

## IS510 Project

# Cancer Drug Trials

### Team Members

Name	Email
Kahan Dave	davekh@clarkson.edu
Nowreen Ahsan	noahsan@clarkson.edu

## **Project Brief:**

A sizable grant has just been awarded to XYZ Hospital to perform research or trial to evaluate a new cancer treatment. A sufficient number of doctors will oversee the trial, which will include some patients and perhaps a few nurses. The hospital needs a database system that might be applied to the study's data and business needs.

## **Databased Requirements**

Let's assume for the sake of simplicity, that the patients in this research must not be aware of the type of medication they are getting. Medical professionals and managers are aware of such knowledge, nevertheless.

There are several requirements and expectations for this project. For the doctors and nurses, their IDs, Name, and DOB is stored. Each doctor can conduct multiple drug trials but every drug trial must have at least one doctor. Each nurse can assist in multiple drug trials but every drug trial must have at least one nurse.

For the patients, their ID, name, gender, and DOB are stored. There are several drugs that are being used. It is quite important to ensure that patients are receiving the intended medication. Patients can voluntarily enroll in the drug trial but each drug trial should compulsory have one patient. Each and every patient are allocated to a specific location for their respective drug trial. Similarly, every doctor and nurses are allocated to a specific location for the respective drug trial that they need to perform.

Some participants in the trial may decide to discontinue the study; in this event, all of their study-related data must be deleted.

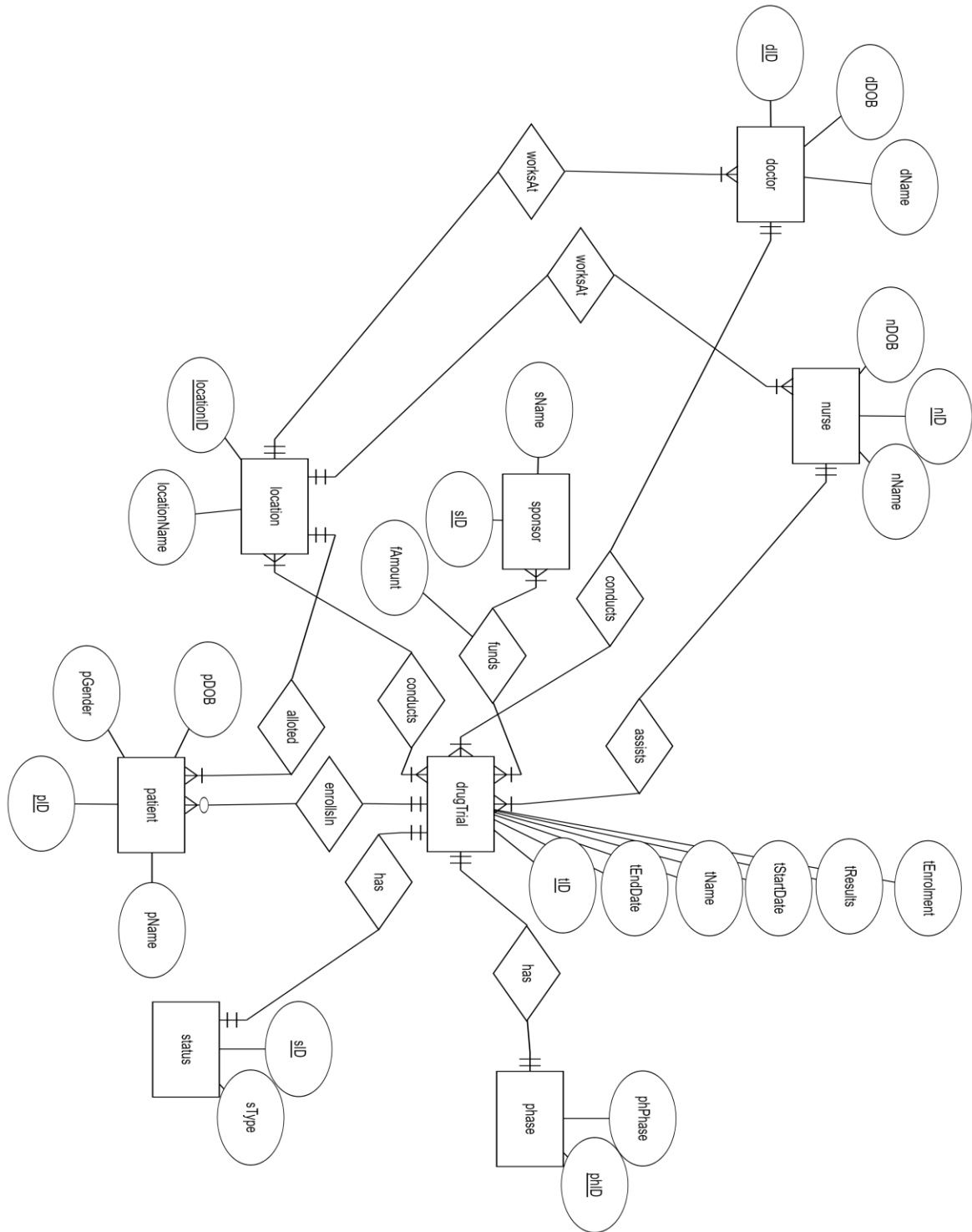
Certain business rules must be met while doing so, which include the following:

Drug trials can have many sponsors' funding. Moreover, each drug trial has only one status and phase at a time.

Before the meetings with their doctors, patients may see the nurse. The nurse will enter the results of patients' visits and which will be stored cumulatively in the database as the overall drug trial's result.

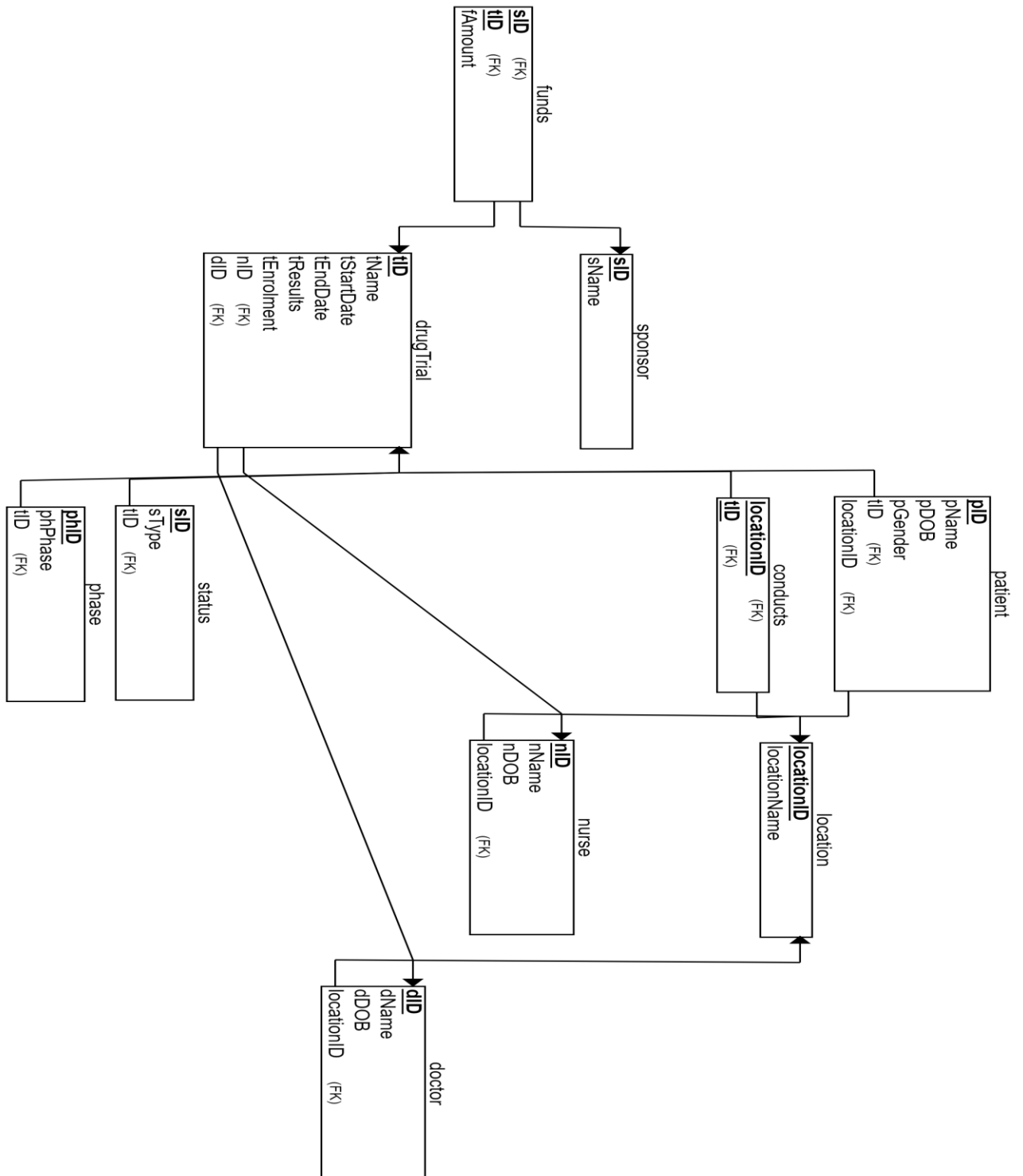
## Entity Relationship Diagram

The first step in the creation of the database is an ERD model. The ERD model is based on the description shown above. The diagram is shown below:



## Relational Schema

This section shows the relational schema with all the primary and foreign keys clearly specified.



## Database Schema with SQL

```
CREATE TABLE location
(
    locationID INT NOT NULL,
    locationName VARCHAR(20) NOT NULL,
    PRIMARY KEY (locationID)
);
```

```
CREATE TABLE doctor
(
    dName VARCHAR(20) NOT NULL,
    dDOB VARCHAR(20) NOT NULL,
    dID INT NOT NULL,
    locationID INT NOT NULL,
    PRIMARY KEY (dID),
    FOREIGN KEY (locationID) REFERENCES location(locationID)
);
```

```
CREATE TABLE nurse
(
    nID INT NOT NULL,
    nName VARCHAR(20) NOT NULL,
    nDOB DATE NOT NULL,
    locationID INT NOT NULL,
    PRIMARY KEY (nID),
    FOREIGN KEY (locationID) REFERENCES location(locationID)
);
```

*CREATE TABLE sponsor*

```
(  
  sID INT NOT NULL,  
  sName VARCHAR(20) NOT NULL,  
  PRIMARY KEY (sID)  
);
```

*CREATE TABLE drugTrial*

```
(  
  tID INT NOT NULL,  
  tName VARCHAR(20) NOT NULL,  
  tStartDate DATE NOT NULL,  
  tEndDate DATE NOT NULL,  
  tResults VARCHAR(20) NOT NULL,  
  tEnrolment INT NOT NULL,  
  nID INT NOT NULL,  
  dID INT NOT NULL,  
  PRIMARY KEY (tID),  
  FOREIGN KEY (nID) REFERENCES nurse(nID),  
  FOREIGN KEY (dID) REFERENCES doctor(dID)  
);
```

*CREATE TABLE phase*

```
(  
  phPhase VARCHAR(20) NOT NULL,  
  phID INT NOT NULL,  
  tID INT NOT NULL,  
  PRIMARY KEY (phID),  
  FOREIGN KEY (tID) REFERENCES drugTrial(tID)  
);
```

*CREATE TABLE status*

```
(  
  sID INT NOT NULL,  
  sType VARCHAR(20) NOT NULL,  
  tID INT NOT NULL,
```

```
PRIMARY KEY (sID),  
FOREIGN KEY (tID) REFERENCES drugTrial(tID)  
);
```

```
CREATE TABLE conducts  
(  
locationID INT NOT NULL,  
tID INT NOT NULL,  
PRIMARY KEY (locationID, tID),  
FOREIGN KEY (locationID) REFERENCES location(locationID),  
FOREIGN KEY (tID) REFERENCES drugTrial(tID)  
);
```

```
CREATE TABLE funds  
(  
sID INT NOT NULL,  
tID INT NOT NULL,  
PRIMARY KEY (sID, tID),  
FOREIGN KEY (sID) REFERENCES sponsor(sID),  
FOREIGN KEY (tID) REFERENCES drugTrial(tID)  
);
```

```
CREATE TABLE patient  
(  
pName VARCHAR(20) NOT NULL,  
pID INT NOT NULL,  
pDOB DATE NOT NULL,  
pGender VARCHAR(20) NOT NULL,  
tID INT NOT NULL,  
locationID INT NOT NULL,  
PRIMARY KEY (pID),  
FOREIGN KEY (tID) REFERENCES drugTrial(tID),  
FOREIGN KEY (locationID) REFERENCES location(locationID)  
);
```

## Sample Queries

Number of patient that are currently in Phase 3?

```
SELECT phase.phPhase, patient.pName, drugTrial.tResults
FROM phase, patient, drugTrial
WHERE drugTrial.tID = phase.tID
AND patient.tID = drugTrial.tID
AND phase.phPhase = "Phase 3"
LIMIT 0 , 30
```

phPhase	pName	tResults
Phase 3	Priya Barton	80% of these patient were cancer positive.
Phase 3	Jermaine Clark	80% of these patient were cancer positive.
Phase 3	Chiara Keith	80% of these patient were cancer positive.
Phase 3	Norma Patton	80% of these patient were cancer positive.
Phase 3	Carlos Berry	80% of these patient were cancer positive.
Phase 3	Taya Doyle	80% of these patient were cancer positive.
Phase 3	Conor Parsons	80% of these patient were cancer positive.



Query that just returns a particular patients Name and Test Result including the phase that they are in?

```
SELECT phase.phPhase, patient.pName, drugTrial.tResults
FROM phase, patient, drugTrial
WHERE drugTrial.tID = phase.tID
AND patient.tID = drugTrial.tID
AND (
    patient.pName = "Rehan Malone"
    OR patient.pName = "Taylor Patel"
```

phPhase	pName	tResults
Phase 1	Taylor Patel	General output always results in changes in skin c...
Phase 1	Rehan Malone	General output always results in enlargement of or...

Query that just returns which doctors working with which nurse performing which test and the location of that test?

```
SELECT doctor.dName, nurse.nName, drugTrial.tName, location.locationName
FROM doctor, nurse, drugTrial, location
WHERE location.locationID = doctor.locationID
AND doctor.dID = drugTrial.dID
AND nurse.nID = drugTrial.nID
LIMIT 0 , 30
```

dName	nName	tName	locationName
Rahul Dravid	Saakshi Sama	Laboratory tests	AIMS
Sharukh Khan	Ranu Reshamiya	Laboratory tests	IIIMS
Zordar Sukhdeve	Mamta Banerjee	Physical exam	BBRAO
Vicky Kaushal	Jacqueline Fernandez	Physical exam	BOSE
Kahan Dave	Sonia Gandhi	Biopsy	MAIMS
Katrina Kaushal	Jacqueline Fernandez	Imaging tests	MAIMS
Kartik Aaryan	Sonia Gandhi	Physical exam	MAIMS

**Query that just returns which patient is under whose supervision including the location?**

```
SELECT patient.pName, doctor.dName, nurse.nName, drugTrial.tName, location.locationName
FROM doctor, nurse, drugTrial, location, patient
WHERE location.locationID = doctor.locationID
AND doctor.dID = drugTrial.dID
AND nurse.nID = drugTrial.nID
AND drugTrial.tID = patient.tID
ORDER BY patient.pName
```

pName	dName	nName	tName	locationName
Abbey Beard	Rahul Dravid	Saakshi Sama	Laboratory tests	AIMS
Abraham Briggs	Kahan Dave	Sonia Gandhi	Biopsy	MAIMS
Anika Dawson	Rahul Dravid	Saakshi Sama	Laboratory tests	AIMS
Ashwin Rhodes	Kartik Aryan	Sonia Gandhi	Physical exam	MAIMS
Asiya Moses	Vicky Kaushal	Jacqueline Fernandez	Physical exam	BOSE
Azaan Torres	Rahul Dravid	Saakshi Sama	Laboratory tests	AIMS
Benjamin Peterson	Zordar Sukhdeve	Mamta Banerjee	Physical exam	BBRAO
Brayden Rowland	Sharukh Khan	Ranu Reshamiya	Laboratory tests	IIIMS
Brenda Singh	Kartik Aryan	Sonia Gandhi	Physical exam	MAIMS
Carlos Berry	Katrina Kaushal	Jacqueline Fernandez	Imaging tests	MAIMS
Carys Knowles	Rahul Dravid	Saakshi Sama	Laboratory tests	AIMS
Chiara Keith	Katrina Kaushal	Jacqueline Fernandez	Imaging tests	MAIMS
Conor Parsons	Katrina Kaushal	Jacqueline Fernandez	Imaging tests	MAIMS
Dale Macdonald	Sharukh Khan	Ranu Reshamiya	Laboratory tests	IIIMS
Dawid Mckinney	Sharukh Khan	Ranu Reshamiya	Laboratory tests	IIIMS