Requirements Analysis Document

St. Jude's Anglican Home

VIPER CONSULTING

October 28, 2016

Revision History

Name	Date	Reason for Changes	Version
Whole team	Oct. 23	Initial document creation.	1.0
Whole team	Oct. 26	Drafts of sections after group meeting.	2.0
Whole team	Oct. 27	Editing drafts.	3.0
Bernice, Zane, Devon, Wayne, Graeme, Todd, Jeff	Oct. 28	Finishing sections, final editing.	4.0

1 Introduction

1.1 Purpose

The document describes the requirements needed in the St. Jude's Anglican Home problem analysis process. The purpose of this project is to address the need of implementing preventative measures and increasing accountability of staff in the food delivery process. Although there has only been one reported food delivery mistake, any error would be a concern for the patient's health and safety.

1.2 Project Scope

The project has two main focuses, both associated with the food delivery process: improving accountability of staff, and implementing preventative measures. The project will explore ways to improve the process of food preparation at St. Jude's so that both the upstairs and downstairs kitchens can prepare and deliver food in identical ways while simultaneously emphasizing patients' safety. The primary objective is to implement preventative measures in the meal distribution process, as it is a potential safety issue for patients.

The project will look at the flow chart of the current food preparation and delivery processes at St. Jude's, and the entire preparation procedure will be analyzed and mapped. This project does not need to completely change the already-established system, but instead produce a solution that implements improvements in specific stages of the workflow.

1.3 Glossary of Terms

RN: Registered Nurse

LPN: Licensed Practical Nurse

Residential Care: A round-the-clock care facility with physicians and nurses where new patients are referred by hospitals.

Vancouver Coastal Health: Regional Health Authority that provides a wide range of health services to over one million BC patients living in Vancouver and surrounding areas.

Viper Consulting: A team of dedicated systems analysts and developers in the Health Information Science and Computer Science programs at the University of Victoria.

1.4 References

[1] St. Jude's Anglican Home. *Care and Services* [Online]
Available: http://stjudes.bc.ca/care-and-services/

[2] St. Jude's Anglican Home. *Care Home Guidelines* [Online]
Available: http://stjudes.bc.ca/data/uploads/2015/family-booklet-sept-2015.pdf

[3] BC Residential Care Facilities. *Residential Care Regulation* [Online]
Available: http://www.bclaws.ca/Recon/document/ID/freeside/96_2009

[4] University of Victoria. *Requirements Document Template* [Online]
Available: https://connex.csc.uvic.ca

1.5 Overview

This document contains seven sections and an appendix. The following section contains a high-level description of the current system. Main product features and stakeholders are described along with assumptions about St. Jude's food delivery system. The third section describes the required system features that must still exist in our proposed solution. The fourth section describes external interactions with the system. The fifth section lists the constraints and nonfunctional requirements, including security and safety requirements. The sixth section contains additional requirements, such as legal ones that are not covered in prior sections. The seventh section outlines the entity relationship diagram, use case model, and data flow diagram that represents the current system. The appendix lists any issues that have not been addressed.

2 Overall Description

2.1 Product Perspective

The system currently being developed by Viper Consulting is a replacement for the existing food delivery system in the St. Jude's Anglican Home cafeterias. This system will increase staff accountability throughout the food delivery process, and reduce errors such as delivering the wrong food to patients. It will store all patient dietary information and meal preferences, which can be altered by nurses, used by dietitians to design meals for each patient, and referred to by cooks when preparing each meal. Users will not be able to access the system outside the workplace, primarily for patient privacy purposes.

2.2 Product Features

Having each staff member log in before altering patient information and meal preferences allows for tracking of each worker's activity in the system; not only will this reduce errors as workers will be more mindful when using the system, but if an error were to occur, it would be easier to find the source and take appropriate action to ensure the error does not reoccur.

The system improvements will not require new hardware or substantial software changes, which reduces costs considerably while fostering an easier transition for users of the current system.

2.3 User Classes and Characteristics

The four main users of the St. Jude's food delivery system are the nursing staff, the cook, the dietary aides, and the dietitian.

The nursing staff determines which patients' information needs to be updated, and modifies said information in the system as needed. This includes allergies, current state of medical conditions, and chewing ability, among others.

The cook looks up food information from the system, which he then uses as a guideline to create new menus. He/she also cooks the food.

The dietitian collects menu choices from the patients, and refers to patients' food charts in the system to design appropriate individual food plans for each senior. The dietitian is also responsible for updating each patient's meal preferences in the system.

The dietary aides have three main responsibilities: gathering meal preferences from each patient, keeping the nurses up-to-date on said preferences, and delivering food from the cook to the patients.

2.4 Operating Environment

The system will operate to support the food service processes of St. Jude's Anglican Home. It operates from 5:00 AM in the morning to prepare breakfast, and runs until 8:00 PM after dinner service is completed. In order to reduce mistakes while increasing efficiency, an updated software and new database will be implemented to the current computer system. Employees will be able to access a unique database containing all meal restrictions for every patient. The system will receive light maintenance daily after 8:00 PM and will be shut down afterward until the next morning.

2.5 Design and Implementation Constraints

Budget: Since St. Jude's is a non-profit organization, funding is limited. Thus, this project will only use the resources that St. Jude's currently has, such as the current computer system and printer.

Software capability: Computers at St. Jude's Anglican Home must be capable of running the new software and database efficiently. Therefore, this project will keep the system as simple as possible to reduce the workload of the computer.

Maintenance: St. Jude's Anglican Home cannot afford to hire a new employee for system maintenance purposes, so the maintenance process must be kept as simple as possible.

2.6 Assumptions and dependencies

Computer connection: This project assumes that the computers on the first and second floor are connected, because the new system requires frequent data interchange between them.

Computer skill: This project assumes that the employees have the basic knowledge and skills required to use a computer and that they are capable of learning how to operate the new system.

Employees adaption: This project assumes that the employees will be capable of following the new food delivery rules, such as signing their name on a list after delivering food.

Time: This project assumes that every employee can be trained without simultaneously hindering the quality of service at St. Jude's Anglican Home.

3 System Features

This section details the system features that will be implemented and maintained within any new or proposed systems.

3.1 Track Patient Information

3.1.1 Description and Priority

Tracking patient information is the basis of the entire food delivery system. It is of the highest importance, as the safety and comfort of patients requires a consistent, detailed means to track patient information accurately.
Priority: High

3.1.2 Functional Requirements

REQ-ER-1: The system must allow for dietitians to meet with patients

- *Backwards Traceability:* Dietitian-patient meetings are necessary in order to create a dialogue between the dietitian and the patient. Direct meetings are necessary to determine and communicate what the dietitian feels the patient should be eating over time.
- *Forwards Traceability:* This requirement can be verified by checking that meetings are happening.

REQ-ER-2: The dietitian must be able to update patients' electronic records

- *Backwards Traceability:* Dietitians play one of the most important roles in determining the short and long term dietary plans. The most effective way to make this information known within the entire system is for the dietitian to be able to update patients' electronic records. Furthermore, dietitians must have access to information that may have been added by staff members that affect patient meal plans.
- *Forwards Traceability:* This requirement can be verified by ensuring the records are being updated (and by whom) via the "Last Updated" text.

REQ-ER-3: Care aids must be able to discuss patients' dietary issues with nurses

- *Backwards Traceability:* Care aides may be the first to notice changes in patients that may directly affect their meal plan. If this is the case, the system must allow for care aides to effectively communicate this with the nursing staff.
- *Forwards Traceability:* This requirement can be verified by ensuring care aide - nurse meetings are occurring.

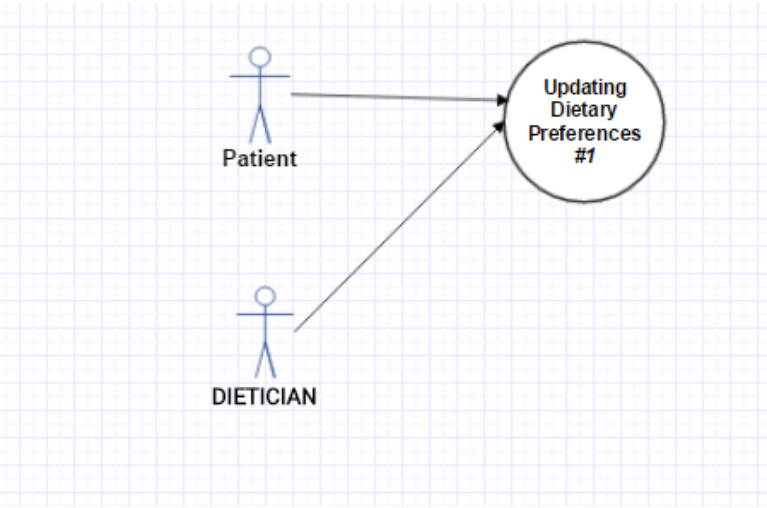
REQ-ER-4: The Nurse must be able to update patients' electronic records

- *Backwards Traceability:* The nurse may be one of the only staff members to be able to medically observe and document dietary-related updates/issues

within patients. Therefore, they must be able to both read and write information to the patient record.

- *Forwards Traceability:* This requirement can be verified by ensuring the records are being updated (and by whom) via the “Last Updated” text.

3.1.3 Use Case(s) associated with the Feature or Functional Requirements



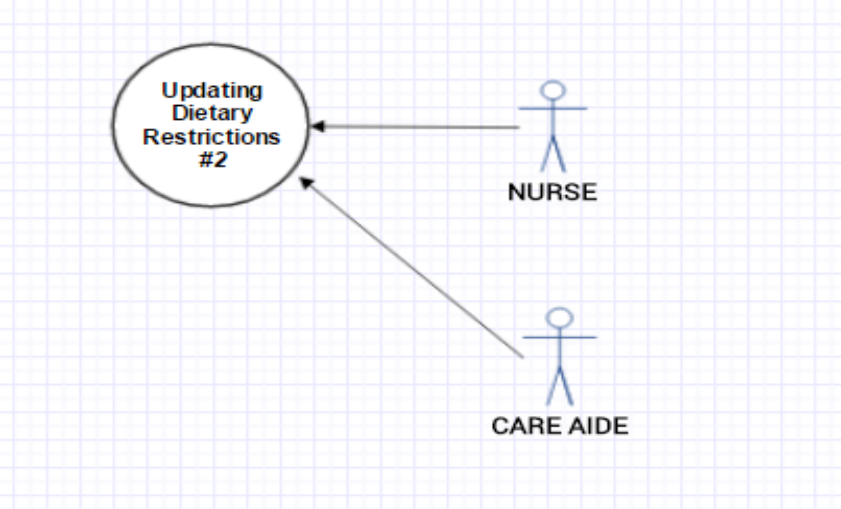
Precondition: The electronic medical record and all patient records exist and have been created.

Use Case: *Updating dietary preferences*

1. dietitian reviews patient plan
2. dietitian schedules meeting with patient
3. dietitian asks patients about their current meal plan
4. dietitian records patients preferences
5. dietitian records and updates information in electronic record

Postcondition: The patient records in the EMR are updated with their preferences.

Alternate Flows: If the patient has no changing preferences, the EMR is updated but the information stays the same.



Precondition: The electronic medical record and all patient records exist and have been created.

Use Case: *Updating Dietary Restrictions*

1. Care aides make observations about patient symptoms relating to health and food choices
2. Aides tell this information to the nurse
3. The nurse updates the patient's electronic chart

Postcondition: The patient records in the EMR are updated with their dietary restrictions.

Alternate Flows: If the patient has no changing preferences, the EMR is updated but the information stays the same.

3.2 Meal Plan Creation

3.2.1 Description and Priority

The planning of meals over time that meet the recommendations of the dietitian is an essential part the system.

Priority: Medium

3.2.2 Functional Requirements

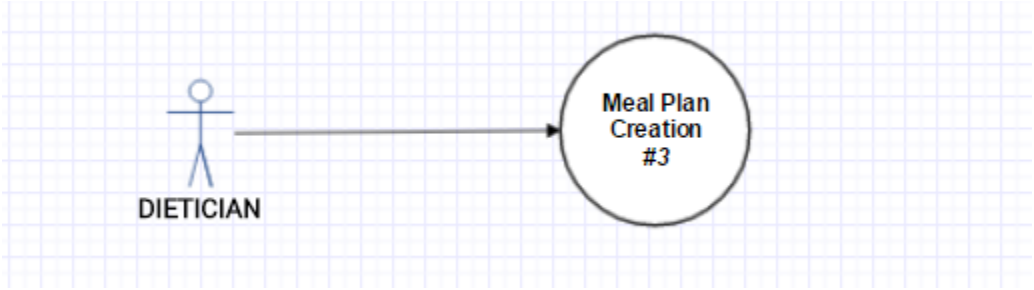
REQ-MPL-1: The dietitian must be able to view patients' electronic records

- *Backwards Traceability:* The dietitian must be able to view patients records in order to determine long term and short term dietary plans.
- *Forwards Traceability:* This requirement can be verified by checking dietician EMR access.

REQ-MPL-2: The dietitian must be able to update the electronic record

- *Backwards Traceability:* Changes noticed or made by the dietitian may be crucial dietary information to be referenced by staff members. Therefore, the dietitian needs to be able to add essential dietary plan-related updates.
- *Forwards Traceability:* This requirement can be verified by ensuring the records are updated (and by whom) via the "Last Updated" text.

3.2.3 Use Case(s) associated with the Feature or Functional Requirements



Precondition: Patient preferences and dietary restrictions exist in the electronic record, and the dietician has access to the electronic record.

Use Case: *Meal Plan Creation*

1. Dietitian reviews records from patient's current chart from the electronic record
2. Dietitian checks for any additional changes to dietary restrictions and preferences

3. Dietitian uses this information to create a new meal plan for the patient (if changes were made)
4. Dietitian records the new meal plan in the electronic record.
5. Process is repeated weekly to keep records up to date.

Postcondition: Patients' updated meal plans are stored in the electronic record.

Alternate Flow: If patients have nothing to change in their meal plan, it is updated without changing any information.

3.3 Menu Creation and Cooking

3.3.1 Description and Priority

The meal preparation process is a fundamental aspect of the system. The system must allow for the preparation of food that meets the dietary needs of patients, while still appealing to their specific preferences.

Priority: High

3.3.2 Functional Requirements

REQ-MPR-1: The system must allow the cook to access the patient chart

- *Backwards Traceability:* In order to create meals for patients, the cook must be able to access the general dietary restrictions of the entire patient populus.
- *Forwards Traceability:* This requirement can be verified by ensuring the records are updated (and by whom) via the "Last Updated" text.

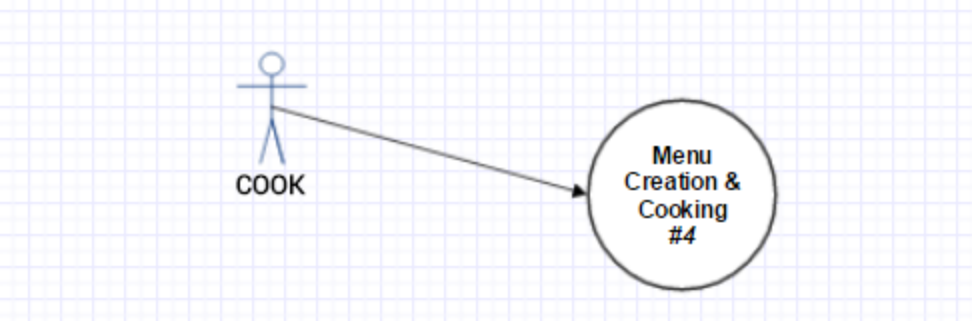
REQ-MPR-2: The system must allow the cook to create a menu

- *Backwards Traceability:* The cook must have a degree of versatility in the choosing of meal types, so that patients will be able to have both their preferences and dietary requirements met.
- *Forwards Traceability:* This requirement can be verified by checking that the weekly menu is updated.

REQ-MPR-3: The system must allow the cook to order ingredients

- *Backwards Traceability:* The cook must be allowed to order ingredients themselves, so they can order based on the menu they intend to create.
- *Forwards Traceability:* This requirement can be verified by ensuring that fresh ingredients are being ordered.

3.3.3 Use Case(s) associated with the Feature or Functional Requirements



Precondition: The patient chart of dietary restrictions and preferences exists and is accessible by the cook.

Use Case: Menu Creation & Cooking

1. The cook accesses the chart for the creation of the weekly menu - the chart will now contain each patient's preferences and restrictions
2. The cook orders appropriate ingredients from external source
3. The cook writes the weekly menu and stores it in the electronic system
4. The cook makes dishes from the weekly menu, which the patients will be able to choose from during meal time.

Postcondition: The weekly menu is created based off of patient preferences and restrictions.

Alternate Flow: Ingredients do not require to be ordered every meal. The cook may order ingredients a few times a week to stock up for his weekly servings of food.

3.4 Meal Distribution

3.4.1 Description and Priority

The system must allow for the physical distribution of meals to each patient, while meeting all of their dietary needs. All of the appropriate staff should have access to the relevant information in order to safely distribute meals effectively.

Priority: High

3.4.2 Functional Requirements

REQ-MD-1: The cook must have access to basic information relevant to meal assembly

- *Backwards Traceability:* In order to create meals for patients, the cook must be able to access the general dietary restrictions of the entire patient populus.
- *Forwards Traceability:* This requirement can be verified by ensuring the cook has patient chart access.

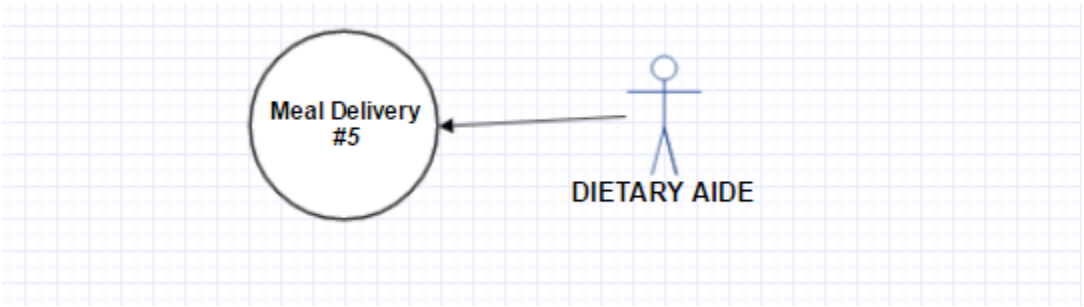
REQ-MD-2: The system must allow the cook to create meals

- *Backwards Traceability:* In order to feed patients, the cook must be able to create meals for each patient - while still meeting any restrictions/preferences.
- *Forwards Traceability:* This requirement can be verified by checking that meals are being created.

REQ-MD-3: The system must allow for the dietary aid to deliver meals to patients

- *Backwards Traceability:* The dietary aid must be able to deliver food to patients, as they are the final step in the expediting of patient meals. The dietary aid must be able to delivery patients, regardless of whether they eat in their rooms or a dining area.
- *Forwards Traceability:* This requirement can be verified by ensuring that patients are receiving their meals.

3.4.3 Use Case(s) associated with the Feature or Functional Requirements



Precondition: The patient dietary chart exists and the cook is able to access it.

Use Case: *Meal Delivery*

1. The Cook prints out a copy of patient dietary restriction chart
2. The Cook assembles cooked food and awaits dietary aide requests
3. The Dietary aide asks each patient for their meal choice, tells cook
4. The Cook assembles plates according to the dietary aide's information as well as the chart information
5. The Dietary Aide delivers the dish to the residents table, assists patient with eating if needed
6. The Dietary Aide signs off that they have delivered the meal.

Postcondition: Patients will be in possession of the meal that they ordered.

Alternate Flow: For patients with dementia (2nd floor), orders are not taken. Instead, the Dietary Aide will simply provide them with a meal that fits their restrictions according to the patient chart. They will then sign off on the chart.

4 External Interface Requirements

4.1 Physician

Physicians are an external interface as they input information into the food delivery system. The system at St. Jude's cannot influence physician, but the actions of physician will directly influence the system. As the professionals who evaluate patients' health and allergies, physicians interact with the system by making decisions about the patients in the facility. For example, a physician might decide that a patient cannot have solid foods for a week, which will affect the subsequent actions taken in the system. A dietician may have to modify food restrictions for that patient while considering their food preferences. The cook also has to consider this change while making the food, and the dietary aide has to consider the change when using the patient chart.

4.2 Food Supplier

Food suppliers are another external interface as they supply food into the system. When food in St. Jude's is insufficient, the cook has to contact a food supplier with a list of ingredients that are needed. The food supplier will check their storage and supply the requested food in a reasonable time. However, certain types of food from the food supplier may meet shortage. In this case, the food supplier will affect some of the actors in the system. The cook may have to consult a dietician about the substitution for the unavailable food. The dietician will make changes on the existing meal plan considering available food, and the cook will prepare food according to the modified meal plan.

5 Other Nonfunctional Requirements

5.1 Performance Requirements

REQ-NF-01: dietitians must adhere to BC Residential Care Home's nutrition policies [3]

Backward Traceability: In order to avoid health and food risk, St. Jude's must adhere to BC's Residential Care Regulation.

Forward Traceability: This requirement can be verified by BC health officers who conduct inspections every month.

Since St. Jude's has more than twenty four patients living in the care home, dietitians must design the meal for the patients. dietitians will design patients meal based on each patient's file stored on the computer located on each floor because the dietitians will not make suitable meal combinations if they do not look at the patient's file and see potential new changes to a patient's health. dietitians must design appropriate meals based on a patient's need and the Canada's Food Guide to ensure healthy diets. Furthermore, the dietary plan must be reviewed on a regular basis with the dietitian.

REQ-NF-02: Cooks must adhere to St. Jude's mealtimes [2]

Backward Traceability: In order to reduce health risk for patients and liability risk for St. Jude's, cooks must prepare food on time as specified in St. Jude's Home Guidelines.

Forward Traceability: This requirement can be verified by dietary aides and patients during meal times.

Nutrition is an important aspect to healthy living and meals must be ready on time for patients to eat. Since St. Jude's has already signed off on exact meal times, cooks need to have the meals prepared on time. For example, although breakfast's start time varies depending on the patient, each patient breakfast time is dependent on an individual patient's needs.

REQ-NF-03: System features must have accountability

Backward Traceability: In order to reduce the potential for error and pinpoint cause of error if it arises, accountability will be added to each system feature.

Forward Traceability: This requirement can be verified by assuring that proper documentation is added to each system feature.

Accountability is crucial to the system because it increases the security and health of patients. This requirement will ensure that nurses, dietitians, cooks, and aides will follow proper procedure will doing their jobs which will reduce potential for errors. If an error does occur, accountability will identify where in the system was the cause of error and the staff responsible for the incident. For example, if an incident occurs in the food preparation process and a cook was the person who made the inadequate meal, investigating the documentation will release the details on who made the error.

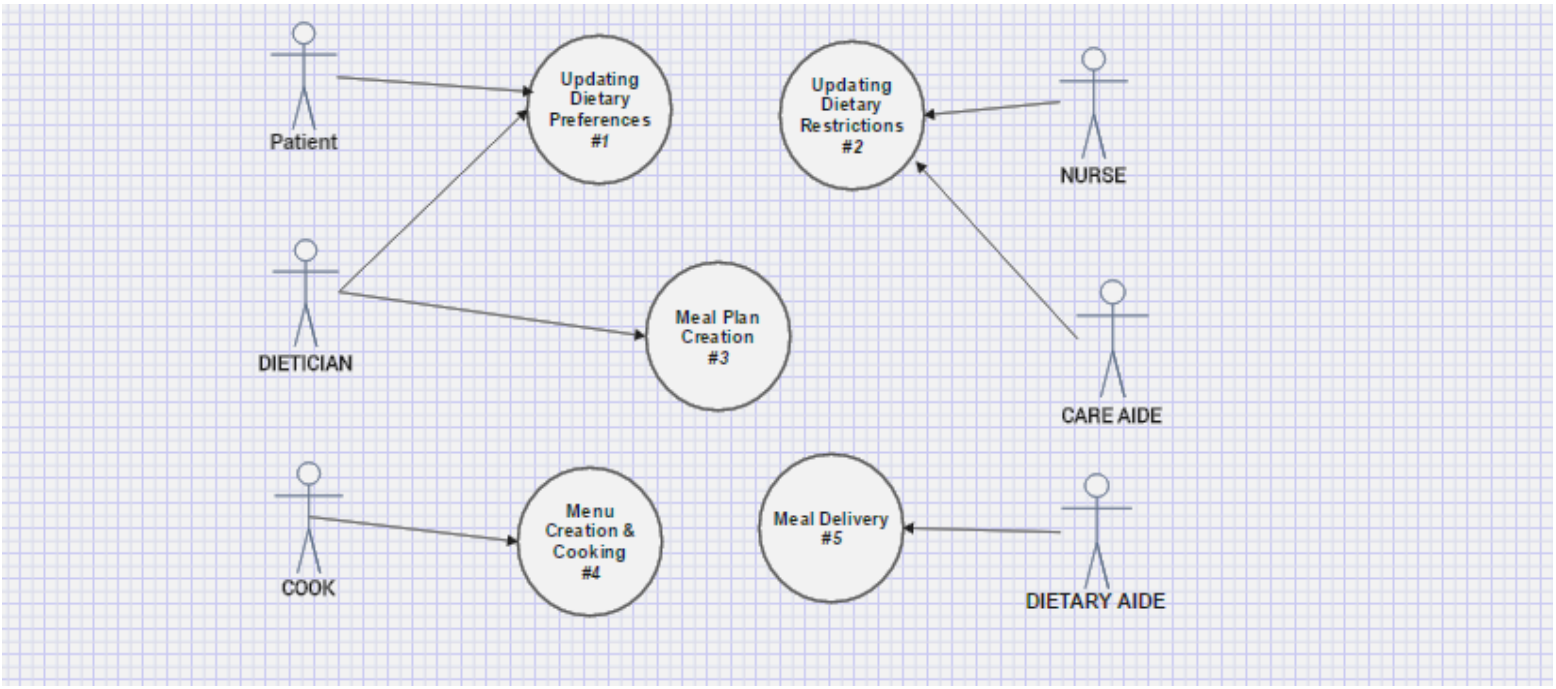
6 Other Requirements

There are no other requirements currently at this point.

7 Analysis Models (Use Case Model, Data Flow Diagrams, Entity relationship diagrams)

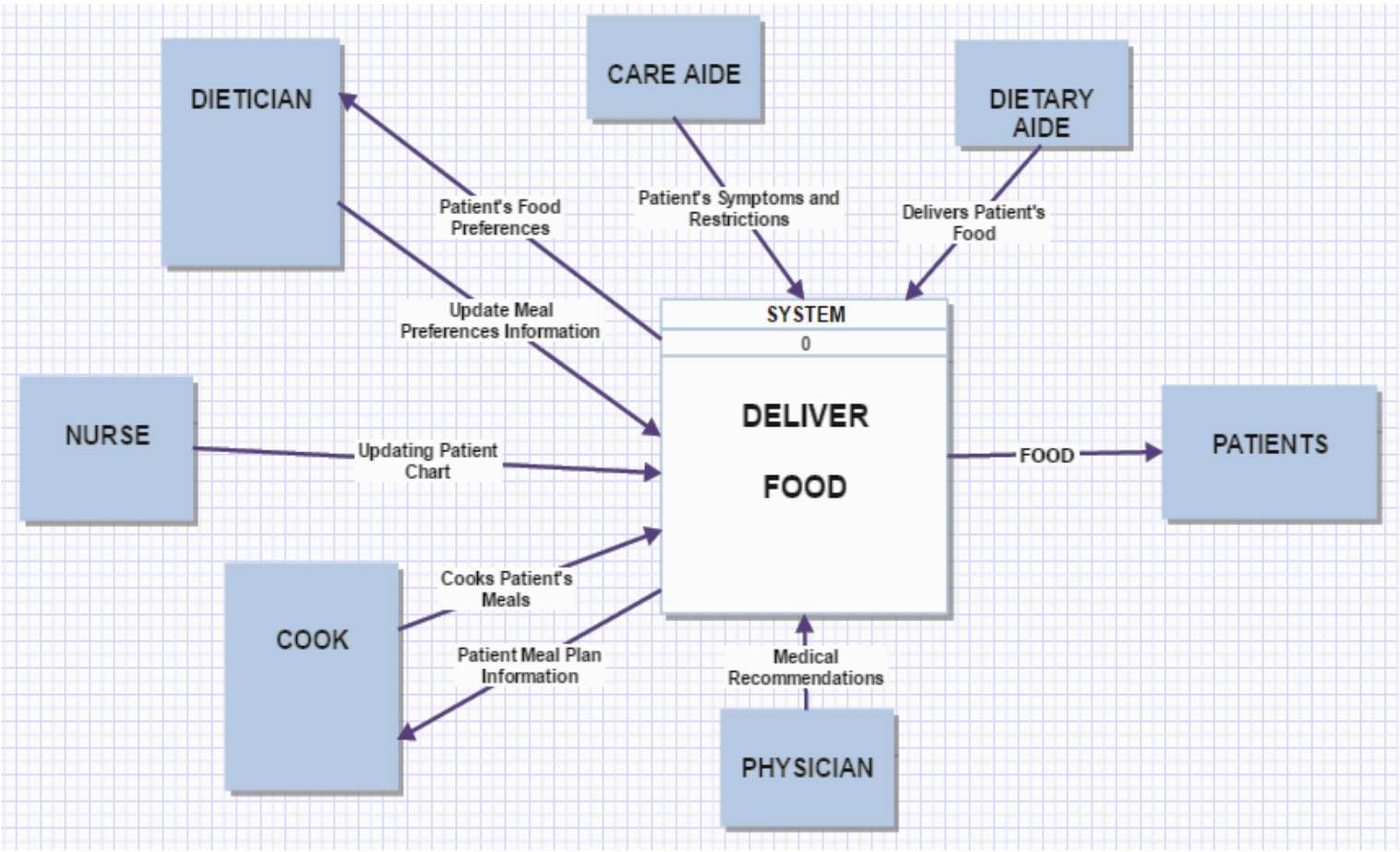
7.1 Use Case Model

This diagram shows the combination of all the use cases in the St. Jude's food delivery system. The six actors in the system - the patients, dietician, cook, nurse, care aide, and the dietary aide, are shown with their relationship to the use cases. Since the information about food preferences comes from the patient's choices, they are contributors to the first use case. Both the nurse and the care aide are involved in updating dietary restrictions. This is because care aides take care of the patient's personal needs and are usually the first person to notice any new changes in the patient's eating abilities. The requirements for each use case and the detailed steps in each use case are outlined in section 3 of this document.



7.2 Context Diagram (Data Flow Diagram - 0)

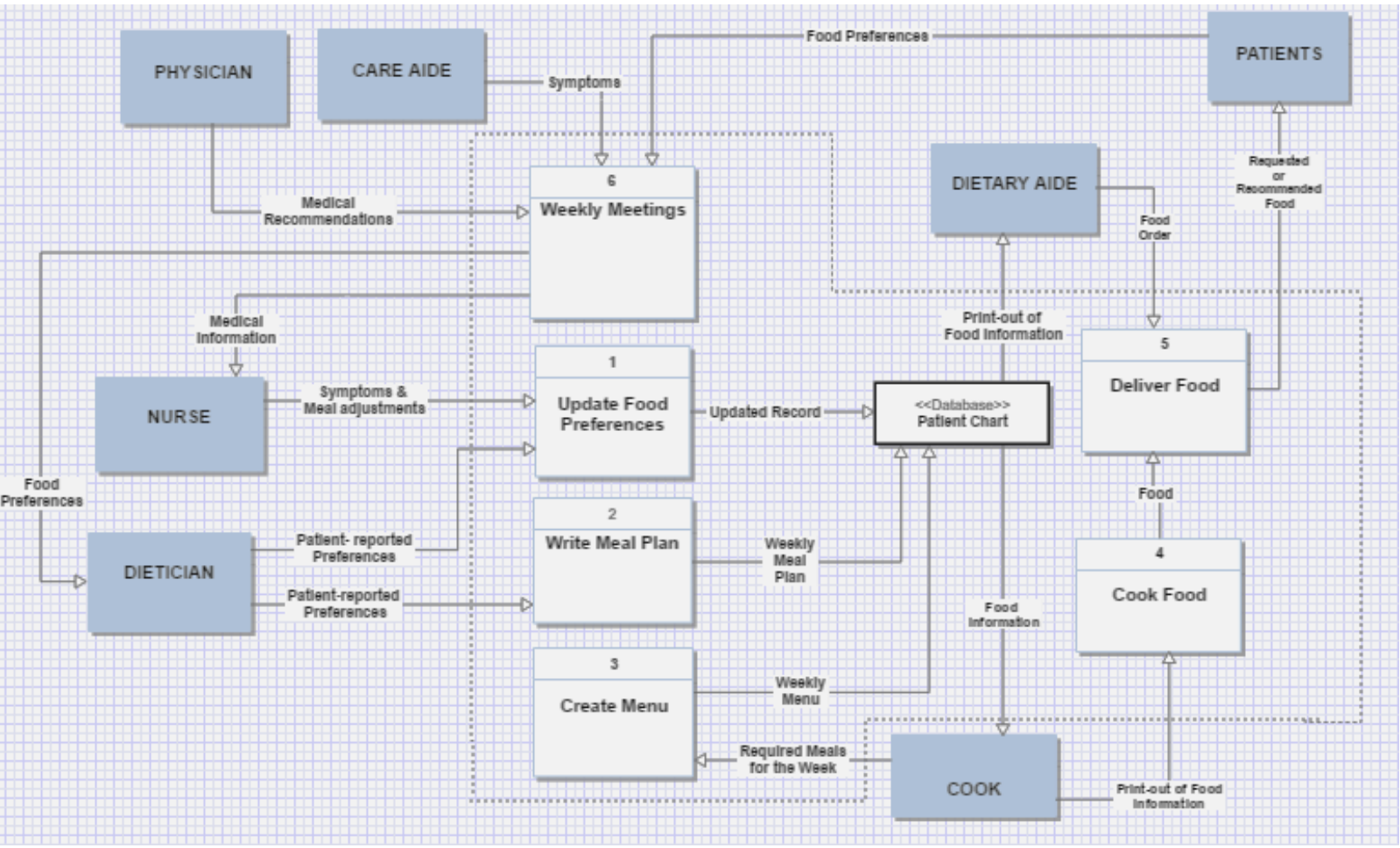
This diagram shows a high level representation of the food delivery system at St. Jude's Anglican Home. The system and its processes are abstracted into the Deliver Food entity, and all the actors are represented with their respective data input and output information. The physician is an external actor that provides information that might influence some internal actions of the system.


DIETICIAN
CARE AIDE
DIETARY AIDE
Patient's Food Preferences
Patient's Symptoms and Restrictions
Delivers Patient's Food
Update Meal Preferences Information
SYSTEM
0
DELIVER FOOD
NURSE
Updating Patient Chart
FOOD
PATIENTS
Cooks Patient's Meals
COOK
Patient Meal Plan Information
Medical Recommendations
PHYSICIAN

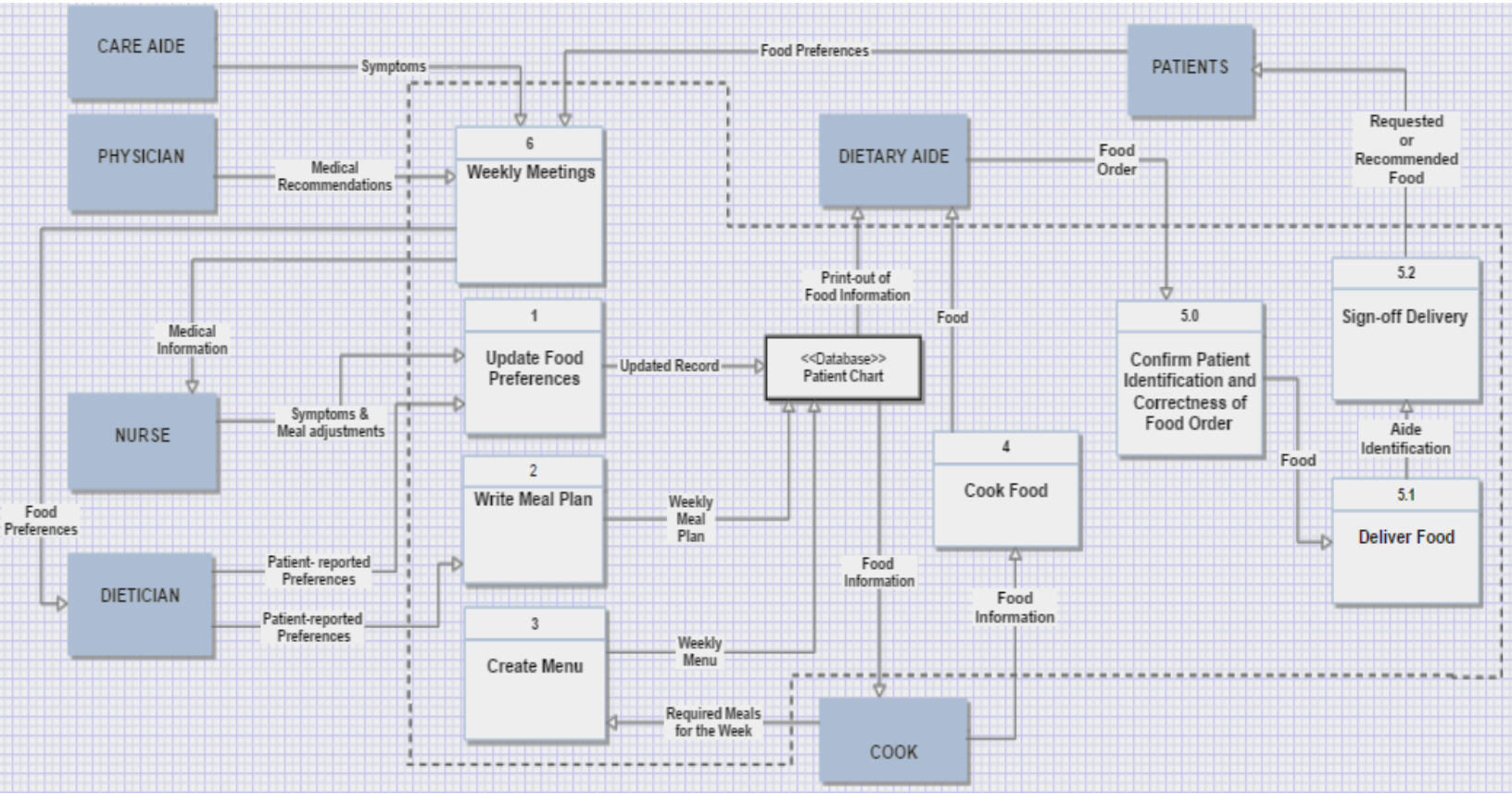
7.3 Data Flow Diagram - 1

This diagram shows the processes that make up the food delivery system in more detail. There are five major processes in this model that make up the entire system. It is evident from the diagram that the data store (also known as the patient chart) is a central host for the information needed in the system processes. The processes are actions taken by the actors in the system, and the information input and output are shown on the arrows.

7.3 Data Flow Diagram - 2

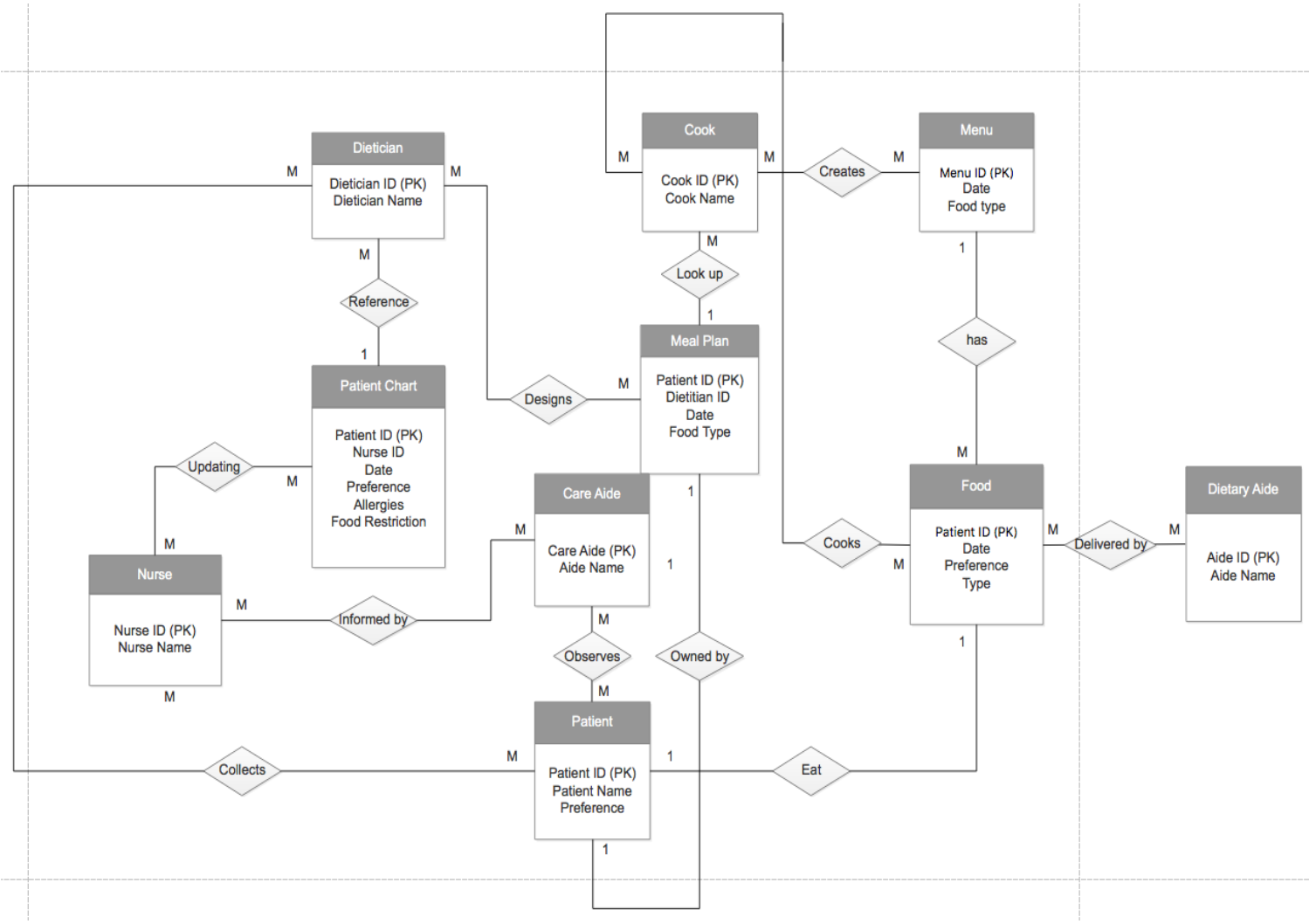


This diagram shows a more detailed layout of the system, particularly the parts of the system where Viper Consulting plans to implement accountability measures (process 5). This diagram shows the flow of information and how an additional step in the food delivery process may be used to encourage accountability among staff.


CARE AIDE
Symptoms
Food Preferences
PATIENTS
PHYSICIAN
Medical Recommendations
6
Weekly Meetings
DIETARY AIDE
Food Order
Requested or Recommended Food
Print-out of Food Information
Food
5.2
Sign-off Delivery
Medical Information
1
Update Food Preferences
Updated Record
<<Database>>
Patient Chart
5.0
Confirm Patient Identification and Correctness of Food Order
NURSE
Symptoms & Meal adjustments
4
Cook Food
Aide Identification
Food
2
Write Meal Plan
Weekly Meal Plan
5.1
Deliver Food
Food Preferences
DIETICIAN
Patient- reported Preferences
Food Information
Food Information
Patient-reported Preferences
3
Create Menu
Weekly Menu
Required Meals for the Week
COOK

7.4 Entity Relationship Diagram

This entity relationship diagram contains ten entities: Nurse, Dietician, Patient Chart, Cook, Meal Plan, Care Aide, Patient, Menu, Food, and Dietary Aide. Physicians are not included in the ERD because they are the external entity. Care Aides observe patient's symptoms relating to health and eating abilities and communicates this information to nurses during the weekly meeting. Nurses then update the patient chart, which will be used by dieticians to design meal plans for each patient. Dieticians may also meet with the patients in order to collect food preferences. The cook looks up the meal plans and creates the Menu, which contains food information. Dietary Aides then deliver the food that is cooked by the cooks to each patient.



Appendix: Issues List

There are currently no issues that have yet to be addressed.