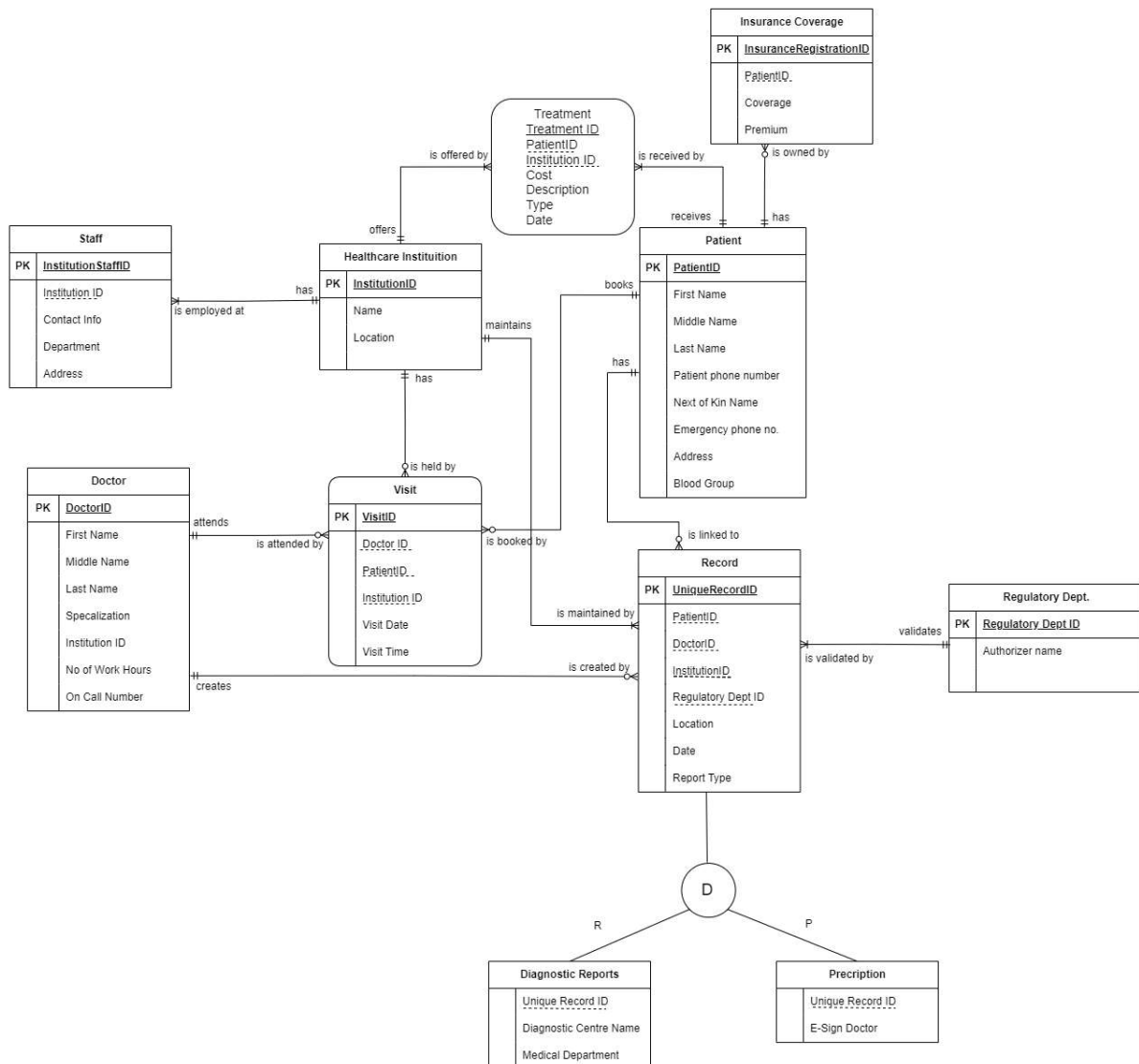# P3: FINAL ERD
Group 1
Prarthana Shetty
Soham Shah
Shantanu Mahakal
Nikhil Kotha

Key Database Design Decision:

Key Changes:
In order to enhance the use case of the system and make it more structured and efficient, we converted the "Treatment" and "Visit" entities into associative entities. Additionally, as suggested by the professor to augment the properties of the "Patient" and "Doctor" entities, we added more realistic attributes. We further improved the efficiency of foreign key tracking for the purpose of maintaining referential integrity. The entity "Prescription" was transformed into a subtype of the "Record" entity, since prescriptions can be classified as a specific sort of record.

1) Associative Entity: Treatment
Primary Key: TreatmentID
Foreign Key: Patient ID, InstitutionID
Entity Relation: This entity is related to the Healthcare institution entity and the Patient entity. Given a particular treatment, it is carried out by one healthcare institution. Given a particular Treatment procedure, it is received by one patient, depending on the need of the patient.
Description: The treatment entity contains all the information about the treatment/procedure taken by a patient. TreatmentID is an identifier for a particular treatments that we would be allocating in order to keep track of procedures so it can also help with Insurance and record management. It has InstitutionID and PatientID as a foreign key so that we can maintain track of which facility provided this treatment and to whom.

2) Entity: Healthcare Institution
Primary Key: InsitutionID
Entity Relation: This entity has relationships with Record, Treatment, Visit, and Staff entities. A healthcare institution offers one or many treatments, (depending on whether it's a clinic, hospital or diagnostic center), maintains zero to many records for patients, has one or many staff members working, and holds zero to many visits.
Description: A Healthcare institution could be a clinic, a hospital, or a diagnostic center. It contains the name and location so we can keep track of the institution's details.

3) Super Type Entity: Record
Primary Key: Unique RecordID
Foreign Key: PatientID, DoctorID, InstitutionID, Regulatory Dept ID
Entity Relation: This entity is related to the Healthcare Institution, Patient, Regulatory Department, and doctor. Given a Record, it is created by only one institution/doctor mandatorily, is validated by only one staff person from the Regulatory Department, and is linked to mandatorily only one patient.
Description: The records of Patients are created by Healthcare institutions and doctors which are in turn validated by the Regulatory department. This contains, MRI scans, CT scans, other health record files, etc

3.1) Sub Type Entity: Diagnostic Reports
    Foreign key: Unique Record ID

Entity Relation: This entity is a subtype of Record, as it inherits its attributes and is a type of Record. X-rays, CT Scans, MRIs, and other healthcare records fall under this.

3.2) Sub Type Entity: Prescriptions
    Foreign key: Unique Record ID
    Entity Relation: This entity is a subtype of Record, as it inherits its attributes and is a type of Record. This will keep track of a patient's prescriptions and it'll help them buy medicines on the go.

4) Associative Entity: Visit
Primary Key: VisitID
Foreign Key: Doctor ID, Institution ID, PatientID
Entity Relation: This entity is related to doctor, institution, and patient to store the details of the patient's visit, which will aid the insurance process. A particular visit slot at a particular institution is booked by mandatorily one patient, a particular visit is held at mandatorily one institution and a visit is attended by mandatorily one doctor.
Description: The visits are booked by the patient and the visit includes of PatientID, DoctorID, and InstitutionID which act as foreign keys so as to maintain referential integrity.

5) Entity: Doctor
Primary Key: DoctorID
Entity Relation: This entity is related to visit and Records. A doctor creates zero to many prescriptions/records, a doctor attends zero or many patients via visits.
Description: A doctor can create/view a patient's previous record and give further medications accordingly. We have recorded the doctor's name, specialization, on-call number, etc as attributes to maintain his details.

6) Entity: Patient
Primary Key: PatientID
Entity Relation: This entity is related to Records, Visits, Insurance Coverage, and associative entity of treatment. A patient has zero to many records linked to themselves, receives at least one treatment to classify as a patient, books zero to many visits, and purchases zero to many insurance coverage plans.
Description: The patient entity keeps track of name, contact info as attributes to maintain their profile. Suppose a patient undergoes heart surgery, we will be able to track which facility provided it, which doctor facilitated the treatment, the prescriptions he was prescribed for the treatment, whether he has insurance for it(if he used insurance), his record file, treatment details, and surgery visit appointment date.

7) **Entity**: Regulatory Department
Primary Key: Regulatory Dept ID
Entity Relation: This entity is related to records. Given a Regulatory Department, it validates one or many records.

Description: This entity validates the details which are shown in the records entered by the user. They check whether the documents uploaded are in line with the global standards and the overall authenticity of the records and prescriptions in the system.

8) **Entity**: Insurance Company
Primary key: Insurance Registration ID
Foreign Key: PatientID
Entity Relation: This entity correlates with the Patient entity and saves all the patient insurance information for easy coverage and access information whenever patients require it. Given a particular insurance registration record it relates to mandatorily only one patient.
Description: This entity stores all the insurance information of a patient, including premiums and coverage with Insurance Registration ID as the primary identifier. When the hospital requires a patient can choose to share their insurance registration info for claims process. It also has PatientID as a foreign key to maintain referential integrity.

9) **Entity**: Staff
Primary key: InstitutionStaffID
Foreign Key: InstitutionID
Entity Relation: This entity correlates with the Healthcare Institution entity and saves all the staff information who work at an institution. Given a particular staff member, they work at mandatorily only one institution.
Description: This entity stores all the staff information, to ensure that the system has all the information of the staff members who might also have access to patient records. This was added keeping in mind the overall system security. It has InstitutionID as a foreign key to save where the staff member is working.