

# Mask Pouch

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USER AND DOMAIN ANALYSIS

Team Water

## Executive Summary

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Our research successfully answered several of the questions and uncertainties held prior to our investigation. First, a large concern was narrowing our scope to the factor that was most resonant with consumers; the environment, convenience, or sterility. We found that both the environment and convenience seemed to be the most important, with convenience slightly ahead. This has impacted our cursory plans for product design and material choice, purely because this needs to be something that is convenient and fashionable enough to be successful on the market.

Second, there were concerns about the public perception surrounding UV. Our focus groups and interviews ranked UV as a low concern in terms of safety, with only one participant expressing any concern regarding the safety or efficacy of UV exposure as a means of sterilization. The vast majority thought alternative sterilization techniques, like heat or chemical exposure, were less effective or potentially dangerous to health. There were also no demonstrated concerns regarding the wear on masks as a result of prolonged exposure to UV radiation.

Third, the majority of our participants stated that they were aware of proper mask precautions, yet zero participants took action to follow these precautions. However, many also stated that this is a concern of theirs, in that they take action at home to keep their masks clean by storing masks in a sterile area yet have no viable option on the go. This includes mask storage on the go, avoiding physical contact with the face of the mask, not touching the mask to any surface for risk of contamination, etc.

Fourth, there was a concern regarding the use of this product after a vaccine was released and adopted by the general public. We surveyed our participants regarding how long they intend to wear masks after the vaccine has been released, and the average anticipated time after widespread vaccine use was between 6-12 months, and long-term mask usage for illnesses like the flu or a cold were not met with resistance. So, the concern that this product would become antiquated quickly is largely avoided.

Some concerns remain for the Mask Pouch. First, there are still unanswered questions regarding the form of this product. We received mixed results as far as where this product would be stored. Some said a wristlet out in the open, some stated clipped to a backpack, some would leave it in the car. These are very different environments and would be marketed towards different users. More research is needed to determine what this product will look like and how it will be constructed.

## Research Methods

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We have mainly researched two types of resources, the first being from existing resources and documentation, and the other being from the input of possible consumers. The information we would get from each of them would be a mixture of quantitative and qualitative data.

We used existing documented resources such as websites, newspapers, and research papers to find more information on the hardware design of our product. We researched the market for the types of UV light options we could get access to. Also, we explored the types of batteries we could use, in order to account for any limitations, we might have to our design. For example, if we concluded that we can use smaller batteries, this will give us more flexibility with designing our pouch. But if the battery we'll be using would be large, we have to account for the bulkiness of our product.

As for the input from our possible consumers, we gathered that information by conducting 15 one-on-one interviews, and 2 focus group interviews. The one-on-one interviews allowed us to go deeper into the conversations and ask about details. It was also a good way to get unbiased opinions and ideas. On the other hand, the focus group interviews had a higher chance of getting biased, due to the possibility of the interviewees being influenced by their other fellow interviewees. But focus groups were a great way to build up conversations between people and see how they can build ideas and thoughts off of each other. Overall, our interviews allowed us to get the thoughts of possible consumers on our product and take a glance at how they would interact with it. This gave us an idea of what they like or dislike about our current product design. Which provided us with insight on how we could improve on our design to better suit the consumers' needs. Moreover, our interviewees provided us with characteristics that we would link to our personas, to make it easier when visualizing our consumers during the design process.

## Research Findings

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Our stakeholder believes success for the product means being able to penetrate the market. This is believed to not be difficult due to the uniqueness of the solution. He does not foresee competition. He wishes to minimize development time to hit the market with the product as soon as possible. He also sees the product expanding beyond masks to sterilizing other small, frequently used objects like keys and phones. Our stakeholder expressed multiple concerns in the team's meeting with him. He had a few questions regarding UV lights: are they safe when they are close to you, what other lights generate UV, will UV break down mask material? He also inquired about our intended user base and the general design language of the product.



The industry our product would fall into is special. There is a new mask market being created due to the COVID-19 pandemic. Many companies have created and distributed their own masks to get their share of this new market. Because of this, there are very little mask cleaning options available to consumers. Our product would offer an option to consumers that will conveniently solve an issue that few in this market are attempting to solve.

Through our interviews, we learned that many in our sample used cloth masks. Those individuals often washed their masks in the washing machine with their regular laundry. These interviewees often cited their reason for wearing cloth masks to be for environmental reasons. Many were concerned about the waste created by disposable masks. We found that many of our interviewees cared about proper mask care, but many were not following the exact rules for mask care. Some stated that there were no convenient options. However, many interviewees care more for personal safety than convenience.

Our focus groups yielded an interesting discovery in an additional application for this product. Participants noted that the product could be essential for those in areas without access to water and electricity. Since this is a portable sterile container, areas without access to typical methods of cleaning have limited access to sterile personal protective equipment. Since masks are available and in-demand, participants noted that humanitarian aid could be a potential area for expansion for the Mask Pouch.



Some were some in our sample that did not believe they would purchase the product because they did not want to change their routine. Some also doubted the efficacy of UV exposure as a method of cleaning and raised concerns about the length of time and strength of exposure required to effectively sterilize a mask.



Prior to research collection, one persistent question was identifying which of our marketable features were most resonant with the market; environmentalism, convenience, or sterility. Amid interviews and focus groups, participants nearly universally cited convenience in some capacity as their rationale for behavior related to mask wearing. For example, common behavior included cleaning masks with the rest of laundry, despite knowing proper mask care procedure. In terms of storage, the majority of participants cited that they were aware of proper sterility techniques for mask storage while on the go, yet no participants reported using any plastic or paper bag for sterile mask transport. At home, we found that they were much more willing to store masks in a clean drawer displaying behavior that is indicative of a value for sterility, yet on the go, masks were put in pockets, backpacks, and on the table while not being worn. Participants also noted that in cases in which they opted for disposable masks; the decision was made primarily out of convenience. Less frequently, participants reported a greater sense of safety with disposable masks, but this was most often in conjunction with a fabric mask among our participants.

Additionally, the environment was less notable than previously anticipated. When presented with cleaning alternatives, including harsh chemical treatments, most participants didn't respond negatively due to the environmental impact of these masks, but more so responded to the concern of breathing in fumes from residual chemicals. Of note, a minority of participants reported snipping the ear holes of masks out of environmental concern, but most wore fabric masks and reported doing so out of concern for the environment, financial reasons, personalization, and most of all, convenience.

With these findings, further research was conducted to explore the extent of market alternatives, specifically targeting sterile mask storage on the go. There are very limited options available, and there aren't any available options for self-cleaning, portable mask storage. In terms of UV products, this market is more well defined, but still inadequate in terms of satisfying user needs. Our research included an analysis of different types of UV lights and the effects of UV exposure. For our selection of lights, we looked at different strings and battery types. UV lights do have the possibility of being harmful to users but only through direct exposure for a long period of time<sup>1</sup>. In order to sterilize an object, it takes roughly thirty minutes.<sup>2</sup>

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<sup>1</sup> Leslie Nemo, "Are Ultraviolet Sanitizing Lights Safe for Humans?," Discover Magazine (Discover Magazine, July 13, 2020), <https://www.discovermagazine.com/health/are-ultraviolet-sanitizing-lights-safe-for-humans>.

<sup>2</sup> G Katara et al., "Surface Disinfection by Exposure to Germicidal UV Light," Indian Journal of Medical Microbiology 26, no. 3 (2008): pp. 241-242.

## Personas

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### Harris Reede

*He/Him/His | College Student*

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Harris is a 20-year-old university student studying biology with a minor in film studies at the University of Wisconsin. He came into college with a dream of heading to Hollywood film festivals, but his advisors and parents encouraged him to go for a safer path like a STEM career. Biology is cool and all, but Harris' true passion is film.

One thing that has come in handy was what he learned in his microbiology class about viruses. After finishing up a class in the spring about viral spread and epidemiology, Harris is more in tune than ever about the dangers of this pandemic. He has been super cautious and only leaves his dorm room to get some sun alone or head to the dining hall for a quick bite to eat.

Since Harris is acutely aware of the immense public health risk of a pandemic, he is respectful of his community and tries to stay in his room as much as possible. This comes with some suffering though – he hasn't seen his friends in quite a while. But, that's worth it as safety is the number one priority.

Although classes keep him incredibly busy, Harris still finds time for the creative parts of life. This applies to not only film, but fashion too. Let's just say you'd never catch Harris wearing a t-shirt around campus. He takes a lot of pride in his aesthetic and isn't afraid of an adventurous wardrobe, and he wants his accessories to match. It wouldn't be unheard of to catch Harris rocking a fanny pack, brandishing a giant pair of bell bottom jeans, or even sporting a sleek cloak. This pandemic has also offered a unique opportunity to accessorize with some custom masks, too.

Harris would sheepishly admit though that his choice of wild outfits is a way to signal to himself, his peers, and his advisors that he is fit for the film world, even if he doesn't fully believe that yet. He's sending a message to the world that his passion is living as a creative, and nothing will stop him from expressing his creative side. Although he hasn't landed a film job quite yet, there are several active side projects in the works and dressing the part is the first step toward reaching your goals.

Otherwise, Harris doesn't really have much going on. School is just about as normal and mundane as it has been in the past, nothing is really happening, and quite frankly, Harris is bored. Without social events and the ability to be rest-assured that socializing can be done safely, he doesn't see himself adventuring out and about for quite some time.

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### Goals

- Pursue his career goals while staying safe
- Implicitly signal his passions through accessories
- Reduce the spread of coronavirus on the college campus

## Sally Stillwell

*She/Her/Hers | Activist*

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When Sally Stillwell, a 28-year-old activist based in Fremont California, heard that face masks were hard to find in stores at the start of the COVID-19 pandemic, she was the first of her friends to break out the sewing machine. In fact, she made dozens of masks and gave them to all her friends – even a stranger on the train once! Sally is not afraid of this sort of confrontation and hates anything that may hold her back. When she comes across a shopper in the mall with a mask pulled down, she politely interjects to ensure the safety of those around her – but don't confuse her politeness with fragility.

Sally works in a small non-profit and has recently begun to work from home with flexible hours. This professional change has opened up a bit more time, so Sally has been able to dedicate more time to her side passion – volunteering at the local pantry. Every evening, Sally heads out at 3 o'clock to help start preparing dinner in bulk for the community members.

To her dismay, Sally checked the weekly meal chart to see that tonight's dinner was soup again. She groaned, rolled her eyes, and started filling the giant 40-gallon pot with water. Another volunteer, Charlie, noticed Sally's consternation and checked in. Sally explained that all the steam in the tiny kitchen heated up the place, and after a hot, California day, plus having to wear a mask, it was a battle to stay sweat-free. This is not her first rodeo though – she brought an extra two facemasks to swap out once one got too damp and left them in her glove compartment. But even so, since Sally isn't willing to just leave her clean masks on the counter, each swap requires some staff coverage while she runs out to the parking lot to change masks.

On her frequent trips through the parking lot, Sally noticed an accumulating number of masks littered on the pavement and surrounding the dumpster among the seagulls looking for an easy snack. This was absolutely unacceptable – that evening, Sally repurposed a cardboard box and drew up a sign advertising a new disposable mask trash bin. After collecting the used masks, Sally personally snips the ear restraints so small animals don't get caught and drops off the waste on her way home.

Once everyone is fed and she arrives back at home later that evening, Sally wrings these masks out into the sink and tosses them onto the growing pile of laundry and hops right into the shower. Luckily, her sewing machine is surrounded by fresh masks made from a new floral fabric she found while thrifting last weekend. She hops out of the shower and puts on a pair of earthy pajamas sets out her outfit for tomorrow and tosses a couple masks onto the pile before turning out the lights and heading to bed.

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## Goals

- Personal safety amid a pandemic
- Upholding of community values
- Environmentalism

## Susan Klawitz

*She/Her/Hers | Mother of three*

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Susan is a 39-year-old single mother of three, with twin 5-year-old boys and an older 11-year-old soccer fanatic of a daughter based out of Cleveland Ohio. The twins are a bit of a handful these days, but Susan is enjoying these last few months before kindergarten. After all, nothing trumps family time for Susan. When she isn't out at her daughter's weekly soccer games, she is rushing the twins to taekwondo, preschool, and running errands.

After a successful career as an investment banker, Susan spent the first few years out of college earning big bucks, but the long hours just weren't fulfilling – she wanted to spend that time with loved ones. While she may have left the investment banking world, she did take something from this career (aside from the boatload of cash) – a strong value for her time. Susan is an avid automater – if a task can be automated, it will be automated. Starting with simple excel macros at work, Susan has become fairly advanced over the years. She's enabled autopay for her monthly bills, she has a set of 16 Amazon Dash Buttons in the pantry to save trips to the store, and when she does head out, she most certainly takes advantage of buying online in advance to avoid aimlessly walking the aisles. After all, it's certainly not easy to raise three kids alone – she takes advantage of all the help she can get! Plus, every minute saved is an extra minute at home with the kids.

But one thing you can't automate is remembering everything when leaving the house. Between taekwondo and soccer and preschool and lunches, Susan's hands are usually full of backpacks, lunchboxes, a gi or two, and her large purse. And when I say full, I mean full – Susan is not one to take two trips. But, things inevitably get left behind. What's worse than arriving to school only to find that a lunchbox is missing? The dashboard of Susan's minivan is plastered with post-it notes with her checklists, but reminders aren't always effective, especially running out of the house. If it's not in the purse, it has a chance of being forgotten.

Amid a pandemic, this daily rush only intensified. Luckily for her daughter, soccer was outside and still meeting. Susan knows that getting coronavirus is not an option, so she is very cautious, only storing her masks in a clean drawer at home and keeping one on the rearview mirror while on the go. But, with all the other parents removing their masks at the soccer games with some even shouting and cheering their kids on, she couldn't help but concern about whether attending these games was a safe option anymore.

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## Goals

- Safety for herself and her family
- Spending time with her kids and ensuring their wellbeing
- Minimizing time spent on errands and maximizing family time

## Sean Clark

*He/Him/His | Barista and photography fanatic*

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Sean is a 25-year-old barista at Starbucks based in Sarasota Florida and part-time photographer in his free time. When the pandemic hit, Sean was a bit concerned after hearing all the reports on TV, but soon grew apathetic as he failed to notice any change among his clientele in the coffee shop. Sure, masks were on, but otherwise it was business as usual.



Sean was most concerned about keeping the stores open. He is living independently, and without a college education, parental support, or a safety net to land on, his greatest concern is how he is going to pay his rent at the end of the month. Plus, any disposable money left over goes right into his photography gig.

Pursuing a passion comes at a cost though. Sean doesn't have the latest clothes or tech. But that's a sacrifice he's willing to make at the expense of being able to pursue his dream job of being a photographer.

But, beyond work, Sean just doesn't think that the coronavirus is that big of a deal. Sure, it can be deadly for those with pre-existing conditions, but as a young man, he is facing very low risk himself and the cost of isolating and cleaning supplies is just too great a cost to bear. So, he enjoys small gatherings with friends, trips to bars, and other moderate-risk activities. However, he isn't cavalier. He still wears his mask, and cleans it when he remembers, but most of the time he just digs around his camera bag until he can find one from the day before. He may not be wearing it for his personal safety, but it is just an easy way to avoid confrontation at stores and odd glares while walking on the street.

What is most important to Sean is his routine. Each morning, he wakes up before his shift to get some yoga and meditation in before work. After his long day at his full-time gig, he heads home and performs his evening ritual of preparing dinner, watching a show on the television, and reading a few chapters of his book before bed. The weekends look a bit different, but if there is one thing about Sean, it is that he is consistent. He hasn't wavered in this pandemic, and nothing is likely to get him to change from his path.

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## Goals

- Financial security
- Adherence to his routine
- Maintaining public image

## Context Scenarios

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### Harris Reede

*He/Him/His | College Student*

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Harris is currently sitting in the university dining hall having a meal while his mask is being sanitized in the mask pouch. Although he doesn't go out very much, Harris was recommended the mask pouch from several friends and family that explained the importance of good mask practices. He was at first skeptical about the design of the mask pouch since many of the options advertised didn't seem very appealing for him to carry around. However, ever since the new fanny pack version was released along with personalized customization, Harris is proud to brandish his new hot-rod flame patterned mask pouch around his waist whenever out in public. Since he only goes out in public every now and then in order to avoid exposure, Harris only carries around one fabric mask which he sanitizes when eating or at home. Harris feels confident that whenever he removes the mask pouch during his studies or going about the rest of his everyday life, his mask is safely contained and sanitized within.



### Susan Klawitz

*She/Her/Hers | Mother of three*

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While driving her daughter to their little league soccer game, Susan carries her mask pouch in her purse with all three of the family members' masks inside. She appreciates it as it allows her to maintain all the cleaning cycles with so many masks. She mainly uses the mask pouch to help keep her kids' masks clean while they go to school, participate in extracurricular activities, etc. She also believes that it is the safest place to store their masks when not in use. At the end of the day when all the kids are done with their masks, Susan tosses them all into the pouch in order to sterilize them. Sometimes, she also keeps the mask pouch in her minivan so that the masks are ready to go whenever she drives her kids to school.





## Sally Stillwell

*She/Her/Hers | Activist*

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When Sally gets up for work in the morning, one of the things she always brings out the door is her fabric mask stored conveniently in her mask pouch. She finds this the safest place to store her mask overnight as there is no place more sterilized. Sally arrives at her non-profit organization that aims to reduce waste generated from the usage of disposable masks. During lunch break, she swaps out her current mask with a second one in the pouch and visits the nearby diner joint with a friend. Sally notices that her friend is still wearing the same mask from the previous day and questions its cleanliness. Her friend admits that it hasn't been sanitized to which Sally then introduces the mask pouch. She shows her friend how easy it is to sanitize a mask using the pouch and how it can be monitored using a companion app on her phone. The mask Sally was using previously in the day is currently undergoing the sanitation process which she shows to her friend. Within minutes, the process is finished and is swapped back as soon as the pair leave the diner. Sally shows her friend how to purchase the mask pouch for themselves to which they agree on its usefulness. After work and swapping out her mask for the second time, Sally visits the local pantry to help prepare for the weekend's brunch. There, she continues to encourage her fellow volunteers to use the mask pouch to help keep themselves and others safe, especially in an environment as busy as the kitchen.



## Sean Clark

*He/Him/His | Barista and photography fanatic*

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Sean bought the mask pouch out of curiosity when it was first released but has since hardly made use of its capabilities. He wanted to know whether or not the mask pouch made masks feel better to wear but was disappointed when there was nearly no difference. Furthermore, he didn't find the need to carry it around with him in public. As a photographer, Sean is already carrying around a backpack-full of equipment at all times and isn't able to find a way to conveniently squeeze in the mask pouch. He doesn't bother downloading the app either due to its limited functionality. Currently, Sean's mask pouch is sitting near his front door. His daily routine consists of sanitizing the mask when coming home from work and then taking it back out when leaving the next morning. He finds this system more efficient since the sanitation process takes too long for him to use it on the go anyways.



# Requirements

Name	How we can help	Requirements
Harry	<p><b>Most important:</b></p> <p>Facilitate proper mask care</p> <p>Make sure he is safe around others on-campus</p> <p><b>If possible:</b></p> <p>Design matching/fashionable accessories</p>	<p>Ability to clean and store mask whenever necessary or possible</p> <p>Ability to customize the exterior design</p> <p>Portable accessory</p>
Susan	<p><b>Most important:</b></p> <p>Keep herself and family safe</p> <p>Help her maximize quality time with loved ones</p> <p><b>If possible:</b></p> <p>Remember her to carry the kid's face mask</p>	<p>Ability to automate cleaning cycles on-the-go</p> <p>Portable and easy to store</p> <p>Capacity to sanitize and store multiple masks at once</p> <p>Ability to track cleaning cycles through a friendly mobile app</p> <p>Ability to get personalized reminders</p> <p>Ability to sterilized mask quickly and effectively</p>
Sally	<p><b>Most important:</b></p> <p>Support her efforts to reduce environmental pollution</p> <p>Help her promote proper mask care to others</p>	<p>Ability to easily swap between face masks when needed</p> <p>Ability to handle multiple cleaning cycles in small periods of time</p> <p>Ability to prevent face mask from wearing out fast</p>



	<p>Reduce the time she spends on switching mask at work</p> <p><b>If possible:</b></p> <p>Reduce the amount of mask she carries with her</p>	
Sean	<p><b>Most Important:</b></p> <p>Reduce his expenditures</p> <p>Reduce any inconveniences</p> <p>Make sure others know he is being safe</p>	<p>Automated shut down after each cleaning cycle finishes</p> <p>Ability to sanitize mask without undergoing any type of water or chemical product expense</p> <p>Wearable accessory</p>

Source	Data needs	Functional needs	Product qualities
Harry	<p>On/off button</p> <p>Percentage of completion through the cleaning cycle</p> <p>Pouch design trends</p> <p>Daily recommendations for proper mask care</p>	<p>Open/close mask pouch</p> <p>Insert mask</p> <p>Click to turn on/off</p> <p>Follow and comment on trends</p> <p>Reply or waive recommendations</p> <p>Hang around waist</p>	<p>Customizable design</p> <p>Soft texture</p> <p>Lightweight material</p>
Susan	<p>Reminder notifications settings</p> <p>Individual indicator of sterilization of multiple masks at once</p> <p>Number of masks stored</p> <p>Sound signal of the start/finish of each cycle</p>	<p>Connect to a mobile device</p> <p>Automate cleaning cycles</p> <p>Open notifications</p> <p>Personalize frequency and type of reminders</p>	<p>Fast and reliant cleaning cycle</p> <p>Multiple sound tones available</p> <p>Fits comfortably in small compartments</p>

	<p>Location of face mask pouch</p> <p>Summary of laundry cycles saved</p> <p>Recommendations of ways to teach kids to be safe</p> <p>Time remaining of each cycle</p>	<p>Store and clean more than one mask</p> <p>Retract mask after the cleaning cycle is over</p> <p>Find mask pouch through a mobile tracker</p> <p>Reply or waive recommendations</p> <p>Store in purse or minivan</p> <p>Track cleaning cycles on-the-go</p>	
Sally	<p>Battery life</p> <p>Number of cycles remaining until the battery dies</p> <p>Alert mask damage</p> <p>Daily usage reports</p> <p>Number of disposable masks that were not wasted</p> <p>Option to share daily usage and to invite friends</p> <p>Recommendations on how to keep an eco-friendly environment while being safe</p>	<p>Charge device</p> <p>Sterilize multiple face mask throughout the day</p> <p>Store different mask</p> <p>Throw away face mask safely after a worn out alert</p> <p>Share daily reports on social media</p> <p>Carry around during the day</p> <p>Estimate mask viability</p> <p>Upgrade user information and app</p>	<p>Environmental-friendly material</p> <p>Customizable profiles</p> <p>Water-resistant</p> <p>Tolerates cold/hot temperatures</p>

Sean	Monetary/utility savings with mask pouch Sleep feature for non-busy days Ways others implement the bag in a daily routine Mute feature	Mute app as desired Automate cleaning cycles Shut down automatically Wear as accessory	Low price Long-lasting material
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**Constraints:** The present limitation our product presents is shared across personas and context scenarios.

- The amount of UV light exposure must be harmless
- Device must be safe around children
- The price ranges dramatically depending on the choice of materials
- Product development and distribution must be fast due to high demand and the speed of the vaccine development

**Experience attributes:** These attributes are shared across personas and context scenarios.

wearable fast  
 effective  
 fashionable  
 automated  
 reliant safe  
 inexpensive  
 environmental-friendly  
 long-lasting  
 portable

# Colophon

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## **Alondra - IxDG**

- Created slides and recorded respective section and concluding message
- Created requirements section
- Participated in group revisions
- Actively engaged in Slack and participated in meetings
- Led focus group and three interviews
- Assisted in group question generation and took notes during interviews

## **Ben - DTL**

- Created slides and recorded respective section
- Created personas and executive overview section
- Participated in group revisions
- Actively engaged in Slack and participated in meetings
- Led three individual interviews
- Assisted in group question generation and took notes during interviews

## **Besmelh - IxDS**

- Created slides and recorded respective section
- Created research methods section
- Participated in group revisions
- Actively engaged in Slack and participated in meetings
- Led focus group and three interviews
- Assisted in group question generation and took notes during interviews

## **Jodie – Ind D**

- Created slides and recorded respective section
- Created research findings section
- Participated in group revisions
- Actively engaged in Slack and participated in meetings
- Led three individual interviews
- Assisted in group question generation and took notes during interviews

## **Kevin – Vis D**

- Created slides and recorded respective section
- Created context scenarios section
- Participated in group revisions
- Actively engaged in Slack and participated in meetings
- Led three individual interviews
- Assisted in group question generation and took notes during interviews