



## Google Aria

According to the CDC, chronic diseases are responsible for 7 of 10 deaths each year, and treating people with chronic diseases account for most of our nation's health care costs. Oftentimes physicians are stretched for additional time spent with treatment for patients. Self-management of such diseases can also be overwhelming for patients, especially those who have demanding daily regimens. While health and fitness trackers exist, they are often geared towards exercise and lifestyle—not chronic diseases. Fortunately, tech giants like Google have been investing more and more into wearable devices designed to track patient's vitals. While there aren't any disease-centric devices out the in the market just yet, I thought it would be rather interesting to convene my health background with my design skills, and create a mobile app (to be used in conjunction with wearable patches), for asthma, an ailment that afflicts about 25 million Americans today.

Project Details	Design Goals	Tools Used
<b>Challenge  </b> Design an Android mobile app that helps users monitor and manage their asthma	<ul style="list-style-type: none"><li>Deliver a strong, app experience that displays data from a wearable patch and aggregates data from additional sources</li></ul>	<b>Research  </b> Industry Research, Competitive Audit, Provisional Personas, User Interviews
<b>Client  </b> Google (fictitious project)		<b>Synthesis  </b> Empathy Map, Trello, Personal Development
<b>Duration  </b> 2 weeks	<ul style="list-style-type: none"><li>Brand app so that it aligns with Google's Material Design, leveraging existing design patterns and user expectations</li></ul>	<b>Product Strategy &amp; Ideation  </b> Whiteboard, Goal Mapping, Feature Matrix, App Map, LucidChart
<b>Role  </b> Lead UI UX Designer: Design Researcher, IxD, Visual Designer	<ul style="list-style-type: none"><li>Create an app that integrates push notifications, health summaries, and symptom / trigger overview</li></ul>	<b>Interaction Design &amp; Testing  </b> Pen + Paper, User Flow, Illustrator, Photoshop, MarvelApp, Apowersoft Recorder
		<b>Delivery  </b> Zeplin

## Research & Synthesis

### 01. Industry Research

As my knowledge within the realms of asthma management was insufficient enough to design an app (not just yet), I crafted a research strategy with the below goals in mind. I then jump-started my research phase with literature reviews. After shifting through a day's worth of medical articles, I was finally armed with enough foundation knowledge to move forward with a competitive analysis.

<b>Goal #1:</b> Understand the pathology and physiology of asthma, particularly what causes it, and what metrics need to be tracked and monitored.	<b>Goal #2:</b> Define Aria's positioning within the market landscape of asthma management tools.	<b>Goal #3:</b> Discover what tools sufferers currently use.	<b>Goal #4:</b> Identify valuable and frustrating aspects that users have with their current management options.
--	---	--	--

## 02. Competitive Analysis | Provisional Personas

Most direct competitor products are still being developed and or tested. This scarcity is nicely counterbalanced with a bountiful amount of indirect players — **38 to be exact**. Needless to say, I had to cut down this listing to a more manageable total of 5 (based on the ratings, features, and functions that most closely meet the high level objectives of this project). I then reviewed each app's features, interface design, and customization functionalities.

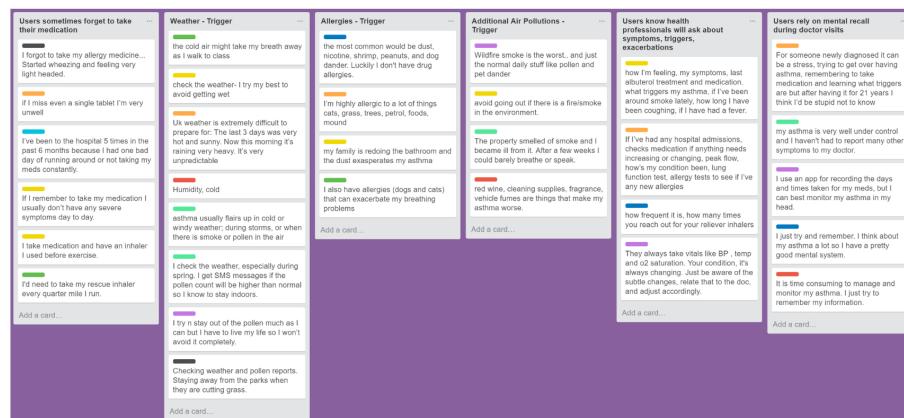
From the secondary research amassed thus far, I aggregated and interpreted the data results into provisional personas to articulate the target audience.



## 03. User Interviews | Empathy Mapping

I used the above provisional personas for prospecting interviewees during research. After scouring asthma forums and online support groups, I was able to secure a total of 6 representative, asthmatic participants to speak with me via video chat. Interview questions were crafted around the aforementioned goals along with any assumptions I held.

I mapped out the findings from my interviews onto Trello to 1. help empathize observations from the research phase, 2. draw out unexpected insights about our user's needs, and 3. to sum up our learning from user engagements.



Empathy Mapping

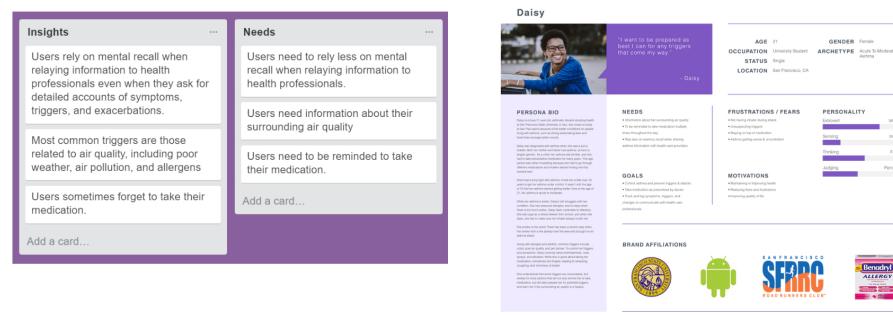
## Discovery

From our research findings, we discovered that designing an asthma application (with a dependent device) will not be completely beneficial for all asthma patients. Different patients have different levels of asthmatic severity and the usage of management tools is dependent on such:

- An app with an associated wearable would be most beneficial for those with moderate asthma.
- Those with acute asthma express little concern / need for trigger, medication, and symptom documentation.
- Those with severe deem it unnecessary because they have had asthma for many years and are already confident in their self-management techniques.

## 04. Persona

Using all the insights garnered from empathy mapping, I was able to distill needs to help refine the target user. From the sum of my research findings emerged my **persona** Daisy, a composite of all my findings from both user interviews and secondary research data.



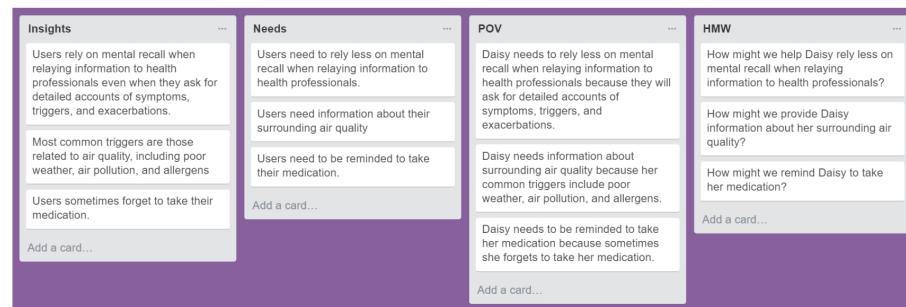
The persona card for Daisy includes the following sections:

- Insights:**
  - Users rely on mental recall when relaying information to health professionals even when they ask for detailed accounts of symptoms, triggers, and exacerbations.
  - Most common triggers are those related to air quality, including poor weather, air pollution, and allergens
  - Users sometimes forget to take their medication.
- Needs:**
  - Users need to rely less on mental recall when relaying information to health professionals.
  - Users need information about their surrounding air quality
  - Users need to be reminded to take their medication.
- Daisy:** A photo of a young woman with dark hair, smiling. Below the photo is a quote: "I want to be prepared as much as possible so I don't forget what comes my way." - Daisy.
- Demographics:** AGE: 21, OCCUPATION: Nursing Student, STATUS: Single, LOCATION: San Francisco, CA, ARCHETYPE: Acute To Moderate.
- NEEDS:**
  - A desire to be prepared as much as possible so she doesn't forget what comes her way.
  - A key concern is how often she forgets to take her medication.
  - She wants to be reminded to take her medication because sometimes she forgets.
- GOALS:**
  - A desire to reduce potential triggers & detect them earlier.
  - A desire to prevent triggers & avoid them.
  - A desire to be more organized and prepared.
- FRUSTRATIONS / FEARS:**
  - A desire to be more organized and prepared.
  - A desire to prevent triggers & avoid them.
  - A desire to be more organized and prepared.
- PERSONALITY:** Adventurous, Honest, Humorous, Feeling, Curious, Planning.
- MOTIVATIONS:**
  - A desire to be more organized and prepared.
  - A desire to prevent triggers & avoid them.
  - A desire to be more organized and prepared.
- BRAND AFFILIATIONS:** SFARMC, Allergy Research Club, Benadryl.

# Defining And Ideation

## 01. POV Statements | HMW Questions

Based on the needs of Daisy, I came up with POV Statements that then led to the creation of action-oriented HMW Questions. Doing so helps to establish a minimal viable product by ideating the best possible solution(s) for each design challenge.

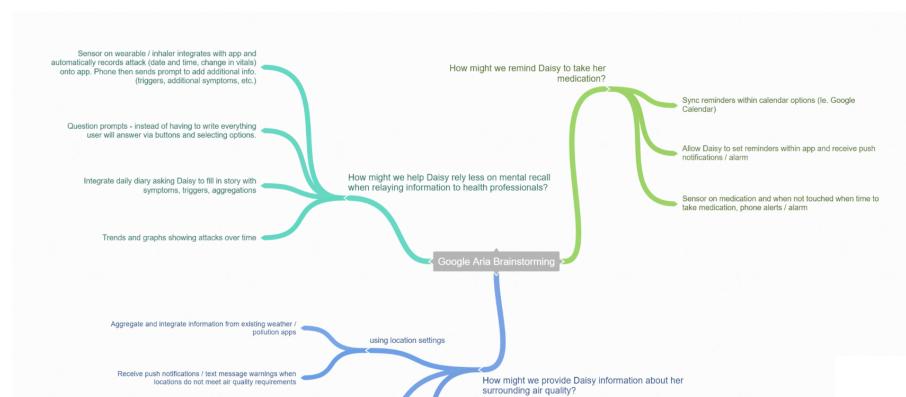


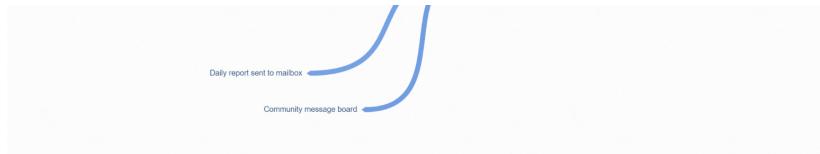
The card maps Insights, Needs, POV statements, and HMW questions:

- Insights:**
  - Users rely on mental recall when relaying information to health professionals even when they ask for detailed accounts of symptoms, triggers, and exacerbations.
  - Most common triggers are those related to air quality, including poor weather, air pollution, and allergens
  - Users sometimes forget to take their medication.
- Needs:**
  - Users need to rely less on mental recall when relaying information to health professionals.
  - Users need information about their surrounding air quality
  - Users need to be reminded to take their medication.
- POV:**
  - Daisy needs to rely less on mental recall when relaying information to health professionals because they will ask for detailed accounts of symptoms, triggers, and exacerbations.
  - Daisy needs information about surrounding air quality because her common triggers include poor weather, air pollution, and allergens.
  - Daisy needs to be reminded to take her medication because sometimes she forgets to take her medication.
- HMW:**
  - How might we help Daisy rely less on mental recall when relaying information to health professionals?
  - How might we provide Daisy information about her surrounding air quality?
  - How might we remind Daisy to take her medication?

## 02. Brainstorming

With the HMW Questions, I came up with potential solutions for the problems at hand and quickly mapped them out via an hour long brainstorm session.





## Product Strategy

### 01. Business And User Goals

Before moving into interaction design, I needed to ruminate for user and business needs and determine middle ground goals that satisfy both parties. To help define the functionality of the MVP features, I cross-examined each brainstormed idea with our business user goal map, which ultimately helps to determine which idea(s) from my brainstorming might best serve the needs of our stakeholders.

BUSINESS GOALS	COMMON	USER GOALS
Collect user's digitized asthma information to <b>provide actionable insights</b> , used to strategize for further investments	<b>Help users monitor asthma</b>	<b>Control asthma and prevent triggers &amp; attacks</b>
Establish <b>leadership in the healthcare wearable market</b>	<b>Helps users manage asthma</b>	<b>Take medication as prescribed</b> by doctor
<b>Differentiation of Aria from other wearables</b> from the competitive market	<b>Turn collected health data into a foundation needed for actionable insights.</b>	<b>Track and log symptoms, triggers, and changes to communicate with health care professionals</b>
High level of <b>user engagement and retention</b>		
Help users <b>monitor and manage their asthma</b>		
<b>Consistent, cohesive branding</b> that follows current design guidelines		

Business User Goals

### 02. Feature Roadmap

Business and user goal alignment informed feature prioritization: Placing Daisy's needs center-stage, I convened my feature solutions into a comprehensive list and ranked them by level of time and resource investment.

A	B	C	D
Feature Name	Description	Priority	Research supporting it
<b>Data From Wearable</b>			
Heart Rate	resting heart rate, but also heart rate zones for moments with higher activity	P1	Secondary research, competitor analysis, User Interviews
Wheezing and coughing	intensity and frequency	P1	Secondary research, competitor analysis, User Interviews
Respiration	breathing rate in breaths per min	P1	Secondary research, competitor analysis, User Interviews
Exercise	the technology can detect when the user is walking, running, doing cardio activities, biking, or swimming	P1	Secondary research, competitor analysis, User Interviews
Sleep	duration and sleep stages so the user can monitor their asthma at night, too	P1	Secondary research, competitor analysis, User Interviews
<b>Data For Surrounding Air Quality</b>			
Weather	Aggregates information from existing weather reports (Eg. WeatherChannel / AirNow)	P1	Secondary research, competitor analysis, User Interviews
Humidity	Aggregates information from existing weather reports (Eg. WeatherChannel / AirNow)	P1	Secondary research, competitor analysis, User Interviews
Pollen Count	Aggregates information from existing weather reports (Eg. WeatherChannel / AirNow)	P1	Secondary research, competitor analysis, User Interviews
Air Pollution	Aggregates information from existing weather reports (Eg. WeatherChannel / AirNow)	P1	Secondary research, competitor analysis, User Interviews
<b>Asthma Management</b>			
Medication Tracker	Allows user to track medication intake and doses by week and day, alarm / push notification when time comes to take it	P1	Secondary research, competitor analysis, User Interviews
Attack / Event Log	Allows for user to log asthma information in the form of an event (Eg. asthma attack), prompts user to enter symptom triggers, usage of controller rescue inhalers / medication taken in response, peak flow, and any relevant notes	P1	Secondary research, competitor analysis, User Interviews
<b>Additionals</b>			
Share	Import and Export options to share information with doctor	P2	Secondary research, competitor analysis, User Interviews
History And Trends	Allows user to view historical timeline of attacks / events by day, week, and month, breaks down data visually and graphically	P2	Secondary research, competitor analysis, User Interviews

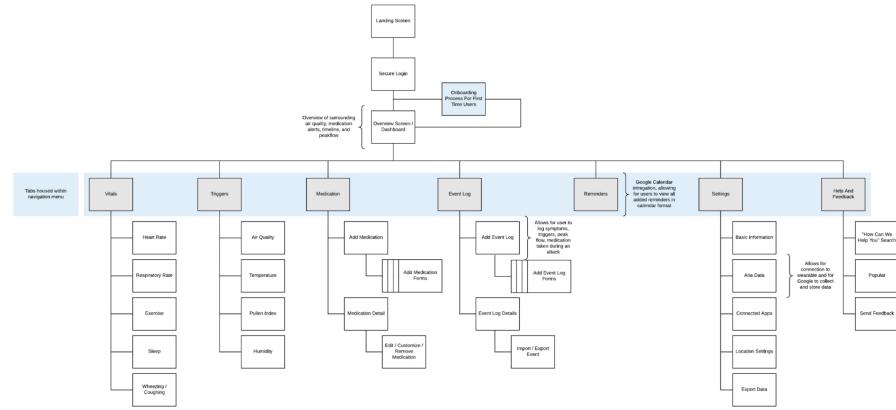
Smartwatch	Allows for user to receive notifications about reminders, surrounding air quality, and push notifications that quickly tells the user if they are doing well or not, as well as what to do if they are not doing well (Emergency Support / First Aid / Emergency Contacts)	P3	Secondary research, competitor analysis
Desktop	User can access additional resources that are otherwise not within the smartphone and mobile app, includes robust asthma education section, ability to export asthma and health trend information	P3	Secondary research, competitor analysis

Feature Roadmap

# Information Architecture

## 01. App Mapping

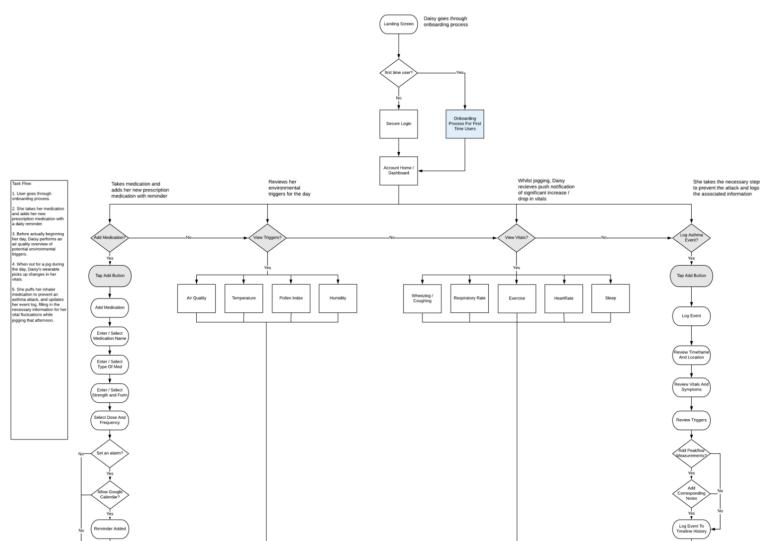
I created an application sitemap with these high priority features for important task flows in the app which will be used by all asthmatic users.

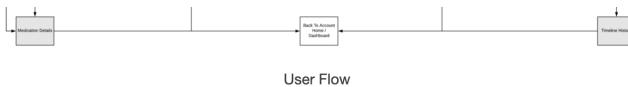


App Mapping

## 02. User Flow

A user flow map provided insight into Daisy's expectations when using the asthma app: It helps empathize with how she would navigate pages to complete linear tasks, and how she would journey to checkout via different entry points and paths.

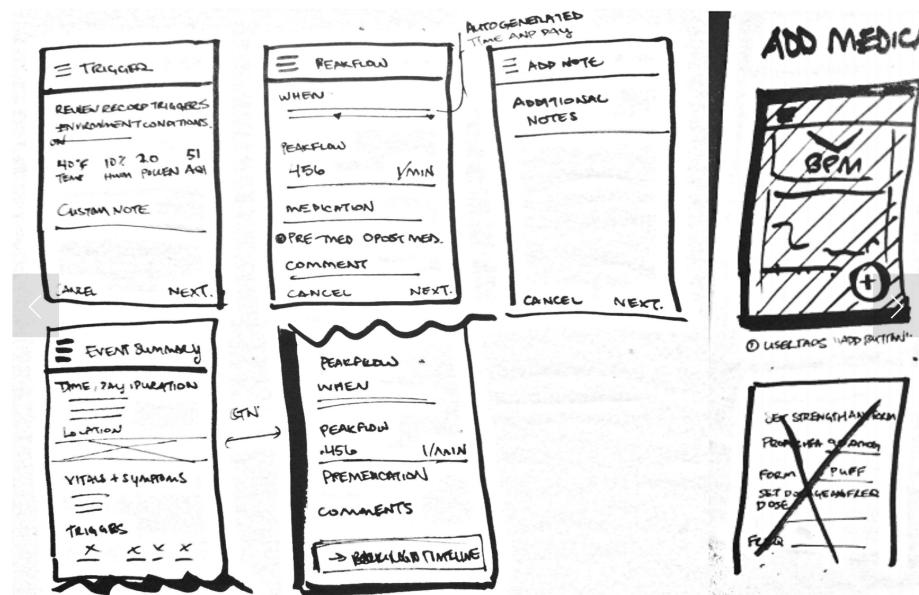




# Interaction Design

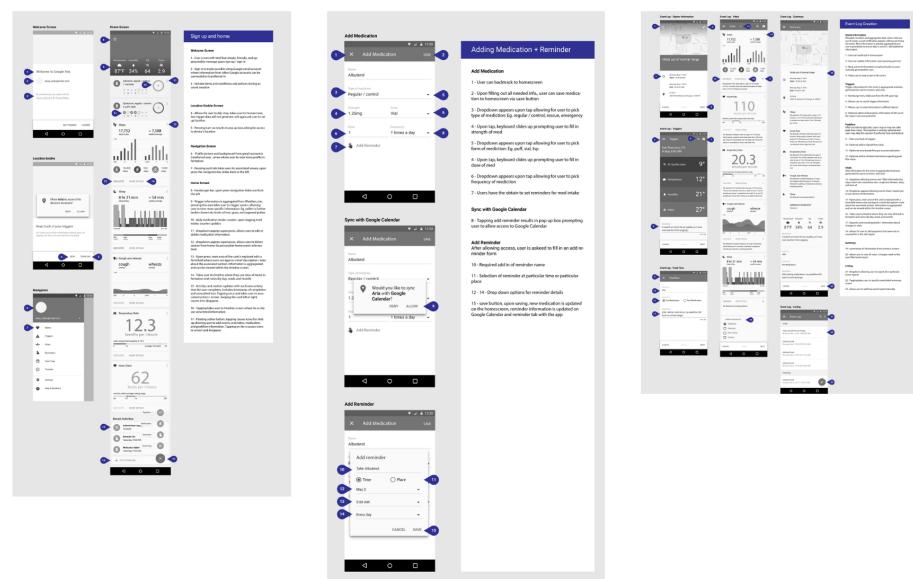
## 01. Sketching

Constructing user flows ultimately informed what key pages and features to design for during user testing. I began by fleshing out my ideas via rough, disposable sketches. At each stage of design, I tried to ensure that the copy and interface was simple enough for the user to comprehend. I wanted task flow interactions to be quick so that users would not be frustrated with time-consuming processes, a pain point of which had been expressed during empathy research.



## 02. Mid Fidelity Wire-framing

From my sketches, I moved on to mid-fidelity wire-frames. Before moving onto prototyping, I annotated my key frames to include details about the content and interactivity.



# Prototyping

My key screens and elements were imported into MarvelApp. The task flows observed in this working mid-fidelity prototype are as follows:

1. User Onboarding
2. Adding Medication
  - o Auxiliary Task(s):
    - Viewing / Setting reminders
    - Deleting / Editing medicine
3. Locate triggers within the app
4. Locate vitals within the app
  - o Auxiliary Task(s):
    - Find trend information for a specific vital
5. Create an event log
  - o Auxiliary Task(s):
    - Export event



# Usability Testing

## 01. Usability Testing

With the mid fidelity prototype, a usability test was conducted with the following objectives in mind:

1. Test the flow of the app's architecture and design and determine if users can easily accomplish tasks, specifically and most importantly: adding medication, setting reminders, and creating event logs.
2. Assess the usability and functionality of the app's navigation and hierarchy.
3. Given that there are many different paths for find-ability, determine which path is preferred for creating event logs as well as setting medication reminders.
4. Observe and note pain points, areas of uncertainty, and/or dissatisfaction with any elements or features

Via moderated remote setting, 4 individuals: 3 male, 1 female, between the range of 20–30 years old with moderate asthma was recruited for user research. (Participants are geographically dispersed.)

## 02. Affinity Charts

From these findings, came an affinity chart, crafted based on errors and issues observed during usability testing. The affinity chart is segmented into 3 specific groups:



### Test Completion And Error Rates

Distillation of usability testing results show that users had the most issues when running through task flows 1 and 3. Specifically, users had difficulty finding the medication section and were confused when asked to find trend information for specific vitals. By re-framing these problems into more "how might we" questions, we enter another round of brainstorming. Solutions that best resolve problems are then charted and prioritized within a list of recommendations.



### User Comments And Observation Patterns

While the design was fairly successful in terms of flows, participants found relationships between **words and meaning** to be rather tricky, and thus, had trouble determining the appropriate course of action from vague links such as "more details."

<b>Overall Findings:</b> The prototype overall was clear and easy to use. Information was well organized and presented in a logical flow. It was easy to navigate and understand, and navigation, set and one-section, logic was good. The information was presented clearly and effectively, making it easy to understand and follow.
<b>Findings:</b>
Viewing of specific trend / vital information was confusing for some users. They did not understand the function, and therefore, did not know what to do with the information.
There was an equal balance between users who search for medication and users who search for vitals.
There is confusion over the "go to" button. Some users expect to see more activities when they click on the "go to" button, while others expect to see more activities when they click on the "view all" button.
1 user expected an event log section to be located under the "view all" section. Another user expected to see the amount of events they have had within a certain period of time.
1 user expected an event log section to be located under the "view all" section. Another user expected to see the amount of events they have had within a certain period of time.

### Prioritized Recommendations

Changes are prioritized from high to low based on amount of users who are frustrated with each specific issue.

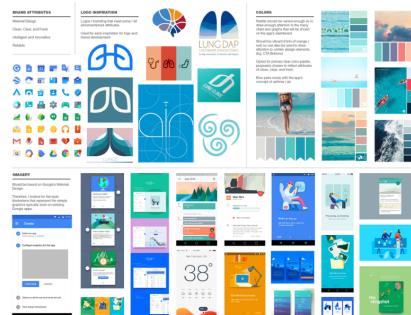
Upon further contemplation, the users seem to be confused by the interface rather easily. It is unlikely that users will be able to quickly identify medications frequently into the interface with the type of medication that they are looking for. This is because users already viewed or remembered which users typically use the navigation bar and search bar.

Given this above insight, we can refine recommendations for the interface to incorporate status cards. Eg. you can have a status card for notifications within this space of time.

# User Interface Design

## 01. Mood Board

To accommodate the changes rolled out in the affinity map, the prototype was iterated into a high-fidelity version. From my base mid-fidelity wire-frames, I started to work on creating a brand identity. Besides complying with Google's Material Design guidelines, the brand should be 1. clean, clear, and fresh, 2. intelligent and innovative, and 3. reliable.



I used these attribute requirements to concoct a mood board that helped to depict my overall vision.

Mood Board

## 02. Logo Design

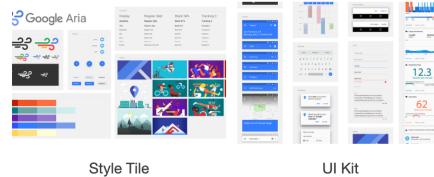
Google Aria's logo is a pictorial representation of asthma management: The waves are a simplified depiction of air. The color scheme is on brand with already existing Google logos, as seen in Google Doc / Calendar / Translate.



Google Air's Logo

## 03. Style Tile & UI Kit

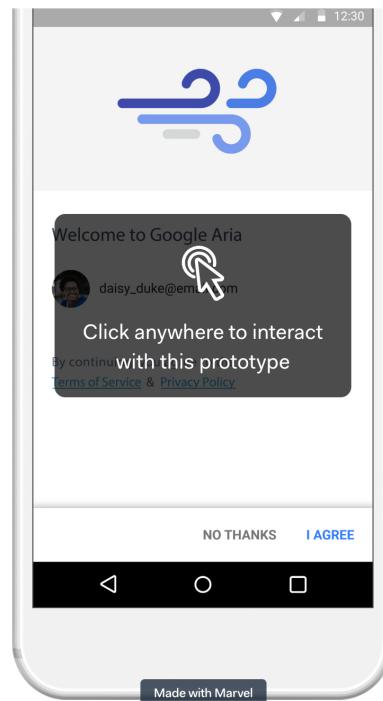
I aggregated my design vision into a style guide which helped simplify the visual design process during the creation of high-fidelity frames. From my high fidelity frames, I created a UI Kit to aid designers and developers during round 2 of design iterations.



Style Tile

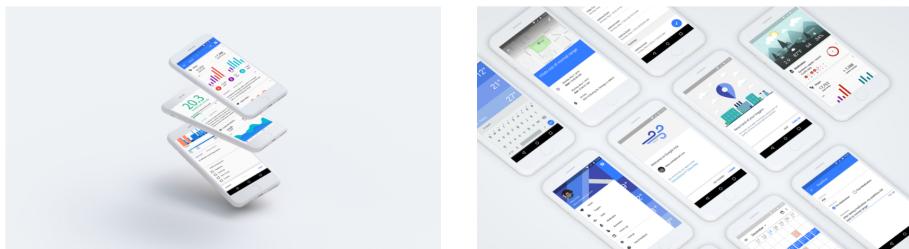
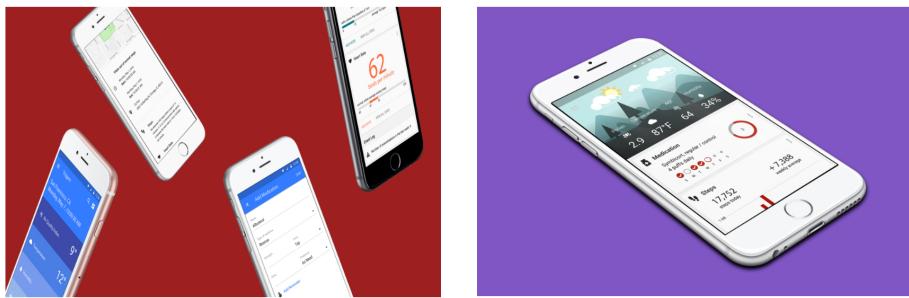
UI Kit

## Final High Fidelity Prototype



Made with Marvel

## Final High Fidelity Frames



## Takeaways & Next Steps

It is rather exciting to see an app evolve based on user feedback, and it is incredibly rewarding to be able to bring the user-centered development process into healthcare. The platform eliminates major problems that plague the industry, particularly the need for asthma patients to fill out long-winded questionnaire forms during doctor appointments and bridging the informational gap during doctor and patient interaction.

With that said, next steps should be taken to ensure product success: The updated prototype needs to be further tested with health care providers. It is absolutely critical that we uncover errors and possible improvements in usability and interaction for respiratory specialists, the sole individuals who can best help asthmatic patients. Further data visualization screens for symptoms, peak flow, triggers and medication also need to be developed to help user's track their treatment progress over an extended period of time.

