Synopsis

In general, our system was able to capture most constraints in the following types: primary key, foreign key, not null, unique, and carnality ratios.

However, the system cannot capture minimum values in some relationships that involves multiple tables or constraints like ones specified in requirement 1 and 2 that needs different behavior based on a conditional value. These constraints will require more complex mechanisms such as triggers and assertions.

The following is the detailed explanation of each requirement:

1. Does you design capture the requirement that all patients under the age of 18 must have a parent or guardian in the system?

   No, because we can add a patient under 18 to the PATIENT table without creating a PARENT. This requirement could probably be captured by triggers or assertions which involves some coding.

2. Does your design capture the requirement that a patient over the age of 18 does not have a parent or guardian?

   No, because we can add a patient above 18 to the PATIENT table and his/her parent to the PARENT_GUARDIAN table at the same time. Also, if an underage patient with a parent grow older than 18. No procedure will be triggered so that his/her parent gets removed. Again, this requirement could probably be captured by triggers or assertions which involves some coding.

3. Does the system document when a person does not have insurance? This could be a new situation after having insurance.

   No, because the system does not directly store a person's current insurance status. It only stores the insurance status of a patient at a specific visit.

4. Does your design capture the insurance information for each visit?

   Yes, because the Iid attribute of VISIT_RECORD table has NOT NULL and FK constrains. The FK constraint points to the Iid of INSURANCE_RECORD table. So every visit record must has a insurance record associated with it.

5. Can a patient be seen by only one service provider per visit?

   No, because VISIT_RECORD table and SERVICE_PROVIDER table do not have direct FK relationship between them. One visit record can have multiple treatment/test/procedure linked to it. And each treatment/test/procedure has a service provider linked to it. So in one visit, a patient can have multiple treatment/test/procedure requested by multiple service providers.

6. Can a patient be seen by different service providers on different visits?

   Yes, because PATIENT table and SERVICE_PROVIDER table do not have direct FK relationship between them. Instead, each visit of a patient can have a treatment/test/procedure requested by a different service provider.

7. Can a patient have more than one diagnosis per visit?

Yes, the results of the test shows that a single Vid(visit_record) appears multiple times which suggests that a patient can have several diagnoses in a single visit.

8. Does every visit have at least one diagnosis?

Yes, in my testing the only way that a diagnosis could possibly not exist is if it were somehow possible to leave the ICD-10-CM code empty. Additionally the foreign keys of the diagnosis table (Vid, Sid) also are required.

9. Can only service providers make a diagnosis(es)?

Based on our diagram it is pretty evident that no other employee (Clerk, Nurse) has a direct link to the diagnosis table. And therefore their ids should not be able to exist in the Sid column of DIAGNOSIS. In my testing, I show that it's not possible to create a DIAGNOSIS and populate the Sid column using either a Nurse or Clerk id. Therefore only the service providers id is the only id that can exist in the Sid column of DIAGNOSIS.

10. Does the system properly document followup tests/procedures with proper coding?

Based on the discussion I had in Office hours, my understanding of this question was, if it's possible to create a single medically identifiable ICD-10-CM code and have that code be associated with multiple diseases. My testing shows that it is possible to have multiple different illnesses associated with a single ICD-10-CM code. There is no constraint that prevents that, therefore our system as it currently is set does not document this correctly and would need further adjustments.

11. Does the system document what intake clerk collected the insurance information and the copay?

Our diagrams insurance record is split up into a couple tables as it was described in the initial prompt. However, to keep track of a patient who would be paying out of pocket, or would be using their insurance we created a third table. In this table we have the Clerk's Cid. It is with this Cid that we are able to get information about the clerk. My testing shows that it is possible to get the Clerks information using the Cid that is associated with a particular insurance record.

12. Does a visit allow for only one initial assessment to be completed?

Yes, The first test in this section was designed to show that met the requirement that each visit allow only one initial assessment. This was demonstrated by showing that each assessment value is unique, and that the foreign attribute Aid (assessment id) in our visit table could only reference a single assessment.

13. Does the system allow the patient to visit the urgent care more than one time?

Yes, next we showed that a patient can visit the er more than once be inserting two visit records with the same patient named 'John Smith' with patient id 98765432.

14. Do initial assessments have the nurse's information associated with it? Can we retreive the nurse's information?

Yes, we showed that each initial assessment has nurse associated with it because the Nid value of assessment is a foreign key attribute the references a nurse entity. We showed that we could retrieve that nurses employee information by joining our employee table with our initial assessment table and extracting employee information.

15. Can a nurse do initial assessments for multiple patients?

Yes, the foreign key attribute of nurse id does not have a unique constraint, so multiple assessments can reference the same nurse id. This was demonstrated by inserting two initial assessments that referenced the same nurse id, and then retrieving that information.

16. Can an initial assessment be complete by only one nurse?

Yes, each initial assessment has nurse id (Nid) as a foreign key attribute. This means that each initial assessment can only reference a signal nurse. This was demonstrated by showing the creation of the table.

17. Are we able to review the vitals as defined on the writeup of the patient through queries for a given visit?

Yes, this was demonstrated by joining our visit record table with our initial assessment table (where vital information is stored) and extracting out the attributes holding vitals values (blood pressure, pulse, etc). Further more the initial assessment id attribute (Aid) has a not null constraint in our visit record table, so each visit record MUST reference an initial assessment. The vital values themselves are allowed to be null, so that is a constraint we may change in the future upon further clarification of the requirements.

18. Can service providers request more than one test/procedure per visit?

Yes, a service provider can request more than one tests/procedures. The test case lock down a certain patient's certain visit, and he/she can create more than one tests/procedures, which means that the condition can happen.

19. Can there be no tests/procedures for a patient for a given visit?

Yes. In this case, I assume if a patient's visit record does not connect any tests/procedures, which means there are no tests/procedures for the given visit. The sql will successfully run and pull out an empty table.

20. Test at least two FKs for the cardinality numbers that are on the design document (your choice of Fks) – do we capture the max numbers for the relations?

To capture the numbers of relations, I count how many FK-connected-table's information can be displayed. Since both FKs I chose to have a 1 to N relation, both of the FK successfully pulled out the max numbers of the relations. For TREATMENT_TEST_PROCEDURE, `Vid` from VISIT_RECORD is the foreign key, and for VISIT-RECORD, `Pid` from PATIENT is the foreign key. Both of them show more than one counts, indicate both of them have 1:N cardinality.And both of them pulled all information on FK-connected tables, indicate max numbers of relations are captured.

21. You should have two tests to test two primary keys or other keys. (your choice of PKs or keys)

I chose to test two primary keys. Since primary keys' features are not null and unique. I chose thetwo primary key columns and tried to insert null value and duplicated value. Both cases failed, which means the two columns cannot be null and cannot be duplicated, which means both of them are primary keys.