

# THE ALLERGY JOURNAL

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## a mobile app

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**361**

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Professor Terry Rooker  
HW 2: Evaluating Requirements

## Summary and Explanation of Changes Made

This section summarizes and explains the changes that were made to the requirements definition and specification and why these changes were made. The changes are listed here and have also been made in the document (and highlighted in green). One of the changes required an update to our UML diagram as well; you will notice the addition of a Reaction Detail API. The scans of our paper prototypes can be found at the end of the document.

### Changed the following:

#### *Change 1:*

Functional Requirements Definition:

From:

- allow the user to create multiple profiles for dependents, each with their own history of product use and allergic reactions

To:

- each user account will have one profiles with its own history of product use and allergic reactions

This was the result of our discussion with our customer, who specified that they wanted each user to have their own account. This makes the app interface sleeker. When a user is logged in, they know exactly which profile is being updated, namely their own. This will also lead to easier integration with the remote medicine features. HIPPA releases, for example, can be tied to a single user account.

### Added the following:

#### *Addition 1:*

Functional Requirements Definition:

- allow the user to optionally record demographic information such as age and race

Prompted by the prototype for adding a reaction, specifically the diagram of the body, part of the discussion in this week's meeting with our customer centered around how specific should we allow the user to be when they are identifying the location of the allergic reaction. In addition, there was some further discussion of what kind of details the medical professionals taking part in the remote medicine feature should be able and would want to see about the individual user. The customer and the team agreed that the user could record demographic information such as age, sex, and race, but that it should be optional.

#### *Addition 2:*

Functional Requirements Definition:

- allow the user to setup scheduled recurring usage of a product

We added the requirement to allow user to setup scheduled recurring product use. This was actually something that we had already discussed as a team and with the customer, but it had just slipped through the cracks when we were writing the requirements.

*Addition 3:*

## Non-Functional Requirements Definition:

- ensure that all information recorded, created and displayed in the app is compliant with all laws and regulations (including HIPAA)

In our discussions with the customer, who already has experience working in the medical field, there are recurring considerations of the strict laws and regulations surrounding the practice of medicine. More specifically, our project needs to be especially thoughtful about the privacy of the users using our app. However, we realized that we had not been explicit enough in our requirements about this, so we added a requirement to ensure that all information recorded, created and displayed in the app is compliant with all laws and regulations (including HIPAA).

*Addition 4:*

## Functional Requirements Specification:

- create an API that allows applications used by remote health care providers to access a user's information

In thinking of which interfaces to draw up prototypes for, one idea was to include the interface that the physician who is on the other end of the remote medicine feature would see. Showing this to the customer and discussing it with them prompted the team to think a little bit more about what exactly would be happening on the physician's end. So, there was a discussion about whether or not the portal the physician would use would be within the system boundaries of our app or if our app was going to send the info from the user to third-party software. In the end we decided to create an API that allows common third-party applications used by remote health care providers to access a user's information.

*Addition 5:*

## Functional Requirements Specification:

- parse recurring product use into individual product use instances by date and time

We added the requirement that the system will parse recurring product use into individual product use instances by date and time. This was something we had talked about in previous weeks that also slipped through the cracks when we were writing the requirements.

*Addition 6:*

## Non-Functional Requirements Specification:

- ensure that API is compliant with all laws and regulations (including HIPAA) and securely handles user information

We added the requirement to ensure that the API we send to the medical professional is compliant with all laws and regulations (including HIPAA) and securely handles user information. The reasoning for adding this requirement is exactly the same as the previous requirement that involves complying with all laws and regulations.

## Problem Our Product Solves:

The Allergy Journal app is a mobile app which uses a data-driven approach to individual health. Many people do not have the flexibility to visit a doctor, especially for a problem that does not appear to be life-threatening. This is especially true with limited weekday hours for doctor's offices, limited appointment availability, long travel times, and possibly no access to health insurance.

This app addresses the problem by providing a simple, intuitive way to record information on a user's product usage along with any allergic reactions that are experienced. When enough data is collected, the application indicates the likely culprit with some measure of confidence.

## Our Customers:

People who suffer from allergic reactions and want systematic, data-driven assistance to determine the probable cause of their reactions.

## What we are creating:

### Requirements Definition

#### Functional Requirements

The program/system shall:

- authenticate the user's credentials
- each user account will have one profile with its own history of product use and allergic reactions
- record allergens entered by the user
- maintain an inventory of products for each user
- record an individual's use of a product
- record instances and symptoms of allergic reactions
- cross-reference historical product-use data to determine whether the user is allergic to ingredients found in used products
- cross-reference picture of reaction (if given) to database of other pictures of reactions and suggest possible type of reaction
- allow users to enter products into their inventory in multiple ways (barcode scan API, manual lookup search, etc.)
- tabularize past uses and reaction instances which can be shared with a medical professional upon user's request in multiple ways
- allow users to track past product uses and reactions through a calendar
- provide images and terms for common reactions
- tell user of known side-effects for product they are using
- allow user to request administrative approval of new, unrecognized product be added to "exceptions" that is not in database
- be able to be used when a user is operating with a poor internet connection
- allow the user to optionally record demographic information such as age and race
- allow the user to setup scheduled recurring usage of a product
- send data (if requested) to a medical professional and generate a response

## Non-Functional Requirements

The program/system shall:

- authenticate users or time out within 10 seconds
- provide a good user experience when unable to connect to the internet
- keep a user's information secure
- find product through barcode scan or manual lookup or time out within 10 seconds
- suggest a list of possible allergen ingredients linked to a reaction with a high degree of confidence
- suggest a possible reaction type linked to a reaction case with a high degree of confidence
- update database by adding a user's suggested, previously unrecognized product of "exceptions" from administrators within 48 hours
- ensure that all information recorded, created and displayed in the app is compliant with all laws and regulations (including HIPAA)

## Use Cases

### Use Case I

**Use case name:** Entering a Product

**Actor:** The app user

**Preconditions:**

- User has app downloaded and setup
- User has account
- User has product in hand and ready to be entered

**Postconditions:**

- User's product has been entered into the database
- The ingredients of the product have been entered into the database

**Flow of Events:**

- User logs into the app and selects profile
- User navigates to the option for adding a product to their profile's database
- User is presented with a form for entering product by barcode scan or manually
- **BARCODE SCAN:**
  - User taps the button that will take them to the screen for acquiring product data
  - System activates user's camera and preview screen is shown to the user
  - User moves phone and product into place to get barcode into focus and takes picture of the product's barcode
  - System uses the barcode lookup API to extract the product's barcode number
  - System uses barcode number and the barcode lookup API to find the product
  - User confirms that the API has returned the correct product
  - System acquires product type. This will be lotion, makeup, conditioner, insect repellent, etc.
  - User confirms that the API has returned the correct product type
  - System acquires ingredient information
  - System displays a list of ingredients in separate text boxes
  - User confirms that ingredient information looks correct
  - System adds products and ingredients to the database
- **MANUAL LOOKUP:**
  - User enters the barcode number manually
  - API searches for product and returns product name, type, and ingredients
  - User verifies that product details are correct
  - System adds product and ingredients to database

- **PRODUCT NOT FOUND:**
  - System returns message indicating that their product is not found
  - User selects for a product request
  - System sends barcode number, photo, and other identifiers as formal request to administrators
  - Administrators approve and add product to database
- User is asked if they want to enter another product
  - Yes: returns to camera activation for photo for API or manual lookup
  - No: confirms to leave product entry section
- User leaves the form

## Use Case II

**Use case name:** Documenting Instance of Product Use

**Actor:** App user

**Preconditions:**

- User has logged into app
- User has previously entered the product information into their list of products
- User has applied a product that exists in their list of products

**Postconditions:**

- Time and date of product use has been recorded
- Site of application on body has been recorded

**Flow of Events:**

- User logs into the app and selects profile
- User navigates to option for recording an instance of using one of their products
- User selects the product from their list of products
- System directs user to interface for recording where the product was applied on the body
- User taps all body regions where product was applied
- System records the information in database with time and date stamp
- User confirms that the information is correct
- User closes the app



### Use Case III

**Use Case Name:** Documenting an Allergic Reaction

**Actor:** The app user

**Preconditions:**

- User has app downloaded and setup
- User notices an allergic reaction
- User has access to mobile device
- Products exists in the user profile database
- At least one instances of product use has been documented

**Postconditions:**

- Reaction case is opened
- Time and date of reaction has been recorded
- Type of reaction has been recorded in text description and possibly by photo
- Affected body area has been recorded
- Reaction case is left open until user comes back to close it after reaction has subsided

**Flow of Events:**

- User logs into the app and selects option for documenting a new “Reaction Case”
- System displays form fields for body region that matches exactly with the form for documenting product use in Use Case II and reaction symptoms date and time is automatically filled in
- User enters the body region affected by choosing from standardized list of body regions
- User may optionally take a photo that can be used for later helping identify reaction other reactions
- User enters the symptoms into proper field. Fields may include options such as: swelling, bumps, itching, splotches, raised, pain level, etc.
- User may optionally select from community provided photos of similar reactions to help standardize reaction data across community
- User confirms the information is correct



## Use Case IV

**Use Case Name:** Allergens and Analytics Reports

**Actor:** The app user, community database, health professional (optional)

**Preconditions:**

- User has app downloaded and set up
- User has logged at least one of their products
- User has logged previous use of at least one product
- User has logged “Reaction Cases” which can either be close or still open
- User has access to mobile device

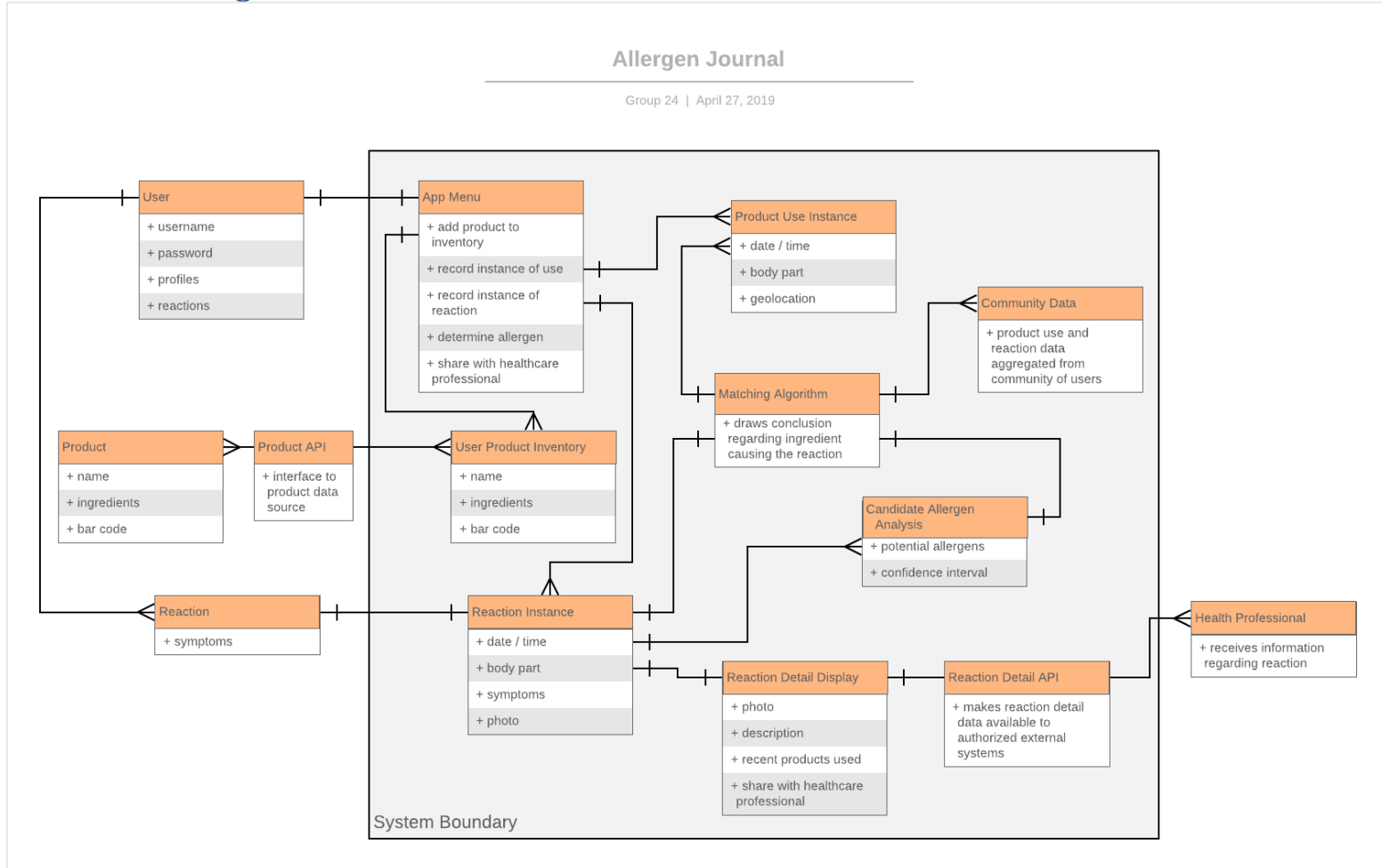
**Postconditions:**

- App has suggested possible allergen to product
- App has suggest possible allergen to specific ingredients in the products
- App has stored this possible allergens in the user profile
- App has provided a user-specific analytics report based on community data and their own product use
- User has optionally shared their allergens with community and/or health professional

**Flow of Events:**

- User logs into the app and selects option for viewing Reports
- System accesses information from Reaction Instances and information from Product Use Instances stored in the database
- System presents the user with the following:
  - List of products that are likely causing the reactions
  - List of likely ingredients that are causing the specific reactions
  - Community report data on:
    - Products that are known that are known to cause a higher than normal number of allergic reactions
    - A list of products in the user’s inventory that they should be cautious about
    - A list of alternative products that have the same use/function that may be safer for the user
  - Option to share their allergy data with community:
    - The product that was used and on the body part it was used on
    - The symptoms associated with the allergic reaction
    - Photo of allergic reaction is optional
  - Option to share reports with allergist or dermatologist
- User leaves the interface

## UML diagram



## Requirements Specification

### Functional Requirements

The program/system shall:

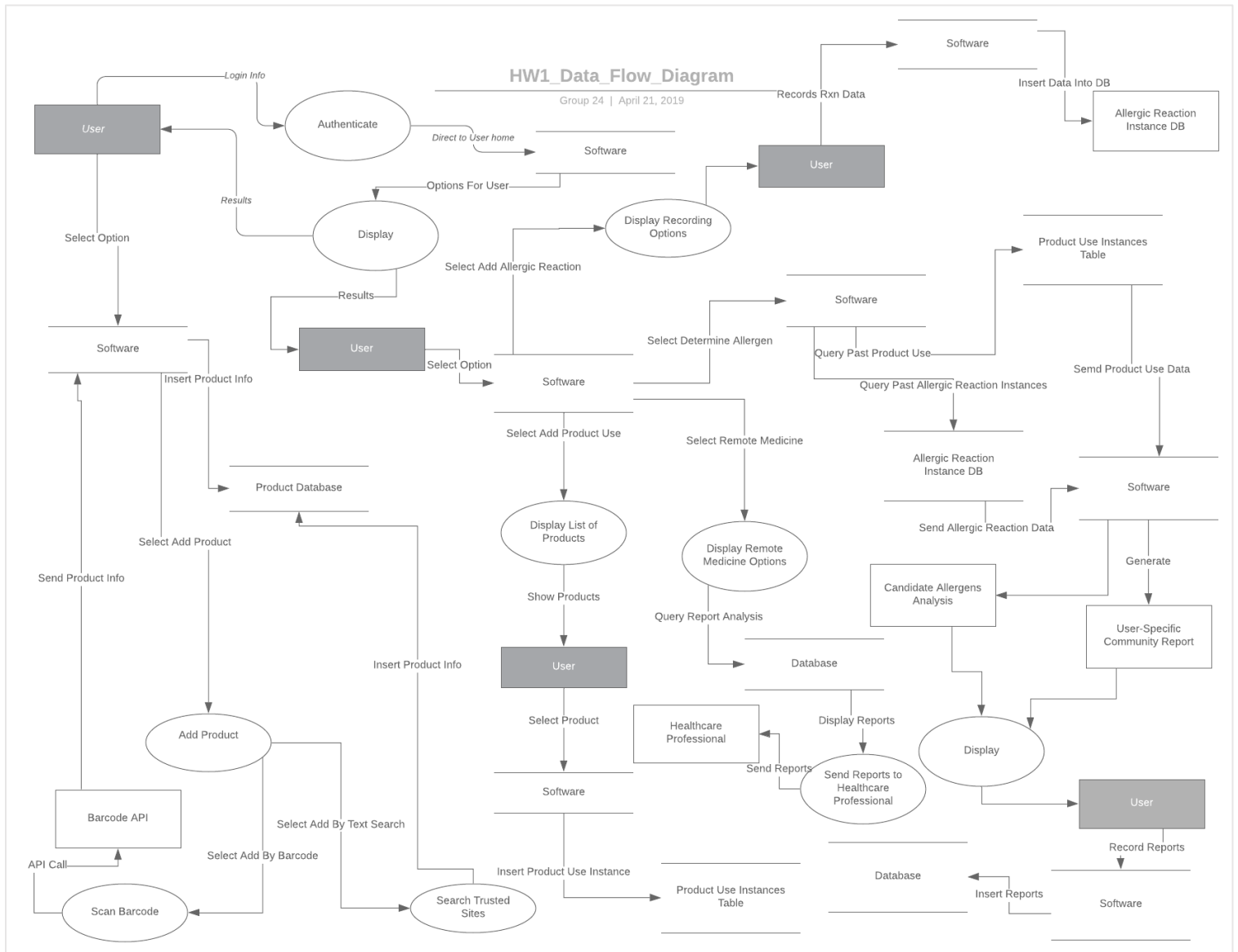
- a user's credentials will be compared to records in the user database to authenticate
- the system interfaces with a product-search API to allow users to find products to add to their inventories
- the system allows the user to manually enter product details if a matching product cannot be found
- analyze past and frequent product use to determine most correlated allergen ingredients to present to user in response to a reaction case
- use image recognition and machine learning to suggest type of reaction in response to a reaction case
- send user requests for new product to be added to administrators of the program/system
- the database of user's will allow multiple profiles to be connected
- contain a database that includes information which relates: users, products, instances of a user's product usage, instances of a user's reactions and symptoms, user's personal product inventory, images and terms for common reactions, product side-effects, etc.
- the system will keep a list of products in the user profile stored in the database that should not be used due to possible allergens
- the system will keep a list of products in the user profile cached in the app's memory that should not be used due to possible allergens
- create an API that allows applications used by remote health care providers to access a user's information
- parse recurring product use into individual product use instances by date and time

### Non-Functional Requirements

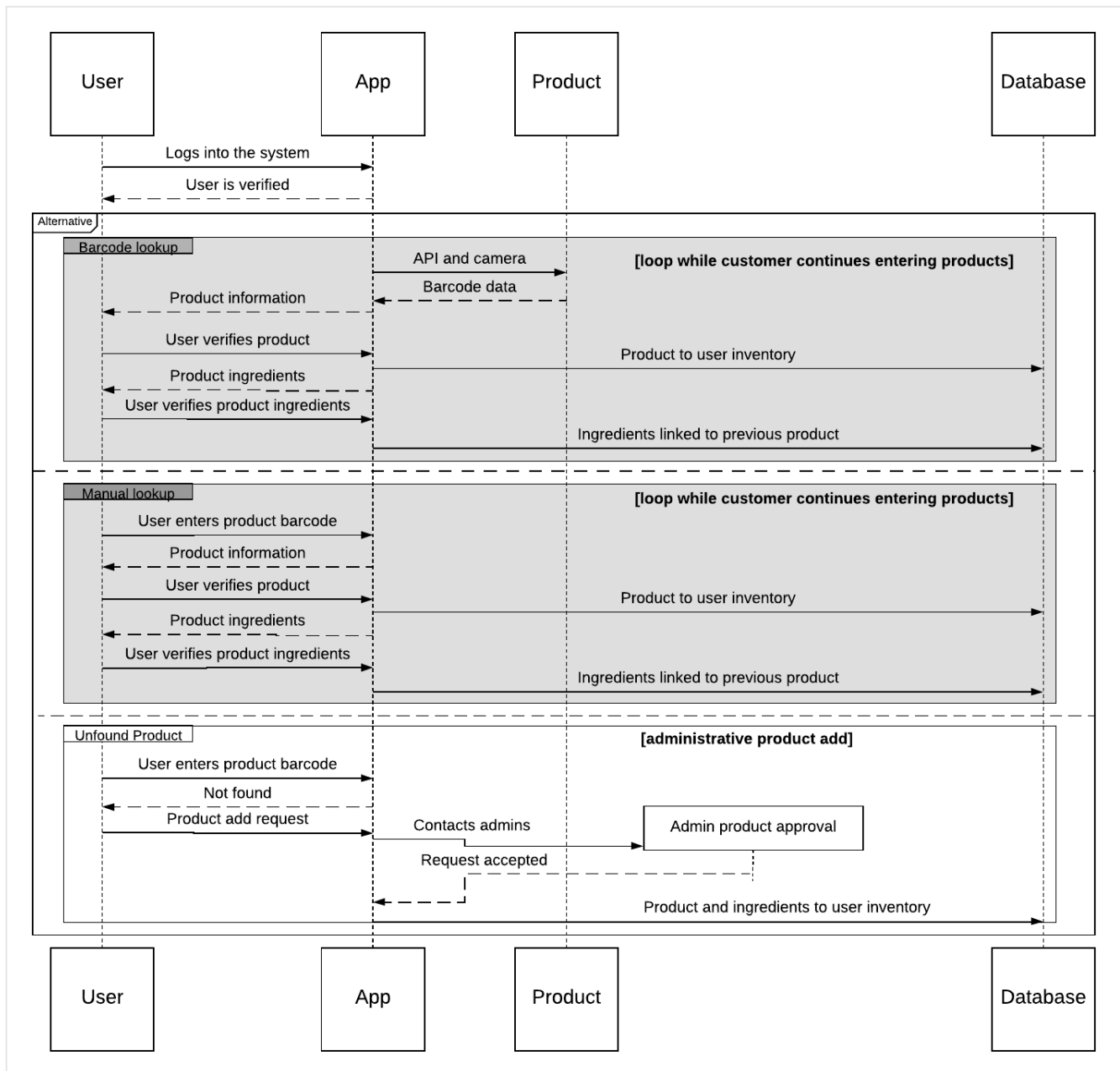
The program/system shall:

- encrypt all network communications
- remove any personally identifiable data from allergen reports before uploading to the community database
- will allow access to previous 10 allergen reports in offline mode
- will allow access to list of known allergens in offline mode
- ensure that API is compliant with all laws and regulations (including HIPAA) and securely handles user information

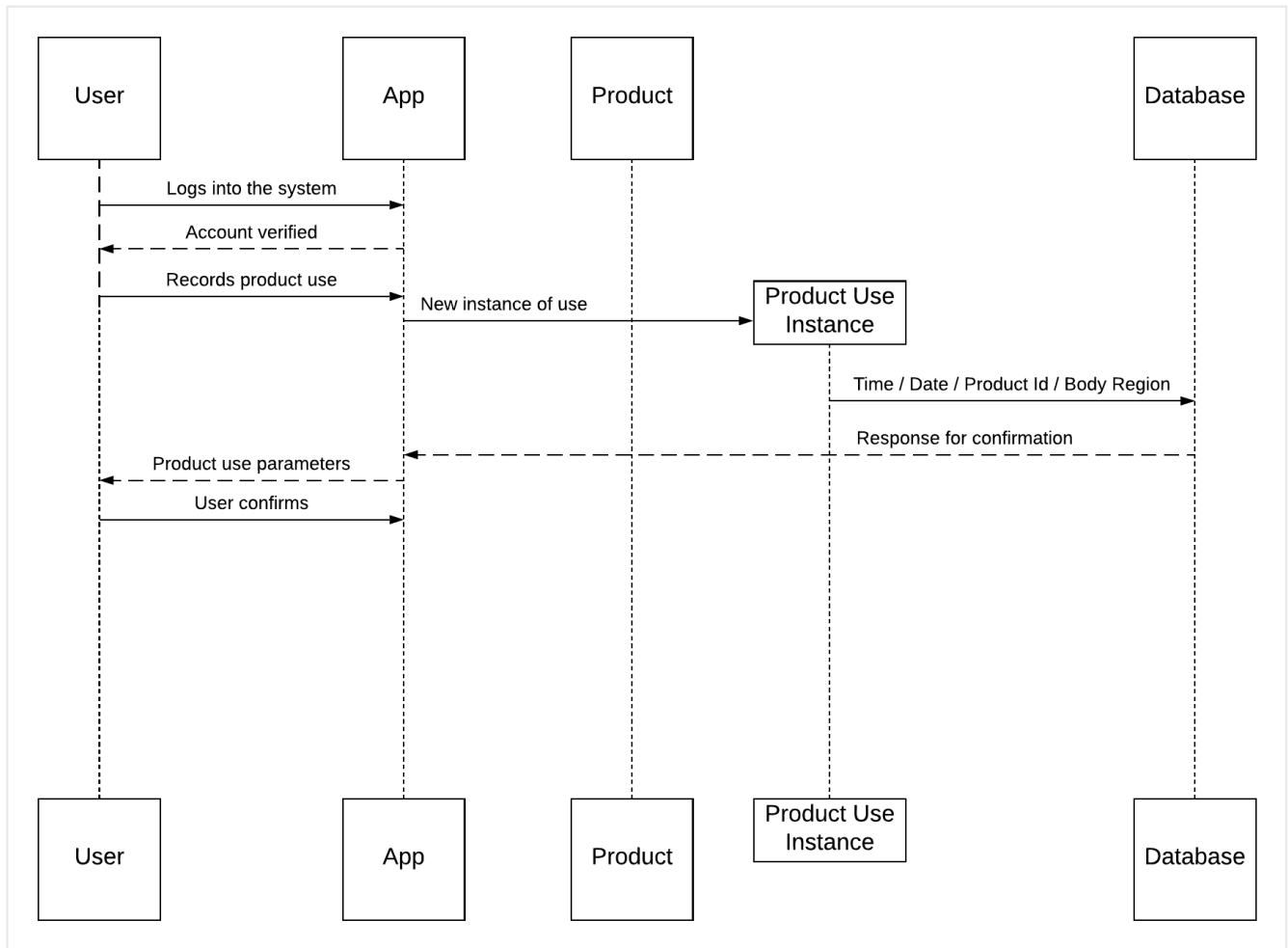
## Dataflow diagram



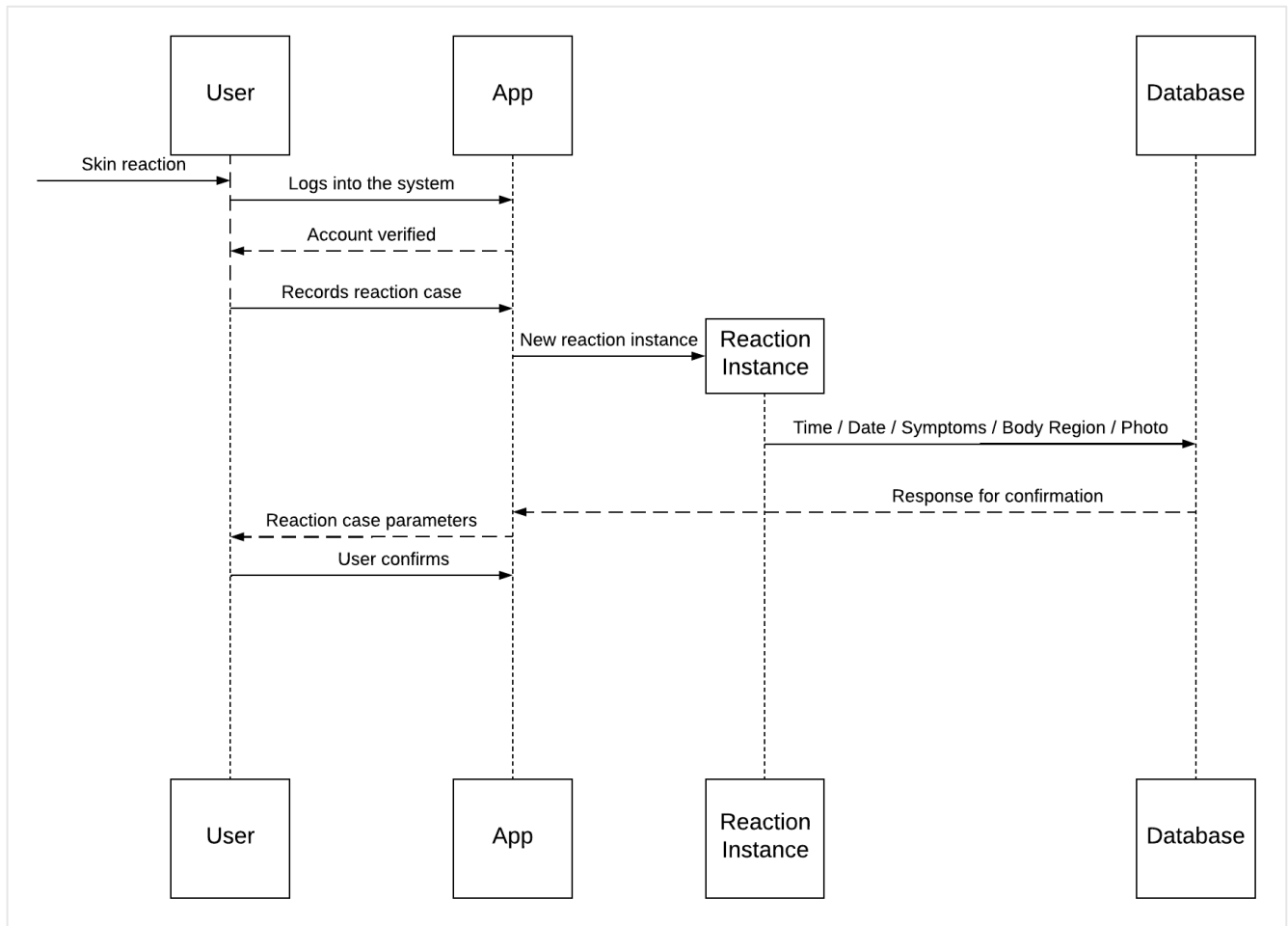
## Message sequence charts



**Use Case 1: Entering a Product**

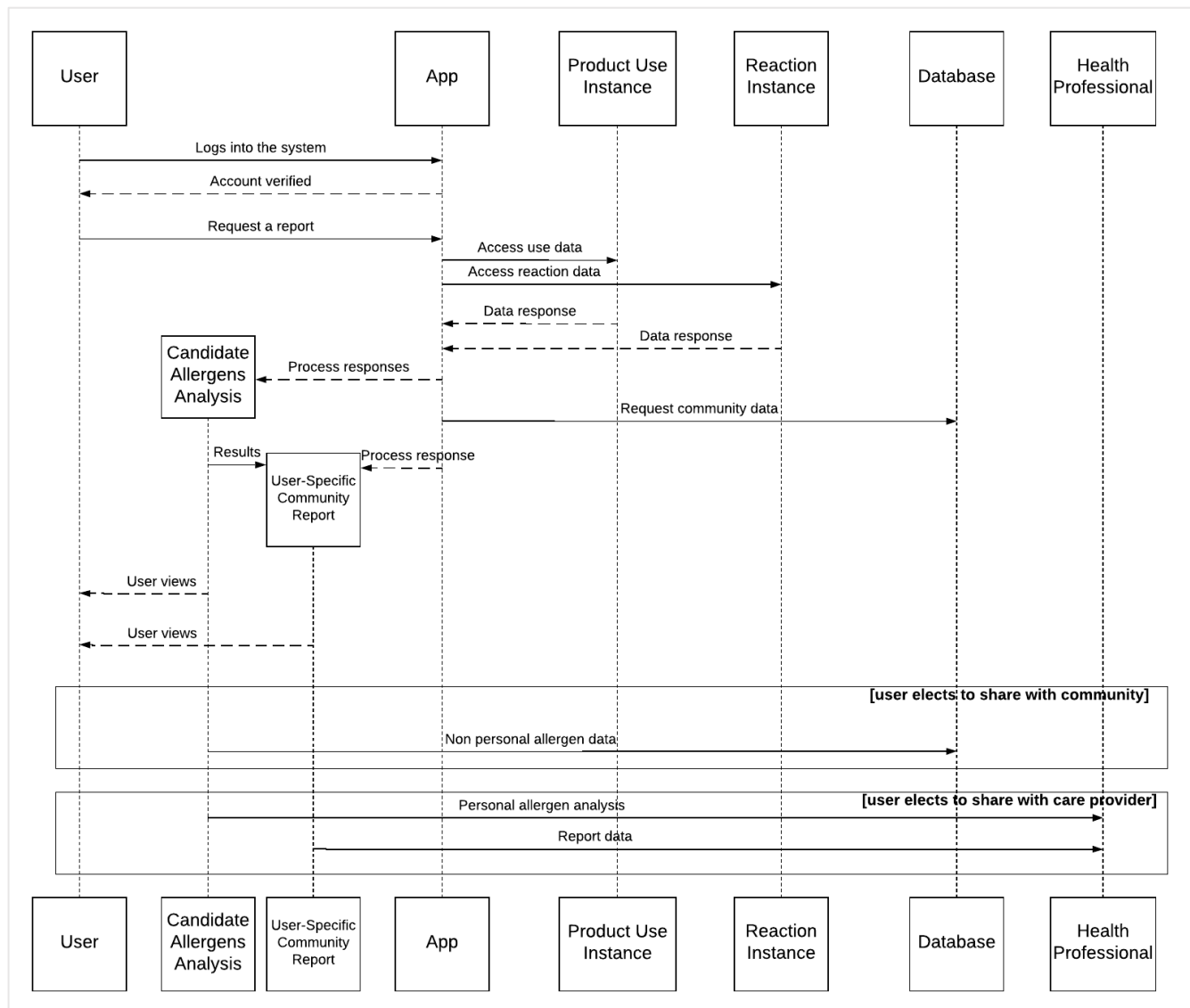


**Use Case 2:** Documenting Instance of Product Use



**Use Case 3:** Documenting an Allergic Reaction





**Use Case 4: Allergens and Analytics Reports**

## Prototypes

Log In:

A hand-drawn prototype of a login page on lined paper. The title 'Allejournal' is written in the center. Below it are two input fields: 'User name:' and 'Password:'. At the bottom, there is a link that says 'Don't have an account? Sign up!'.

Home Page:

A hand-drawn prototype of a home page on lined paper. At the top, there is a header with a hamburger menu icon, the name 'John Doe', and a user profile icon. Below the header is a calendar grid for the month of 'April'. A note 'calendar display of product use + reactions' points to the calendar. Under the calendar are three buttons: 'Document Product Use', 'Document Allergic Reaction', and 'Generate or View Reports'. At the bottom is a navigation bar with three icons and labels: a house icon for 'Home', a list icon for 'Product List', and a sad face icon for 'Reactions'.

## Document Allergic Reaction First Screen:

REACTION OPTIONS JANE DOE MENU

OPEN A NEW REACTION CASE

VIEW ALL PREVIOUS REACTIONS

YOUR RECENT ACTIVITY

STATUS	DATE	PRIMARY REGION
OPEN	Apr 25, 2019	LEFT ARM
OPEN	Apr 22, 2019	HEAD/NECK
RESOLVED	Mar 12, 2019	LEFT ARM
RESOLVED	Feb 20, 2019	RIGHT LEG

## Document Allergic Reaction Second Screen:


NEW REACTION FOR JOHN DOE MENU

Select Day and Time You First Noticed the Reaction DATE TIME

Select up To Five Symptoms

(as user selects symptoms, guidance photos appear here)

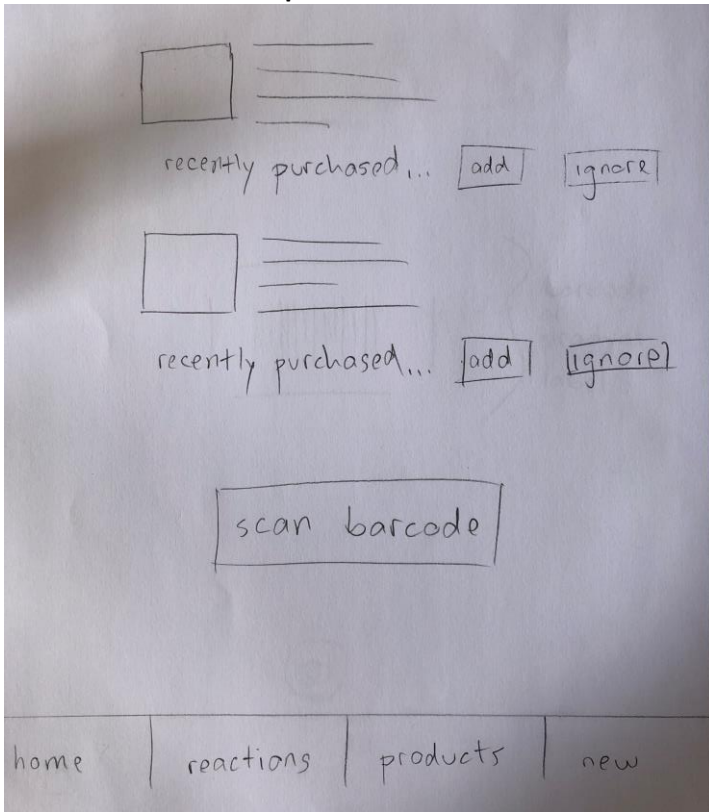
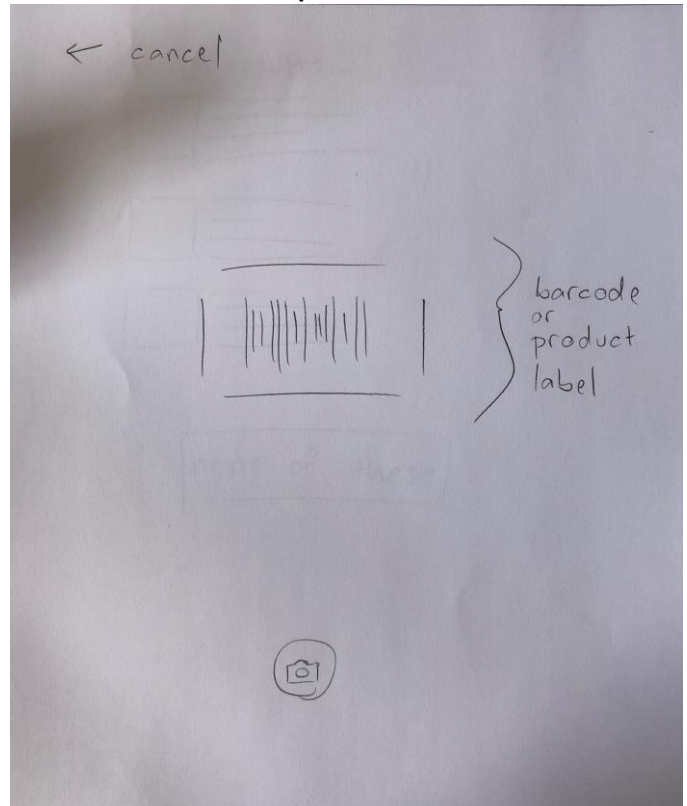
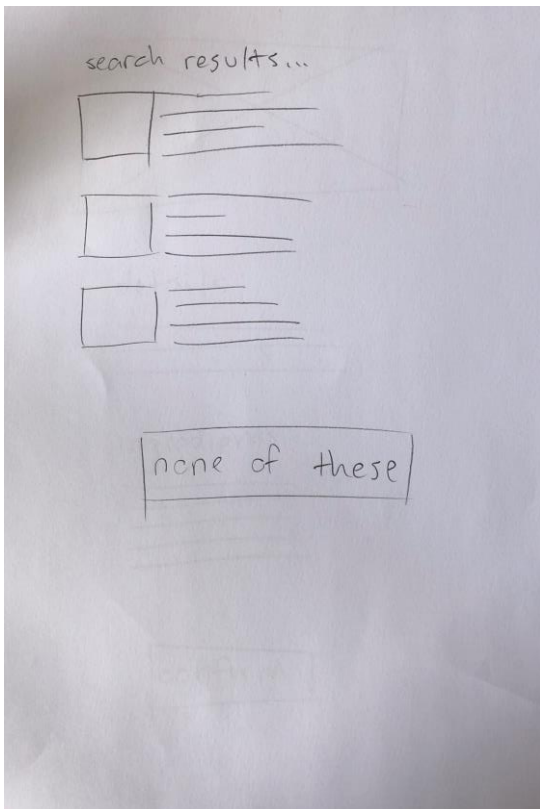
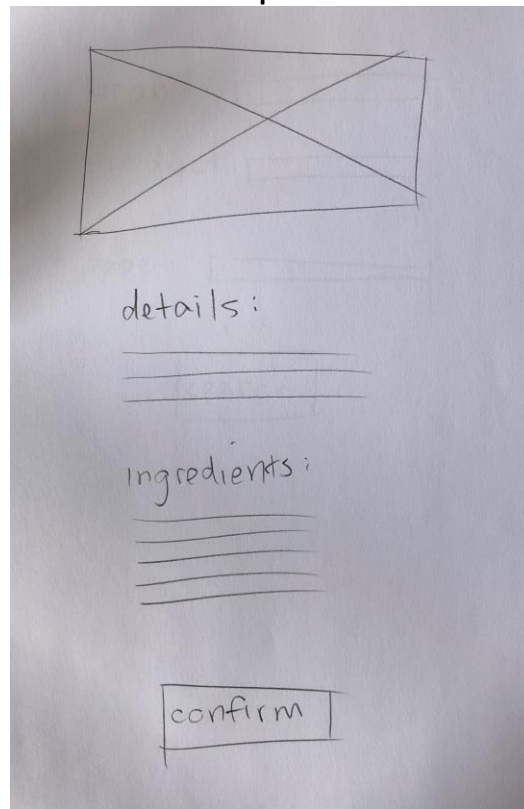
Select body areas affected

Add Photo? 

Select All That Apply

- ☐ Upper Arm : Front
- ☐ Upper Arm : Back
- ☐ Arm Pit
- ☐ Forearm : Palm Side
- ☐ Forearm : Back/Top
- ☐ Palm
- ☐ Back of hand
- ☐ Fingers

Enter Additional Notes:

**Product 1 – Add a new product:****Product 2 – Scan a new product:****Product 3 – Product Search Results:****Product 4 – Confirm product:**



### Product 5 – Manual Product Lookup:

brand:

product:

type:

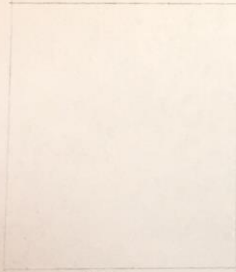
### Administrative Request to Add Product:

REQUEST PRODUCT APPROVAL


Product Name

Product Type

Barcode



Product Photo



Barcode Photo

### Documenting Product Use:

One Time Product Use


Select Day and Time

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Setup Recurring Product Use

Start Date	End Date	Time of Day	Frequency
<input type="text" value="1/1"/>	<input type="text" value="1/1"/>	<input type="text" value="1/1"/>	<input type="text" value="1/1"/>
May 2	May 3	May 4	May 5
8:00am	8:00am	9:00am	8:00am
5:00pm	5:00pm	5:00pm	5:00pm

Select body area(s) applied



Select all that apply

- ☐ Nose
- ☐ Forehead
- ☐ Chin
- ☐ Cheek: left
- ☐ Cheek: right
- ☐ Ear: left
- ☐ Ear: right
- ☐ Lips

## Document Allergic Reaction First Screen:

REACTION OPTIONS JANE DOE MENU

OPEN A NEW REACTION CASE

VIEW ALL PREVIOUS REACTIONS

YOUR RECENT ACTIVITY

STATUS	DATE	PRIMARY REGION
OPEN	Apr 25, 2019	LEFT ARM
OPEN	Apr 22, 2019	HEAD/NECK
RESOLVED	Mar 12, 2019	LEFT ARM
RESOLVED	Feb 20, 2019	RIGHT LEG

## Document Allergic Reaction First Screen:


NEW REACTION FOR JOHN DOE MENU

Select Day and Time You First Noticed the Reaction DATE TIME

Select Up To Five Symptoms

(as user selects symptoms, guidance photos appear here)

Select body areas affected

Add Photo? 

Select All That Apply

- ☐ Upper Arm : Front
- ☐ Upper Arm : Back
- ☐ Arm Pit
- ☐ Forearm : Palm Side
- ☐ Forearm : Back/Top
- ☐ Palm
- ☐ Back of hand
- ☐ Fingers

Enter Additional Notes:

## Allergy Reports:

< Allergy Reports

Filter By: Week ▾ 4/21/19 - 4/28/19

Allergy Record Reports Show Full Reaction Products

4/22/19 ▾ Show Details

Suspected Allergen List

1. ~ 98.7%
2. ~ 88.2%
3. ~ 64.0%
4. ~ 29.7%

4/24/19 ▾ Show Details

4/28/19 ▾ Show Details

≡

## Product Ingredient Reaction List:

< Reaction List

Products to Stay Away From Products ▾ can switch to ingredients

Product 1 picture of product

- Ingredients

Product 2

- 
- 

≡



## Reaction Details:

< Report Details

Reaction Report  
4/22/19

View Community Report

Share w/ medical pro

List of Ingredients

List Products

Products

1. Ingredient 1 98.7%  
 • Product 1  
 • Product 2  
 • Product 3

2. Ingredient 2 83.2%  
 • ~  
 • ~

3. ~  
 • ~  
 • ~

4. ~  
 • ~  
 • ~

>

## Recent Activity:

RECENT ACTIVITY JANE DOE MENU

PRODUCTS REACTIONS

DATE	PRODUCT	BODY REGION
Apr 23, 2019 8:00 am	Face Wash	Head / Neck
Apr 23, 2019 8:15 am	Concealer	Head / Neck
Apr 23, 2019 8:20 am	Moisturizer	Head/Neck R. Arm L. Arm
Apr 22, 2019 9:30 pm	Shampoo	Head / Neck

↓  
( And So on )

## Customer Availability

Our customer was willing and able to meet with us on Friday, April 26, 2019. He has also been very generous with the team by answering questions in slack!

## Contributions of team members

	Kendrick CHU	Anthony GIULIANO	John HASH	Kristopher HILL	Karen MCFARLAND
Revision of Requirements definition	X	X	X	X	X
Revision of Requirements specification	X	X	X	X	X
Prototypes	X	X	X	X	
Summary of Changes	X	X	X	X	X
Stitch together document					X
Review final draft	X	X	X	X	X
Submit document					X