<u>Final Design</u>
Phase 4 - Green Team

The following reference items represent the final database design.

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ER Dictionary

Entities

Entity	Patient
Key	PatientID
Attributes	Name [nvarchar](80), Address [nvarchar](80), Gender [nvarchar](6), LivingWill [nvarchar](80), PatientID [int], Phone [char](25), NOKName [nvarchar](80), NOKRelation [nvarchar](50), NOKGender [nvarchar](50), NOKPhone [char](25), NOKAddress [nvarchar](80)
Notes	None.

Entity	Condition
Key	ConditionID
Attributes	Name [nvarchar](50), Cost [money], ConditionID [int]
Notes	None.

Entity	Specialty
Key	SpecialtyID
Attributes	Type [nvarchar](25), SpecialtyID [int]
Notes	Allows a Surgeon to treat one or more Conditions.

Entity	Ward
Key	WardID
Attributes	Name [nvarchar](25), Type [nvarchar](25), WardID [int]
Notes	*Weak Entity.*

Entity	Operating Theater
Key	OperatingTheaterID
Attributes	Name [nvarchar](25), OperatingTheaterID [int]
Notes	None.

Entity	Recovery Room
Key	RecoveryRoomID
Attributes	Maximum Occupancy [int], Name [nvarchar](25), RecoveryRoomID [int]
Notes	None.

Entity	Room
Key	Room Number
Attributes	Price [money], Room Number [int]
Notes	Belongs to one Ward.

Entity	Staff
Key	EmployeeID
Attributes	EmployeeID [int], Gender [nvarchar](6)
Notes	Has subclasses: Nurse, Surgeon, and Technician.

Entity	Nurse
Key	EmployeeID
Attributes	EmployeeID [int], Rank [nvarchar](25)
Notes	Subclass of Staff. Oversees Wards.

Entity	Suregon
Key	EmployeeID
Attributes	Cost [money]
Notes	Subclass of Staff. Performs operations.

Entity	Technician
Key	EmployeeID
Attributes	Cost [money]
Notes	Subclass of Staff. Assists with operations.

Entity	Practice
Key	PracticeID
Attributes	Address [nvarchar](80), Name [nvarchar](25), Phone Number [char](25), PracticeID [int]

Notes	Has one or more Surgeons as associates.

Entity	Insurance Company
Key	InsuranceCompanyID
Attributes	Address [nvarchar](80), Name [varchar](50), Phone Number [char](25), InsuranceCompanyID [int]
Notes	None.

Entity	Insurance Agent
Key	AgentID
Attributes	Address [nvarchar](80), AgentID [int], Name [varchar](50), Phone [nvarchar](80)
Notes	None.

Entity	Insurance Plan
Key	Plan ID
Attributes	Deductible [money], Maximum Allowance [money], Plan ID [int]
Notes	Offered by one Insurance Company, purchased by one Patient. *Weak entity.*

Relationships

Relationship	Suffer From
Cardinality	1 : N
Entities	Patient, Condition
Domain	N/A
Attributes	None.
Notes	A Patient suffers from one or more Conditions.

Relationship	Resides In
Cardinality	1 : N
Entities	N/A
Domain	Patient, Room
Attributes	Checkin [datetime], Checkout [datetime], Duration [datetime] (derived)
Notes	A Patient resides in a Room on some hospital stay.

Relationship	Recovers In

Cardinality	1 : N
Entities	Patient, Recovery Room
Domain	[0, Maximum Occupancy]
Attributes	Checkin [datetime], Checkout [datetime], Duration [datetime] (derived)
Notes	A Patient recovers in a Recovery Room.

Relationship	Contacts
Cardinality	N : M
Entities	Patient, Insurance Agent (*partial participation*)
Domain	N/A
Attributes	None.
Notes	*Partial Participation: Insurance Agent.* A Patient has contact with a nonspecific Insurance Agent.

Relationship	Has
Cardinality	1 : N
Entities	Patient, Insurance Plan (total participation)
Domain	N/A
Attributes	None
Notes	A Patient has one or more Insurance Plans.

Relationship	Operates
Cardinality	N : 1 : 1
Entities	Staff, Patient, Operating Theater (total participation)
Domain	N/A
Attributes	CheckIn [datetime], CheckOut [datetime], Duration [datetime] (derived)
Notes	Staff (Surgeons, Technicians) operate in one Operating Theater on one Patient (at a time not overlapping with another Operation in that Operating Theater).

Relationship	Works In
Cardinality	1 : N
Entities	Nurse (*total participation*), Ward
Domain	N/A
Attributes	None.

Notes	*Total participation*: *Nurse*. A Nurse may work in one or more Wards.

Relationship	Associate Of
Cardinality	1 : N
Entities	Surgeon, Practice
Domain	N/A
Attributes	None.
Notes	A Surgeon may be an associate of one or more independent Practices.

Relationship	Specialize In
Cardinality	1 : 1
Entities	Surgeon, Specialty (total participation)
Domain	N/A
Attributes	None.
Notes	Applicable to a Staff member who is a Surgeon. A Surgeon has one Specialty. This relationship with Specialty relates to treatment of Conditions.

Relationship	Specialize In
Cardinality	1 : N
Entities	Technician, Specialty (total participation)
Domain	N/A
Attributes	None
Notes	Applicable to a Staff member who is a Technician. A Technician has one Specialty. This relationship with Specialty relates to assisting in the treatment of Conditions.

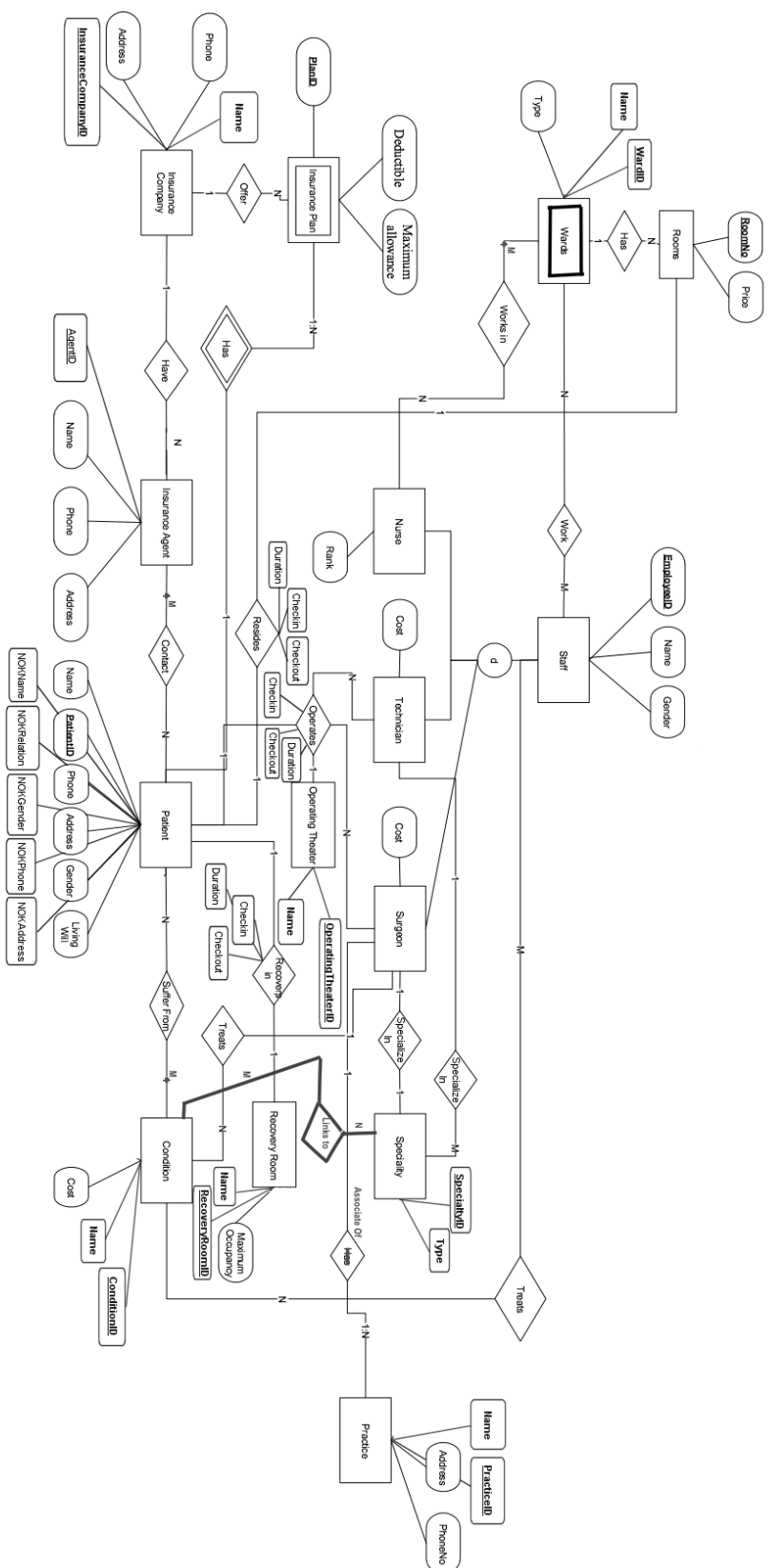| Relationship	Links To
Cardinality	N : M
Entities	Specialty, Condition

Domain	N/A
Attributes	None.
Notes	A Specialty associates a Surgeon or Technician with a procedure treating some Condition or Conditions.

Relationship	Contains
Cardinality	1 : N
Entities	Ward, Room (total participation)
Domain	N/A
Attributes	None.
Notes	A Ward has one or more rooms. A Ward cannot exist with 0 rooms.

Relationship	Offers
Cardinality	1 : N
Entities	Insurance Company, Insurance Plan (total participation)
Domain	N/A
Attributes	None
Notes	An Insurance Company offers one or more Insurance Plans for purchase. The Insurance Plans of an Insurance Company which ceases to exist also cease to exist.

Relationship	Employs
Cardinality	1 : N
Entities	Insurance Company, Insurance Agent
Domain	N/A
Attributes	None
Notes	An Insurance Company employs one or more Insurance Agents.

ER Diagram

Insurance Company
InsuranceCompanyID
Address
Phone
Name

Offer
N
1

Insurance Plan
PlanID
Deductible
Maximum allowance

Wards
WardID
Type
Name

Has
N

Rooms
RoomNo
Price

Works in
M

N

Have
1

N

Has
1:N

Insurance Agent
AgentID
Name
Phone
Address

Contact
M

N

Work
N
M

Staff
EmployeeID
Name
Gender

d

Nurse
Rank

Technician
Cost

Surgeon
Cost

Resides
1

N

Operates
N
1

Checkin
Checkout
Duration

Operating Theater
Name
OperatingTheaterID

Recovery In
N
1

Checkin
Checkout
Duration

Patient
PatientID
Name
NOKName
NOKRelation
NOKGender
NOKPhone
NOKAddress
Phone
Address
Gender
Living Will

Suffer From
M
N

Condition
ConditionID
Name
Cost

Treats
M

Recovery Room
RecoveryRoomID
Name
Maximum Occupancy

Links to
N
N

Specialty
SpecialtyID
Type

Specialize In
M
N

Specialize In
1

Associate Of

Has
N
N

Treats
N

Practice
PracticeID
Name
Address
PhoneNo

1:N

Schema Dictionary

Name: PATIENT

Description: A person who is suffering from some disease or injury.

- **PatientID:** Unique Integer. Primary key identifying a Patient.
- **Name:** Nvarchar(80) The name of the Patient.
- **Gender:** Nvarchar(6) The gender of the Patient: male, or female.
- **Address:** Nvarchar(80). Home address of the Patient.
- **Phone:** Char(25). Phone number of the Patient.
- **LivingWill:** Nvarchar(80). Indicates where the Patient's living will is filed.
- **NOKName:** Nvarchar(80). Full name of Next of Kin of Patient.
- **NOKRelation:** Nvarchar(50). Relation to the patient.
- **NOKGender:** Nvarchar(10). Gender of the named next of kin.
- **NOKPhone:** Char(25). Phone number of the named next of kin.
- **NOKAddress:** Nvarchar(80). Address of the named next of kin.

Name: STAFF

Description: Staff member who is an employee of the hospital.

- **EmployeeID:** Unique Integer. Primary key identifying a Staff member.
- **Name:** Nvarchar(80). Full name of an Employee.
- **Gender:** Nvarchar(6). Gender of an Employee.
- **NFlag: Bit.** Boolean flag to identify employee as a Nurse.
- **Rank:** Nvarchar(25). Rank of a Nurse. Null if Staff is not a Nurse.
- **SFlag: Bit.** Boolean flag to identify employee as a Surgeon.
- **TFlag: Bit.** Boolean flag to identify employee as a Technician.
- **Cost: Money.** The cost charged by a particular Surgeon or Technician.

Name: SPECIALTY

Description: A Specialty possessed by a Surgeon or Technician.

- **Type:** Nvarchar(25). Name of the Specialty.
- **SpecialtyID:** Unique Integer. Primary key identifying a Specialty.

Name: INSURANCE COMPANY

Description: A distinct company which employs Insurance Agents and offers Insurance Plans.

- **Name:** VARCHAR(50). Name of the Insurance Company.

- **Phone:** CHAR(25). Phone number of the Insurance Company.
- **Address:** Nvarchar(80). Address of the Insurance Company.
- **InsuranceCompanyID:** Unique Integer. Primary key identifying an Insurance Company

Name: INSURANCE AGENT

Description: It is a person employed by an insurance company who promotes and sells their plans.

- **AgentID:** Unique Integer. The primary key identifying each tuple.
- **InsuranceCompanyID:** Integer. The foreign key of the Insurance Company for which the Insurance Agent works.
- **Name:** Varchar(50). The name of the Insurance Agent.
- **Phone:** Char(25). Phone number of the Insurance Agent.
- **Address:** Nvarchar(80). Address of the Insurance Agent.

Name: INSURANCE PLAN

Description: A single Insurance Plan held by a Patient.

- **PlanID:** Unique Integer. The primary key identifying an Insurance Plan.
- **InsuranceCompanyID:** Integer. The foreign key of the associated Insurance Company.
- **PlanHolder:** Integer. Foreign key of the Patient table.
- **Deductible:** Money. It is the deductible of the plan paid by the Patient.
- **MaximumAllowance:** Money. Maximum Allowance offered by this insurance plan.

Name: WARD

Description: Categorized block of rooms.

- **Name:** VARCHAR(25). Name of the Ward.
- **Type:** VARCHAR(25). Type of the Ward. i.e. Pediatric, Maternity, Psychiatric. Etc.
- **WardID:** Unique Integer. Primary key identifying a Ward.

Name: ROOM

Description: Residential room which is inside some Ward and used by a Patient.

- **RoomNumber:** Unique Long Integer. Primary key identifying a Room.
- **WardID:** Integer. Foreign key from a Ward.
- **Price:** Decimal. Nightly cost to stay in this Room.

Name: OPERATING THEATER

Description: Location where a Patient is operated on by Staff members.

- **Name:** Nvarchar(25). Name of the Operation Theater.

- **OperatingTheaterID:** Unique Integer. The primary key of the Operating Theater.

Name: RECOVERY ROOM

Description: Room that are assigned to patients to recover.
- **Name:** Nvarchar(25). Name of the Recovery Room.
- **MaximumOccupancy:** short Integer. Maximum number of patients that can occupy recovery room.
- **RecoveryRoomID:** Unique Integer. The primary key of a Recovery Room.

Name: PRACTICE

Description: An association of Surgeons which may exist inside or outside of the hospital system.
- **Name:** Nvarchar(80). The name of a Practice.
- **Phone:** Char(25). Primary phone number of the Practice.
- **Address:** Nvarchar(80). Address of the Practice.
- **PracticeID:** Integer. Primary key of a Practice.

Name: CONDITION

Description: The illness or injury associated with a suffering Patient.
- **Name:** VARCHAR(50). The name of a Condition.
- **Cost:** Money. Cost of a procedure to treat this Condition.
- **ConditionID:** Integer. Primary key of a Condition.

Name: SUFFER FROM

Description: Patients suffer from one or more Conditions.
- **PatientID:** Integer. Foreign key from Patient table.
- **ConditionId:** Nvarchar(25). Foreign key from Condition table.

Name: RECOVERS IN

Description: A Patient's recovery takes place in a Recovery Room.
- **PatientID:** Integer. Foreign key from Patient table.
- **RecoveryRoomID:** Integer. The foreign key from a Recovery Room.
- **Checkin:** DateTime. Start time at which patient is admitted to recover.
- **Checkout:** DateTime. End time at which patient leaves recovery room.
- **Duration:** Date Time. A derived attribute valued (Checkout - Checkin).

Name: CONTACTS

Description: A Patient contacts one or many Insurance Agents.

- **PatientID:** Integer. Foreign key from Patient table.
- **AgentID:** Integer. Foreign key from Insurance Agent table.

Name: OPERATES

Description: Details of an operation on one patient.

- **PatientID:** Integer. Foreign key from Patient table.
- **EmployeeID:** Integer. Foreign key from Staff table.
- **CheckIn:** DateTime. start time of when room is used, in use, or will be used if scheduled in advance.
- **Checkout:** DateTime. end time of when operation is thoroughly completed and operating theatre is not occupied.
- **OperatingTheaterID:** Integer. Foreign key from the OperatingTheater table.
- **Duration:** Date Time. A derived attribute valued (Checkout - Checkin).

Name: WORKS IN

Description: The ward name where a Nurse is working.

- **EmployeeID:** Integer. Foreign key from Staff table.
- **WardID:** Integer. Foreign key from the Ward table.

Name: ASSOCIATE OF

Description: A Surgeon is an associate of a Practice.

- **EmployeeID:** Integer. Foreign key from Staff table.
- **PracticeID:** Integer. Foreign key from the Practice table.

Name: SPECIALIZE IN

Description: Surgeons and Technicians have Specialties.

- **EmployeeID:** Integer. Foreign key from Staff table.
- **SpecialtyID:** Integer. Foreign key from the Specialty table.

Name: LINKS TO

Description: Indicates which Specialty is required in treating a given Condition.
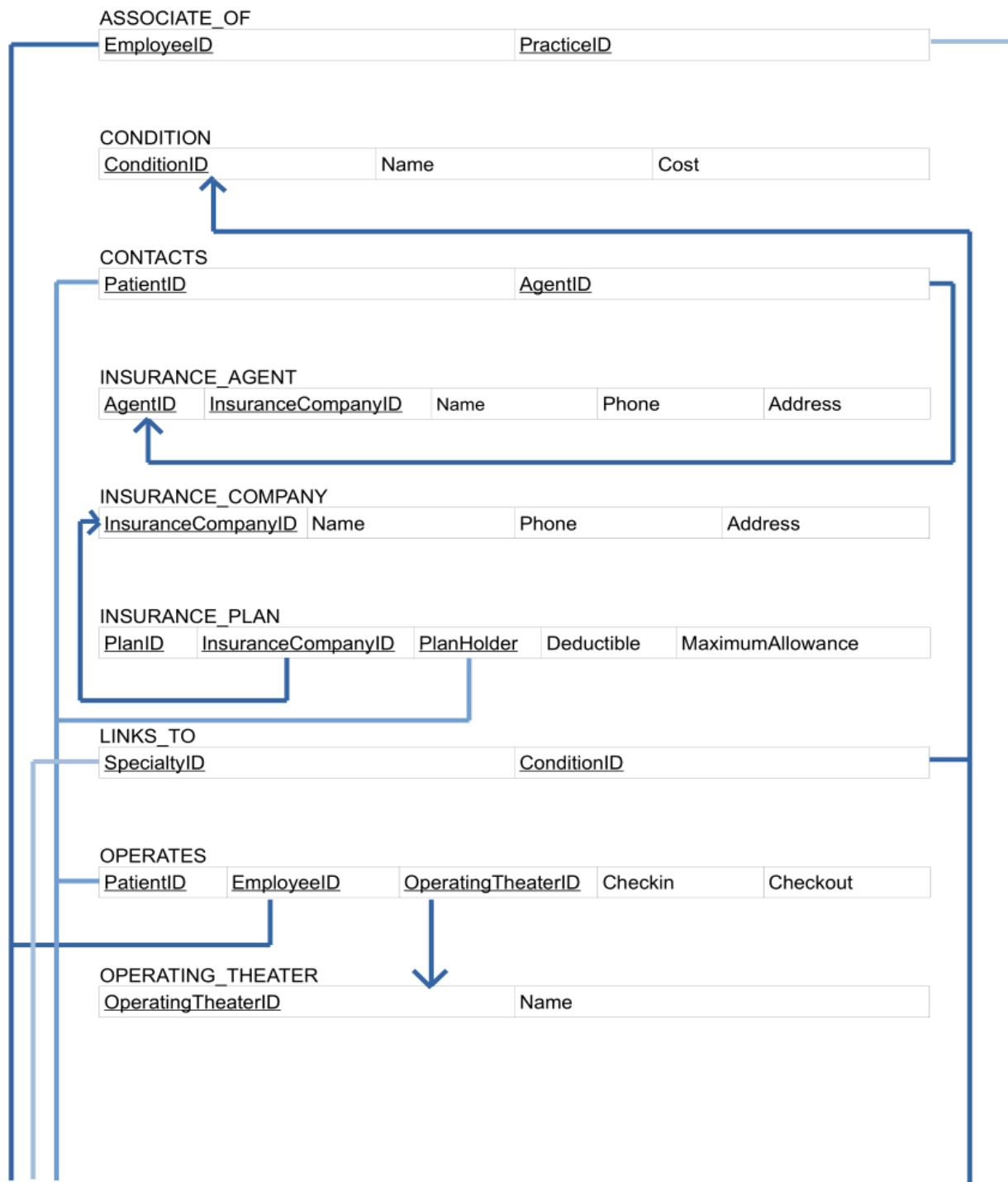
- **SpecialtyID:** Integer. Foreign key from Specialty table.
- **ConditionID:** Integer. Foreign key from the Condition table.

Name: RESIDES IN

Description: Describes the stay of a Patient in a Room.

- **Checkin:** Date Time. Time at which a Patient checks in to this Room.
- **Checkout:** Date Time. Time at which a Patient checks out of this Room.
- **PatientID:** Integer. The foreign key from the Patient table.
- **RoomNo:** Integer. The foreign key of the Room in which the Patient is staying in.
- **Duration:** Date Time. A derived attribute valued (Checkout - Checkin).

Schema Diagram

ASSOCIATE_OF

EmployeeID	PracticeID

CONDITION

ConditionID	Name	Cost

CONTACTS

PatientID	AgentID

INSURANCE_AGENT

AgentID	InsuranceCompanyID	Name	Phone	Address

INSURANCE_COMPANY

InsuranceCompanyID	Name	Phone	Address

INSURANCE_PLAN

PlanID	InsuranceCompanyID	PlanHolder	Deductible	MaximumAllowance

LINKS_TO

SpecialtyID	ConditionID

OPERATES

PatientID	EmployeeID	OperatingTheaterID	Checkin	Checkout

OPERATING_THEATER

OperatingTheaterID	Name

PATIENT

Patient ID	Name	Gender	Add-ress	Phone	Living Will	NOK Name	NOK Relation	NOK Gender	NOK Phone	NOK Address

PRACTICE

PracticeID	Name	Phone	Address

RECOVERS_IN

PatientID	RecoveryRoomID	Checkin	Checkout

RECOVERY_ROOM

RecoveryRoomID	Name	MaximumOccupancy

RESIDES_IN

PatientID	RoomNumber	Checkin	Checkout

ROOM

RoomNumber	WardID	Price

SPECIALIZE_IN

EmployeeID	SpecialtyID

SPECIALTY

SpecialtyID	Type

STAFF

EmployeeID	Name	Gender	NFlag	Rank	SFlag	TFlag	Cost

SUFFER_FROM

PatientID	ConditionID

WARD

WardID	Name	Type

WORKS_IN

EmployeeID	WardID