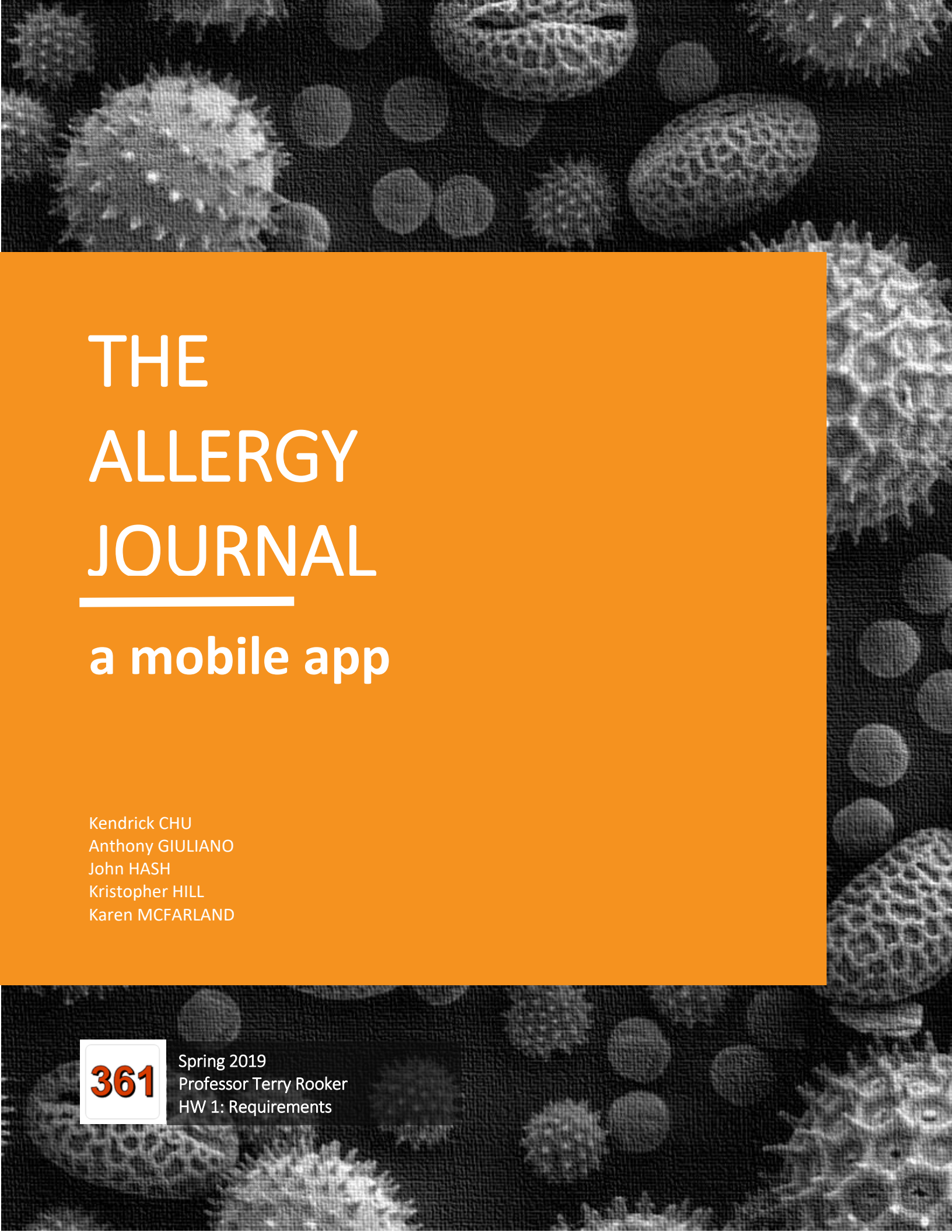

# THE ALLERGY JOURNAL

## a mobile app

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361

Spring 2019
Professor Terry Rooker
HW 1: Requirements

# 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
- allow the user to create multiple profiles for dependents, each with their 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
- 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

# 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

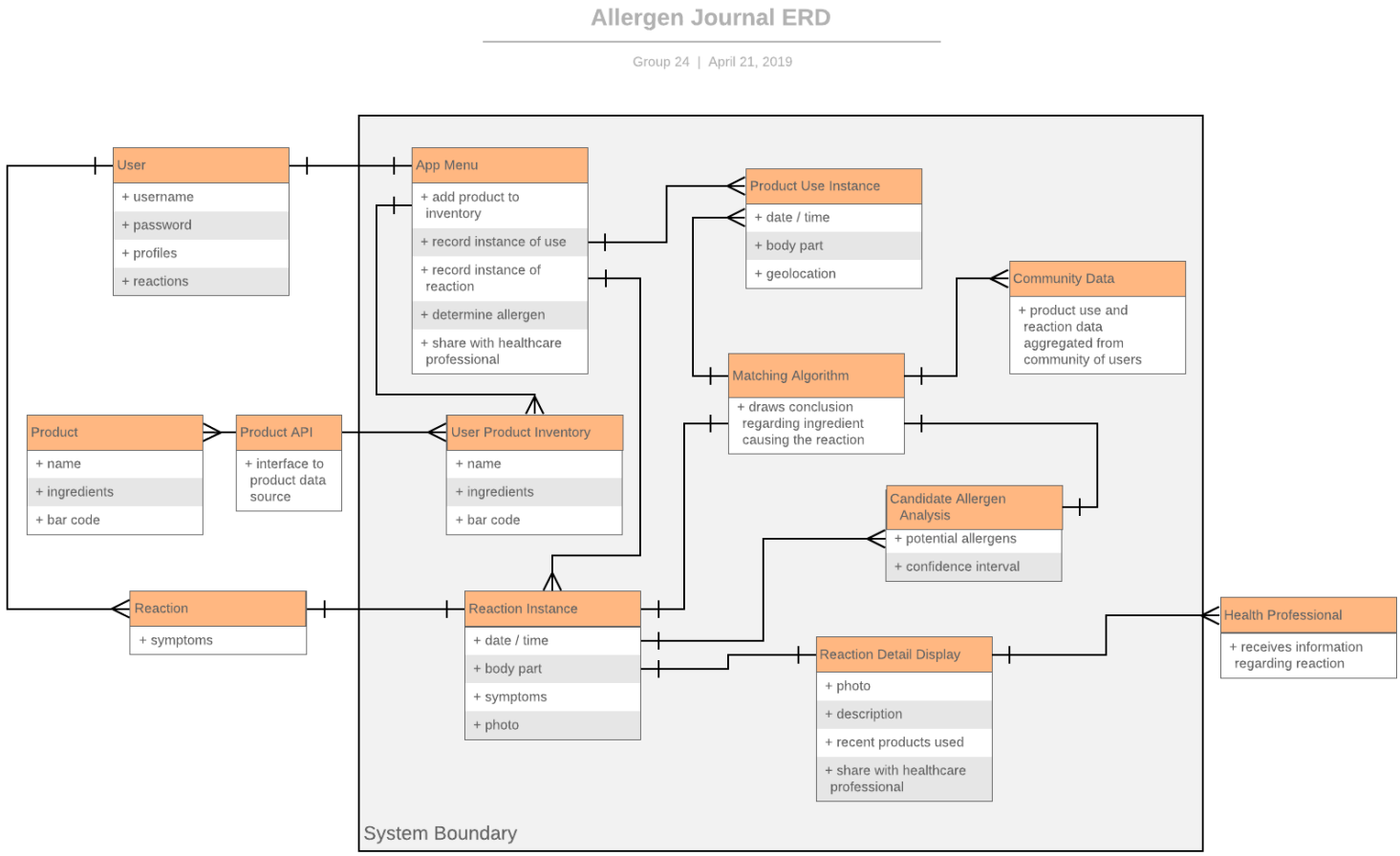
    - Community report data on:
        - Products that are known that are known to cause a higher than normal number of allergic reactions
        - A list of products in the user's inventory that they should be cautious about
        - A list of alternative products that have the same use/function that 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


Allergen Journal ERD
Group 24 | April 21, 2019
User
+ username
+ password
+ profiles
+ reactions
App Menu
+ add product to inventory
+ record instance of use
+ record instance of reaction
+ determine allergen
+ share with healthcare professional
Product Use Instance
+ date / time
+ body part
+ geolocation
Community Data
+ product use and reaction data aggregated from community of users
Matching Algorithm
+ draws conclusion regarding ingredient causing the reaction
Product
+ name
+ ingredients
+ bar code
Product API
+ interface to product data source
User Product Inventory
+ name
+ ingredients
+ bar code
Candidate Allergen Analysis
+ potential allergens
+ confidence interval
Reaction
+ symptoms
Reaction Instance
+ date / time
+ body part
+ symptoms
+ photo
Reaction Detail Display
+ photo
+ description
+ recent products used
+ share with healthcare professional
Health Professional
+ receives information regarding reaction
System Boundary

# Requirements Specification

## Functional Requirements

The program/system shall:

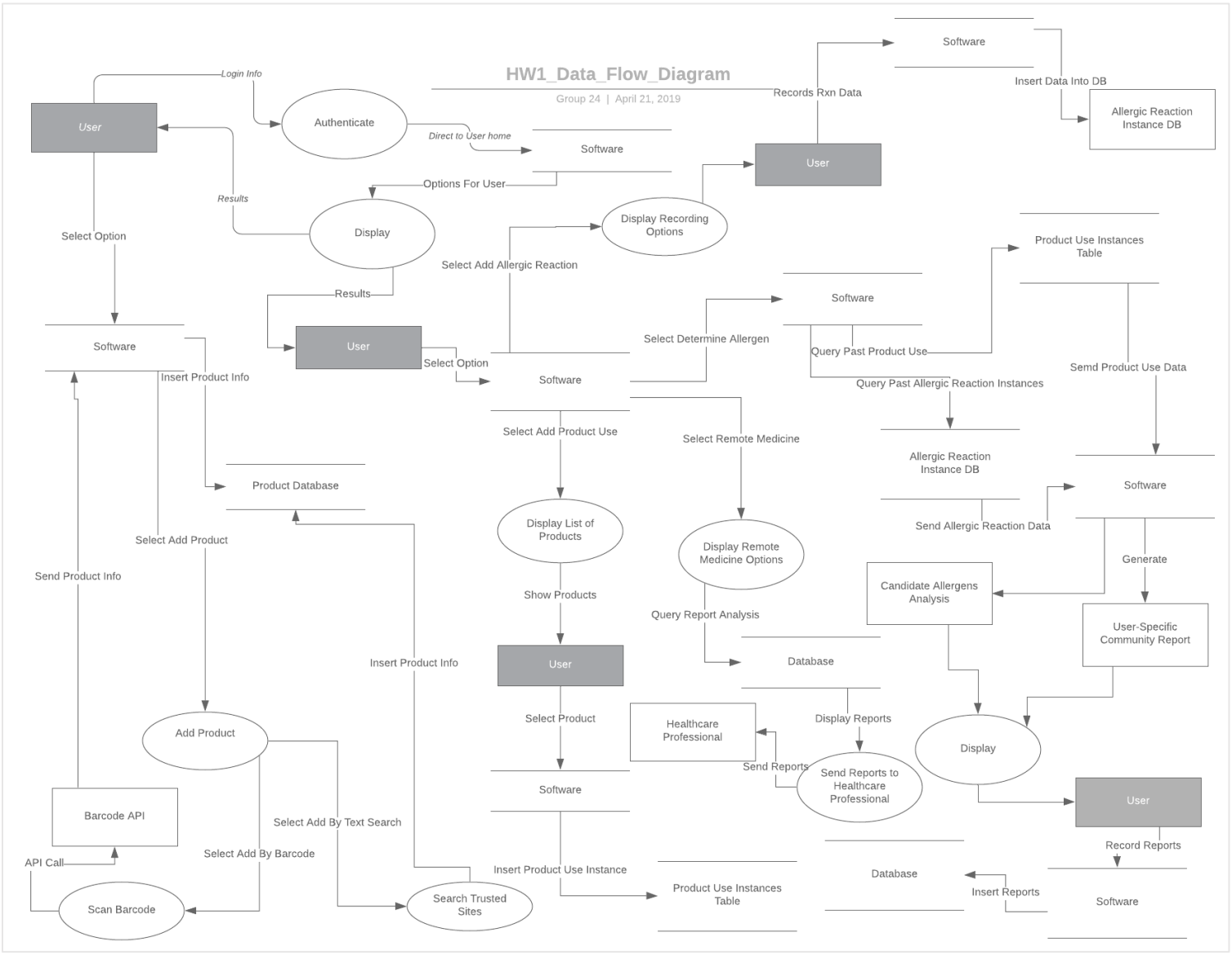
- a user's credentials will be compared to records in the user database to authenticate
- the system interfaces with a product-search API to allow users to find products to add to their inventories
- the system allows the user to manually enter product details if a matching product cannot be found
- 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

## Non-Functional Requirements

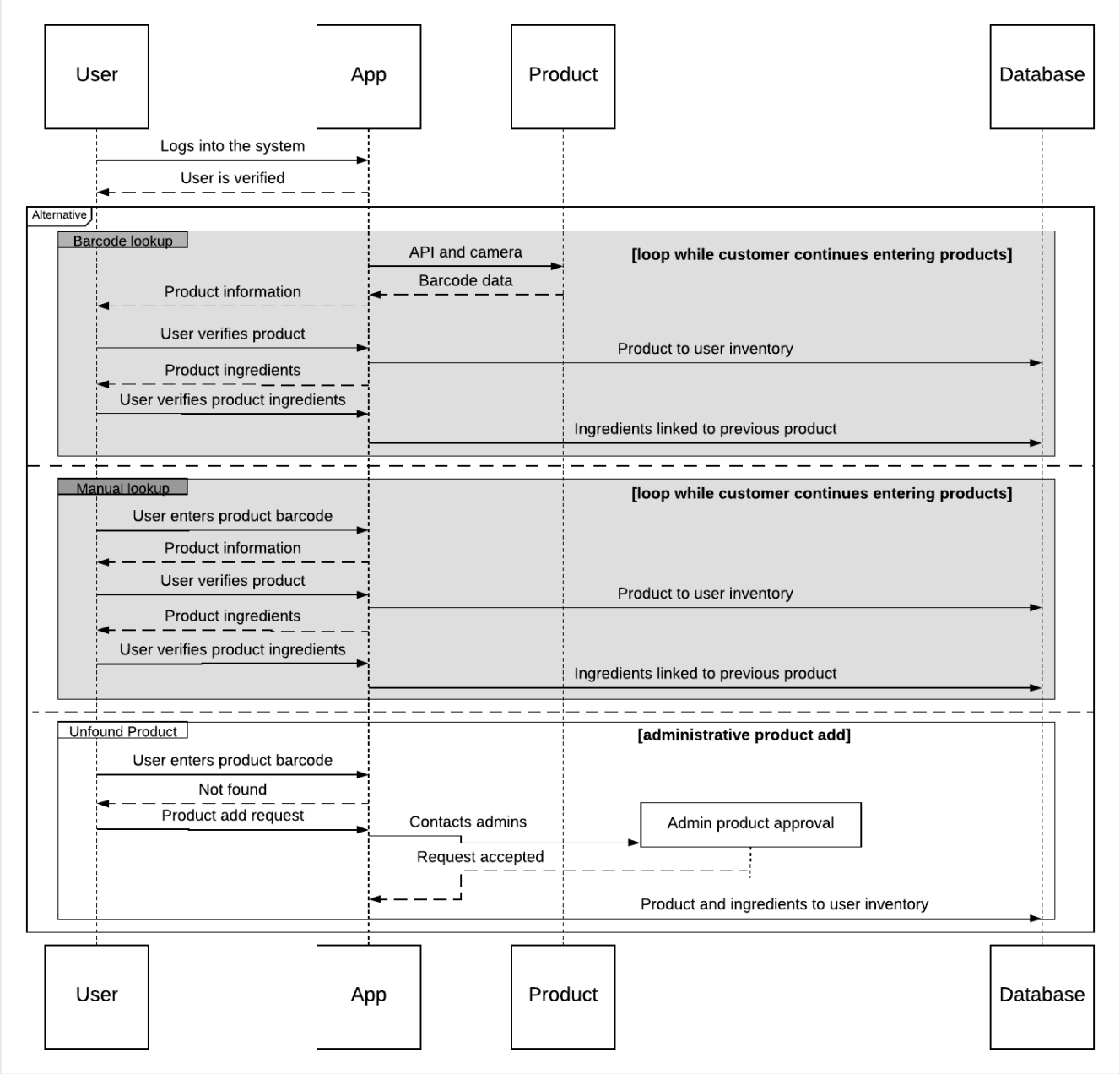
The program/system shall:

- 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

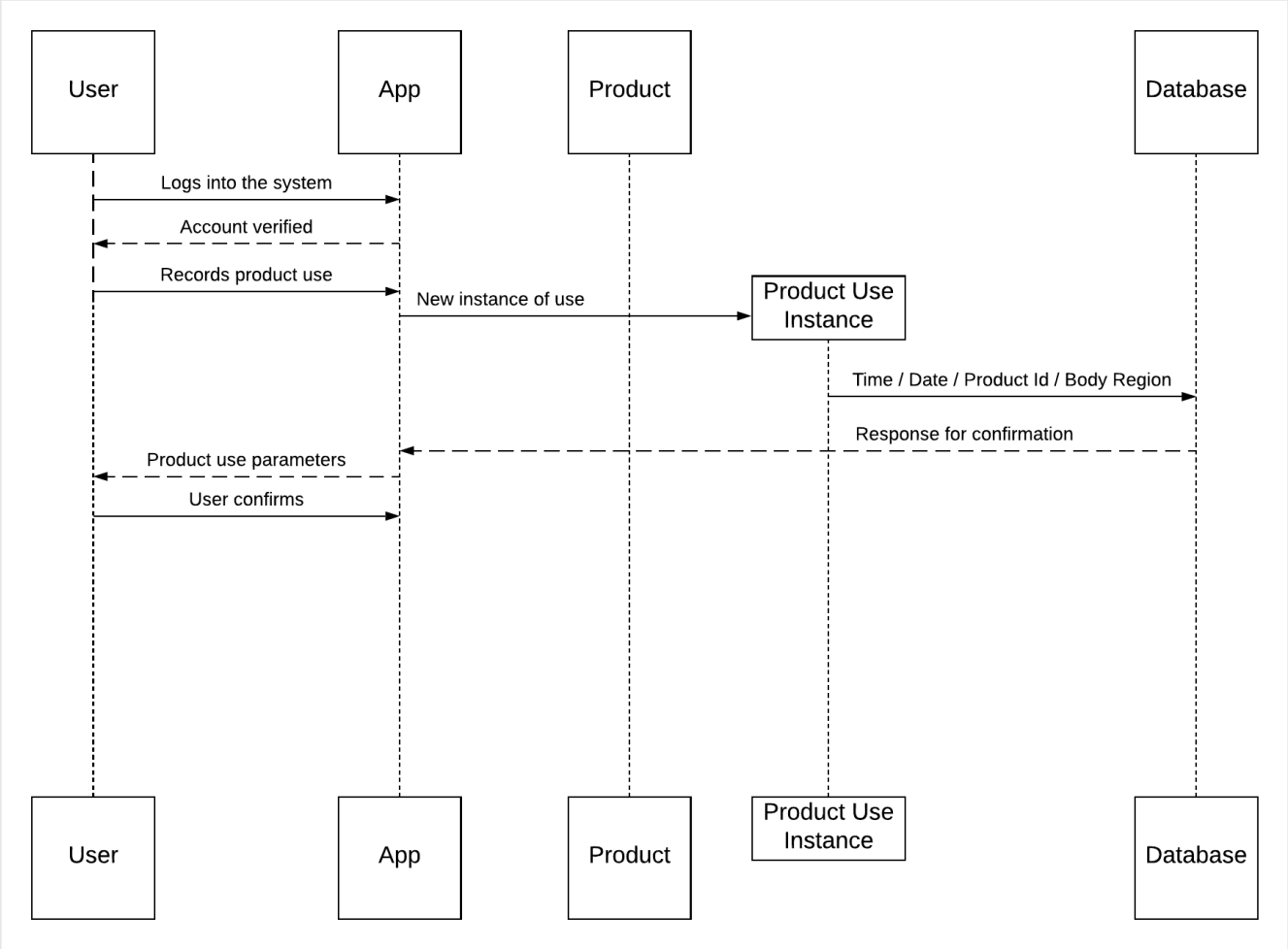
# Dataflow diagram



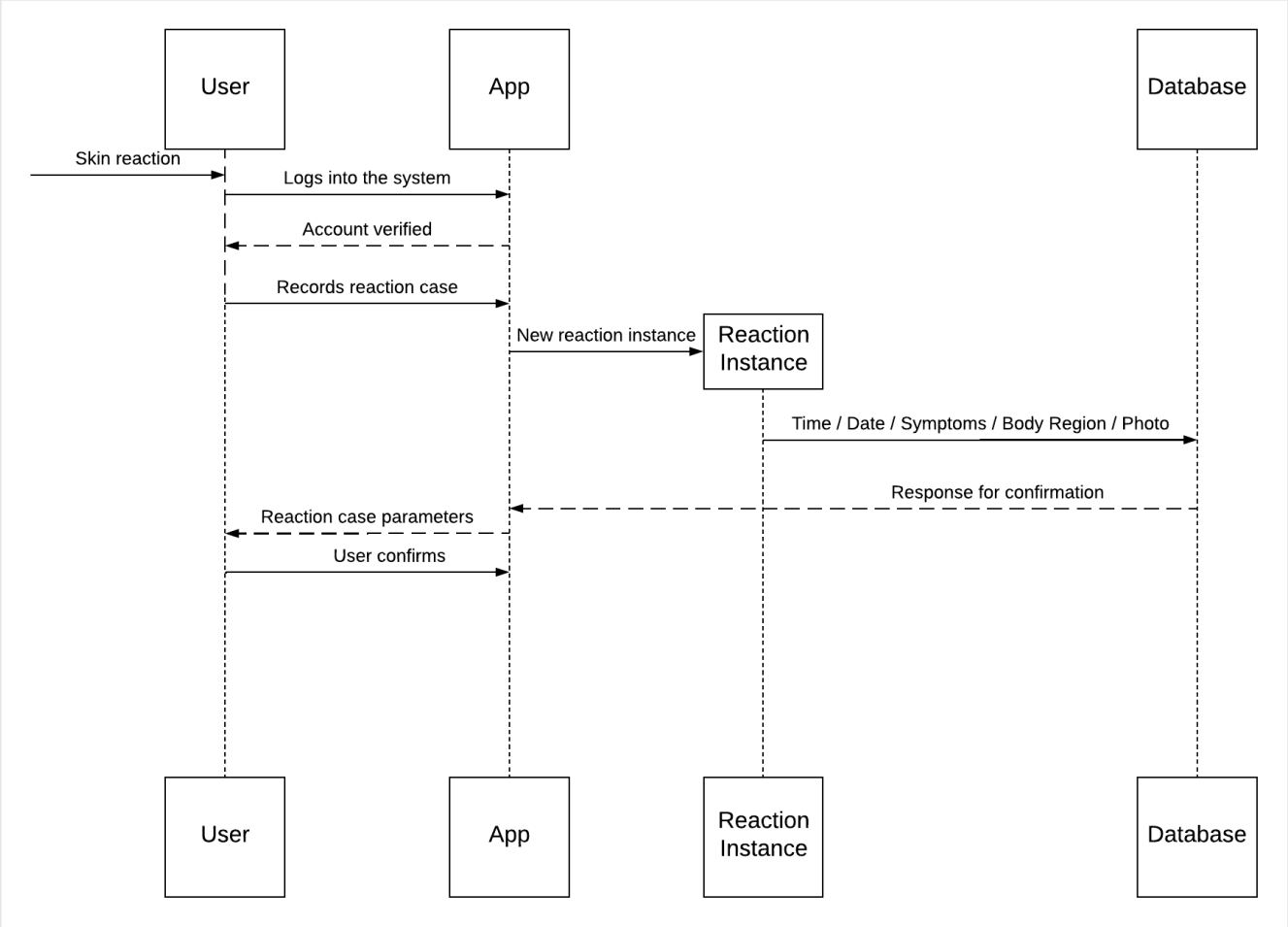
## Message sequence charts



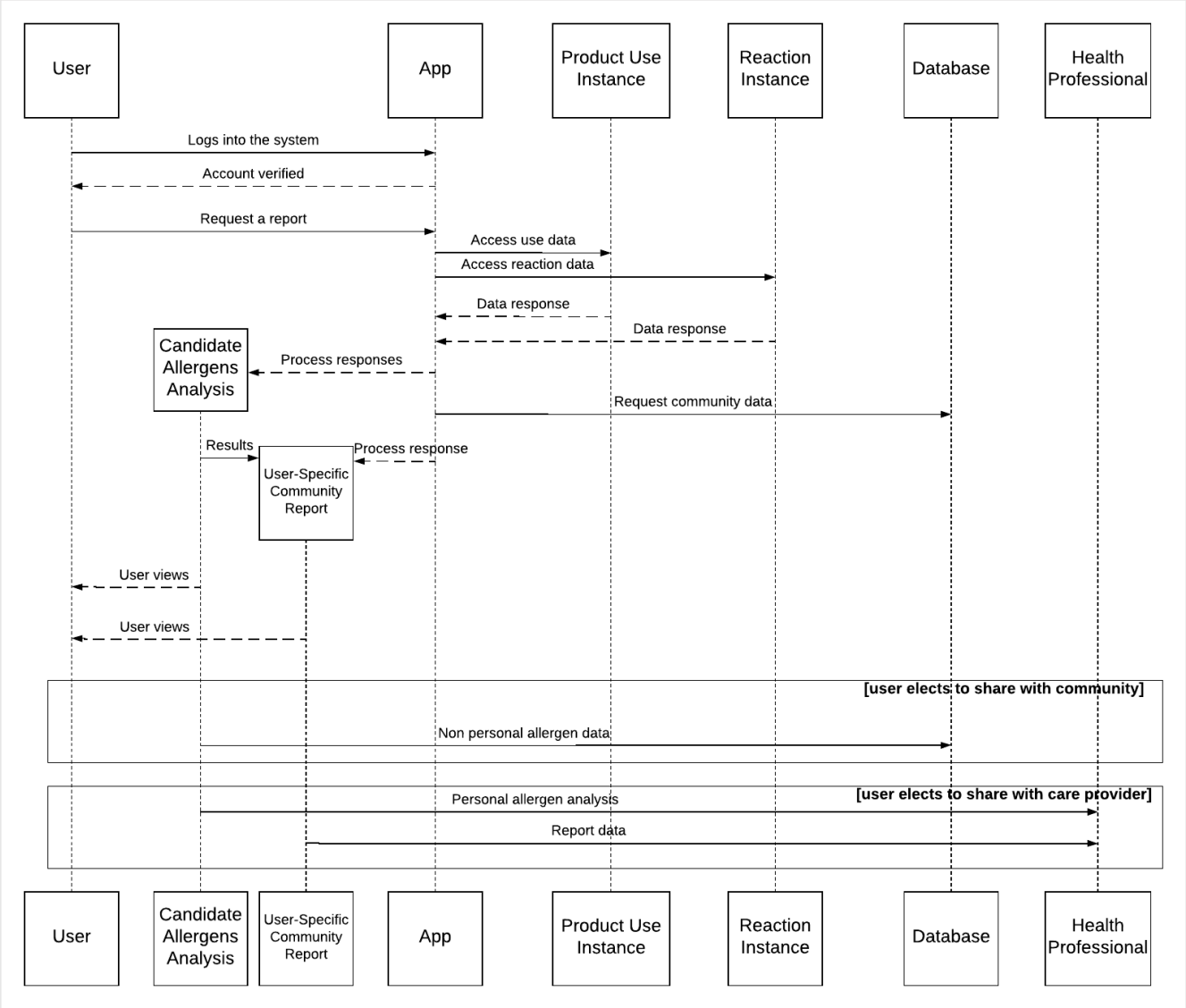

**Use Case 1:** Entering a Product




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




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




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

## Customer Availability

Our customer was willing and able to meet with us on Tuesday, April 16, 2019. After one of our group members (John Hash) spoke with the instructor, our customer was very generous and met with us again on Friday, April 19, 2019.

## Contributions of team members

| | Kendrick CHU | Anthony GIULIANO | John HASH | Kristopher HILL | Karen MCFARLAND |
|---|---|---|---|---|---|
| Requirements definition | | | | | |
| English descriptions of functional requirements | X | X | X | X | X |
| Use Cases | X | | X | | |
| UML diagram | | X | | X | X |
| Requirements specification | | | | | |
| English descriptions of functional requirements | X | X | X | X | X |
| Dataflow diagram | X | X | | X | |
| Message sequence charts | X | | X | | |
| Miscellaneous | | | | | |
| Stitch together document | | | | | X |
| Review final draft | X | X | X | X | X |
| Submit document | | | | | X |