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SWDV 691
Design: Database

Overview

The UHealth database, henceforth known as UHealthDB or UHDB, is a relational database that will be built in either SQL Server 2017 or PostgreSQL. The data is highly normalized with many relationships between tables. The UHDB, as currently planned, will consist of ten tables: seven data tables and three bridge or pivot tables. There is not central table that joins all of the tables, however, each table of data can and will be extracted into independent data objects for use inside of the application. As you will see from the Entity Relationship Diagram provided, there are many different paths a user can take to access and join all of the tables together.

Assessment

As stated in the overview, the UHDB will consist of ten tables: seven data tables and three bridge tables:

Data Tables

- Facility_Dimensions
- Facility_Type_Dimensions
- Procedure_Code_Dimensions
- Procedure_Base
- Physician Dimensions
- Specialty Dimensions
- Insurance Dimensions
- Physician Review Dimensions (stretch goal)

Bridge Tables

- Procedure_Facility_Bridge
- Facility_physician_Procedures_Bridge
- Physician_Insurance_Bridge

The Facility_Dimensions table is the base table for all facilities that exist in the UHealth application. The Facility_Dimensions table has a primary key called the facility_skey which is unique to each facility in the system. This key will also exist as a foreign key in the bridge and type tables in order to join those tables to the facility for more information. The Facility_Dimensions table primary responsibility is to hold and update the name, address and facility_type_skey of each facility in the application.

The Facility_Type_dimensions table is one of the only “types” data table that exists in the UHDB. This table has a primary key of facility_type_skey which is unique to each facility type and is a foreign key into the Facility_Dimensions table in order let each facility know what its “type” is. A facility can be things like a hospital, pharmacy, convenient care, or other medical facility. The primary responsibility of the Facility_Type_Dimensions table is to hold a record of every possible type of facility and link that data to the facility in question. In the UHealth application, this table will allow the user to filter down what facilities they see based on the type of facility selected.

The Procedure_Code_Dimension table is the base table for all procedures that a medical facility can perform. The table consists of a procedure_code primary key which links as a foreign key to the

procedure_base table and the procedure_facility_bridge table. The primary responsibility of the Procedure_Code_Dimensions table is to hold information on each unique procedure_code (unique to each facility) and the description of the procedure in question. In the UHealth application, this table will allow users to filter down facilities based on what procedures can be linked to each facility.

The Procedure_Base table is the base table that handles the cost and length_of_stay of each procedure. This table also has a primary key of procedure_code and links to the Procedure_Code_dimensions table with this same key, and the Facility_Physician_Procedures_Bridge table as a foreign key. Since each procedure_code is unique to the facility that performs it, there will be duplicate data in both procedure tables for difference types of procedures. For example, there might be two unique procedure_codes for a heart transplant that also have different costs and length of stay.

The Procedure_Facility_bridge table is one of the three bridge tables that exists in the UHDB. This is the largest table in the UHDB because it not only joins two tables (Facility_Dimensions and Procedure-Code_Dimensions), but it also contains unique information such as total_cost (a calculated field), procedure_date, major_complications, minor_complications, readmission, and the provider NPI number. This table is responsible for much of the facility comparison that will happen inside of the application and is one of the most critical stores of information for the application.

The Facility_Physician_Procedures_Bridge is a bridge table is essentially a pivot table between Facility_Dimensions and Procedure_Base to the Physician_Dimensions table. The only responsibility of this table is to join physician, and thus insurance information by proxy, to facilities and procedures.

The Physician_Dimensions table contains the information about each physician listed in the UHealth application. The primary key is the National Provider Index (NPI) number that is unique to each physician in the world. This table contains name information on the physician and a specialty_skey, so that each physician can be given its specialty in the application.

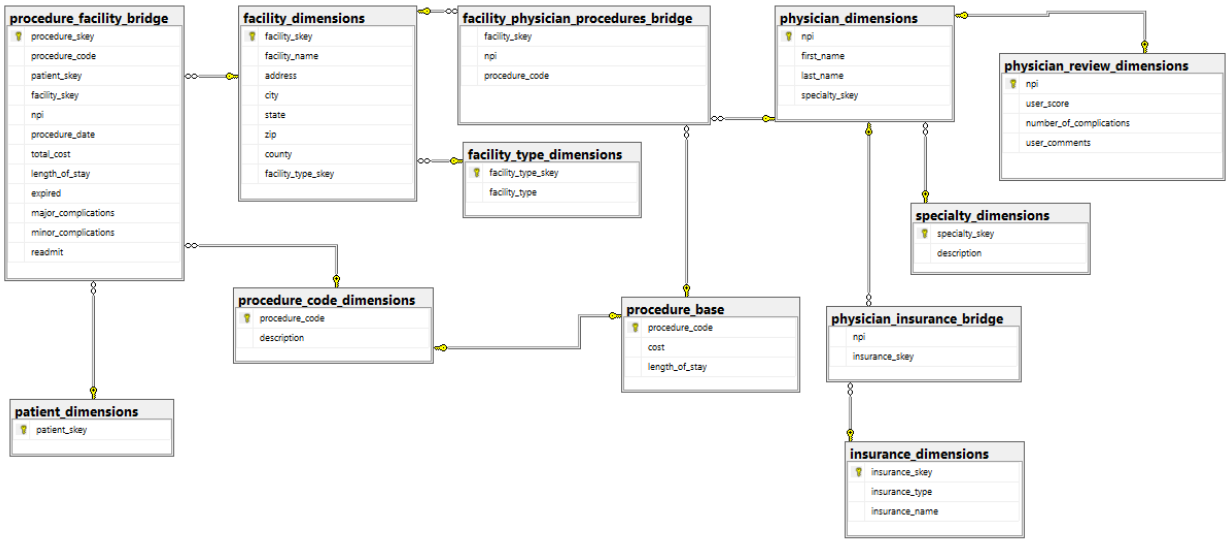
The Specialty_Dimensions table is a types table similar to the Facility_Type_Dimensions table that contains a primary key, specialty_skey, and a description of what each specialty is. Specialties include things like cardiovascular, orthopedic, pediatrician and so on. In the UHealth application, this will allow users to filter down hospitals and facilities based on what specialties can be linked to each facility.

The Insurance_Dimensions table contains information about insurance that is accepted by a physician and, by proxy, a facility. The insurance_skey is the primary key and links to the physician_dimensions table via a bridge table. Each insurance entry has a name and a table. In the UHealth application, this table will allow a user to filter down facilities based on the type of insurance that is accepted by that facility.

The Physician_Insurance_Bridge table is a pivot table between the Physician_Dimensions table and the Insurance_Dimensions table. This table contains only the NPI number for linking to Physician_Dimensions and the insurance_skey for linking to the Insurance_Dimensions Table.

The Physician_Reviews_Dimensions table contains information about user reviews of each doctor. This includes things like bedside manner, procedure complications, a user score and comments about that specific physician. The table is joined to the Physician_Dimensions table on the NPI field.

Entity Relationship Diagram (Updated for Stretch Goals)



Use Cases

When a user conducts a base search by location or zip code, the information displayed on the Map and on the facility list to the right comes from the Facility_Dimensions table.

When that same user opens a filter dropdown from the list on the left hand side of the UI, the information contained in the dropdowns comes from the joined tables in the UHDB. For example, if a user wanted to filter by facility type, the only types that would exist in the dropdown list are types that exist in the currently selected location. There would be no reason to allow a user to filter on “optometrist” if there are no optometrists in the area, for example.

By selecting a specialty filter from the filter list, the facilities are filtered out by joining the facility_dimensions table to the specialty_dimensions table via the physician_dimensions table and the facility_physician_procedures_table.

Insurance filtering follows a similar path as specialties except the insurance_dimensions table is joined to the physician_dimensions table via the physician_insurance_bridge table.

When a user is comparing statistics on a facility, that information is being compared mostly by data in the procedure_facility_bridge table, but there will be other data included as well such as specialties and insurance types.