CSE 111 Project Phase 1

PATIENT DATA ANALYTICS SYSTEM FOR DOCTORS

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SYSTEM DESCRIPTION

- The **Patient Data Analytics System** is a secure, multi-tier data management platform designed to help doctors efficiently manage and analyze patient medical data across multiple hospitals.

- The system includes data management tools to add, view, update, and delete patient records as well as analytical tools to identify common conditions and analyze demographic and disease trends through interactive charts.

- To protect patient privacy, identifiable information (such as name, birth date, and contact information) are excluded from the data used, ensuring compliance with data protection requirements while still allowing doctors to extract helpful statistical insights.
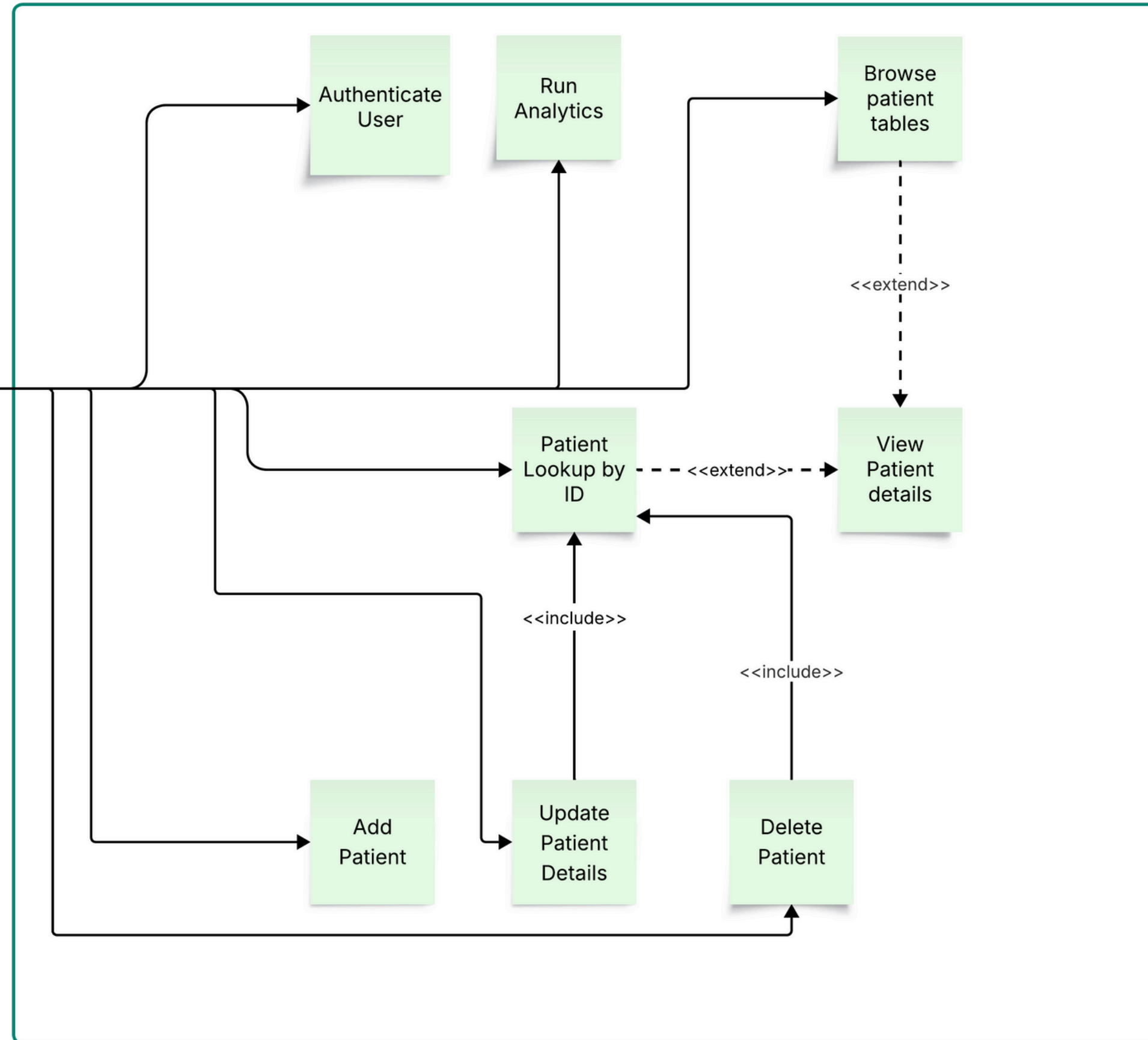
USE CASES

- **Authenticate User**
  - Secure login to the system (only for doctors)
- **Patient Lookup**
  - Retrieve a patient's information using MRN
- **Add Patient**
  - Create a new patient record
- **Update Patient**
  - Update patient information
- **Delete Patient**
  - Delete outdated/invalid patient records
- **Browse Patient Tables**
  - View patient data by table (ex: condition, hospital, etc.)
- **Analyze Disease/Demographic Prevalence**
  - Extracts statistical insights from patient data
  - Example: Most prevalent gender for a condition, most prevalent blood type per condition, number of patients that took vaccine, etc.

UML USE CASE DIAGRAM

Patient Records and Analytics System

Doctor

- Authenticate User
- Run Analytics
- Browse patient tables
- Patient Lookup by ID
- View Patient details
- Add Patient
- Update Patient Details
- Delete Patient

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ENTITIES AND RELATIONSHIPS

Entities (6):

1. **Patient**
   a. *(patient_id, medical_record_number, birth_year, gender, blood_type)*
2. **Doctor**
   a. *(doctor_id, name, specialty, hospital_id)*
3. **Hospital**
   a. *(hospital_id, name, city)*
4. **Condition**
   a. *(condition_id, name)*
5. **Medication**
   a. *(medication_id, name)*
6. **Vaccine**
   a. *(vaccine_id, name)*

Relationships (7 Total, 6 Many to Many):

1. **Patient — Doctor (M:N)**
   a. A patient can be treated by many doctors; a doctor treats many patients.
2. **Patient — Hospital (M:N)**
   a. A patient can visit many hospitals; a hospital serves many patients.
3. **Doctor — Hospital (N:1)**
   a. Each doctor works at exactly one hospital; a hospital employs many doctors.
4. **Patient — Condition (M:N)**
   a. Patients can have multiple conditions; conditions can apply to many patients.
5. **Patient — Medication (M:N)**
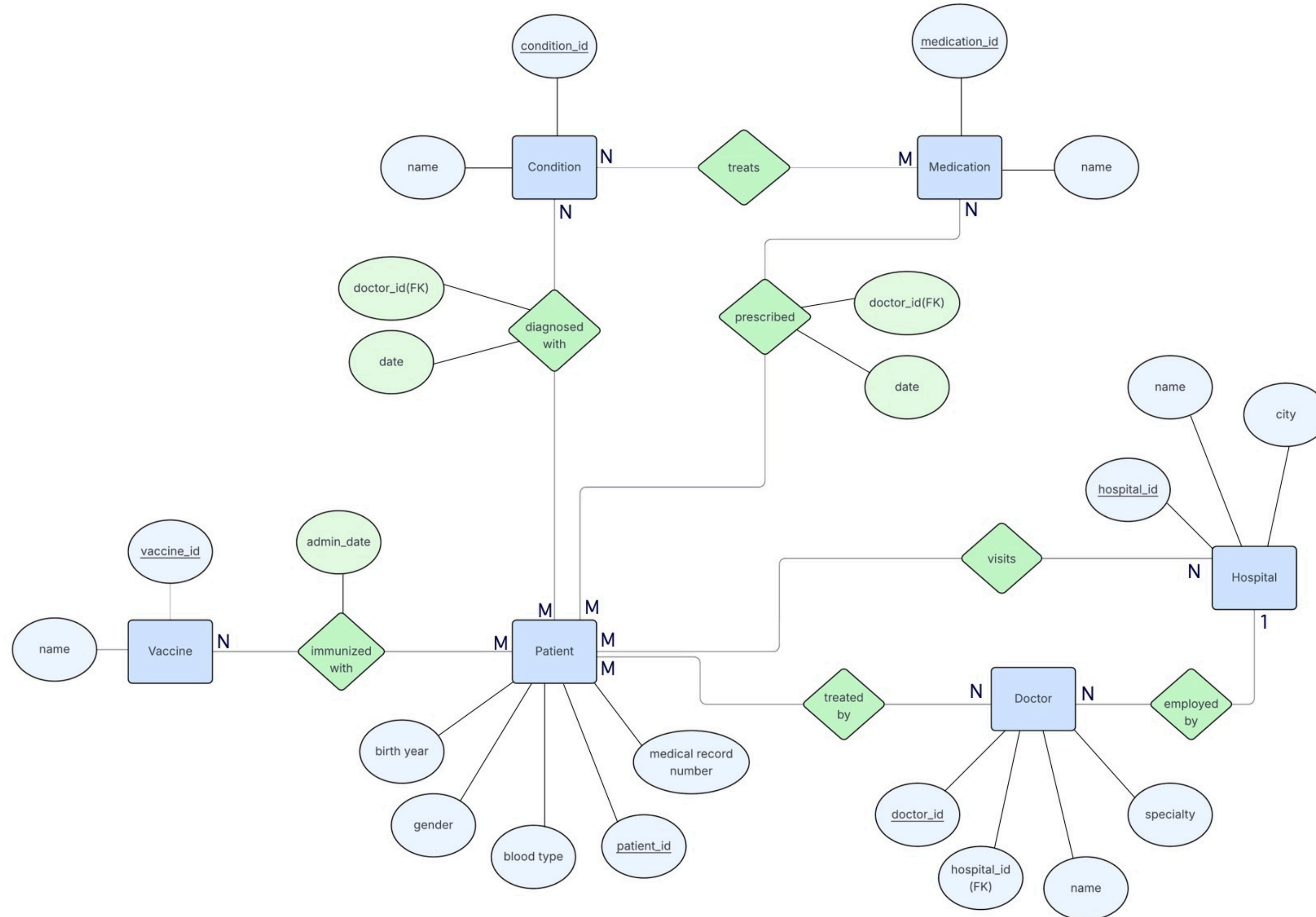   a. Patients can take multiple medications; medications can be prescribed to many patients.
6. **Patient — Vaccine (M:N)**
   a. Patients can receive multiple vaccines; each vaccine can be given to many patients.
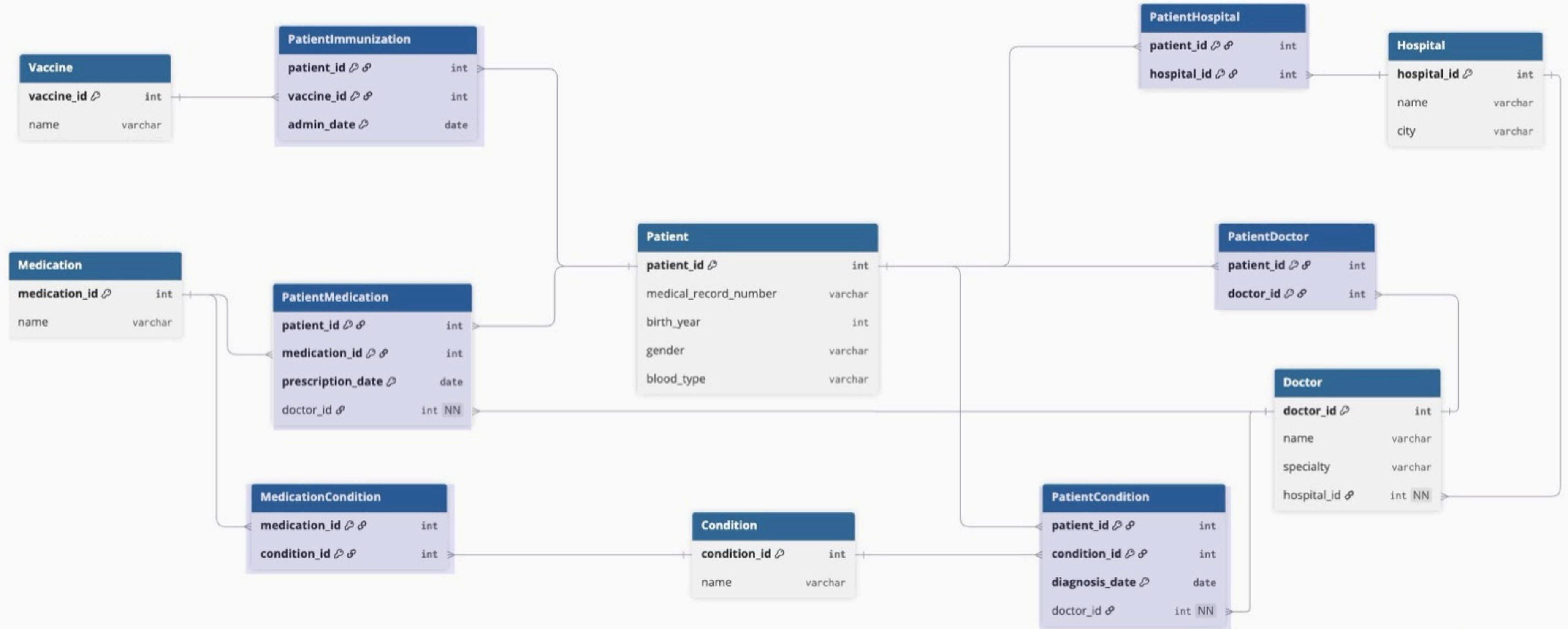7. **Medication — Condition (M:N)**
   a. A medication can treat many conditions,,condition can be treated with many medications.

E/R DIAGRAM

RELATIONAL SCHEMA

THANK YOU !