**Database design documentation for Dental Office**

**Submission by:**

**Group-1**

1. ADITYA SARGAR (NUID: 002195371)
2. ANKIT JAGTAP (NUID: 002193023)
3. NIUL PANVALKAR (NUID: 002950308)
4. PRANAV ADHAV (NUID: 001519666)

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# REVISION HISTORY

11/11/2021

Created a basic design document displaying high-level overview of entities and business rules.

11/19/2021

Updated Business rules and added more entities

11/20/2021

Created ER diagram for the dental office database

12/02/2021

Updated Data definitions and attributes

12/02/2021

Added prescription table to keep track of prescriptions associated with the appointments

12/02/2021

Updated Business rules

12/07/2021

Updated some table with modifications

12/13/2021

Removed the table as some of them were over normalized

12/15/2021

Updated ER diagram and made changes in the table

# Business Rules

1. A patient can book an appointment slot of 15 minutes each and maximum of 6 slots in total.
2. Office will have rooms based on type of usage. For example: there will be specific rooms for general dentists, orthodontists, periodontists, etc. Operation Theaters will be mentioned separately.
3. Symptoms will cover patient’s wellness check (covid point of view) as well as reasons for doctor’s appointment.
4. Consent should be not null, and its value would determine the level of data to be captured.
5. One or more people can share the same insurance determined by the insurance\_id.
6. We should have a separate table to capture allergies that are not included in the form.
7. Use an id to represent the consent instead of depending on the names.
8. A prescription entity is needed (can be prescribed by doctor and not the dentist).
9. A dentist can go to multiple offices.
10. While booking an appointment with the provider, the application will check if that slot is already booked with that provider.
11. An appointment can have one and only one procedure type. If a patient wants multiple services, he must book multiple appointments.
12. An appointment can be cancelled by the patient and the cancellation reason will be stored.
13. The medication history of the patient will be stored in a separate table so that the provider would know beforehand, what treatment plan should be followed.
14. The admin will have read/write/update access with the help of the portal to all the tables.
15. The prescription entity will be associated with the appointment since every appointment can potentially have a different prescription, if any.
16. The slots for provider’s schedule will be added depending on the availability of the provider. Also, the past slots will be deleted on a schedule.

# 

# ENTITIES

## 1 RECORDS

## DENTAL\_HISTORY

Dental\_history entity captures dental conditions linked to a unique dental\_history\_id. It is entered into the system by the admin and lists all the dental conditions. This will be a lookup table to Patient\_dental\_history.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute | Data Type | Required | Key | Desc | Ex1 |
| Dental\_history\_id | INTEGER | YES | PRIMARY | Primary key to store dental history | 11(dhid) |
| Condition\_name | VARCHAR(50) | YES | None | Column to store name of the dental condition | ulcer |
| Patient\_id | Integer | YES | FOREIGN | Foreign key to store the patient id from patient\_info | 050(pid) |

## ORAL\_CONDITION

Oral\_condition table captures details of the dental condition. It is entered into the system by the admin to determine the status of the tooth (Missing, Decayed, Non-Functional). This will be linked to other tables like Patient\_info.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute | Data Type | Required | Key | Desc | Ex1 |
| Oral\_condition\_id | INTEGER | YES | PRIMARY | Primary key to store oral condition | 23(ocid) |
| Patient\_id | Integer | YES | FOREIGN | Foreign key to store the patient id from patient\_info | 050(pid) |
| Tooth\_number | CHAR(3) | YES | None | Column to store the tooth number that has the dental condition | M7 |
| Status | VARCHAR | No | None | Status of the tooth | MISSING |

## CONSENT

Consent entity captures consent given by the patient to utilize their data. It is entered into the system by the patient. This will be linked to tables like Patient\_info.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute | Data Type | Required | Key | Desc | Ex1 |
| consent\_id | INTEGER | YES | PRIMARY | Primary key to store the consent | 009(csid) |
| Patient\_id | INTEGER | YES | FOREIGN | Foreign key to store the patient id from patient\_info | 050(pid) |
| Is\_Valid\_till | DATE | YES | None | Date of signature expiry | 12/12/2021 |

## PRESCRIPTION

This table is used to store the medicine that the provider prescribes if any. It is associated with the Appointments table since every appointment can have a prescription.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute | Data Type | Required | Key | Desc | Ex1 |
| Precription\_id | INTEGER | YES | PRIMARY | Primary key to store prescription | 012(prid) |
| Prescription\_name | CHAR(50) | YES | NONE | Name of the medicine | Ibuprofen |
| Appointment\_id | INTEGER | YES | FOREIGN | Foreign key from Appointments table | 0045(aid) |
| Description | VARCHAR(100) | NO | None | Information related to the prescription | Ibuprofen is used to treat toothache |
| Price | FLOAT | NO | None | Store the price of the prescription | 75.00 |

## 

## APPOINTMENT

This table stores the information regarding the appointment details of patients with the dentist and it stores valuable information related to it like room, service, provider, date and time, number of slots and it is cancelled or not. This table is linked to various table some of them are office\_room table, provider\_services, provider\_personal\_info, etc.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute | Data Type | Required | Key | Desc | Ex1 |
| Appointment\_id | INTEGER | YES | PRIMARY | Primary key to store the Appointment | 0045(aid) |
| Patient\_id | INTEGER | YES | FOREIGN | Foreign key from Patient\_info table | 050(pid) |
| Provider\_id | INTEGER | Yes | FOREIGN | Foreign key from provider info table | 0876(poid) |
| Service\_id | INTEGER | Yes | FOREIGN | Foreign key from provider info table | 3(sid) |
| Room\_id | INTEGER | Yes | FOREIGN | Foreign key from provider info table | 2212(rid) |
| Date\_created | Date | Yes | None | Date when appointment created | 10/12/2021 |
| Appointment\_date | Date | Yes | None | Date of appointment | 10/24/2021 |
| Start\_time | Time | Yes | None | Start timing | 11:00 |
| End\_time | Time | Yes | None | Start timing | 12:00 |
| Number\_of\_Slots | INTEGER | YES | None | Number of total slots | 4 |
| Cancelled | BIT | NO | None | Flag to check if the appointment is cancelled or not | 1 (TRUE) |
| Cancellation\_reason | Varchar (50) | NO | None | Reason to cancel the appointment | Had some work to do |

# OFFICE

## OFFICE\_LOCATION

Office\_location table gives idea about the location of the dental office. It contains basic information about the location of the dental office. This table is linked to other tables like Room.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute | Data Type | Required | Key | Desc | Ex1 |
| Location\_id | INTEGER | YES | PRIMARY | Id to store the location of the dental office | 549(lid) |
| Location\_city | VARCHAR(50) | YES | None | City of the dental office | Boston |
| Location\_state | VARCHAR(50) | YES | None | State of the dental office | Massachusetts |
| Location\_zip | VARCHAR(12) | YES | None | Zip code of the dental location | 02115 |
| Location\_street | VARCHAR(50) | NO | None | Street address of the dental office | Boylston street |

## ROOM

table gives information about the room of the dental office. This table contains room type id and location id with the primary key. This will be linked to other tables like Appointments.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute | Data Type | Required | Key | Desc | Ex1 |
| Room\_id | VARCHAR(20) | YES | PRIMARY | Primary key to store the room number which is the combination of location and room number | 2212(rid) |
| Room\_type\_id | INTEGER | YES | FOREIGN | Foreign key from room\_type table | 5(rtid) |
| Location\_id | INTEGER | YES | FOREIGN | Foreign key from dental\_location | 549(lid) |

## ROOM\_TYPE

Room type gives an idea about the type of room in the dental office. This table is a static table. It will help the patient find a room that they have booked the appointment for . E.g., orthodontist. This will be linked to other tables like room.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute | Data Type | Required | Key | Desc | Ex1 |
| Room\_type\_id | INTEGER | YES | PRIMARY | Primary key to store the room type | 5(rtid) |
| Room\_Type | VARCHAR(30) | YES | None | Column to store the type of dentist | orthodontist |

## 2.4. ROOM\_EQUIPMENT

This entity describes which equipments are placed in the specific room.

This would make it easier for the provider and other staff to locate some machinery in the building.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute | Data Type | Required | Key | Desc | Ex1 |
| Equipment\_id | INTEGER | YES | PRIMARY | Primary key to store the room equipment id | 2(eid) |
| Room\_id | INTEGER | YES | FOREIGN | Foreign key from room table | 2212(rid) |
| Equipment\_name | VARCHAR(50) | YES | None | Name of the equipment | Dental chair |

# PROVIDER

## PROVIDER\_INFO

This table is used to capture the basic information of the provider like his name and contact. It is entered into the system by the provider himself. It is linked to tables such as provider\_contact, provider\_type, dental\_provider\_services, appointment and provider\_schedule.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute | Data Type | Required | Key | Desc | Ex1 |
| Provider\_id | INTEGER | YES | Primary | Primary key to store the id of the provider | 0876(poid) |
| First\_Name | VARCHAR(50) | YES | None | First name of the provider | Chandler |
| Last\_name | VARCHAR(50) | YES | None | Last name of the provider | Bing |
| Provider\_type\_id | INTEGER | YES | Foreign | Foreign key from provider\_type table | 04(ptid) |

## PROVIDER\_SERVICES

This table is used to store the services that the dentist/provider provides. It is entered into the system by the provider.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute | Data Type | Required | Key | Desc | Ex1 |
| Provider\_id | INTEGER | YES | Foreign | Foreign key from Provider\_info table | 04(ptid) |
| Service\_id | INTEGER | YES | Primary | Primary key to store services | 3(sid) |
| Service\_name | VARCHAR(50) | YES | None | Name of the service | Root canal |
| Duration | INTEGER | YES | None | Duration in minutes | 60 |
| Fee | FLOAT | YES | None | Price in Dollars | 100.00 |

## PROVIDER\_TYPE

This table is used to capture the type of the provider. Examples include Orthodontist, Endodontist, Periodontist, etc. It is linked to dental\_provider.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute | Data Type | Required | Key | Desc | Ex1 |
| Provider\_type\_id | INTEGER | YES | Primary | Primary key to store the category of the provider | 04(ptid) |
| Category | VARCHAR(25) | YES | None | Category of the doctor | orthodontist |

## PROVIDER\_CONTACT

This table is used to store the contact information for the dental provider. The contact\_id in this table serves as a foreign key in the dental provider table.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute | Data Type | Required | Key | Desc | Ex1 |
| Contact\_id | INTEGER | YES | Primary | Primary key to store contact information | 0098(cid) |
| Provider\_id | INTEGER | YES | Foreign | Foreign key from provider table | 0876(poid) |
| Provider\_contact | VARCHAR(10) | YES | None | Mobile number | 9999999999 |
| Is\_primary | BIT | YES | None | Column to check if this is the primary contact number | 1 (True) |
| Email | VARCHAR(30) | YES | None | Email of the provider | ross@gmail.com |

## PROVIDER\_SCHEDULE

This table is used to keep track of the schedule of the dental provider. It is linked to dental\_provider with provider\_id being the foreign key originating from dental\_provider table.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute | Data Type | Required | Key | Desc | Ex1 |
| Schedule\_id | INTEGER | YES | Primary | Primary key to store schedule | 007(scid) |
| Provider\_id | INTEGER | YES | Foreign | Foreign key from provider table | 0876(poid) |
| Date | DATE | YES | None | Date of the provider availability | 12/21/2021 |
| Start\_time | TIME | YES | None | Start time of the doctor’s schedule daily | 10:00.000 |
| End\_time | TIME | YES | None | End time of the doctor’s schedule daily | 20:00.000 |

# PATIENT

## PATIENT\_PERSONAL\_INFO

This table stores the basic information of the patient. The table will be used to get the patient information from the patient\_id. It is connected to other tables like patient\_address, patient\_contact, etc.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute | Data Type | Required | Key | Desc | Ex1 |
| Patient\_Id | INTEGER | YES | PRIMARY | Primary key to identify patient | 050(pid) |
| First\_name | VARCHAR(25) | YES | None | First name of the patient | Joey |
| Last\_name | VARCHAR(25) | YES | None | Last name of the patient | Tribbiani |
| Gender | VARCHAR(10) | YES | None | Sex of the patient | Male |
| Date\_of\_birth | DATE | YES | None | Birth date of the patient | 08/14/1997 |
| Email | VARCHAR(25) | YES | None | Email of the patient | joey@gmail.com |

## PATIENT\_ADDRESS

Patient Address table gives information about the patient’s address. It also tells whether the address is primary or not. The address attribute gives details about the apt number, street. This will be linked to other tables like patient\_personal\_info.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute | Data Type | Required | Key | Desc | Ex1 |
| Patient\_id | INTEGER | YES | FOREIGN | Foreign key from patient table | 0050(pid) |
| Patient\_street | CHAR(50) | YES | None | Street name of the patient | Boylston street |
| Patient\_city | CHAR(30) | YES | None | City of the patient | Boston |
| Patient\_state | CHAR(30) | YES | None | State of the patient | Massachusetts |
| Patient\_zip | INTEGER | YES | None | Zip code of Patient | 02120 |
| Is\_primary | BOOLEAN | YES | None | Flag to check if the address is primary | 0(true) |

## PATIENT\_CONTACT

Patient contact entity gives idea about the patient’s phone number. This table also gives information about the phone number whether it is primary or not. This is linked to other tables like patient\_personal\_info.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute | Data Type | Required | Key | Desc | Ex1 |
| Patient\_id | INTEGER | YES | FOREIGN | Foreign key from patient table | 0050(pid) |
| Contact | VARCHAR(10) | YES | None | Mobile number of the patient | 8888888888 |
| Is\_primary | BOOLEAN | YES | None | Flag to check if the mobile number is primary | 0(True) |

## PATIENT\_PHARMACY

Patient pharmacy entity gives details about the patient’s Pharmacy. This table also has information about the location of the pharmacy, and it’s contact details. This will help the provider to get the idea if recommended medicines will be available at the specific pharmacy or not. This will be linked to other tables like patient\_personal\_info.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute | Data Type | Required | Key | Desc | Ex1 |
| Pharmacy\_name | CHAR(25) | YES | None | Name of the pharmacy | CVS pharmacy |
| Pharmacy\_phone\_no | VARCHAR(10) | YES | None | Contact number of the pharmacy | 7777777777 |
| Pharmacy\_street | CHAR(25) | YES | None | Steet name | Riverway |
| Pharmacy\_zip | INTEGER | YES | None | Zip of the address | 02115 |
| Pharmacy\_city | CHAR(15) | YES | None | City of the store | Boston |
| Pharmacy\_state | CHAR(15) | YES | None | State of the store | MA |
| Patient\_id | INTEGER | YES | FOREIGN | Foreign key from patient table | 0050(pid) |

## PATIENT\_MEDICATION

This table gives an idea about the patient’s medicine history. Doctors can review the previous medical record and according to that they can start further treatment. This is a lookup table.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute | Data Type | Required | Key | Desc | Ex1 |
| Patient\_Id | INTEGER | YES | FOREIGN | Foreign key from patient table | 0050(pid) |
| Medication\_name | CHAR(20) | YES | None | Name of the medication | Ativan |

## PATIENT\_INSURANCE

Patient Insurance table gives details about the patient’s insurance. This table also has information about the subscriber of the insurance. One insurance can be used by multiple members of the family. E.g., subscriber family can also use his insurance. So, the insurance id will be same but the patient id are different for everyone therefore we take patient\_id and insurance id together as primary key.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute | Data Type | Required | Key | Desc | Ex1 |
| Insurance\_id | INTEGER | YES | COMPOSITE | Foreign key to store insurance info | 123(iid) |
| Patient\_id | INTEGER | YES | COMPOSITE | Foreign key from patient\_info table | 050(pid) |
| Subscriber\_Fname | VARCHAR | YES | None | First Name of the subscriber to the insurance | Ross |
| Subscriber\_Lname | VARCHAR | YES | None | Last Name of the subscriber to the insurance | Geller |

## PATIENT\_ALLERGIES\_OTHER

This table is used to store the allergies that are not mentioned in the form.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute | Data Type | Required | Key | Desc | Ex1 |
| Patient\_id | INTEGER | YES | FOREIGN | Foreign key from patient\_info table | 050(pid) |
| Allergy\_name | VARCHAR | YES | None | Name of the allergy | Itching on the body |

# OTHER

## OTHER\_ALLERGIES

This table captures the information regarding the allergies of the patient and table stores the details of allergies such as allergy name and description. This table is linked to the patient personal info table.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute | Data Type | Required | Key | Desc | Ex1 |
| Allergy\_id | INTEGER | YES | PRIMARY | Primary key to store allergy info | 08(alid) |
| Allergy\_name | VARCHAR | YES | None | Name of the allergy | Dust |
| Allergy\_description | VARCHAR | YES | None | Description of the allergy | Allergy of dust |
| Patient\_id | INTEGER | YES | FOREIGN | Foreign key from patient\_info table | 050(pid) |

## OTHER\_SYMPTOMS

This table stores the symptoms of the patient and the name of the symptom.

This table is connected to the patient symptoms table and patient\_id is foreign key from patient info table

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute | Data Type | Required | Key | Desc | Ex1 |
| Symptom\_id | INTEGER | YES | PRIMARY | Primary key to store the symptom info | 45(syid) |
| Patient\_id | INTEGER | YES | FOREIGN | Foreign key from patient\_info table | 050(pid) |
| Symptom\_name | VARCHAR | YES | None | Name of the symptom | Fever |

## INSURANCE\_LOOKUP

These table is created to store the information about the insurance and the description of the same and these table is linked to insurance table.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attribute | Data Type | Required | Key | Desc | Ex1 |
| Insurance\_Id | INTEGER | YES | PRIMARY | Primary key to store the insurance | 123(iid) |
| Insurance\_provider | VARCHAR | YES | None | Name of the insurance company | Aetna |
| Insurance\_description | VARCHAR | YES | None | Description about the insurance | Medicare Advantage plan, the Center for Medicare & Medicaid Services (CMS) will cover the full cost of the vaccine |

# Entity Relationship Diagram

