DBAS 5206-01

Mountainview Community Hospital

Database Migration Documentation

Adrian Kriz, James Weber, Daniel Allen

How we plan to implement a solution

Mountainview Community Hospital has overgrown its current system and requires a new adaptive database system that solves their issues with the previous one. The current system does not allow for medical staff to record and report on laboratory tests and procedures. This is an issue due to need for these processes to be recorded for the staff to do their jobs, currently it must be done outside of the current system, which causes issues in trying to look up and perform them. We plan on fixing that by including these inside or system for the staff to have swift easy access to this important data that they need. The next issue that was brought up was the fact that the current system is batch oriented and does not support some desired on-line features. This means that the data in the system has the possibility to contain not entirely up to date data, this means that the staff will not be able to dynamically access information on their patients and that might lead to errors. To rectify this issue, we plan to make the database update to a server hosted on site, so that employees who are allowed can have access to both registrations, and billing at a moment notice. The Third issue that was brought up by the Hospital was the lack of sorting costs by department or cost centre, this causes issues with audits not being able to check exactly where most of the expenses are coming from. While this might seem like an easy fix it is not going to be, a refactoring of how costs are to be recorded will be added, adding a field to show what cost center is associated to them, alongside this there will be a report for the totals and the values that add up to them. The final deficiency that was pointed out to us was the current inflexibility of the current system and how it does not respond well to updating reporting requirements. This is an issue since the hospital is not meeting the standards set by the other health system agencies, this means that transferring information, or even having an intake of patients from other hospitals is not as simple or easy as it should be, as these standards not being met not only means the hospital isn't following them, it also means that data transfer needs data truncated or deleted. Our plan to solve this issue is to make the system up to the current standard and on top of that make it in a program that would allow us to easily make edits to the software to keep up with the ever-changing needs of the hospital. The new system that will be made for the Mountainview Community Hospital will grow alongside it adapting to its needs and making sure that it will stay relevant and not old and inflexible like the current system in place.

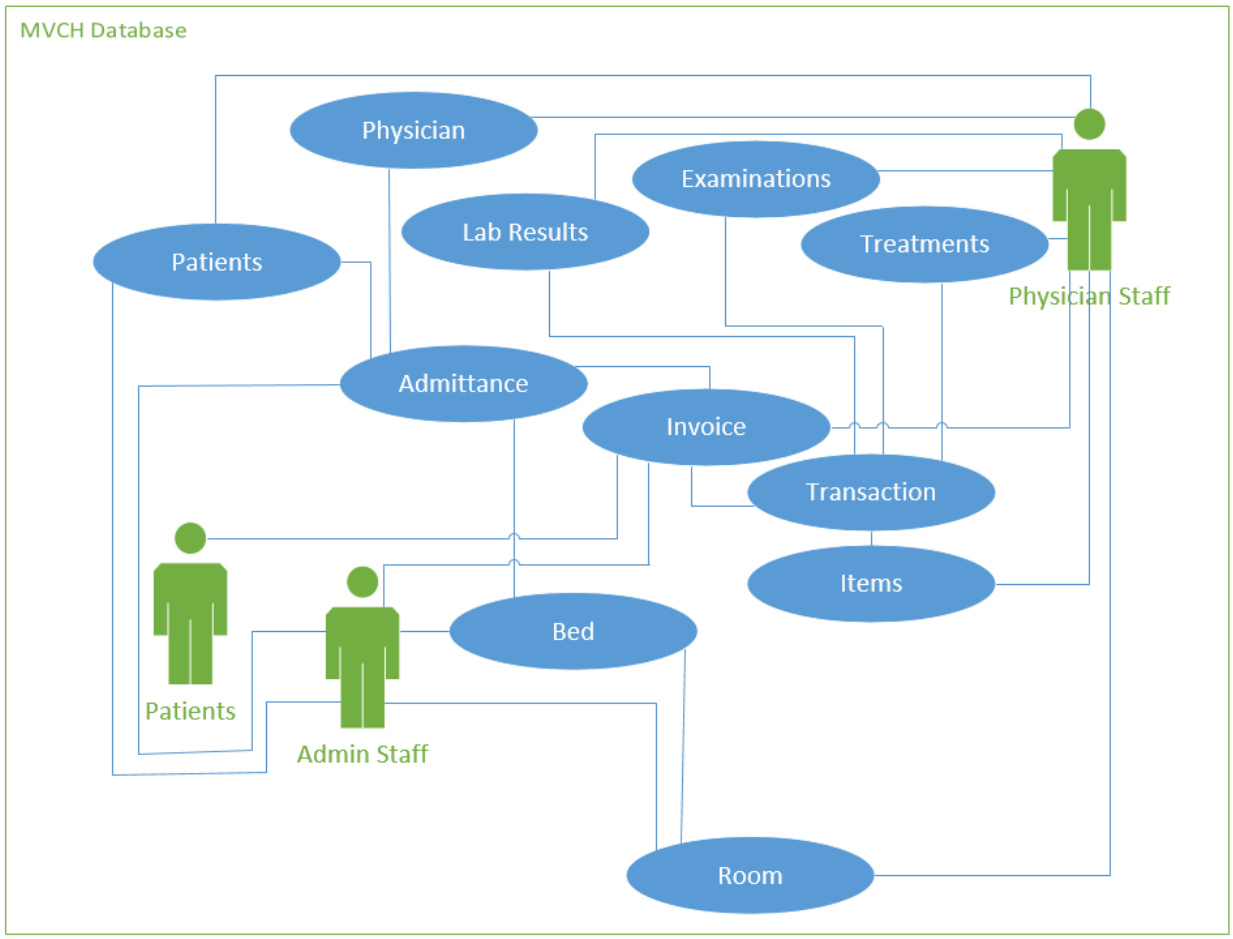
Mission Statement

Our team's goal is to create a new dynamic database for the Mountain View Community Hospital that will maintain all the information needed to keep the hospital working, while allowing real-time updating and reading of data with a scalable design that will keep pace with the hospital's changing needs.

Mission Objectives

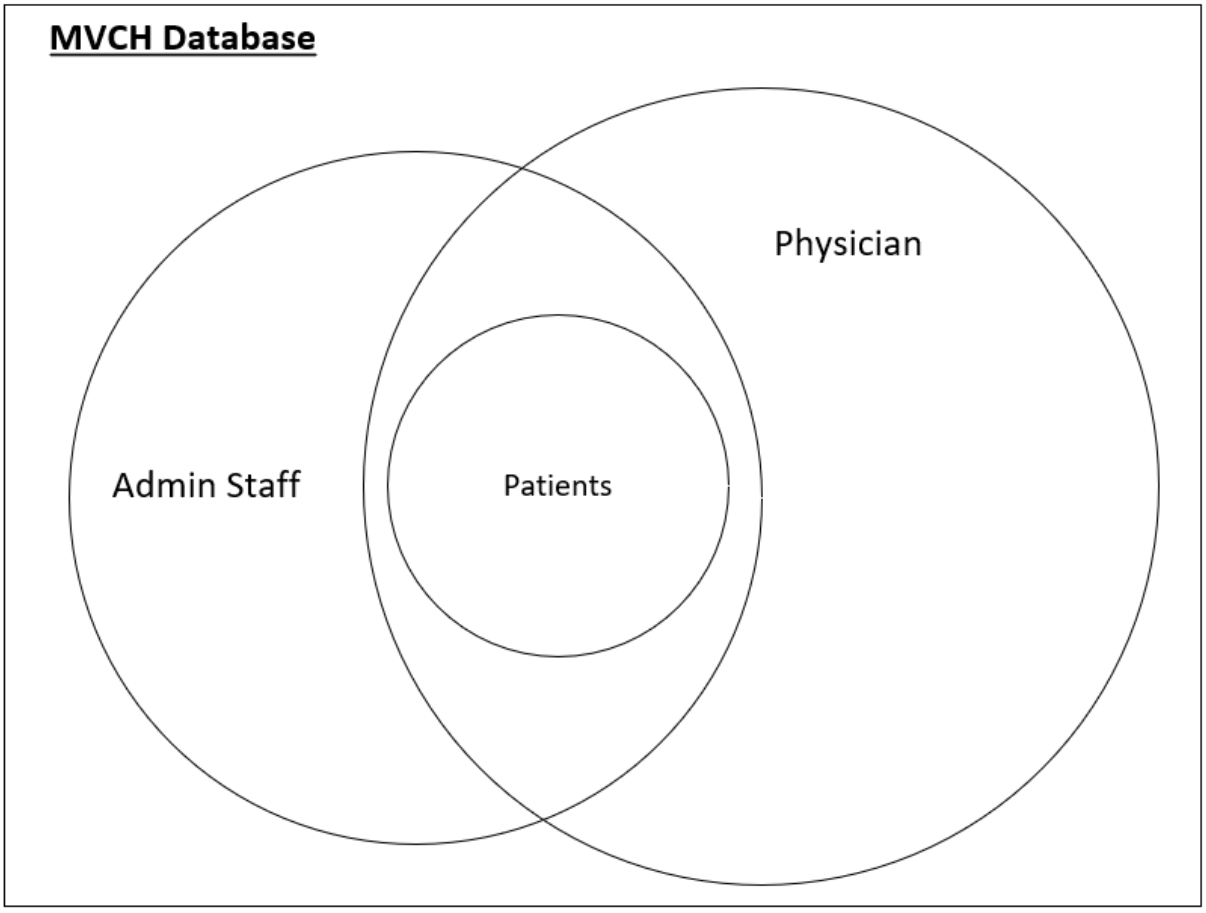
- Record information on patients
- Record information on a patient's admittance
- Record information on physicians
- Record information on lab results
- Record information on examinations
- Record information on treatments applied
- Create cost centres
- Create items for inventory
- Create invoices for a user's stay at the hospital
- Update information on patients
- Update information on a patient's admittance
- Update information on the location of beds
- Update information on physicians
- Update information on the invoices to account for more charges
- Update cost centres
- Update item prices
- Delete patient information after 2 years
- Delete patient admittance information after the 2 years
- Flag physicians as no longer working and
- Delete physicians after the previous and they have no patient/physician records
- Delete cost centres
- Delete items from the list
- Track the patients' current status (treatments, results, examinations)
- Track the any cost a patient is accruing
- Track costs by cost centre
- Track the room locations for each bed being used
- Track the speciality of each physician
- Create reports on each patient
- Create reports on each physician
- Create reports on each patient a physician has
- Create reports on the daily revenue
- Create reports based upon how a room is being used
- Create reports on a patient's bill
- Create reports based upon revenue

System Boundary



The above system boundary is how our new system will work and all the relationships required. There are 3 types of users available within the system, these people use the system in different ways and thus have different access levels to it. The first user is the patient, they have the smallest view of the system as they can only see their own invoices, they are put as an internal part of the system since patients are themselves the subject of a table, however they need to be at the hospital to even interact with the system. The next user is the administrative staff, the people who do all the paperwork and the clerical requirements of the hospital. They can access the patients, their admittances, the beds, the rooms, and the invoices generated during a patient's stay. This allows for them to admit and help medical staff put patients into the database with all their information gathered here. Finally, there is the physician staff, the staff that handle all the medical requirements of the hospital, they can access patient information, physician information, lab results, the results of examinations, ongoing treatments, any items the patient is using, the room each patient is in, and the overall invoice for the stay. This means that this user can look at all that is being done to a patient and from there go on and diagnose and treat the user properly.

User Views



Patients can only see their information on the invoice and thus have the smallest view in the database, this hides confidential medical information from other patients and from non medical practitioners.

Admin staff can see what patients can see plus some information that the physicians can see, however some information is limited only to them, this allows them to do their book keeping without being cluttered with information that is unnecessary for them to have.

Physicians have the largest view however it does not encompass the entire system, they can see what patients see, and a bit of what the administrative staff can see, however more medical information is limited to them, since that is what pertains to their job.

3NF Design

Patient Table
(PatientID, Patient Name, Patient Address, City, Provence, Postal Code, Sex, Health Card Number, FinancialID)

Admitted Table
(AdmittanceID, PatientID, Date Admitted, Discharge Date, BedID)

Financial Table
(FinacialID, Financial Status/Source name)

Bed Table
(BedID, RoomID, BedLocation, Extension)

Physician Table
(PhysicianID, Physician Name, Telephone, SpecialtyID)

Specialty Table
(SpecialtyID, Specialty Name)

Cost Centre Table
(CostCentreID, CostCentreName)

Item Table
(ItemID, ItemName, Charge, CostCentreID)

Room Table
(RoomID, RoomType, RoomTypeLong, RoomTelephone)

Invoice Table
(InvoiceID, AdmittanceID, InvoiceDate)

Transaction table
(TransactionID, InvoiceID, ItemID, DateCharged, CostAtDate)

Physician/Admittance table
(PhysicianID, AdmittanceID)

Lab Result table
(ResultID, TransactionID, LabResultDetails)

Examination Details table
(ExaminationID, TransactionID, ExaminationDetails)

Treatments Table
(TreatmentID, TransactionID, TreatmentDetails)

List of functional dependencies

tblPatients
PatientID -> PatientName
PatientID -> PatientAddress
PatientID -> City
PatientID -> Provence
PatientID -> PostalCode
PatientID -> Sex
PatientID -> HealthCard#

tblAdmittance
AdmittanceID -> Date Admitted
AdmittanceID -> Discharge Date

tblFinance
FinacialID -> FinancialName

tblBed
BedID -> BedLocation
BedID -> Extension

tblPhysician
PhysicianID -> PhysicianName
PhysicianID -> Telephone

tblSpeciality
SpecialityID -> SpecialityName

tblCostCentre
CostCentreID -> CostCentreName

tblItems
ItemID -> ItemName
ItemID -> Charge

tblRooms
RoomID -> RoomType
RoomID -> RoomTypeLong
RoomID -> RoomTelephone

tblInvoice
InvoiceID -> InvoiceDate

tblTransaction
TransactionID -> DateCharged
TransactionID -> CostAtDate

tblLabResult
ResultID -> LabResultDetails

tblExaminationDetails
ExaminationID -> ExaminationDetails

tblTreatments
TreatmentID -> TreatmentDetails

Data Dictionary

tblPatient

Field Name	Description	Type	Domain	Required	Key	Comments
PatientID	Unique Identifier for each patient	Int(6)	000001 -> 999999	YES	PK	AutoNumbered
PatientName	Name of the Patient	String (30)		YES	/	
PatientAddress1	Street address of the patient	String (30)		YES	/	
PatinetAddress2	City Province Postal Code of the Patient	String (30)		YES	/	
Sex	The sex of the patient	Char(1)	M/F/O	YES	/	
HealthCard#	The Health Card of the Patient	Int(12)	000000000001 -> 999999999999	YES	/	Masked to ####-###-###-##
FinacialID	The Unique IDentifier for the Financial source of the patient	char(1)	A/E/S/O	YES	FK	FinancialID from tblFinancial

tblAdmittance

Field Name	Description	Type	Domain	Required	Key	Comments
AdmittanceID	Unique Identifier for each stay at the hospital	Int(7)	0000001 -> 9999999	YES	PK	AutoNumbered
PatientID	Unique Identifier for each patient	Int	000001 -> 999999	YES	FK	PatientID from tblPatient
Date Admitted	Date the patient was admitted to hospital	Date		YES	/	
Discharge Date	Date the patient was discharged from hospital	Date		NO	/	
BedID	Unique identifier for the bed the patient stayed at	Int		YES	FK	BedID from tblBed

tblFinance

Field Name	Description	Type	Domain	Required	Key	Comments
FinancialID	Unique Identifier for each Financial source	Char(1)	A/E/S/O	YES	PK	AutoNumbered
FinancialName	The name of each Financial Source	String (8)	Assure/ ESI/ Self-Pay/ Other	YES	/	

tblBed

Field Name	Description	Type	Domain	Required	Key	Comments
BedID	Unique Identifier for each Bed	Int(4)	0001 -> 9999	YES	PK	AutoNumbered
RoomID	Unique Identifier for each Room	int(3)	001 -> 999	YES	FK	RoomID from tblRoom
BedLocation	Location of the bed inside the room	Char(1)	A/B/C/D	YES	/	
Extension	The extension of the phone for the bed	int(3)	001 -> 999	NO	/	Private rooms don't have extensions

tblPhysician

Field Name	Description	Type	Domain	Required	Key	Comments
PhysicianID	Unique Identifier for each physician	Int(3)	001 -> 999	YES	PK	AutoNumbered
Physician Name	Name of each Physician	String (30)		YES	/	
Physician Telephone	The phone number to contact the physician by	Int(10)	0000000000 -> 9999999999	YES	/	###-###-####
SpecialtyID	Identifier for each physician's specialty	Int(2)	01 -> 99	YES	FK	SpecialityID from tblSpeciality

tblSpeciality

Field Name	Description	Type	Domain	Required	Key	Comments
SpecialtyID	Unique Identitifier for each specialty	Int(2)	01 -> 99	YES	PK	AutoNumbered
Specialty Name	Name for each Specialty field	String (10)		YES	/	

tblCostCentre

Field Name	Description	Type	Domain	Required	Key	Comments
CostCenterID	Unique Identifier for each cost center	Int(3)	001 -> 999	YES	PK	AutoNumbered
Cost Center Name	Name for each Cost Center	String (10)		YES	/	

tblItem

Field Name	Description	Type	Domain	Required	Key	Comments
ItemID	Unique Identifier for each item.	Int(4)	0001 -> 9999	YES	PK	AutoNumbered
ItemName	Name for each Item	String		YES		
Charge	Charge associated with each item	Decimal(6)	0000.01 -> 9999.99	YES		Updates over time
CostCentreID	Id from the specific cost center the item came from	Int(3)	001 -> 999	YES	FK	CostCentreID from tblCostCentre

tblRoom

Field Name	Description	Type	Domain	Required	Key	Comments
RoomID	Unique Identifier for each Room	Int(3)	001 -> 999	YES	PK	AutoNumbered
RoomType	Acronym of the type of room	String (2)	PR/SP/IC/W3/W4	YES	/	
RoomTypeLong	Type of the room	String (20)	Private/ Semiprivate/ Inensive Care/ Ward, 3 beds/ Ward, 4 beds	YES	/	
RoomTelephone	Telephone for the room	Int(10)	0000000000 -> 9999999999	YES	/	Masked to ###-###-####

tblInvoice

Field Name	Description	Type	Domain	Required	Key	Comments
InvoiceID	Unique Identifier for each patient	Int(7)	0000001 -> 9999999	YES	PK	Autonumbered
AdmittanceID	Unique identifier for each admittance to the hospital	Int(7)	0000001 -> 9999999	YES	FK	AdmittanceID from tblAdmittance
InvoiceDate	The date that the invoice was charged	Date		YES	/	Masked to MM-DD-YY

tblTransaction

Field Name	Description	Type	Domain	Required	Key	Comments
TransactionID	Unique Identifier for each transaction	Int(7)	0000001 -> 9999999	YES	PK	Autonumbered
InvoiceID	Unique Identifier for each invoice	Int(7)	0000001 -> 9999999	YES	FK	InvoiceID from tblInvoice
ItemID	The unique Item code for each item	Int(4)	0001 -> 9999	YES	FK	ItemID from tblItem
DateCharged	The Date at which the item was charged to the patient	Date		YES	/	Masked to MM-DD-YY
costAtDate	The cost of the item when it was charged	Decimal (6)	0000.01 -> 9999.99	YES	/	Copied from tblItem

tblPhysician/Admittance

Field Name	Description	Type	Domain	Required	Key	Comments
PhisicianID	Unique Identifier for each Physician	Int(3)	001 -> 999	YES	PK/FK	PhysicianID from table Physician
AdmittanceID	Unique Identifier for each stay at the hospital	Int(7)	0000001 -> 9999999	YES	PK/FK	AdmittanceID from Table Admittance

tblLabResult

Field Name	Description	Type	Domain	Required	Key	Comments
ResultID	Unique Identifier for each Lab Result	Int(7)	0000001 -> 9999999	YES	PK	AutoNumbered
TransactionID	Unique Identifier for each transaction	Int(7)	0000001 -> 9999999	YES	PK/FK	TransactionID from Table Transaction
LabResultDetails	Some notes for the results of the lab test	Text		YES		
PhisicianID	Unique Identifier for each Physician	Int(3)	001 -> 999	YES	FK	PhysicianID from table Physician

tblExaminationDetails

Field Name	Description	Type	Domain	Required	Key	Comments
ExaminationID	Unique Identifier for each Examintation	Int(7)	0000001 -> 9999999	YES	PK	AutoNumbered
TransactionID	Unique Identifier for each transaction	Int(7)	0000001 -> 9999999	YES	PK/FK	TransactionID from Table Transaction
ExaminationDetails	Some notes for the examination	Text		YES		
PhisicianID	Unique Identifier for each Physician	Int(3)	001 -> 999	YES	FK	PhysicianID from table Physician

tblTreatments

Field Name	Description	Type	Domain	Required	Key	Comments
TreatmentID	Unique Identifier for each Treatment	Int(7)	0000001 -> 9999999	YES	PK	AutoNumbered
TransactionID	Unique Identifier for each transaction	Int(7)	0000001 -> 9999999	YES	PK/FK	TransactionID from Table Transaction
TreatmenttDetails	Some notes describing the treatment	Text		YES		
PhisicianID	Unique Identifier for each Physician	Int(3)	001 -> 999	YES	FK	PhysicianID from table Physician