

## Dental Practice Management System

Dental care in the United States is growing rapidly every year as people are increasingly concerned about their oral health. A growing demand for cosmetic dentistry has also accelerated the market. To stay in business, dental practices should manage their systems efficiently to drive in more revenue and more patients. Using a practice management system, practices can automate many functions and focus more on managing staff and patients

Keeping track of all of a patient's medical records can be very difficult, so a database is necessary to keep track of all of the treatment history and the patient's personal information.

The database that I am designing will keep track of all the treatments taken by the patient in a particular dental clinic as Electronic Health Record (EHR), treatment cost, patient details, provider details, practice details, insurance details, appointments, payment plan, drug prescription, staff management, registration of patients and staff members, material supplies and connect other practices chains.

The design of a dental practice management database is complex, so we have put some limitations on it.

- We are assuming that new patients and returning patients may book only one appointment a day.
- There will only be a maximum of five practice locations.
- All practice locations offer only a limited number of treatments
- Insurance will cover certain percentages for certain procedures and none for cosmetic treatments and the cost associated with the procedures will be provided in a chart.
- A location will have a maximum of one dentist, one dental hygienist and one front office staff member and a lab technician.
- The treatment cost includes only the patient estimate and the insurance estimate. We won't be considering the case of deductibles and copays.
- There are only two types of insurance - self and dependent. We will not be considering other plans like PPOs, Indemnity or HMOs.

- The patient's insurance provider receives the E-Claim, and the percentages specified in the treatment plan are covered by their insurance plan without the patient having to make any out-of-pocket payments.

The system focuses on

1. Scheduling

- Manage the entire day's patient appointments and schedule new appointments by front office staff.
- Minimize the number of open timeslots to achieve optimal time management.
- Assign patients to dentists and chairs in practices.
- Generate reports which show days when the clinic is busy.

2. Online booking

- Patients will be able to request appointments through the patient portal.
- Allows patients to complete intake information with forms.
- Check the availability of dentists

3. Patient payment

- Provides the option of using net banking or a credit card to make payment online.
- Patients can link their insurance information to their profile.
- Reminds the patient about any outstanding payments.
- The patient gets a detailed breakdown of the payment and related procedures.

4. Clinical

- Record patient treatment history.
- Adding procedures, conditions, and clinical notes.
- Create a treatment plan with the cost of each procedure.
- Prescription of drugs to patients.

5. Claims management

- Submit insurance verification.
- File electronic claims with insurance companies
- Understands the limitations and exclusions of the patient insurance plan.
- Manage insurance payments and claim denials.

6. Practice management
  - Manages dentists, dental assistants, hygienists, and other staff.
  - Managing all employees' payroll.
  - Keep track of earnings and expenses.
7. Patient feedback
  - Collect feedback from patients.
  - Feedback is collected from patients using their email, phone and name as identifications

## **Business Goals**

1. Practices can generate report to find procedures which brings revenue to the practice at different locations
2. Generate insurance reports to determine which patients with more than 1 insurance denial and the procedures that insurance does not cover for these patients.
3. Determine how often each patient visits the clinic and where they are located and find correlation between procedures that are available in particular location to the popularity.
4. Generate reports to find different lab tests taken by patients and the amount the patient is spending for each lab test. From this report find the net profit generated by all the dental practices.
5. The practice owner can view the revenue of different locations for 10years along with the list of employees who contributed to the revenue in different locations.
6. Find treatment case acceptance and the cost associated with different procedures in different locations. Find the percentage of insurance coverage for that particular procedure and find why the patient either accepted or denied the treatment (based on insurance cover).
7. Find information regarding the age of the patient's base and which insurance is most prevalent.
8. Identify the different payment methods used by patients at different locations.
9. Find the percentage of patients receiving only hygiene treatments and the cost associated with the procedure at different locations.
10. Generate a report to find how many patients cancel their appointments against the total number of appointments on your schedule at different locations.

11. Generate reports to find active patients and new patients that visited the clinic in the last 12 months. Find the location where most of the new patients visit.
12. Find the patients which did extraction procedure or was allocated to surgery operatory in the last year and was taking drug medications. Also get the drug details they were taking during those period
13. Find the number of employees and the location where the practice that has employees earning more than 50k and works more than 42 hours per week. Also find the employee name and the location where they work
14. Find the practice that has least average rating and the number of ratings different practice has.
15. Which location is more popular with patients and dentists they prefer in that particular practice.
16. Generate a report to find how much it cost the practice for each procedure. This can be calculated from gross production. This report can be used to find if the practice can stay in business with the current rate of collection.
17. Generate a report to find the number of procedures done by a provider in a dental practice.
18. Find the patient list and their outstanding payments from patients and insurance providers who has either canceled or not shown for the appointment more than twice and the payment is pending for those patients for the treatments they have taken in the dental practice
19. Find the practice which does the most treatments and the type of treatment which is done more often in that practice

## **Data Description**

### **1. Patient**

- A person who is receiving dental care or treatment.
- Patients can do booking through an online portal.
- The patient can have self-insurance or dependent insurance
- Details:

Patient-ID, F-Name, L-Name, DOB, SSN, Phone, Email-ID, Gender, Emergency Contact-No, Default Location, Insurance-ID

### **2. Practice**

- Dental practices are places where dentists perform procedures or treatments.

- Different practices can have offices in different locations.
- Dentists and hygiene specialists may work in different practices located at different locations.
- In order to receive treatment, patients need to schedule an appointment with the offices.
- Details:  
Practice-ID, Practice-Name, NPI, Tax-ID, Phone, Address, Location

### 3. Insurance

- Dental insurance or plan covers a portion of the treatment cost associated with dental care.
- There are 2 types of dental plan: Self and Dependent. Those under a self-insurance plan are the primary insurance holder, and their dependents are those associated with the primary holder.
- The self-insured will receive 100% insurance cover, while dependents will only receive 75% coverage.
- Details:  
Insurance-ID, Insurance-Name, Insurance-Type, Insurance-Plan, Percentage-Covered, Premium, Installment-Type, Instalment-Duration

### 4. Treatment Plan

- Dental treatment plan outlines exactly what dental treatment the dentist recommends, in what timeframe and how much they will cost after insurance
- The treatment plan includes information about the surface/tooth being treated.
- It contains information about the provider who performed the procedure, as well as the location where it is done.
- Details:  
Treatment-ID, Treatment-Type, Location, Description, Tooth/Surface, Phase, Status, Patient-ID, Provider-ID

### 5. Payment Plan

- Dental insurance plans cover a patient's dental visit as well as the treatment they receive.
- Dental Plans usually cover a hundred percent of the preventative procedures, such as your check-up, cleaning.
- Details:

Payment-ID, Payment-Type, Payment-Method, Patient-ID, Amount, Status, DateTime

6. Materials

- Materials are used for procedures in treatment plans.
- Details:  
Patient-ID, Material-ID, Type, Name

7. Bookings

- Each patient appointment has a unique ID.
- Returning patients can schedule an appointment by using their patient ID and new patients have to request an appointment and the office will confirm the booking until then the new patient will remain in a waiting list.
- Bookings are made against a specific location and an operator.
- Details:  
Booking-ID, Date, Time, Patient-ID, Location-ID, Provider-ID, Operator-ID

8. Prescriptions

- Patients are prescribed medicines by providers.
- Details:  
Prescription-ID, Medicine, Dosage, Patient-ID, Provider-ID, Practice-ID

9. Employees

- Employees are people who work at a practice
- Employees can work at different locations
- Each employee have a job role and associated salary
- Details:  
Emp-ID, F-Name, L-Name, Address, Phone, Email-ID, DOB, Job-Role, Salary, SSN

10. Lab Reports

- Our system captures lab tests taken by patients
- Lab reports are accessible in different locations
- Patients can view their lab reports in patient portal
- Details:  
ID, Lab-ID, Patient-ID, Provider-ID, Practice-ID, Result, Type, Status