

# How can we engage patients to manage their own physical activity and hygiene?

## Cincinnati Children's Hospital Medical Center

### ADL I-2-3 Adherence Device

In collaboration with: John P. Perentesis, MD, Christopher Dandoy, MD, Victoria Hickey, John Huber  
When: Spring - Fall Semester 2016

#### The Opportunity

The I-2-3 initiative was started within the BMT unit in an effort to cut down on infection rates. This initiative was an incentivized program that awarded stickers to patients who completed 3 daily tasks (bathing once, doing physical activity twice and doing oral care three times). Stickers were exchanged for "BMT Bucks" which could be used to buy toys from Child Life. This system was very effective and increased patient adherence from 25% to 75% among young children and teens.

#### The Challenge

While this system improved patient adherence, it was difficult and time consuming for nurses to manage. LWC was challenged to automate this system, create a device that would effortlessly collect and log points, while also engaging the parent or caregiver.

#### The Approach

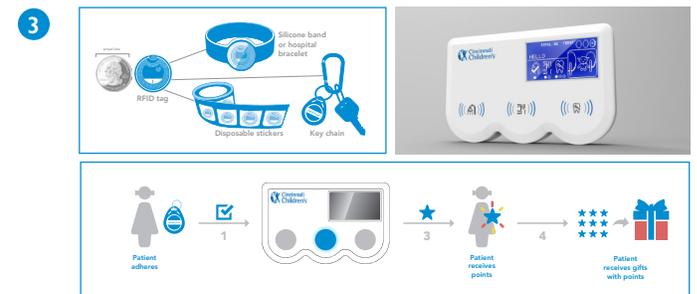
The team investigated ways to automate the point collection process. They developed a touch-free device that allowed maximum freedom for all users while taking into account the constraints of current hospital protocols. The team created initial sketches and 3D concepts, and tested them with families and key stakeholders. After numerous rough electronic models were user tested, a working 3D case was developed and further refined with input from clinical engineering.

#### The Impact

The current prototype is a device that tracks patient bathing, teeth brushing, and physical activity through an integrated system monitored by hospital staff.

#### Where is it now?

CCHMC Equipment & Standards Committee has approved the device and IRB approval has been obtained. Six devices are currently being tested at the Liberty Campus. Initial results are very promising. An additional 24 devices will be tested through a randomized trial at base campus beginning Q1 FY18. A second iteration of the project will begin at Live Well in summer 2019. Work Published: Hickey V, Flesch L, Lane A, Pai A, Huber J, Badia P, Davies S, Dandoy C. Token economy to improve adherence to activities of daily living, Pediatric Blood Cancer. 2018.



#### 1 I-2-3 Device Design

#### 2 Training Video

#### 3 Automating the System

# How can we improve on Version 1 of the ADL 123 Device to increase patient adherence and motivation?

## Cincinnati Children’s Hospital Medical Center I23 Device Redesign

Sponsored by: Children’s Hospital  
When: Summer 2019

### The Opportunity

During the Summer 2019 Project, the Live Well Collaborative team goals were to provide holistic solutions to improve the cancer journey experience for stakeholders.

### The Challenge

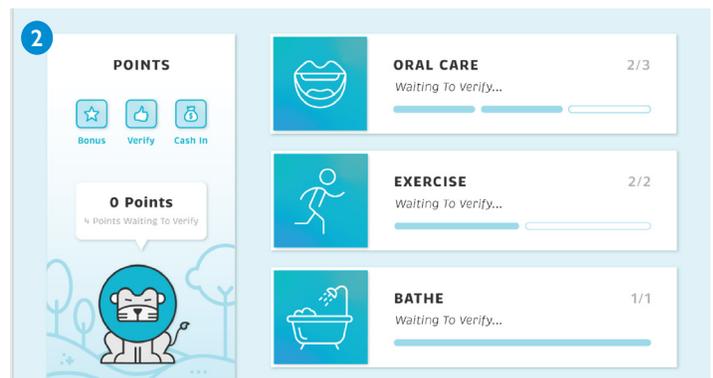
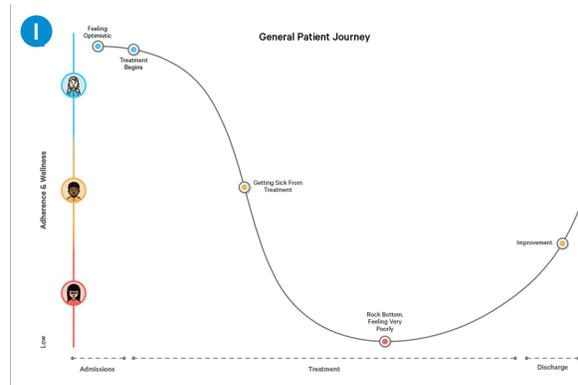
Challenges included understanding experiential deficiencies of the 1.0 device from various stakeholder perspectives as well as identifying opportunities and synthesizing insights into a concise strategy for improvement, and finally, design an improved 2.0 device.

### The Approach

The team spent the first half of the semester utilizing benchmarking, interviews, and past projects reviews to gain insights on how to develop a more efficient and engaging device. The second half of the semester was spent developing wire-frames, visual identities, prototyping and user testing.

### The Results

The team presented a thorough analysis of the current device including stakeholder personas and identifying areas of opportunities based off of these personas. The Live Well Collaborative team also produced an initial clickable prototype covering activity entry and approval, incentivization and redemption, and feedback and shared decision making.



### 1 Patient Journey Map

A map exploring how adherence is effected by where a patient is in their health journey.

### 2 Home Screen

The patient home screen of the V2 application.

### Where is it now?

The work on version 2 will continue into Fall semester 2019.



# How can we improve on the Children's V1 123 Device to increase patient adherence and motivation?

## 123 DEVICE

During the Fall 2019 Project, the LWC teams goals were to provide holistic solutions to improve the cancer journey experience for stakeholders.

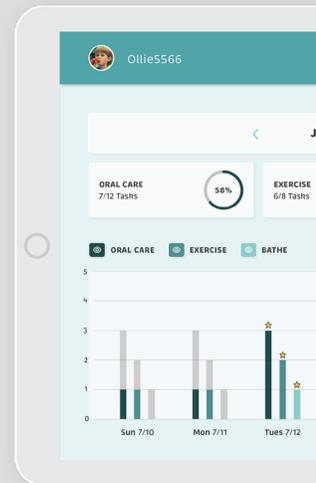
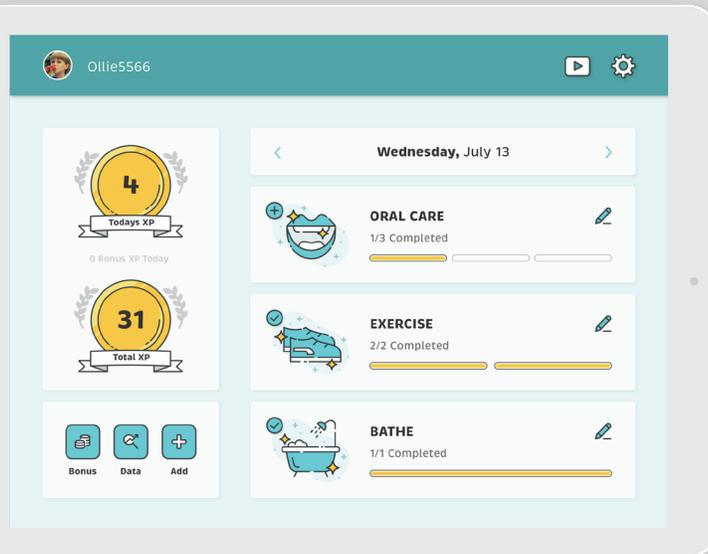
### WHEN:

Fall 2019

### SKILLS INVOLVED:

UI/UX Design  
Product Design  
User Research  
Graphic Design  
Medical Design

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Challenges included understanding experiential deficiencies of the 1.0 device from various stakeholder perspectives as well as identifying opportunities and synthesizing insights into a concise strategy for improvement, and finally, continuing to add on the design improvements made in Summer semester.

## Research

The team mostly focused on improving the overall visual look the Summer semester designs to be more inclusive of all ages, as well as further expanding on the concepts of shared decision-making and incentivization/points redemption. The team also implemented a quality improvement test to compare prototype usage to overall tablet usage and determine the strengths and weaknesses of the prototype. This QI test was done by developing a minimum viable prototype and allowing patients to use the app for 1 weeks duration and then passively gathering their data.

## Ideation

The LWC team worked to implement improvements and develop a redesigned prototype.

### Improvements:

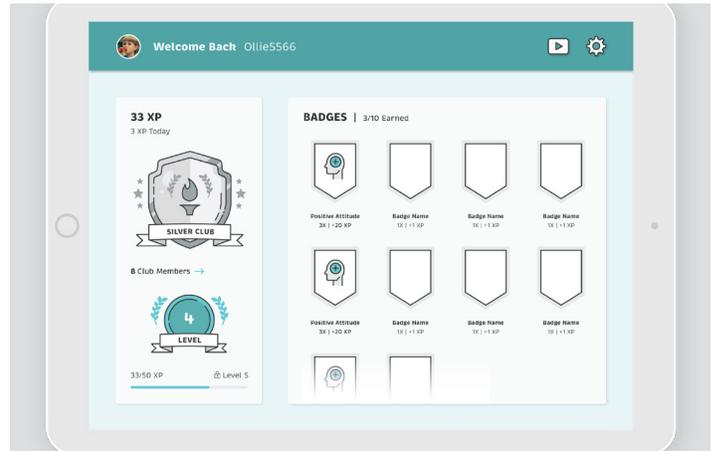
- Home Screen**  
 An updated home screen design was implemented to be more inclusive of a wider range of ages.
- Screen Designs**  
 Screens of the app address the expanded designs of feedback and shared decision making as well as incentivization.
- Incentivization Map**  
 This map explores the different avenues of complexity that could be implemented to the incentivization approach.

## Refinement

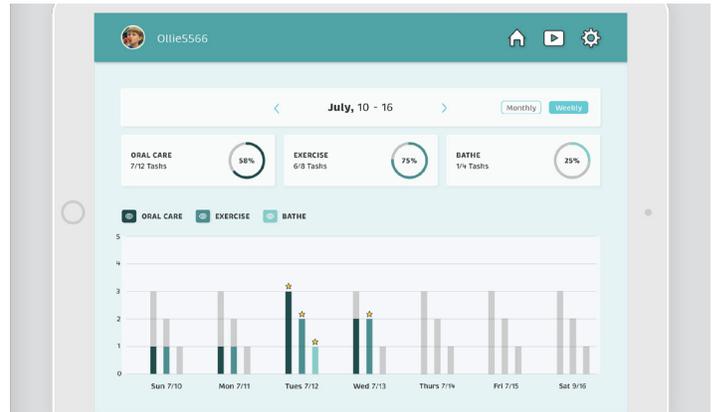
The LWC team also produced a redesigned and fully clickable prototype covering activity entry and approval, incentivization and redemption, and feedback and shared decision making. The team was also able to conduct the QI test with two patients.

### Key Benefits:

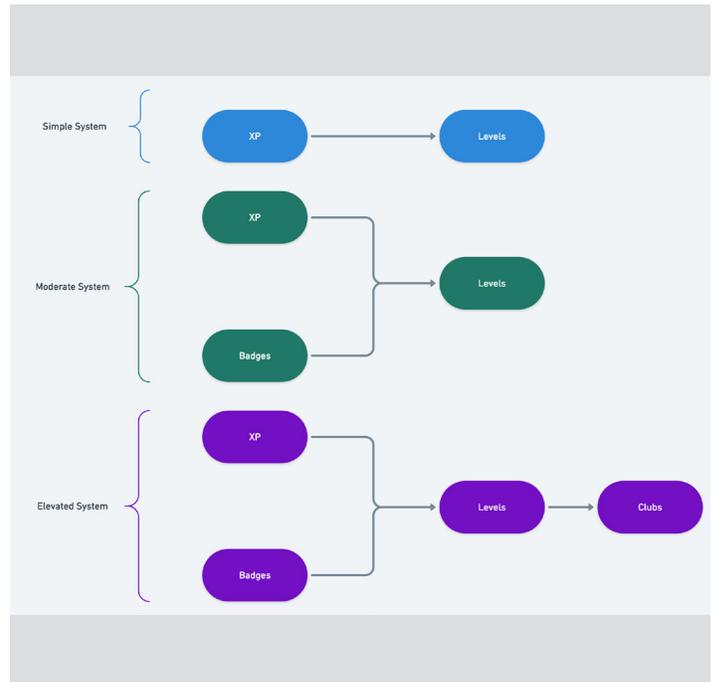
01. Improved interface
02. Appeals to all ages
03. Mapped complexities



Badge screen



Data screen



## Where is it now?

Redesigns were shared with the clinical team.



## ADL 123 APP

Over the course of the semester, the Live Well team sought to improve the adl 2.0 application to better serve patient, caregiver, and clinician needs.

### WHEN:

Spring 2020

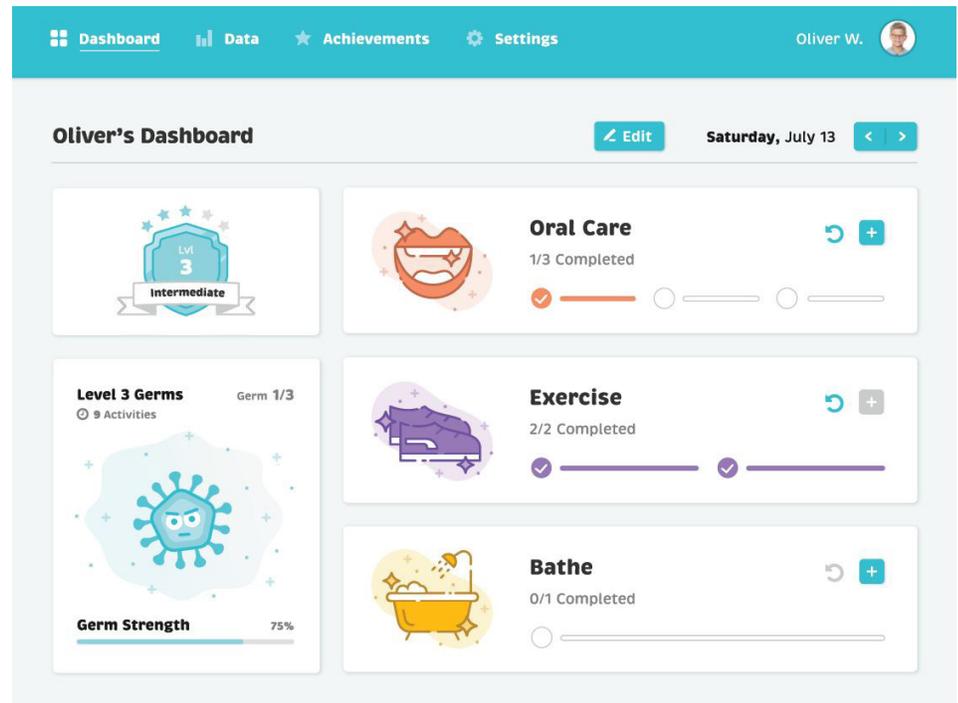
### SKILLS INVOLVED:

Interviewing  
User Testing  
Prototyping  
Persona Development

### CINCINNATI CHILDREN'S, CANCER AND BLOOD DISEASES INSTITUTE

The vision of the Cancer and Blood Diseases Institute is to be the global leader in leading-edge cancer/blood disease care, research and education

## ADL 123 VERSION 2.0



About 2 years after the successful implementation of the original 1-2-3 Device, Cincinnati Children's Hospital expressed interest in exploring the possibilities of a 2.0 device. Live Well and CCHMC developed a brief outlining goals including understanding the experiential deficiencies of the 1.0 device and developing a prototype that begins to address some of these areas of improvement. This semester was a continuation of designing the 2.0 system.

### Research

The Live Well team began research by interviewing CCHMC staff about the adl program. Nurses also helped in engaging in usability testing of the current 123 app design. Receiving excellent feedback on the usability of the app, the team then moved on to addressing the difficult challenge of youth incentivization. Getting quality information from a young interview respondent is very difficult by using traditional qualitative methods. The Live Well team needed to innovate in order to gain a better understanding into what motivates young demographics in gamified scenarios. The team then designed play-based interview tools to gather information on specific gamified motives that could be incorporated into the adl app.



## Ideation

During the ideation phase the team used insights from the play-based interview sessions to base incentivization concepts. Multiple paths were explored, but the most effective was a concept rooted in story. The protagonists of this story were the ADLs and your immune system. The goal was to defeat the antagonist...Germs!

## Tools Used:

- **Play-Based Interview tools**

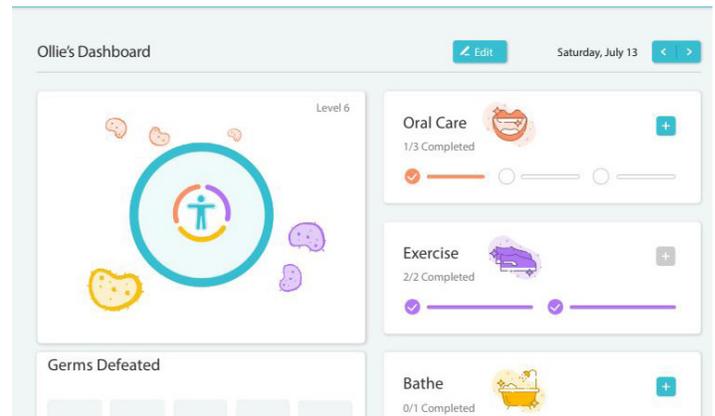
The team developed tools to help gather data on youth interview respondents. This was a great way to engage during the interview.

## Refinement

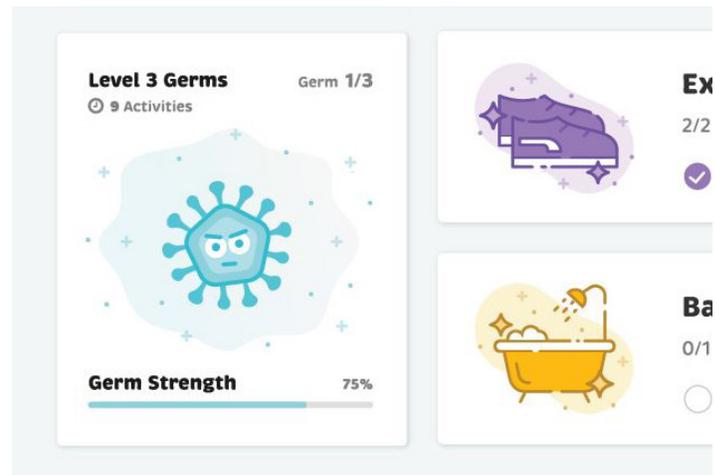
The final “germ boss” concept was deeply thought out in this phase. User flow maps, interactive prototypes, and game mechanic diagrams were created to explain the app. Personas were also created to frame the concept components back to the problems they were solving.



Play-based interview tools



Ideation concepts



## Where is it now?

The CCHMC team expressed their interest in pushing the ADL app into possible development. Both the Live Well and CCHMC are currently assessing what next steps should be for the ADL app.