CS 340 Project Step I Draft for My Kidney Nutrition Tracker Application
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Overview

Kidney disease impacts around 37 million people within the United States and is one of the leading causes of death. Health insurances pay an estimated $87.2 billion to treat chronic kidney disease and around $37.3 billion to treat those who have end stage renal disease.[1] The diet for individuals who have kidney disease is one of the most complicated diets to follow which include potentially restricting phosphorus, sodium, and potassium. There are currently more than 165,000 health-related and diet applications where only one third of these actually focus on chronic diseases. Most of the current kidney related applications information that is provided are not accurate or evidence-based. Many of them such as Kidney APPetite, Kidney Diet and Pocket Dietitian have been discontinued with newer operating systems. [2]

Our database driven website will provide a niche that is not currently being represented in today's market for dialysis. Especially bringing in renal dietitian skills paired with development; there is currently nothing that exists with this experience mixture but needs to in order to provide accurate and evidence-based information to those that struggle with their diet and require this information to be accessible to them. In this database, we will provide our Patient (on dialysis) with a tracking system for their Food consumed which will allow the Patient to track specific nutritional content that is renal focused to help them achieve their health goals/Lab Results that are within metric benchmarks. These Lab Results are influenced by what Food the Patient decides to consume and impacted by the Dialysis Form they are on as well. This database will provide the Patient with the resources ultimately to achieve better outcomes while tracking certain attributes that influence their abilities to achieve these goals.

Database Outline
Patients: Records the details of the patients. Focusing on patients with end stage renal disease that are on dialysis.

- patient_id: INT, auto_increment, unique, not NULL, PK
- last_name: VARCHAR(128), not NULL
- first_name: INT(128), not NULL
- age: INT, not NULL
- gender: VARCHAR(20)
- height: INT, not NULL
- weight: INT, not NULL

- relationship: M:M relationship with food implemented with patient_id as a FK inside of food.
- relationship: 1:M relationship with Lab_Results implemented with patient_id as a FK inside of Lab_Results.
- relationship: M:1 relationship with Dialysis_Forms implemented with patient_id as a FK inside of Dialysis_Forms.

Food: records the food the patients consume focusing on minerals/calories that need to be watched in the renal diet. These main minerals include phosphorus, potassium, and sodium. Along with focusing on calories consumed too.

- food_id: INT, auto_increment, unique, not NULL, PK
- name: VARCHAR(128), not NULL
- phosphorous_content: INT
- phosphorous_units: VARCHAR(32), not NULL
- potassium_content: INT
- potassium_units: VARCHAR(32), not NULL
- sodium_content: VARCHAR(32)
- sodium_units: VARCHAR(32), not NULL
- calories: INT
- calories_units: VARCHAR(32), not NULL
- relationship: M:M relationship with Patients implemented with food_id as a FK inside of Patients.

Lab_Results: records the lab results of the kidney patients that are nutritionally relevant such as phosphorus, potassium and sodium levels. It is also important to monitor adequacy or also known as Kt/v which is a metric that shows how well the patient is dialyzing which is heavily influenced by the type of dialysis they are on since different forms of dialysis have different adequacy metrics to meet.

- lab_id: INT, auto_increment, unique, not NULL, PK
- name: VARCHAR(128), not NULL
- phosphorus_lab: FLOAT
- phosphorus_lab_units: VARCHAR(32), not NULL
- potassium_lab: FLOAT
- potassium_lab_units: VARCHAR(32), not NULL
- sodium_lab: INT
- sodium_lab_units: VARCHAR(32), not NULL
- dialysis_adequacy_lab: FLOAT
- lab_results_time: DATETIME(), not NULL
- relationship: M:1 relationship with Patients implemented with lab_id as a FK inside of Patients.

- relationship: M:1 relationship with Dialysis_Forms implemented with lab_id as a FK inside of Dialysis_Forms

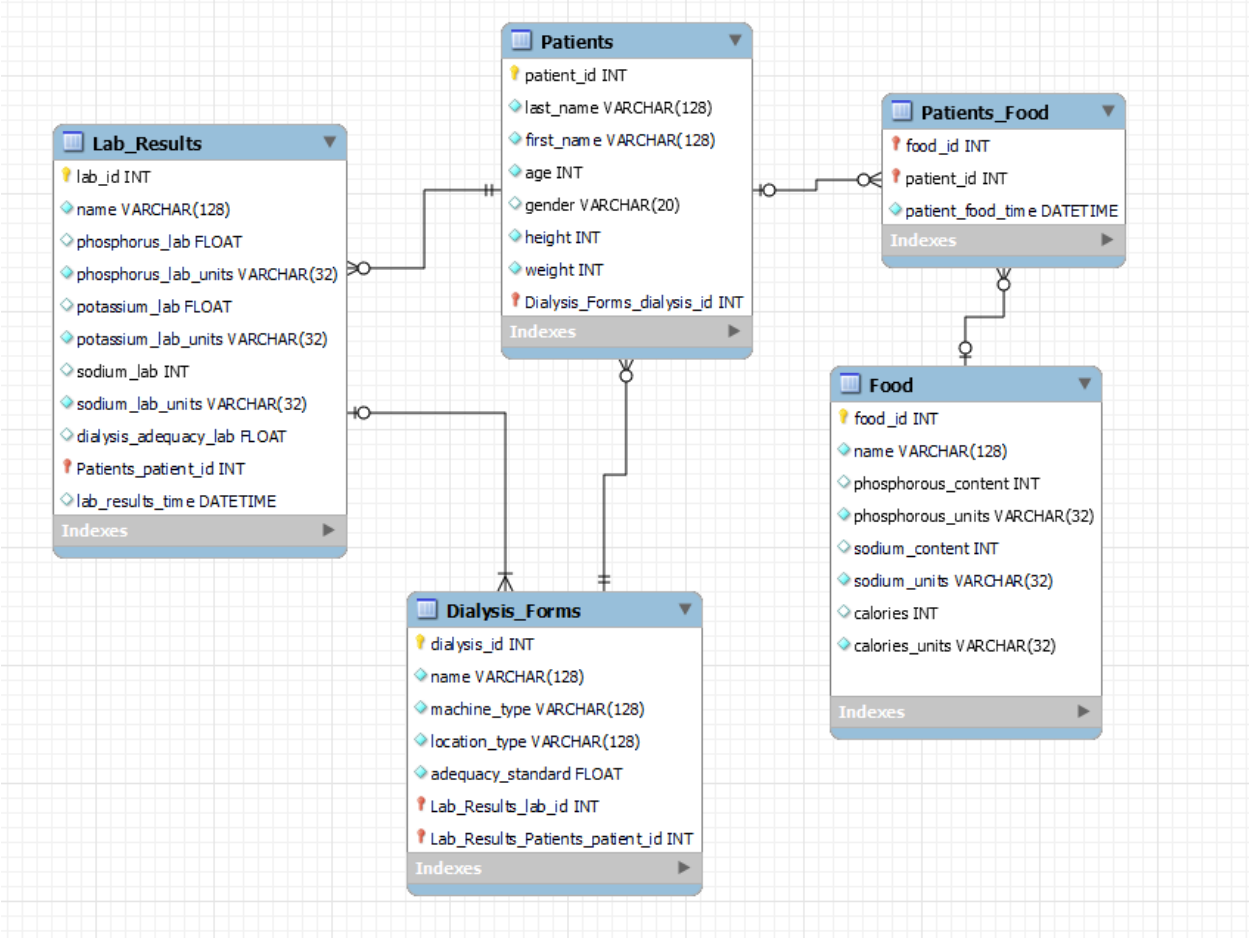
Dialysis_Forms:records the type of dialysis the kidney patient is on; common types of dialysis include in-center, home-hemo, and peritoneal dialysis. The form of dialysis can affect the desired lab results, and different forms of dialysis have different desired adequacy metrics.

- dialysis_id:INT, auto_increment, unique, not NULL, PK
- name: VARCHAR(128), not NULL
- machine_type: VARCHAR(128), not NULL
- location_type: VARCHAR(128), not NULL
- adequacy_standard: FLOAT, not NULL
- relationship: 1:M relationship with Patients implemented with dialysis_id as a FK inside of Patients.
- relationship: 1:M relationship with Lab_Results implemented with dialysis_id as a FK inside of Lab_Results

Patient_Food: Intersection table between Patients and Food. Connects the patients to food that they have eaten, and add a time characteristic for when the patient ate the food.

- food_id: INT, FK
- patient_id: INT, FK
- patient_food_time: DATETIME(), not NULL

Entity Relationship Diagram



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[1]Centers for Disease Control and Prevention. (2022, February 28). *Chronic Kidney Disease Basics*. Centers for Disease Control and Prevention. Retrieved April 3, 2022, from https://www.cdc.gov/kidneydisease/basics.html#:~:text=15%25%20of%20US%20adults%20are,is%20about%2037%20million%20people.

[2]*Renal diet apps: Which one should I use?* Kidney Diet Tips. (2018, July 30). Retrieved April 3, 2022, from https://blogs.davita.com/kidney-diet-tips/renal-diet-apps-which-one-should-i-use/