are connected it is described as relationships, where key fields are unique identifiers in a table. It is important to have a distinct attribute as a main key when we are selecting key fields because this will guarantee data accuracy making our information quick and easy to retrieve. The primary key maintains data integrity and prevents data duplication in the table.

The relationship between tables is important to establish the link between elements. Primary key and foreign key serve as a foundation for relationships. For example, the primary key in the patient table can be used as a foreign key in most of the other tables that link tables.

Primary and foreign keys play an important role in improving performance in a database (SQL). The database engine can use the primary key as a clustered index so that it can be physically stored as the primary key which will improve query performance whereas the foreign key can optimize join queries between the tables improving the performance.

**PICOT Question**

The PICOT format is an approach that summarizes research questions exploring the effect of therapy. (Riva et al., 2012) It provides a framework efficient for searching electronic databases. The format includes a patient population of interest (P), intervention or area of interest (I), comparison intervention or group (C), outcome (O), and time (T) (Melnyk.,2010)

**Scenario**

You are working in risk management and need to track medication administration errors and adverse events for patients over 6 months. You are receiving information from the inpatient areas, outpatient clinics, and home health.

PICOT question:

(P): Patients in inpatient areas, outpatient clinics, and home health

(I): Track medication administration errors and adverse events

(C): compared to not tracking medication errors and adverse events

(O): result in finding the root cause of the problem

(T): over six months.

The table that we would require to get an answer for this scenario will include:

**Patient table:** The primary key on this table would be patient\_id containing data on the patient’s demographic and patient identification numbers that are distinctive.

**Medication Administration Error table:** this table will keep track of prescribed medication with their name, error\_id, date, type, and description. The primary key under the Patient table is seen as a foreign key in this table showing us the relation.

**Adverse Event:** This table has information about the event that occurred where patient\_id is a foreign key again describing a one-to-many relationship.

**Inpatient/outpatient/Home Health areas**: Three different tables are designed under Inpatient areas, outpatient areas, and home health areas keeping track of appointment dates, admission/discharge dates, and nurse/provider names. We have patient\_id as a foreign key in two tables which was the primary key under the patient table showing one-to-many relationships.

**Medication table:** Keeps track of the medication, its route, dosage, and frequency administered.

**Summary**

Database design plays an important role in health care as it provides a foundation for data analysis, reporting, and retrieval. A database that is well structured enables to generation of crucial insights through intelligence and analytics tools. According to Micro.com, A Well-structured database can unlock the full potential of data for decision-making.

**References:**

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