Hospital Administrator

Ha Tran

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Purpose

The purpose of this Database Design Documentation (DBDD) is to help the hospital administrator create a database to keep track nurse assignments to their wards and nurse interactions with their patients, patient admissions by their doctors and treatments administered by doctors to their patients, bed assignments for each patient and items charged to patients during their stay.

Narrative

The hospital administrator wants to create a database to track nurse assignments to their wards and nurse interactions with their patients, patient admissions by their doctors and treatments administered by doctors to their patients, bed assignments for each patient and items charged to patients during their stay. The administrator wants to record each nurse's name and address, phone and alternate phone, email and the medical specialties he or she is certified. Some nurses supervise one or more other nurses. No nurse is supervised by more than one nurse, and some nurses are unsupervised.

Each ward at the hospital has a designated number, descriptive name, physical location and phone number. Each ward has at least one nurse assigned to it. A nurse is assigned to at least one ward and rotates assignments among other wards. The assignment is tracked by the specific date and the hours worked in the assigned ward by each nurse on that date.

In addition to nurse assignments, each ward also has a charge nurse. The charge nurse is the custodian of the medical records for the ward. Not all nurses act in this capacity, but those that do are in charge of only one ward, and a ward only has one charge nurse.

A ward consists of hospital beds. The beds are inventoried to a specific ward. Information on beds including their size (small, large, extra-large) and their type (elevated electrically or manually). Most of the beds are large and manual (this is the default setting).

When a patient is admitted to the hospital they are assigned to a specific bed. Not all beds are available for use all the time, and a bed may not be assigned to more than one patient.

Information on patients is recorded: name, gender, dob, address, phone, alternate phone, email.

The date the patient is admitted to the hospital, the admitting doctor, the date the patient is discharged, and discharging doctor are also tracked.

Some doctors admit patients while others do not. Doctor information tracked: name, address, phone, alternate phone, email and their medical specialties.

The hospital tracks the treatments administered to patients and the treating doctor. Treatments are tracked by name, description, and charge. The hospital also tracks the date and time of each treatment administered and the results. Some doctors treat patients while others do not.

A given patient may receive no treatments or may receive many, and some patients may receive their treatments from more than one doctor. Some treatments have yet to be used while others have been used often.

In addition to treatments, patients incur other charges for items used during their stay. The hospital tracks these charges as “items” and stores information on what items have been charged to which patients, based on date and quantity. Information that is to be stored for each item includes the item name and charge. All patients incur at least one charge for consumable items used during their stay. Some items are used often while items may be new or unusual in nature and might rarely or never be charged to any patients.

Lastly, the hospital tracks nurse patient care. Each nurse patient care interaction is an event. There are several types of events: wellness check, medication, food service, assistance, treatment admin, and “other.” Given the number of shifts and ward rotations, a patient will typically be seen by more than one nurse during their stay, and a nurse most likely will interact with the same patient over several events during a single shift.

Requirements (Actors/Roles)

Nurse: Some nurses supervise one or more other nurses. No nurse is supervised by more than one nurse, and some nurses are unsupervised

Ward: Each ward has at least one nurse assigned to it. A nurse is assigned to at least one ward and rotates assignments among other wards.

Patient:When a patient is admitted to the hospital they are assigned to a specific bed. A patient receives no treatments or many treatments from doctors and nurses and incur charges for items consumed during their stay

Doctor: Some doctors admit patients while others do not. Some doctors treat patients while others do not.

Treatment: A given patient may receive no treatments or may receive many, and some patients may receive their treatments from more than one doctor. Some treatments have yet to be used while others have been used often.

Bed: A bed is associated with a specific ward. Not all beds are available for use all the time, and a bed may not be assigned to more than one patient.

Item: All patients incur at least one charge for consumable items used during their stay. Some items are used often while items may be new or unusual in nature and might rarely or never be charged to any patients.

Entities

- Nurse
- Ward
- Patient
- Doctor
- Treatment
- Bed
- Item

Entities w/ Nested Attributes

- Nurse
    - Employee No
    - Name
    - Phone
    - Address
    - AltPhone
    - E-mail
- Ward
    - Ward Name
    - Location
    - Phone
- Patient
    - Patient No
    - Name
    - Gender
    - Date Of Birth
    - Admit Date
    - Discharge Date
- Doctor
    - DoctorID
    - Name
    - Phone

    - Address
    - Email
    - AltPhone
    - Specialty
- Treatment
    - Treatment No
    - Name
    - Description
    - Charge
- Bed
    - Bed No
    - Size
    - Type
- Item
    - Item No
    - Name
    - Charge

Business Rules

Nurse: Some nurses supervise one or more other nurses. No nurse is supervised by more than one nurse, and some nurses are unsupervised

Ward: Each ward has at least one nurse assigned to it. A nurse is assigned to at least one ward and rotates assignments among other wards.

Patient:When a patient is admitted to the hospital they are assigned to a specific bed. A patient receives no treatments or many treatments from doctors and nurses and incur charges for items consumed during their stay

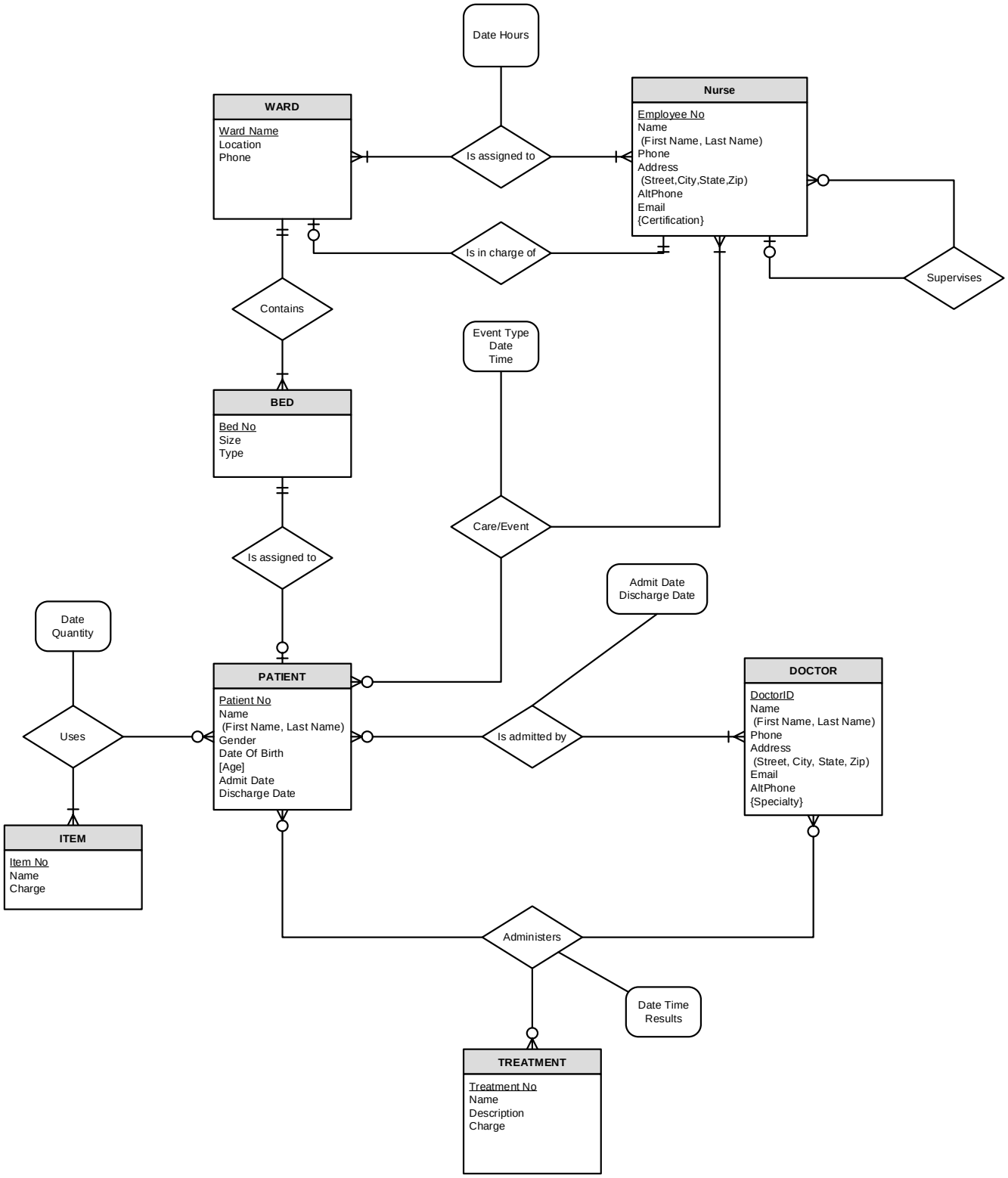
Doctor: Some doctors admit patients while others do not. Some doctors treat patients while others do not.

Treatment: A given patient may receive no treatments or may receive many, and some patients may receive their treatments from more than one doctor. Some treatments have yet to be used while others have been used often.

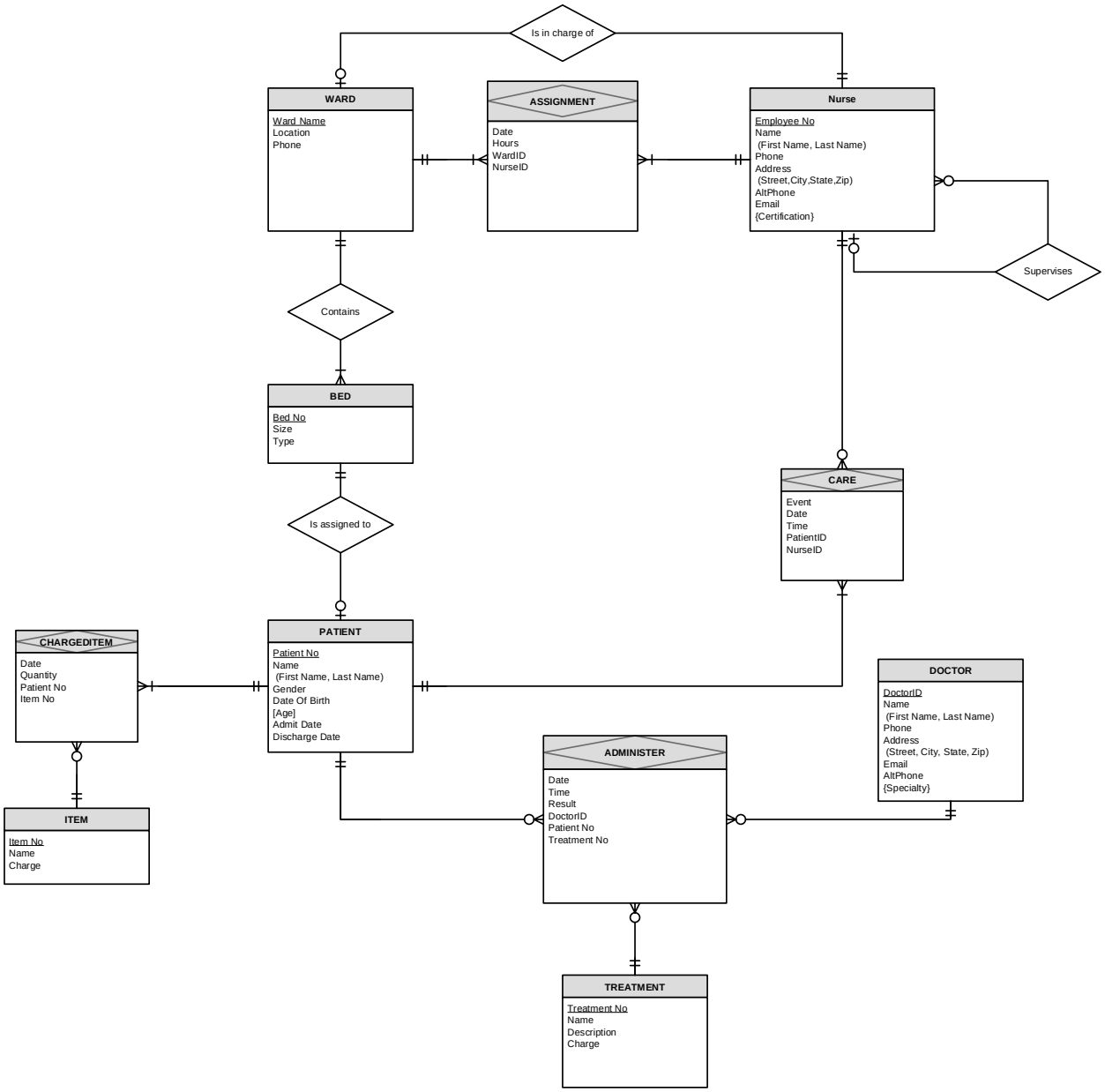
Bed: A bed is associated with a specific ward. Not all beds are available for use all the time, and a bed may not be assigned to more than one patient.

Item: All patients incur at least one charge for consumable items used during their stay. Some items are used often while items may be new or unusual in nature and might rarely or never be charged to any patients.

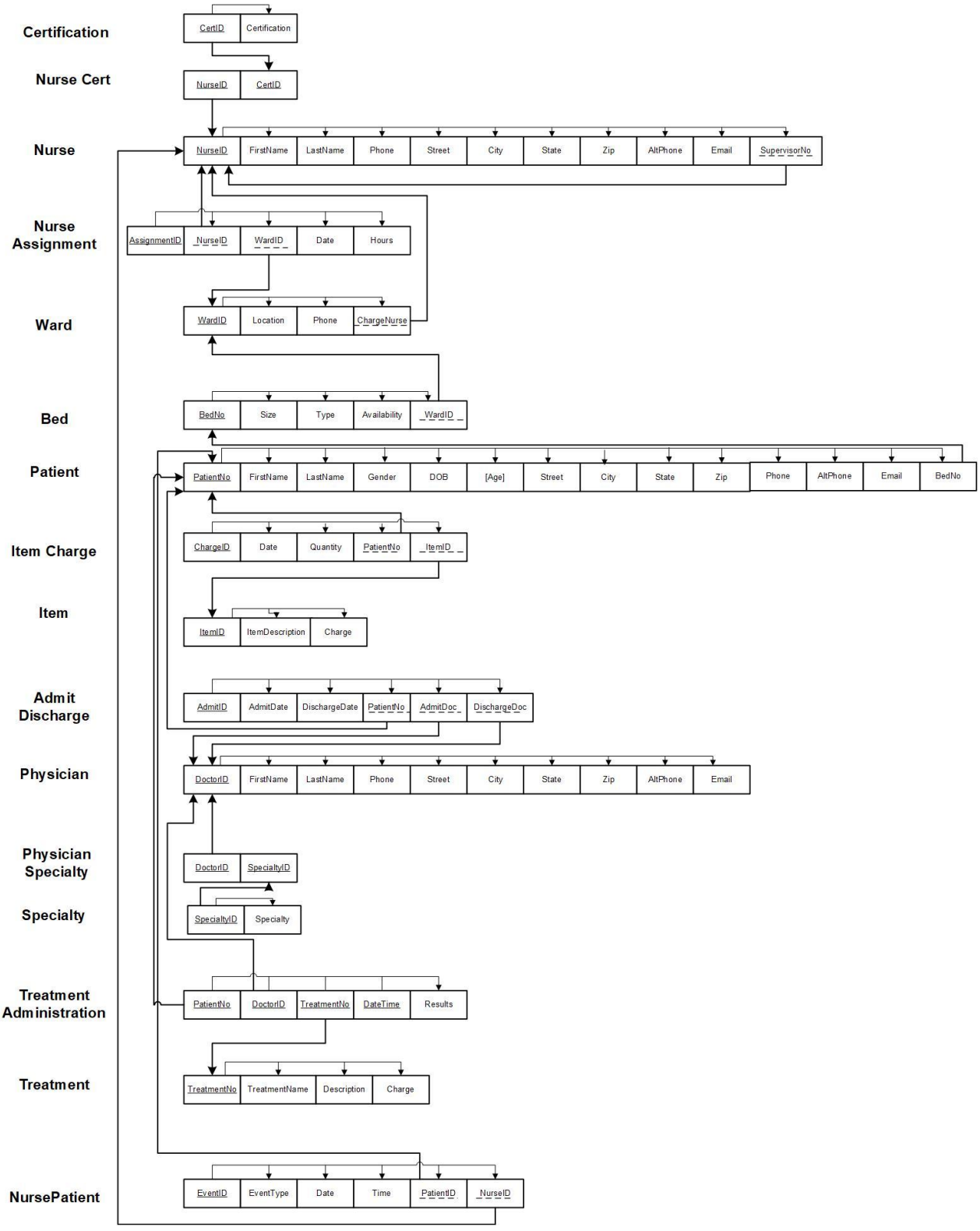
ERD


Date Hours
WARD
Ward Name
Location
Phone
Is assigned to
Nurse
Employee No
Name
(First Name, Last Name)
Phone
Address
(Street,City,State,Zip)
AltPhone
Email
{Certification}
Is in charge of
Supervises
Contains
Event Type
Date
Time
BED
Bed No
Size
Type
Care/Event
Is assigned to
Admit Date
Discharge Date
Date
Quantity
PATIENT
Patient No
Name
(First Name, Last Name)
Gender
Date Of Birth
[Age]
Admit Date
Discharge Date
DOCTOR
DoctorID
Name
(First Name, Last Name)
Phone
Address
(Street, City, State, Zip)
Email
AltPhone
{Specialty}
Uses
Is admitted by
ITEM
Item No
Name
Charge
Administers
Date Time
Results
TREATMENT
Treatment No
Name
Description
Charge

EERD


Is in charge of
WARD
Ward_Name
Location
Phone
ASSIGNMENT
Date
Hours
WardID
NurseID
Nurse
Employee No
Name
(First Name, Last Name)
Phone
Address
(Street,City,State,Zip)
AltPhone
Email
{Certification}
Supervises
Contains
BED
Bed No
Size
Type
Is assigned to
CARE
Event
Date
Time
PatientID
NurseID
CHARGEDITEM
Date
Quantity
Patient No
Item No
PATIENT
Patient No
Name
(First Name, Last Name)
Gender
Date Of Birth
[Age]
Admit Date
Discharge Date
DOCTOR
DoctorID
Name
(First Name, Last Name)
Phone
Address
(Street, City, State, Zip)
Email
AltPhone
{Specialty}
ADMINISTER
Date
Time
Result
DoctorID
Patient No
Treatment No
ITEM
Item No
Name
Charge
TREATMENT
Treatment No
Name
Description
Charge

RS


Certification
CertID
Certification
Nurse Cert
NurseID
CertID
Nurse
NurseID
FirstName
LastName
Phone
Street
City
State
Zip
AltPhone
Email
SupervisorNo
Nurse Assignment
AssignmentID
NurseID
WardID
Date
Hours
Ward
WardID
Location
Phone
ChargeNurse
Bed
BedNo
Size
Type
Availability
WardID
Patient
PatientNo
FirstName
LastName
Gender
DOB
[Age]
Street
City
State
Zip
Phone
AltPhone
Email
BedNo
Item Charge
ChargeID
Date
Quantity
PatientNo
ItemID
Item
ItemID
ItemDescription
Charge
Admit Discharge
AdmitID
AdmitDate
DischargeDate
PatientNo
AdmitDoc
DischargeDoc
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Phone
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City
State
Zip
AltPhone
Email
Physician Specialty
DoctorID
SpecialtyID
Specialty
SpecialtyID
Specialty
Treatment Administration
PatientNo
DoctorID
TreatmentNo
DateTime
Results
Treatment
TreatmentNo
TreatmentName
Description
Charge
NursePatient
EventID
EventType
Date
Time
PatientID
NurseID

Data Dictionary

Table: **Certification**

Column Name	Description	Data Type	Size	Identity	Unique	Default	Rule	Check	AllowNulls	Index
CertID	**PK** for Certification	int		Y						Y
Certification	Nurse's certification	nvarchar	50							Y

Table: **NurseCert**

Column Name	Description	Data Type	Size	Identity	Unique	Default	Rule	Check	AllowNulls	Index
NurseID	**CPK**, **FK** tracks Nurse, references Nurse table	int								Y
CertID	**CPK**, **FK** tracks Certification, references Certification table	int								Y

Table: **Nurse**

Column Name	Description	Data Type	Size	Identity	Unique	Default	Rule	Check	AllowNulls	Index
NurseID	**PK**, Unique sequential nurse ID number	int		Y						Y
FirstName	Nurse's first name	nvarchar	20							Y
LastName	Nurse's last name	nvarchar	20							
Phone	Phone number of the nurse	char	14							
Street	Street of the nurse	nvarchar	30							
City	City of the nurse	nvarchar	30							
State	State of the nurse	char	2					LIKE '[A-Z][A-Z]'		
Zip	Zip code of the nurse	char	5					LIKE '[0-9][0-9][0-9][0-9][0-9]'		
AltPhone	Alternative phone number of the nurse	char	14							
Email	Email of the nurse	nvarchar	20							
SupervisorNo	Recursive **FK**, Synonym for NurseId, one nurse supervises another nurse	int								

Table: **NurseAssignment**

Column Name	Description	Data Type	Size	Identity	Unique	Default	Rule	Check	AllowNulls	Index
AssignmentID	**PK**, Unique sequential nurse assignment ID number	Int		Y						Y
NurseID	**FK** tracks Nurse, references Nurse table	int								Y
WardID	**FK** track Nurse, references Nurse table	int								Y
Date	Date of the nurse assignment	date								
Hours	Number of hours the nurse work on this assignment	decimal	(4,2)							

Table: **Ward**

Column Name	Description	Data Type	Size	Identity	Unique	Default	Rule	Check	AllowNulls	Index
WardID	**PK**, Unique ward ID number	int		Y						Y
Location	Location of the ward	nvarchar	20							
Phone	Phone number of the ward	char	14							
ChargeNurse	**FK** references Nurse table, synonym for NurseID, one nurse is in charge of a ward	int								

Table: **Bed**

Column Name	Description	Data Type	Size	Identity	Unique	Default	Rule	Check	Allow Nulls	Index
BedID	**PK**, Unique bed ID number	int		Y						Y
Size	Size of the bed	char	2			‘L’		LIKE ‘S’ OR ‘M’ OR ‘L’ OR ‘XL’		
Type	Type of the bed	char	1			‘M’		LIKE ‘E’ OR ‘M’		
Availability	Availability of the bed	char	1			‘O’		LIKE ‘O’ OR ‘A’		

WardID	**FK** tracks ward, references Nurse table	int								

Table: **Patient**

Column Name	Description	Data Type	Size	Identity	Unique	Default	Rule	Check	Allow Nulls	Index
PatientID	**PK**, Unique sequential Patient ID number	int		Y						Y
FirstName	Patient's first name	nvarchar	20							
LastName	Patient's last name	nvarchar	20							
Gender	Patient's gender	char	2					LIKE 'M' OR 'F' OR 'NA'		
DOB	Patient's date of birth	date								
Age	Calculated age of the patient: datediff(year,DOB,getdate())	computed								
Street	Street of the patient	nvarchar	30							
City	City of the patient	nvarchar	30							
State	State of the patient	char	2					LIKE '[A-Z][A-Z]'		
Zip	Zip of the patient	char	5					LIKE '[0-9][0-9][0-9][0-9][0-9]'		
Phone	Phone number of the patient	char	14							
AltPhone	Alternative phone number of the patient	char	14							

Email	Email of the patient	nvarchar	30							
BedID	**FK** to Bed table	int								Y

Table: **ItemCharge**

Column Name	Description	Data Type	Size	Identity	Unique	Default	Rule	Check	Allow Nulls	Index
ChargeID	**PK**, Unique sequential charge ID number	int		Y						Y
Date	Date of the charge	date								
Quantity	Quantity of items	int								
PatientID	**FK** to Patient table	int								
ItemID	**FK** to Item table	int								

Table: **Item**

Column Name	Description	Data Type	Size	Identity	Unique	Default	Rule	Check	Allow Nulls	Index
ItemID	**PK**, Unique item number	int		Y						Y
ItemDescription	Description of the item’s name	nvarchar	30							
Charge	Cost of item in money	money								

Table: **AdmitDischarge**

Column Name	Description	Data Type	Size	Identity	Unique	Default	Rule	Check	Allow Nulls	Index
AdmitID	**PK**, Unique sequential admit ID number	int		Y						Y
AdmitDate	Date the patient is admitted	date								
DischargeDate	Date the patient is discharged	date								
PatientID	**FK** to Patient table	int								
AdmitDoc	**FK** to Physician table, synonym for DoctorID	int								
DischargeDoc	**FK** to Physician table, synonym for DoctorID	int								

Table: **Physician**

Column Name	Description	Data Type	Size	Identity	Unique	Default	Rule	Check	AllowNulls	Index
DoctorID	**PK**, Unique sequential doctor ID number	int		Y						Y
FirstName	Doctor's first name	nvarchar	20							Y
LastName	Doctor's last name	nvarchar	20							
Phone	Phone number of the doctor	char	14							
Street	Street of the doctor	nvarchar	30							
City	City of the doctor	nvarchar	30							
State	State of the doctor	char	2					LIKE '[A-Z][A-Z]'		
Zip	Zip code of the doctor	char	5					LIKE '[0-9][0-9][0-9][0-9][0-9]'		

AltPhone	Alternative phone number of the doctor	char	14							
Email	Email of the doctor	nvarchar	20							

Table: **PhysicianSpecialty**

Column Name	Description	Data Type	Size	Identity	Unique	Default	Rule	Check	AllowNulls	Index
DoctorID	**CPK**, **FK** tracks Doctor, references Physician table	int								Y
SpecialtyID	**CPK**, **FK** tracks Specialty, references Specialty table	int								Y

Table: **Specialty**

Column Name	Description	Data Type	Size	Identity	Unique	Default	Rule	Check	AllowNulls	Index
SpecialtyID	**PK** for Specialty	int		Y						Y
Specialty	Description of the specialty	nvarchar	50							Y

Table: **TreatmentAdministration**

Column Name	Description	Data Type	Size	Identity	Unique	Default	Rule	Check	Allow Nulls	Index
PatientID	**CPK**, **FK** tracks Patient, references Patient table	int		Y						Y
DoctorID	**CPK**, **FK** tracks Doctor, references Physician table	int								Y
TreatmentID	**CPK**, **FK** tracks Treatment, references Treatment table	int								Y
DateTime	**CPK**, date and time of the treatment	datetime								Y
Results	Result of the treatment	nvarchar	50							

Table: **Treatment**

Column Name	Description	Data Type	Size	Identity	Unique	Default	Rule	Check	Allow Nulls	Index
TreatmentID	**PK**, Unique treatment ID number	int		Y						Y
TreatmentName	Description of the treatment's name	nvarchar	30							
Description	Description of the treatment	nvarchar	50							
Charge	Cost of the treatment in money	money								

Table: **NursePatient**

Column Name	Description	Data Type	Size	Identity	Unique	Default	Rule	Check	AllowNulls	Index
EventID	**PK**, Unique event ID number	Int		Y						Y
EventType	Type of the event	nvarchar	15					LIKE ‘wellness check’ OR ‘medication’ OR ‘food service’ OR ‘assistance’ ‘treatment admin’ OR ‘other’		
Date	Date of the event	date								
Time	Time of the event	time								
PatientID	**FK** to Patient table	int								Y
NurseID	**FK** to Nurse table	Int								Y

Database Diagram