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Enable-IT Project Report

HCI 595X Visual Design for HCI

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# Project Overview

PKyoU is a dietary management, analytics, and educational web application for adults with phenylketonuria (PKU).

The application allows users to track and monitor their nutritional intake, and check the suitability of specific food items for the PKU diet. It also includes an educational component that allows users to increase their nutritional awareness through gamified learning.

# About PKU

## What is PKU?

PKU is an inherited genetic disorder that limits the production of the phenylalanine hydroxylase (PAH) enzyme. The PAH enzyme is necessary for the body to process the phenylalanine (Phe) amino acid, found in foods that contain protein. Since people with PKU can't process Phe in the typical way, the Phe amino acid builds up in their blood (PKU Alliance, 2011, p. 9).

The PAH enzyme enables people without PKU to convert Phe into the amino acid tyrosine, which is essential for several cognitive and other body functions. Since people with PKU are unable to produce sufficient PAH, they cannot convert Phe to tyrosine. When someone with PKU consumes foods that are high in protein, their brain becomes overloaded with Phe, causing cognitive and behavioral problems (PKU Alliance, 2011, p. 10).

## Treatment

The primary treatment for Phe is strict adherence to a low-Phe diet, supplemented with medical formula. Nutritional management is essential, and must be maintained throughout the patient's life cycle (MacLeod & Ney, 2010, p. 63).

# The PKU Diet

In general, people with PKU must maintain a life-long target blood Phe level of 120-360  $\mu\text{mol/l}$  to achieve optimal cognitive outcome (Singh et al., 2014, p. 122). Nutrition management is the key factor to maintaining the target Phe level.

For the PKU diet, foods can be categorized as prohibited, restricted, or allowed. Prohibited foods should be eliminated from the diet altogether. Restricted foods can only be consumed in measured amounts. Allowed foods can generally be consumed without the need to calculate Phe content.

Prohibited foods include red meat, chicken, fish, eggs, milk, yogurt, cheese, nuts, soybeans, beans, and any food containing the artificial sweetener aspartame.

Restricted foods include regular bread and pasta, cereals, cookies, crackers, chips, spinach, rice, corn, pasta, peas, and potatoes.

Allowed foods include most non-starchy fruits and vegetables, juices, fats, sugars, and many foods that are specially modified to be low in protein.

However, even allowed foods should not be consumed in unlimited quantities. It is still important that overall Phe intake stays within daily limits.

# Online Health Interventions

Research indicates that computer –delivered interventions can improve health-related knowledge, attitudes, and intentions. They have also proven to be an effective means of modifying health behaviors, including dietary intake (Portnoy, Scott-Sheldon, Johnson, & Carey, 2008, p. 13).

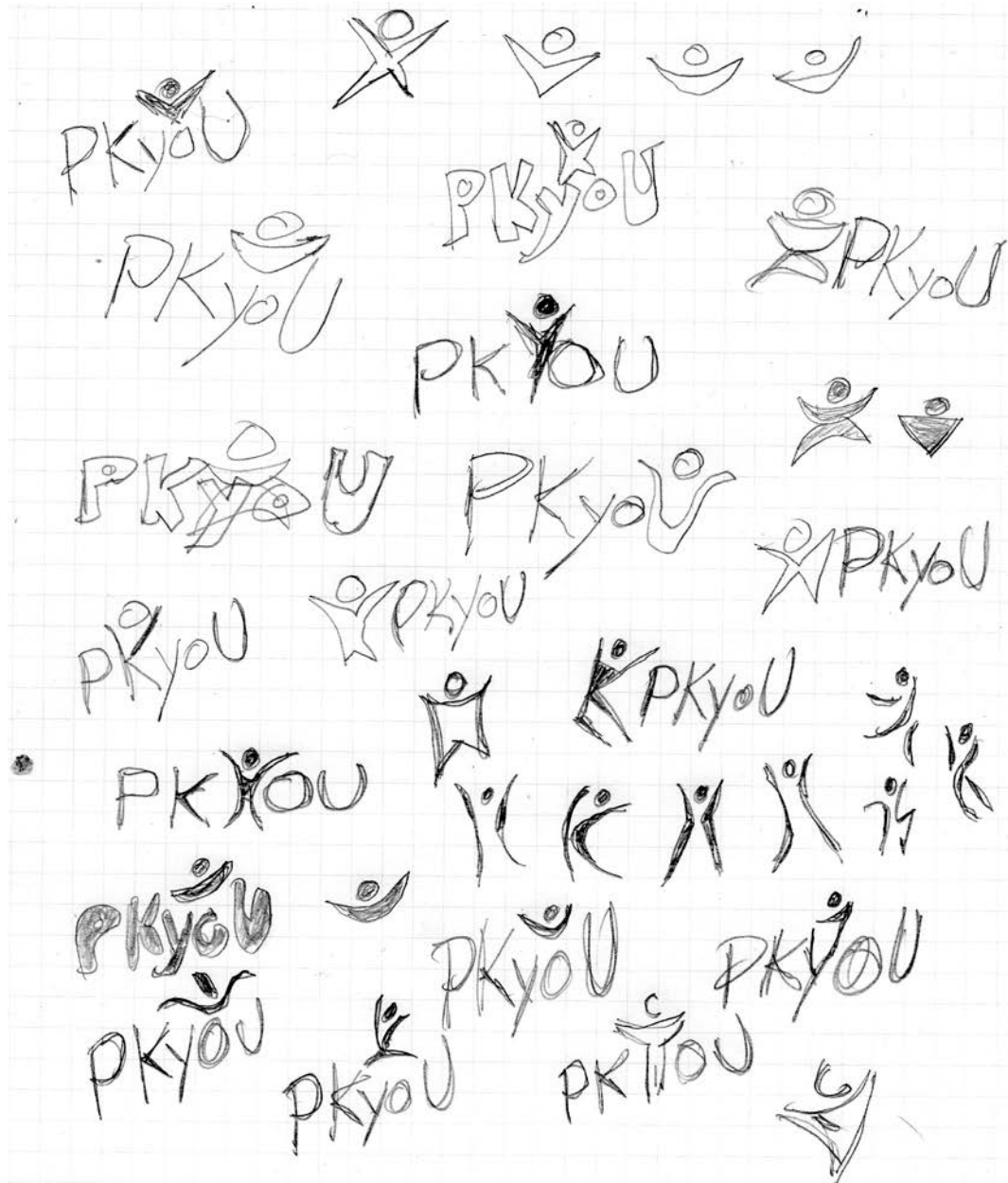
A study focused specifically on increasing personal awareness of dietary intake found that a web-based nutrition information program had a greater impact and was more appreciated than nutrition information delivered via other means. The web-based intervention was evaluated more favorably on several criteria necessary to effective dietary interventions (Oenema, Brug, & Lechner, 2001, p. 658).

Web-based nutrition interventions allow immediate feedback, increasing the likelihood that the information will match the user's current level of awareness, dietary pattern, and motivations. Also, information delivered interactively more closely approximates interpersonal counseling, which can make the intervention more effective. Additionally, web-based interventions are flexible, and be easily updated with new dietary information relevant to the user (Oenema et al., 2001, p. 659).

Several other studies confirm the efficacy of online health interventions as well. Since dietary awareness and management is central to PKU treatment, an online application designed to help people with PKU monitor and modify their nutritional intake could prove effective.

# Brand Identity

## Preliminary Sketches



# Brand Identity

## *Typeface Exploration*

My goal was to find an uplifting typeface that suggested both enjoyment and empowerment.

PKyoU

**PKyoU**

PKyoU

PKyoU

**PKyoU**

Agency FB  
OpenType

Eras Demi ITC  
OpenType

Eras Medium ITC  
OpenType

Essai  
TrueType

Excelsior Sans  
TrueType

# Brand Identity

## Typeface Exploration (cont'd)

I ultimately chose the serif calligraphy typeface "Forte", because its brush-like strokes and open letterforms best suited my typeface goal.

***PKyoU***

**PKyoU**

**PKyoU**

**PKyoU**

**PKyoU**

Forte  
OpenType

MoolBoran  
OpenType

Qlassik Bold  
OpenType

Vollkorn Bold  
TrueType

Walkway Black  
TrueType

# Brand Identity

## *Logo Graphic Exploration*

My goal was to produce a simple, abstract interpretation of a human figure with arms raised joyously.

As with the typeface, the objective was to suggest enjoyment and empowerment.



# Brand Identity

## *Digitized Logo Exploration*

I added the graphic element to several of my typeface finalists before making my final typeface decision.



# Brand Identity

## *Logo Evolution*

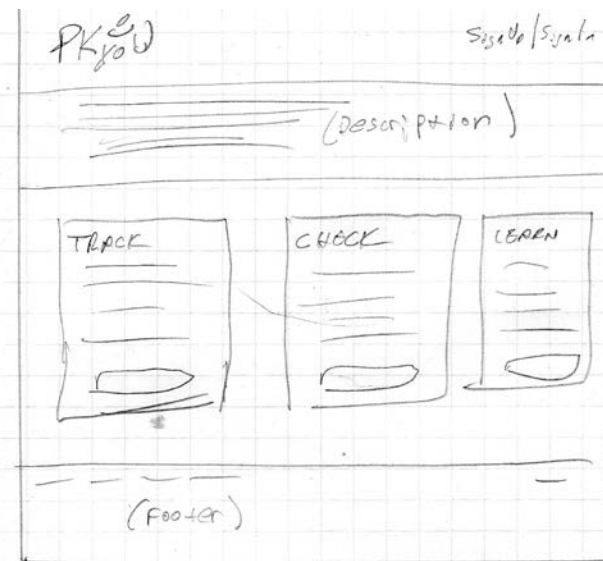
After selecting a typeface, I added the graphic element.

I wanted the logo to be a little taller and more compact, so I increased the vertical scaling of the type 40 percent, and reduced the horizontal scaling 40 percent. I also reduced the size of the graphic element slightly to better fit the more compact type.

Finally, I added a subtle under arch to the logotype to help convey the overall idea of “reaching upward.”

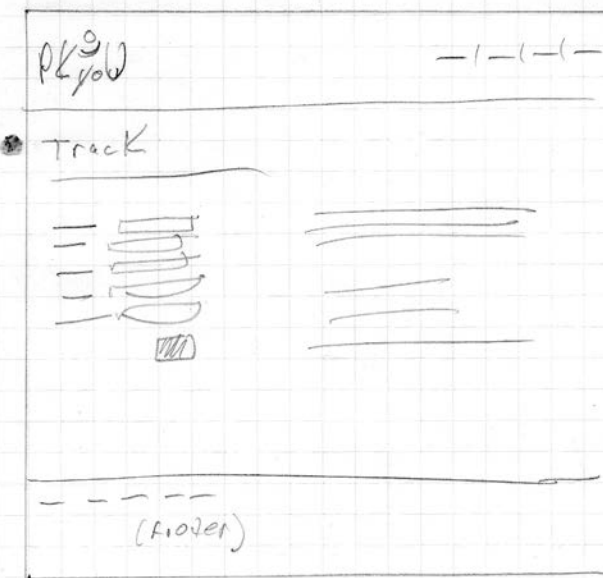


# Website Wireframes



HOME PAGE

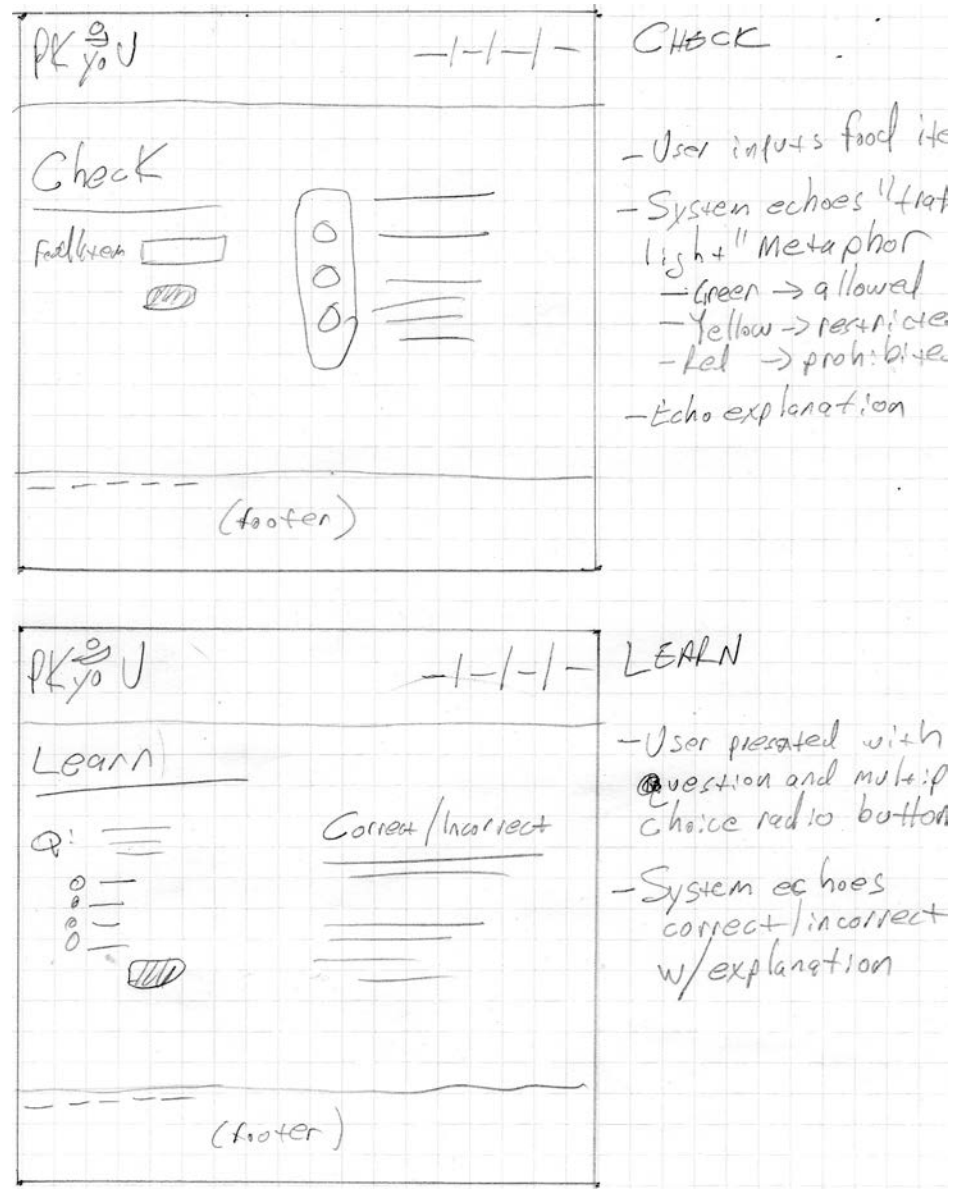
- Keep it simple
- Highlight three main areas of functionality



TRACK

- User inputs food consumed, when, amount
- System echoes in+ and calculated Phe intake

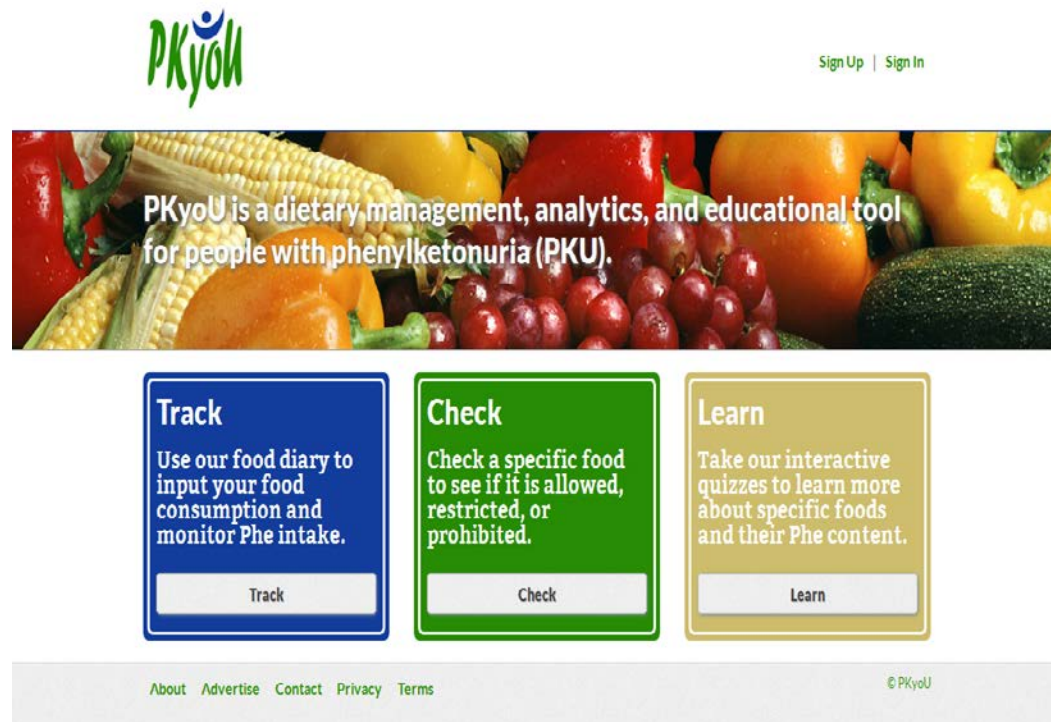
# Website Wireframes



# Prototype Screen Shots

## *Home Page*

The home page allows users to sign in or sign up, and steers them to the site's three primary functional areas.

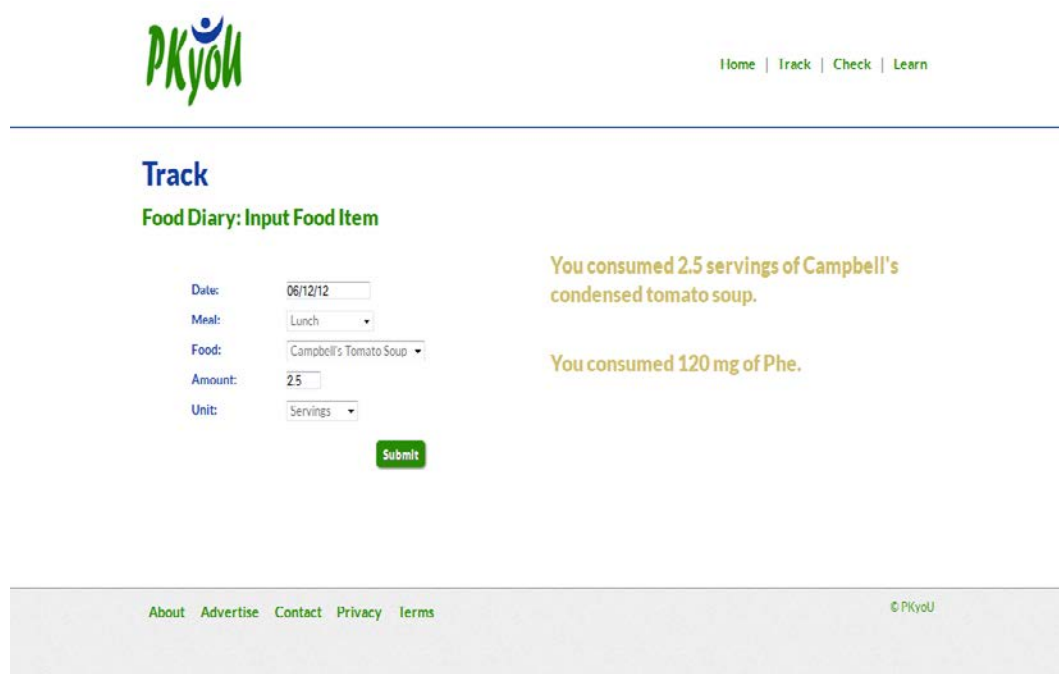


# Prototype Screen Shots

## *Track: Food Input*

When tracking food intake, the user enters the date, the meal, selects a food item, and enters a quantity and unit measure. The amount of Phe is then calculated and displayed.

Users can later view their 3-5 day food intake diary, as well as their calculated Phe log based on this intake.



The screenshot shows the PKyoU website's 'Track' section. At the top is the PKyoU logo and a navigation bar with links for Home, Track, Check, and Learn. Below the logo, the heading 'Track' is followed by 'Food Diary: Input Food Item'. The form contains five input fields: 'Date' (06/12/12), 'Meal' (Lunch), 'Food' (Campbell's Tomato Soup), 'Amount' (25), and 'Unit' (Servings). A green 'Submit' button is located below the form. To the right of the form, two lines of feedback text are displayed: 'You consumed 2.5 servings of Campbell's condensed tomato soup.' and 'You consumed 120 mg of Phe.' The footer contains links for About, Advertise, Contact, Privacy, and Terms, along with the copyright notice '© PKyoU'.

PKyoU

Home | Track | Check | Learn

### Track

Food Diary: Input Food Item

Date: 06/12/12  
Meal: Lunch  
Food: Campbell's Tomato Soup  
Amount: 25  
Unit: Servings

Submit

You consumed 2.5 servings of Campbell's condensed tomato soup.

You consumed 120 mg of Phe.

About Advertise Contact Privacy Terms

© PKyoU

# Prototype Screen Shots

## *Check: Food Item Suitability*

If a user wants to check the suitability of a particular food item, they simply choose the item. The application uses a traffic light metaphor to indicate the suitability of the food item (red = prohibited, yellow=restricted, green=allowed).

If the item is restricted, the user is advised of the Phe content of the item.

The screenshot displays the PKyoU website's 'Check' page. At the top, the PKyoU logo is on the left, and navigation links for 'Home', 'Track', 'Check', and 'Learn' are on the right. The main heading is 'Check' in blue, followed by 'Food Item Suitability' in green. A form on the left includes a 'Food Item:' label, a dropdown menu with 'Broccoli' selected, and a green 'Submit' button. To the right of the form is a large black traffic light icon with the yellow light illuminated. Next to the icon, the text reads 'Proceed with caution!' and 'Broccoli is a restricted food item.' Below this, it states 'Each 30 grams of broccoli contains 50 milligrams of Phe.' and 'Check your recent Phe intake before deciding how much broccoli you can safely consume.' The footer contains links for 'About', 'Advertise', 'Contact', 'Privacy', and 'Terms', along with the copyright notice '© PKyoU'.

# Prototype Screen Shots

## *Learn: Interactive Quiz*

A series of interactive quizzes allow the user to expand their nutritional awareness as it relates to the PKU diet.

The screenshot shows a web interface for PKyOU. At the top left is the PKyOU logo, and at the top right are navigation links: Home | Track | Check | Learn. Below the logo is a blue horizontal line. The main heading is 'Learn' in blue, followed by 'Test and Expand Your Knowledge' in green. The quiz question is 'How many milligrams of Phe are in each gram of protein?'. There are four radio button options: 30, 50 (selected), 25, and 100. A green 'Submit' button is below the options. To the right of the options, the text 'Correct!' is displayed in orange, followed by the answer: 'There are 50 milligrams of Phe per gram of protein consumed.' Below this, a disclaimer states: 'But always be sure to check serving sizes when using this conversion based on food label information. Food labels list amounts of protein per serving, but a package may contain several servings.' At the bottom of the page is a grey footer bar containing links: About | Advertise | Contact | Privacy | Terms, and a copyright notice: © PKyOU.

PKyOU

Home | Track | Check | Learn

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## Learn

Test and Expand Your Knowledge

How many milligrams of Phe are in each gram of protein?

☐ 30

☒ 50

☐ 25

☐ 100

Submit

**Correct!**

**There are 50 milligrams of Phe per gram of protein consumed.**

But always be sure to check serving sizes when using this conversion based on food label information. Food labels list amounts of protein per serving, but a package may contain several servings.

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About | Advertise | Contact | Privacy | Terms

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# Challenges

## **Lack of Standards**

There is a lack of internationally accepted guidelines for the treatment of PKU, so dietary guidelines can vary from country to country. As a baseline, an application such as PKyoU could adopt and follow a specific set of guidelines, such as those most recently recommended by the American College of Medical Genetics and Genomics and Genetic Metabolic Dieticians International. However, it might be useful to allow users to choose their own guidelines, either as they prefer or as recommended by their health care provider.

## **Acceptance by Untreated Adults**

Adults with PKU who had not previously been on a restricted diet often have difficulty accepting the PKU diet. A tool that allows them to track and visualize their food and Phe intake might not be enough. An application such as PKyoU would need to introduce some creative positive behavior reinforcements to reach this population effectively.

## **Expansion of Functionality**

The PKyoU prototype in this report showed brief samples of tracking food and Phe intake, checking the suitability of a food for the PKU diet, and gamified learning opportunities. To be an effective behavior change tool, though, there would have to be a significant analytics component that allows the user to visualize the data in a truly meaningful way.

# References

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