



final report

CS147 Fall 2023

Find Your Contraceptive Fit

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Table of Contents

Table of Contents	2
Value Proposition & Team	3
Value Proposition	3
Team Members and Roles	3
Problem & Solution Overview	4
Needfinding	5
Interviews	5
Synthesis	7
POVs & Experience Prototypes	9
Emily's POV	9
Emily's HMW's	10
Briana's POV	10
Briana's HMWs	11
Angela's POV	11
Best HMWs & Solutions	12
Experience Prototypes	14
Design Evolution	16
Final Solution	17
Tasks	17
Design Evolution Visualizations and Rationale	18
Values in Design	30
Accuracy	30
Accessibility	30
Privacy	31
Personalization	31
Final Prototype Implementation	32
Tools Used	32
Wizard of Oz Techniques	32
Hard-Coded Techniques	33
Reflection & Next Steps	34
Main Learnings	34
Future Steps	35
Appendix	37

Value Proposition & Team

Value Proposition

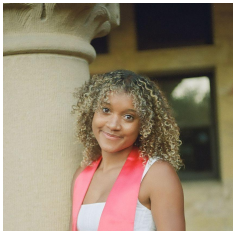
Find contraception that is right for you, and minimize the side effects of contraception.

Team Members and Roles

- *Shreya Shubhangi*: User Researcher and Mobile Developer



- *Emily Broadhurst*: User Researcher and UX Designer



- *Allie Clements*: User Researcher and Mobile Developer



- *Eric Martz*: User Researcher and Mobile/Web Developer



Problem & Solution Overview

The same contraceptive treatments are often offered to patients with very different symptoms, preferences, and medical histories despite the availability of hundreds of

possible contraceptive options. Unfortunately, these generic prescriptions often lead to side effects for users, prompting many women to discontinue hormonal treatments and rely solely on condoms.

IUDIY addresses this issue by empowering users to identify their ideal prescription match through personalized contraceptive suggestions based on preferences, medical and family history. This tool facilitates informed discussions with healthcare providers, promoting the adoption of a prescription that aligns best with the individual's needs.

Needfinding

Interviews

When our team assembled, it became clear that our shared passion lay in the realm of women's health. Eager to make a meaningful impact, we initiated the need-finding process to pinpoint potential issues worthy of our attention. Key areas of focus emerged, including menstruation, contraception, and menopause. To delve deeper, we engaged in conversations within these domains with women from various backgrounds, demographics, and age groups (our interviewees spanning from 21 to 71 years old). In total, we conducted seven insightful interviews, recruiting participants through a network of friends-of-friends, emails to Stanford professors, and outreach on NextDoor, as illustrated in Figure 1.

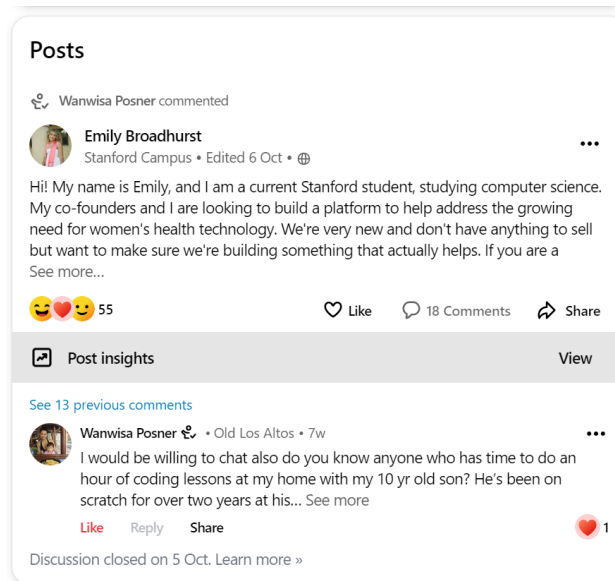


Figure 1: Nextdoor post for generation

In our initial round of interviews, we engaged with four distinct individuals to gain diverse insights into women's health. The interviewees included Dr. Marcia Stefanick, a seasoned Women's Health professor and domain expert; Prakriti, a 45-year-old friend's mom navigating through perimenopause; Rosann, a 62-year-old friend's mother; and Raagavi, a 23-year-old college student grappling with PCOS, serving as our extreme user. We tailored our questions to delve into their technological preferences based on personal experiences, concerns about aging, and any specific women's health issues occupying their thoughts. This approach aimed to unearth nuanced perspectives and shed light on the unique challenges faced by women across different life stages.

We extracted three crucial insights from our research: a pervasive one-size-fits-all approach to women's health, a notable lack of understanding around period disorders, and a significant gap in knowledge regarding menopausal symptoms. Firstly, we surprised to notice the common one-size-fits-all methodology applied to contraception and menopause, resulting in the prescription of similar treatments with minimal personalization for individual patients. Our investigation also revealed a concerning lack of comprehension surrounding period disorders, both among field experts and menstruators. This knowledge gap contributes to extended diagnosis periods and considerable frustration among patients. Furthermore, we identified a distinct lack of knowledge within the older women community concerning the understanding of menopausal symptoms, a situation exacerbated by societal stigma. We were able to successfully uncover these insights as our broad questions facilitated healthy and diverse discussion.

The following week, we decided to schedule three more interviews with Brianna (40-year-old sexual health specialist), Angela (66 year-old retired high school teacher), and Emily (23-year old medical school applicant). For this set of interviews, we decided to hone in on three common themes: lack of contraceptive drug personalization, delay in symptom recognition in menopause and inefficiency in period disorder diagnosis. Our inquiries brought to light that women's personal values and past experiences significantly influence their choices in contraceptive treatments, aspects often overlooked in conventional prescription discussions. Also, we identified that women find themselves acting as their own advocates, particularly when changing doctors due to inefficiencies in addressing period disorders. Finally, we identified that many women find it hard to identify a contraceptive with minimal side effects. Our diversity of participants allowed for a rich gathering of potential insights.

Synthesis

These interviews provided a wealth of information to sort through, and to provide a more structured framework for analysis we constructed several empathy maps as illustrated below in Figures 2, and 3.

Empathy Map: Dr. Marcia Stefanick



Figure 2: Empathy map of Dr. Marcia Stefanick's interview

Rosann



Figure 3: Empathy map of Rosann's interview

Our empathy maps proved instrumental in identifying shared themes across interviews and uncovering issues that may not have been explicitly discussed. This was evident in the insights derived from the "feel" and "do" sections of the map, enabling us to extract maximum value from each interview and comprehensively understand the nuances of the participants' experiences.

POVs & Experience Prototypes

To maximize the effectiveness of our interviews and figure out the pain points we extracted three point of views from our most interesting interviews (Emily, Brianna, and Angela). The following point of views enabled us to reframe specific problem grounded in specific user insights. Each point of view has four main parts: who we interviewed, what we were surprised to hear, a potential reasoning of the cause of that surprise, and an insight. For each insight we constructed around 10 how might we statements to focus on how we could potentially approach solving that user painpoint. Then, we selected the three most interesting how-might-we statements and ideated to find a solution that addressed that statement specifically. Then, with those solutions, we constructed three experience prototypes to test the critical assumptions the prototype was based on.

Emily's POV

We met...

Emily, a 23 year old medical school applicant, who has had difficulty finding the right contraceptive method for her.

We were surprised to notice...

While she did talk to her doctor about contraceptive options, she needed to do her own research on what contraceptives were a viable option for her.

We wonder if this means...

Finding a contraceptive that works best is a stressful and time-intensive experience for users.

It would be game-changing to...

Simplify how menstruators understand their symptoms and needs.

Emily's HMW's

1. How might we better inform women about their contraceptive options?
2. How might we take away the stress of choosing a contraceptive?
3. How might we make the process of changing contraceptive methods simple?
4. How might we find a better match for a user looking for a new contraceptive?
5. How might we inform doctors about contraceptives so that women don't have to do their own research?

6. How might we use a patient's reaction to a contraceptive to inform which one they choose next?
7. How might we adjust contraceptive options to a patient's preferences?
8. How might we redefine what makes a 'good' contraceptive?
9. How might we use family history to inform a contraceptive choice?
10. How might we simulate a patient's contraceptive use before they actually use it?

Briana's POV

We met...

Brianna, a 40-year-old administrative worker in student sexual health who is premenopausal and struggles with irregular periods and autoimmune disease.

We were surprised to notice...

Despite her complicated medical history, she was still prescribed a one-size-fits-all hormonal treatment.

We wonder if this means...

That there is a lack of personalization of treatment in relation to menstrual health which is extremely frustrating to users.

It would be game-changing to...

Personalize women's health medications based on preferences and patient history.

Briana's HMWs

1. How might we allow initial women's health prescriptions to be based on patient medical history?
2. How might we incorporate family history into helping prescribe menstrual treatments?
3. How might we eradicate the need to change contraception prescription?
4. How might we personalize health medications/contraceptives for women based on their preferences and experiences?
5. How might we introduce women to knowledge of different types of birth control and their side effects?
6. How might we empower women to understand how to pivot to other medications based on their symptoms?
7. How might we create an easier experience for women to find treatments that work for them?

8. How might we incorporate community into womens' menstrual health?
9. How might we include the user's personal values in their treatment?
10. How might we provide alternatives to hormonal treatment for menstruation?

Angela's POV

We met...

Angela, who is a 66-year-old retired school teacher who recently finished menopause.

We were surprised to notice...

That when older women leave the workforce they change doctors frequently due to different insurance plans.

We wonder if this means...

That it's frustrating for older women to have to become their own self-advocate to ensure continuity of medical care.

It would be game-changing to...

Empower women to be able to provide their medical women's health history efficiently and simply.

Angela's HMWs

1. How might we remove the need to update doctors on medical histories?
2. How might we help women keep track of their own medical histories?
3. How might we allow a previous doctor and new doctor to build a rapport?
4. How might we streamline the process of seeing a new gynecologist for women?
5. How might we make the medical history create a close relationship with a new doctor?
6. How might we help women quickly find new doctors that are in their network?
7. How might we make relaying medical history simple and efficient?
8. How might we help patients keep rapport with doctors despite changing insurance/healthcare providers?
9. How might we help women advocate their own medical histories while changing doctors?
10. How might we simplify how women record their symptoms?

Best HMWs & Solutions

From the three POVs we selected the three HMWs which inspired us the most and brainstormed potential solutions for that HMW in a solution map. Finally, we selected our most promising solution from the map to pursue, as shown in Figures 4, 5, and 6.

1. **HMW:** How might we personalize health medications/contraceptives for women based on their preferences and experiences?

Solution: Give women recommendations for hormonal therapies based on their previous health history and current menstrual symptoms.

How might we personalize health medications/contraceptives for women based on their preferences and experiences?



Figure 4: Solution map from HMW1

2. **HMW:** How might we simplify how women record their menstrual symptoms?

Solution: A continuous questionnaire that periodically sends notifications to get symptomatic feedback based on contraception and menstrual health.

How might we simplify how women record their symptoms?

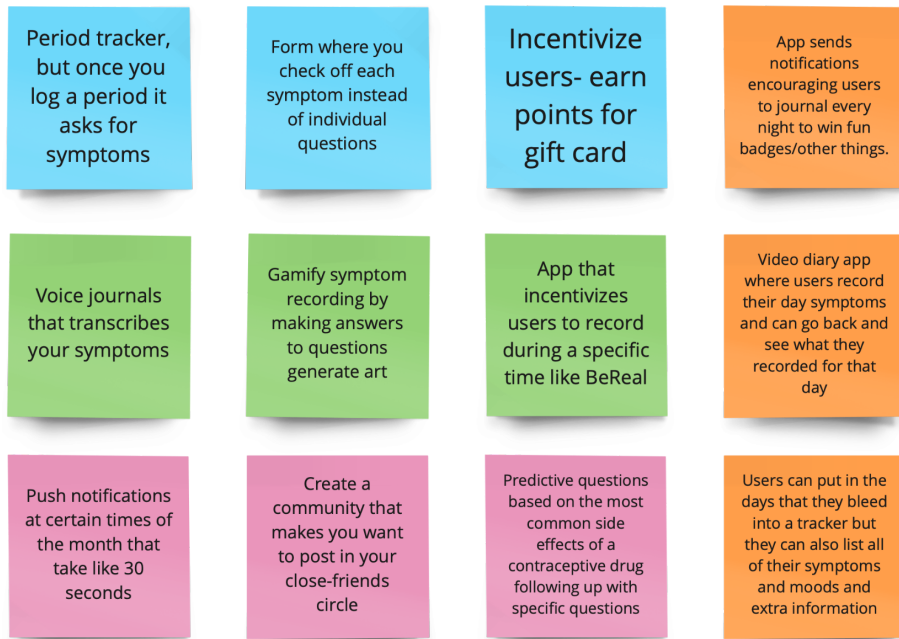


Figure 5: Solution map from HMW2

3. **HMW:** How might we make relaying medical history simple and efficient?

Solution: Take notes during doctors visits based off of recording, and create a patient's own version of doctors notes which can be shared with new doctors.

How might we personalize health medications/contraceptives for women based on their preferences and experiences?



miro

Figure 6: Solution map from HMW3

Experience Prototypes

Having chosen the most promising solution from each solution map, we sought to quantifiably test and evaluate the three options to inform our final solution decision. To influence our choice, we focused on testing three critical assumptions associated with each solution. By systematically assessing these assumptions, we identified what worked and employed this information to guide our ultimate solution selection.

1. **Assumption 1:** Solution 1 assumes that patients want personalized drug medication for women's health.

Key Aspects of Prototype: We asked a series of questions about contraception orally to users to figure out their preferences, and medical history, Figure 7 illustrates the range of questions asked. Then, we gave each user a personalized contraceptive based on their answers. Our experiment included multiple college aged women.

What Worked/Didn't Work: We found that the process made women feel listened to and empowered. But, we found that the number of questions asked was not sufficient for women to feel comfortable taking the prescription.

Implications: Our interviews indicated that many women felt they didn't grasp the variety of contraceptive choices, leading to some stopping contraception due to perceived ineffective medications (e.g., side effects). They also expressed hesitancy to engage in conversations with healthcare providers to enhance their contraceptive experience.

- General information questions
- What was the first day of your last period?
 - Do you think you might be pregnant?
 - Have you ever used the following medications: birth control pills, birth control shot, condoms, birth control patch, birth control ring, emergency contraception, birth control implant, IUD, or other?
 - Have you ever experienced a bad reaction to using hormonal birth control? If yes, describe the method?
 - Have you ever been told by a medical professional not to take birth control?
- Medical History
- Have you given birth within the past 6 weeks?
 - Do you have diabetes?
 - Do you get migraine headaches?
 - Do you have high blood pressure?
 - Have you ever had a heart attack?
 - Have you had recent major surgery?
 - Do you have any allergies?
- Preferences
- What are your habits? Can you commit to taking a drug every day?
 - What are your key concerns?

Figure 7: Questionnaire to test assumption 1

2. **Assumption 2:** Solution 2 assumes that patients want to track their symptoms and will respond to a regular questionnaire.

Key Aspects of Prototype: We sent questions to women to gather symptomatic feedback related to understanding contraceptive fit and menstrual health. Randomly

throughout the day, women received questions about common menstrual symptoms to simulate an app notification.

What Worked/Didn't Work: We found that users were willing to respond to questions, and usually fairly quickly. Users liked the spacing of the questions. However, users would have preferred an easier input such as checking boxes rather than writing the input.

Implications: Our conversations led us to believe that the participants want to track their symptoms. Thus, this validates assumption two, as participants willingly and confidently responded to questions, actively engaging in tracking their symptoms.



Figure 8: Questionnaire over text to test assumption 2

3. **Assumption 3:** Solution 3 assumes that patients want their own version of doctor's notes.

Key Aspects of Prototype: We asked women to summarize their menstrual health history, symptoms and healthcare experiences. Then, we generated a summary of the main points covered. We followed that with a survey focused on measuring how effective the 'doctor notes' were.

What worked/Didn't Work: Our participants appreciated having a personal record of their menstrual history for personal knowledge and felt empowered by this information. However, women expressed reluctance to maintain accurate notes, citing uncertainty about the relevance of these notes for future visits.

Implications: This assumption proved invalid, as users struggled to identify the value of keeping these notes without understanding their potential significance.

Design Evolution

Based on our experience prototypes, we discovered that users were receptive to answering questions about their menstrual health and symptoms. Additionally, there was a strong interest among women in receiving personalized contraceptive recommendations, driven by a general lack of knowledge about available options. However, we encountered challenges in validating the assumption that women highly valued having access to their own personal copy of doctor's notes.

Moving forward, we decided to leverage the successful aspects of the personalized contraceptive solution. Our focus shifted toward empowering users to engage in meaningful discussions with their physicians about potential options to minimize side effects. This approach involves implementing a more comprehensive survey that takes into account preferences, patient history, and family medical history. The goal is to provide users with a contraceptive method or medication that has the highest chance of effectiveness with minimal side effects.

Final Solution

Our solution, rooted in the insights gained from the experience prototypes, encompasses the following key features:

1. **User Completes Medical History and Medication Preferences Form:** Users provide information through a comprehensive questionnaire detailing their medical history and medication preferences.
2. **Algorithm-Based Initial Prescription:** Users receive their initial prescription for contraception generated by an algorithm tailored to their responses.
3. **Continuous Symptom Tracking:** Users consistently track their symptoms, enabling the identification of any side effects or symptoms and facilitating prescription adjustments as needed.

This final solution emerged as a fusion of the initially proposed solutions—regular symptom tracking and personalized contraceptive recommendations. Our confidence in the success of this approach was bolstered by the positive outcomes observed in our experience prototypes. These prototypes demonstrated that women were keen on minimizing side effects, seeking the ideal contraceptive method, and were willing to actively engage in the process by answering pertinent questions. The target demographic primarily comprises women between the ages of 15-55 who are premenopausal, as they stand to benefit the most from personalized contraceptive solutions.

Tasks

To fully implement our solution, we identified a few taskflows that were required for user satisfaction. We identified many different tasks, but to scope the discussion to what would be achievable in within the class timeframe we limited choice of a single simple, moderate and complex task.

- Simple Task: Log symptoms

Minimizing contraceptive side-effects we found to be a large reason for user interest in personalized contraceptive methods, which meant that users must daily track their symptoms so that symptoms and discomfort can be identified and minimized.

This is a simple task because it is one that takes only a few moments to completed and must be completed everyday. It requires users to add all the symptoms that they are experiencing in a given day to ensure that users with a sub-optimal prescriptive match are identified quickly.

- Moderate Task: Find a pharmacy that carries your current prescription.

Post contraceptive match, we wanted to decrease the friction associated with finding a pharmacy that carried the prescription to make sure that customers adopted the recommendation that we are suggesting. By making it easier to understand where an individual could pick up their prescription makes it more likely that a user would bring up the medication as an option with their doctor, and empower them to find the perfect contraceptive for their needs.

This is a moderate task because it is a less frequent task so it will be more difficult to complete. Furthermore, navigating a potential map and inputting a geographical location requires a level of personalization that is greater than simply logging your symptoms.

- Complex Task: Change your current contraceptive recommendation.

The efficacy of this system relies on a perfect contraceptive recommendation and match, which means that it is vital users are able to easily and quickly navigate to change their recommendation if they feel that it doesn't work for them.

This is a complex task because it requires generating a new personalized prescription based on a users' preferences, medical history and own patient history, plus

documenting why their previous recommendation didn't work for them to maximize the next recommendation's chance of success.

Design Evolution Visualizations and Rationale

Low-fi Prototypes (Sketches)

During the sketching process, we explored three potential interfaces for our final product: VR, an app, and wearables. Figures 9, 10, and 11 illustrate our solution concept sketches for each interface.

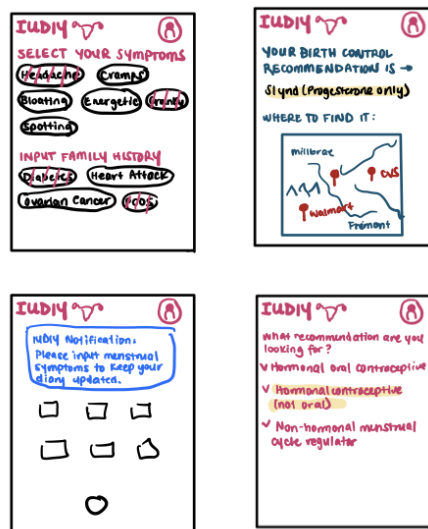


Figure 9: App concept sketches

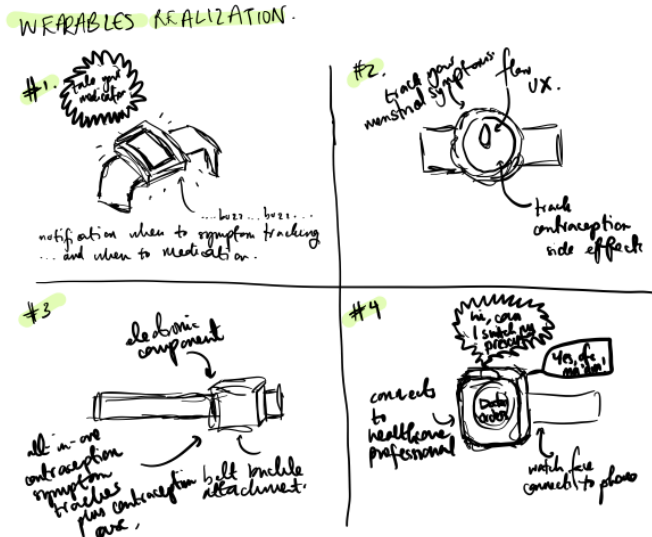


Figure 10: Wearables concept sketches



Figure 11: VR concept sketches

We particularly favored our app realization since none of the interviewed users had access to a VR setup, while all possessed mobile phones. Additionally, market research revealed a strong user comfort level in managing menstrual health through apps like Flo, boasting 200 million downloads and over 40 million active users. This underscores the potential success of an app in the menstrual/contraceptive health sector, positioning it as the optimal means to reach users.

While VR offers an immersive experience that could enhance engagement, we recognized its limited accessibility, especially for lower-income brackets. Additionally, for unfamiliar users, VR could significantly increase the time required to perform actions. In light of these considerations, we prioritized accessibility and decided to maintain the assumption of an app interface. Figure 12 summarizes our app interface design.

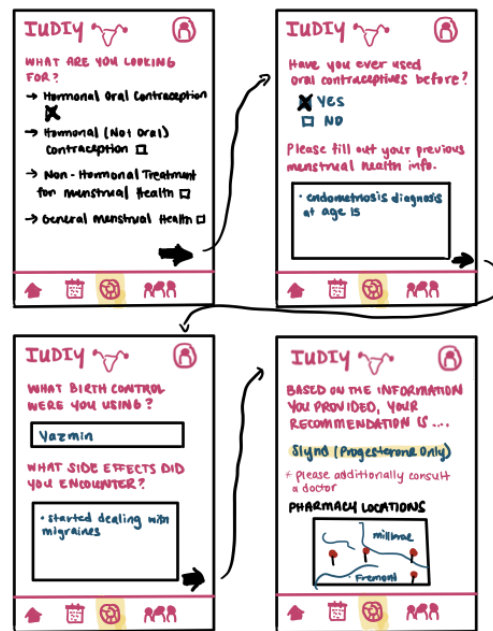


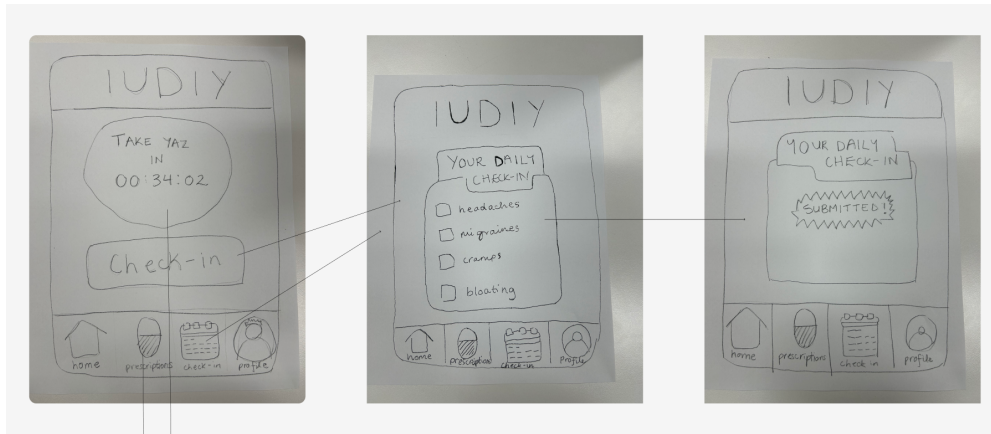
Figure 12: Further app realization sketches

After deciding the optimal interface for our design, we started constructing a low fidelity prototype out of paper by brainstorming all task-flows and putting the most common ones in the navigation bar, and then began to construct ways to navigate through the flows. This process revealed the necessity for several key pages in our prototype:

1. Home
2. Prescriptions (section to change prescription and investigate your prescription)
3. Check-in (section to log daily symptoms and side effects)
4. Profile (section to place medical history and initial preferences questionnaire)

Following this model, we constructed a paper prototype with screens able to complete the three tasks previously described.

- **Simple Task: Log your symptoms.**



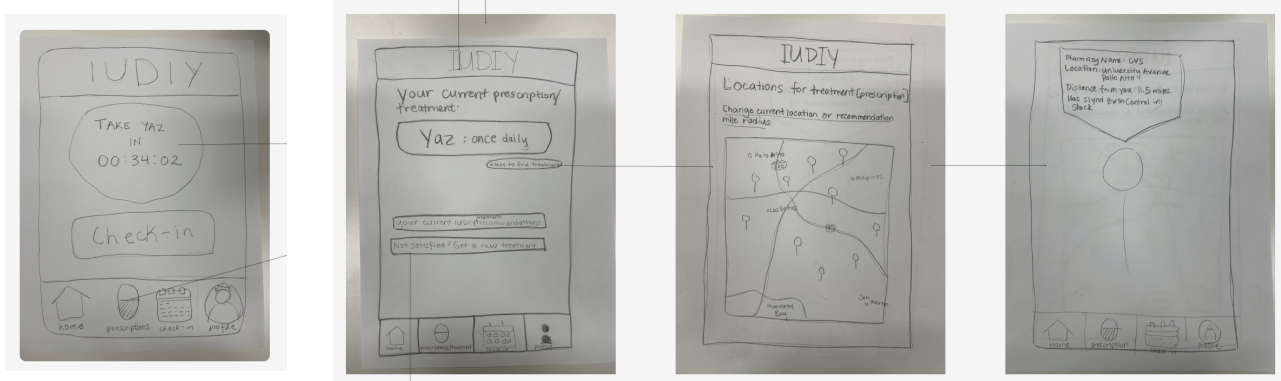
Home screen includes check in button, navigation bar, and reminder timer

Check-in tracks symptoms with checkbox interface

Submitted screen shows user is done with check-in and recommendations are updated

Figure 13: Simple low-fi task flow

- **Moderate Task: Find a pharmacy that carries your current prescription.**



Home screen navigates to recommendation page from timer or navigation bar

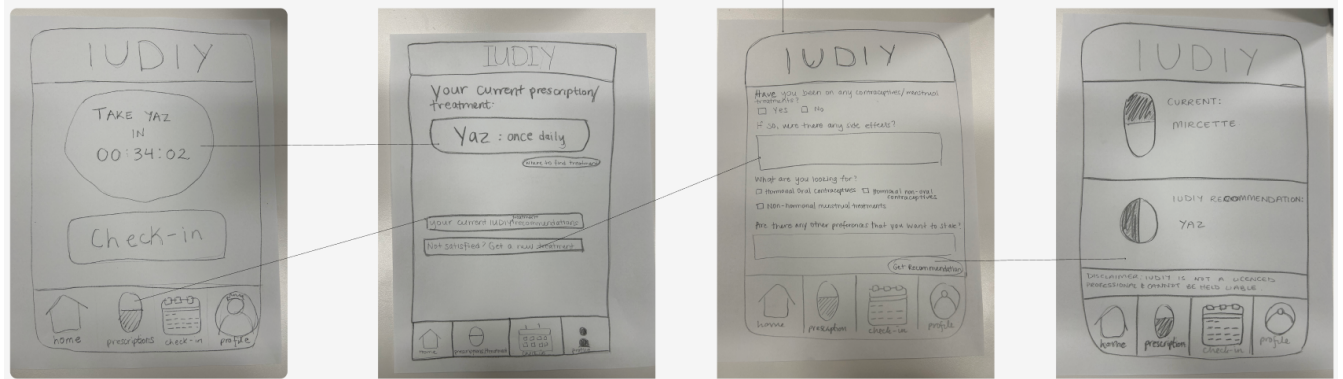
Prescription screen shows current meds and buttons to recommendations

Map showing different pharmacies or treatment centers

Screen shows details about the pharmacy or doctor's office and what they offer

Figure 14: Moderate low-fi task flow

- **Complex Task: Change your current contraceptive recommendation.**



Home screen navigates to recommendation page from timer or navigation bar

“Not satisfied?” lets users get new recommendations

Questionnaire leads to new recommendation

Screen showing updated recommendation vs old recommendation

Figure 15: Complex low-fi task flow

Once we constructed these paper prototypes, the next step was to gather feedback on our initial design through usability testing with four users. Our participant pool included a 24-year-old woman with an IUD, a 32-year-old new mother, a 26-year-old using contraceptive pills, and a 23-year-old utilizing contraception. Leveraging the community platform Nextdoor once again proved highly beneficial in recruiting willing participants for our usability studies.



Figure 16: Usability studies over zoom and in-person

To maximize the effectiveness of our interviews we gave participants minimal background on how to use the app, and asked them to adopt a think-out-loud approach to allow us to gather process data. Our interviews were largely successful, and captured a diverse range of women in-person and through Zoom, as shown in Figure 16. All participants expressed excitement about this solution and were excited to see the lo-fi prototype in action. All users were able to achieve all three task flows but with much more time than previously anticipated.

To measure usability, we also generated usability goals to more quantitatively establish intuitiveness, ease and user-friendliness through counting the number of clicks to achieve a task

flow and number of errors performed by task flow. We found that the simple task took 25% longer than the moderate task, but resulted in fewer errors. The complex task resulted in two errors, the moderate task had one and no errors were generated in the simple task. Conducting this testing was incredibly useful before diving into the details of the medium and high fidelity prototype.

Design Changes: Lo-Fi to Medium-Fi

Our bottom-line data allowed us to infer the meaning behind the process data. Our biggest observations were the following:

- There are too many words on many of the buttons, which slowed users down.
- The new recommendation task flow was confusing to start for users and all interviewees clicked around almost all the pages to find the correct one.
- It was difficult for people to return to the previous pages as there were no back buttons.
- Users struggled to find the location of the prescriptions page based on the icons.

These observations lead us to the following conclusions to resolve as we move forward to the medium-fi to high-fi:

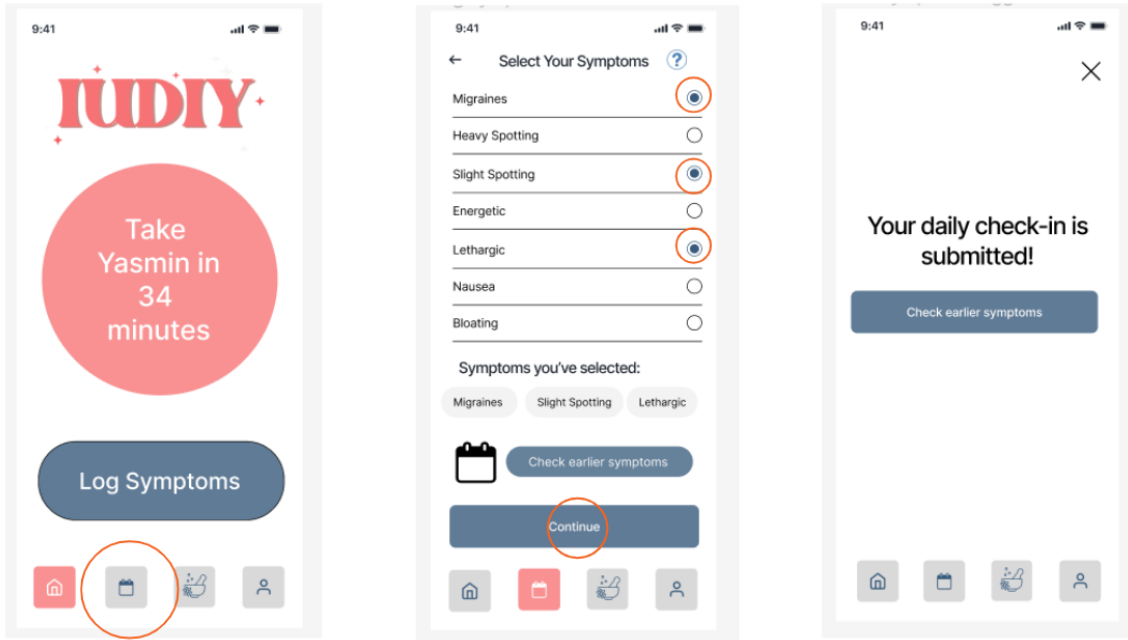
- Make words on buttons more concise
- Redesign and simplify the new recommendation task flow
- Add back buttons to all screens
- Update the icons so that they are easy to recognize from the navigation bar

Medium-Fi Prototype

To enhance the level of detail in our design after usability studies, we transitioned from paper construction to Figma. Figma offers a more detailed representation closely resembling the iPhone user experience. Our Figma focused only on demonstrating the three task-flows previously discussed and was not a comprehensive prototype. Tasks such as how to fill out the initial profile, how to sign up for the service, and how to change symptoms once the daily symptoms were logged were all missing, among others.

To only include information that was required for the task flows, we hard-coded some features, e.g. symptoms to-be logged. Despite these deliberate limitations, our Figma prototype effectively brought our ideas to life, offering an interactive experience closer to the user interface of a fully operational application.

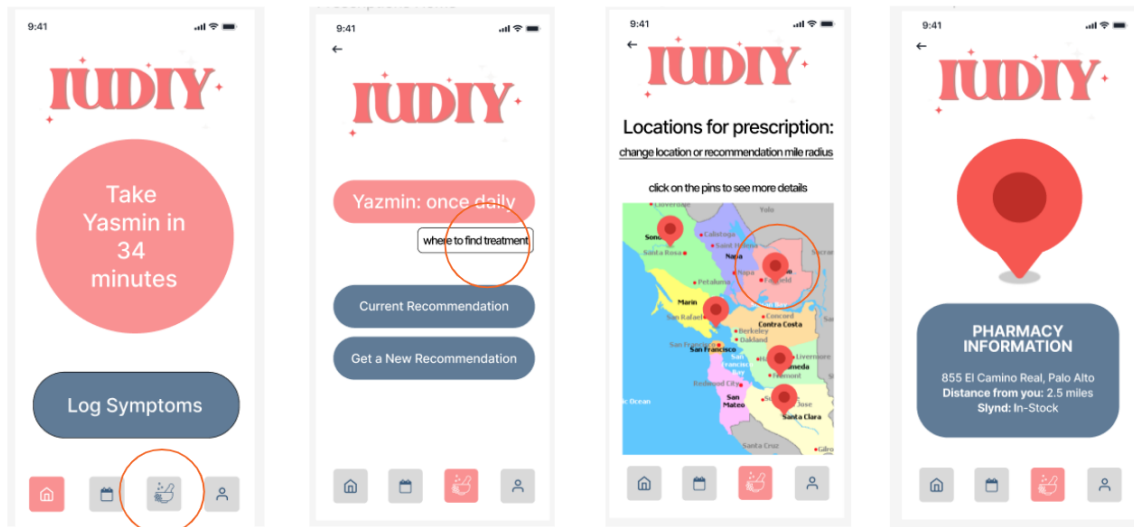
1. Simple: Log your symptoms



Click check-in icon. → Add symptoms, and click continue. → Symptoms experienced are then submitted.

Figure 17: Simple task flow using medium-fi prototype

2. Moderate: Find pharmacy that carries your prescription



Click prescriptions button. → Click to see where to find treatment. → Click a specific pin. → Review details of pharmacy.

Figure 18: Moderate task flow using medium-fi prototype

3. Complex: Change your current contraceptive recommendation.

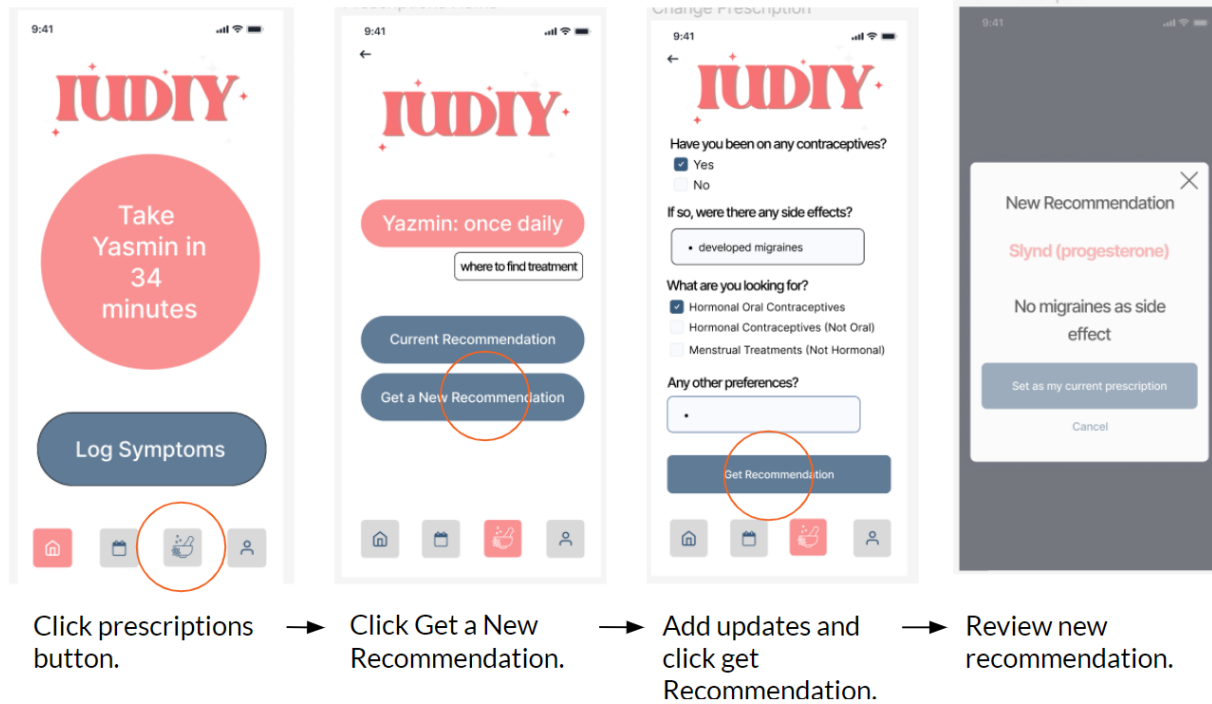


Figure 19: Complex task flow using medium-fi prototype

After completing our medium-fidelity prototype as illustrated in Figures 17, 18, and 19, we employed other CS147 groups in section to conduct heuristic evaluations of the screens. During the heuristic evaluation, each team reviewed our screens completing each of the task flows without prior communication of how the medium-fi prototype worked and then noted what violations of Nielsen’s Heuristics they found. After they individually found as many as they could see, each group gathered to summarize their findings.

Design Changes: Medium-Fi to High-Fi

Our evaluators in summary found 67 violations, and 6 violations with a severity rating of 3 or 4. Our biggest two takeaways were: inclusionary design and consistency. Our design choices were not intentional enough to allow a diverse group of users to enjoy the app. Then, our formatting was not consistent enough with respect to alignment, theming and clickable elements, making for an unintuitive user-experience.

Severity 3 violations characterize the violation to be a major UI issue, and Severity 4 violations characterize the design element to be a UI catastrophe, which warrants our focus to change before moving into the hi-fi prototype.

1. H12: Value alignment and inclusion: The use of a more “feminine” color like pink as one of the main colors may cause certain gender demographics to feel uncomfortable using the app.
2. H12: Value alignment and inclusion: There’s no option for users to input their own symptoms on the symptom logging page. Not all symptoms a user experiences will fall under one of these buckets.
3. H11: Accessible design: The screen became dim when viewing a user’s current prescription on the prescriptions page, making it comparatively difficult to view the information being displayed.
4. H2: Match between system and the real world: The questions that are provided don’t seem comprehensive enough to accurately prescribe.
5. H3: User Control and freedom: User cannot access the third button on the toolbar without completing the symptom logging portion.
6. H3: User Control and freedom: After changing a user’s prescription recommendation, the option to return to the prescription page is lost as there is no longer an active link in the navigation bar to the prescriptions page. Users should be able to view their prescriptions following a change in their recommendations.

In response to these points we decided to fix violations 1, 2, 3, and 6. We decided intentionally not to fix the violation 4 because it focused on the lack of comprehensiveness of the questions asked. However, that is a limitation of our Figma implementation as this was a hard-coded functionality that didn’t represent the full number of questions that we plan to ask before a prescription is made. Additionally, we decided not to alter violation 5. That violation highlighted the evaluators confusion over the use of the symptom logging button. The evaluator wanted to view current prescription through the symptom-logging button. However, this is not the purpose of the page, and is accessible through a different icon found in the navigation bar throughout the app. Aside from these two exceptions, we found these suggestions extremely helpful in ensuring consistency and accessibility. And, thus before we moved onto coding these changes in the high fidelity prototype we decided to alter the medium-fi prototype to act as a northstar for our high fidelity prototype. Figures 20, 21, 22 and 24 illustrate the changes that we made to address the violations.

1. Remove the color scheme focus on pink.

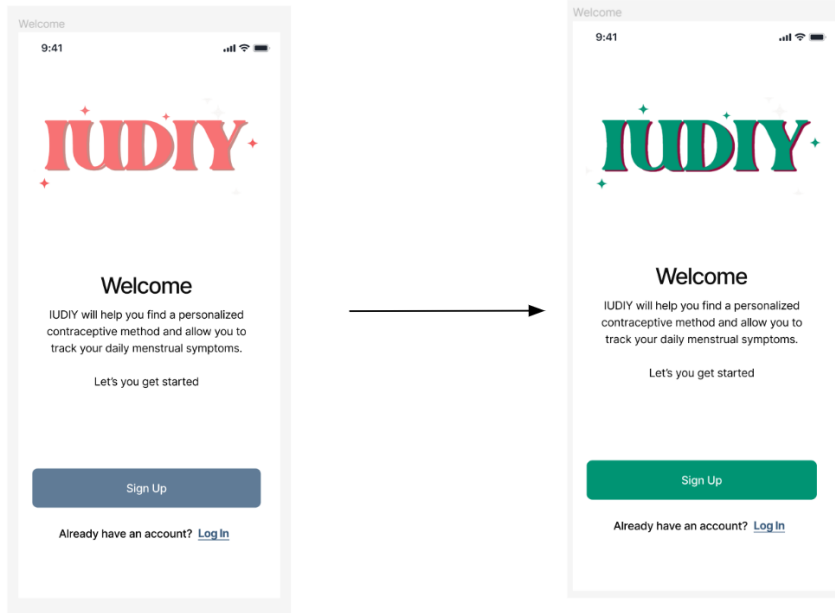


Figure 20: Violation 1 fix

2. Allow users to add their own symptoms.

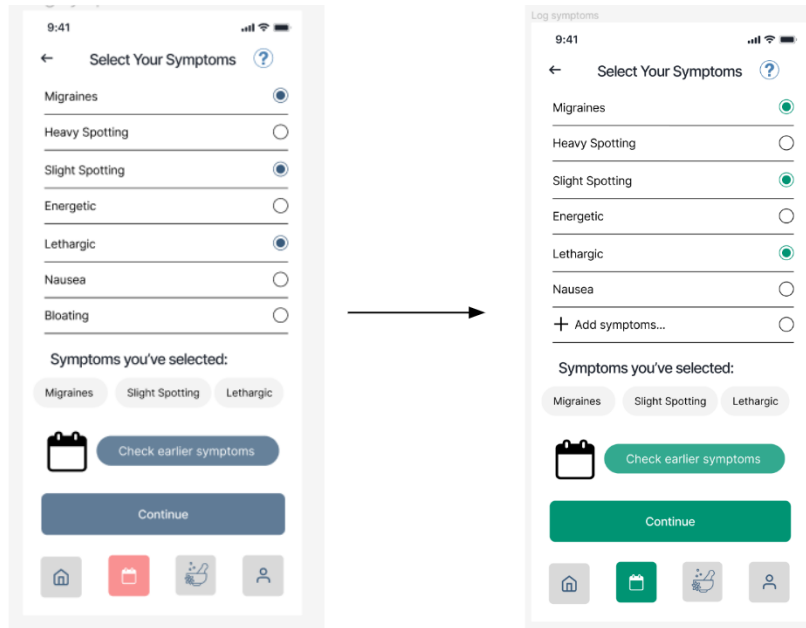


Figure 21: Violation 2 fix

3. Decrease eye strain and make it easier to read the screen for the visually impaired.

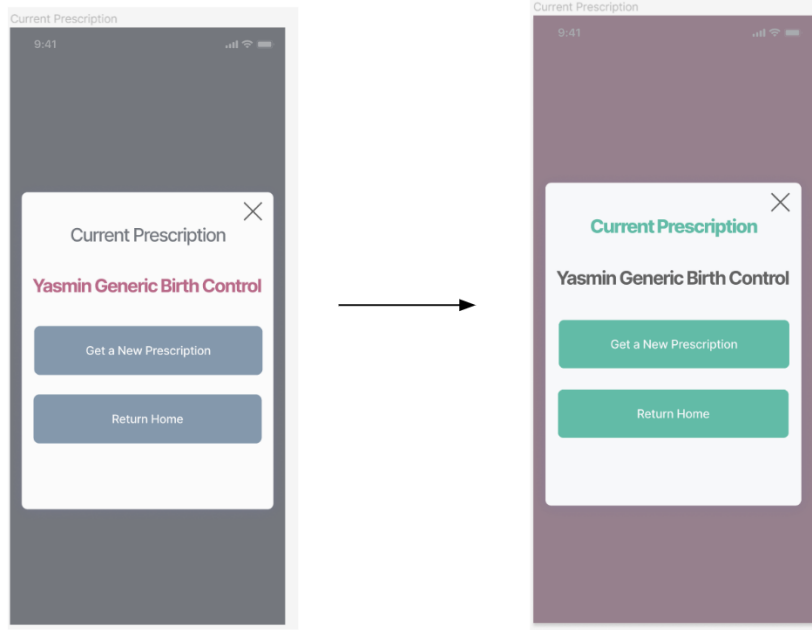


Figure 22: Violation 3 fix

4. Enable the flexibility to return to any part of the app with the navigation bar presence

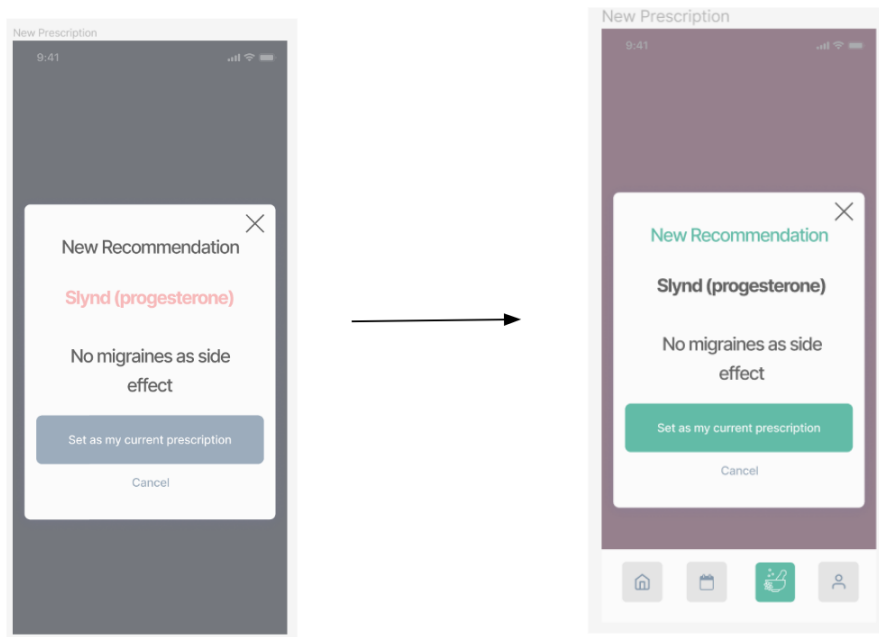
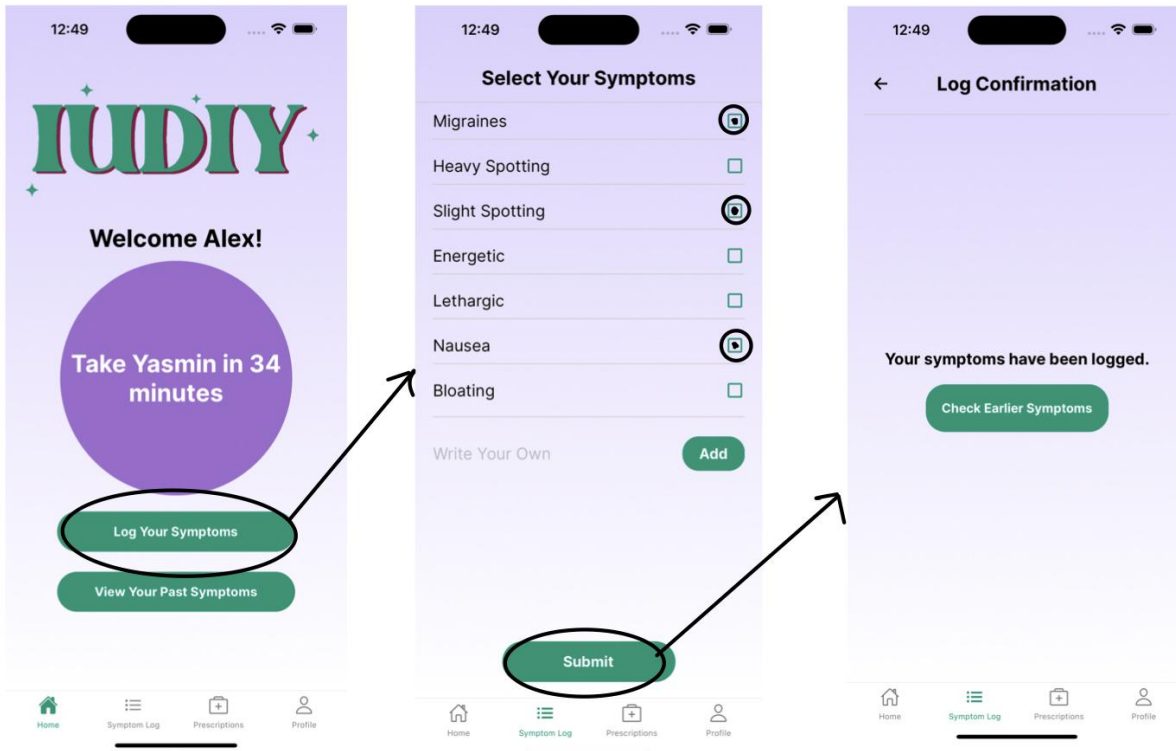


Figure 23: Violation 6 fix

High-Fi Prototype

We built our hi-fi prototype with these changes incorporated from the previous heuristic evaluation. Below is our task flows as reflected in our prototype:

Simple: Log your symptoms



Click "Log your Symptoms"

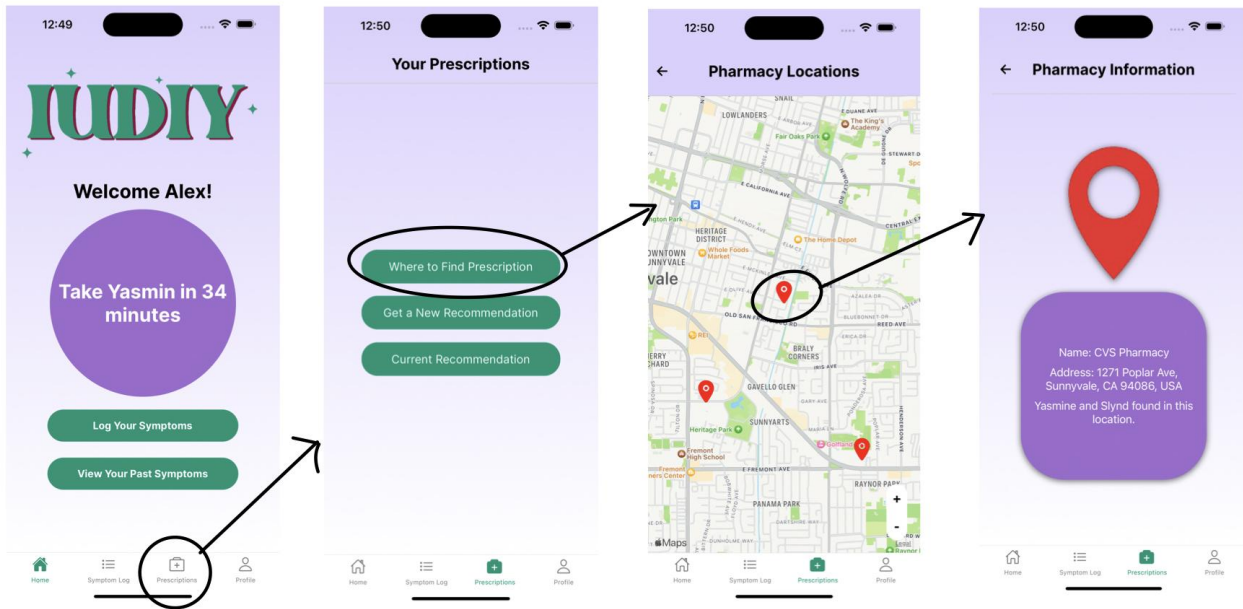


Select symptoms then hit "submit"



Confirmation that symptoms have been logged

Moderate: Find pharmacy that carries your prescription



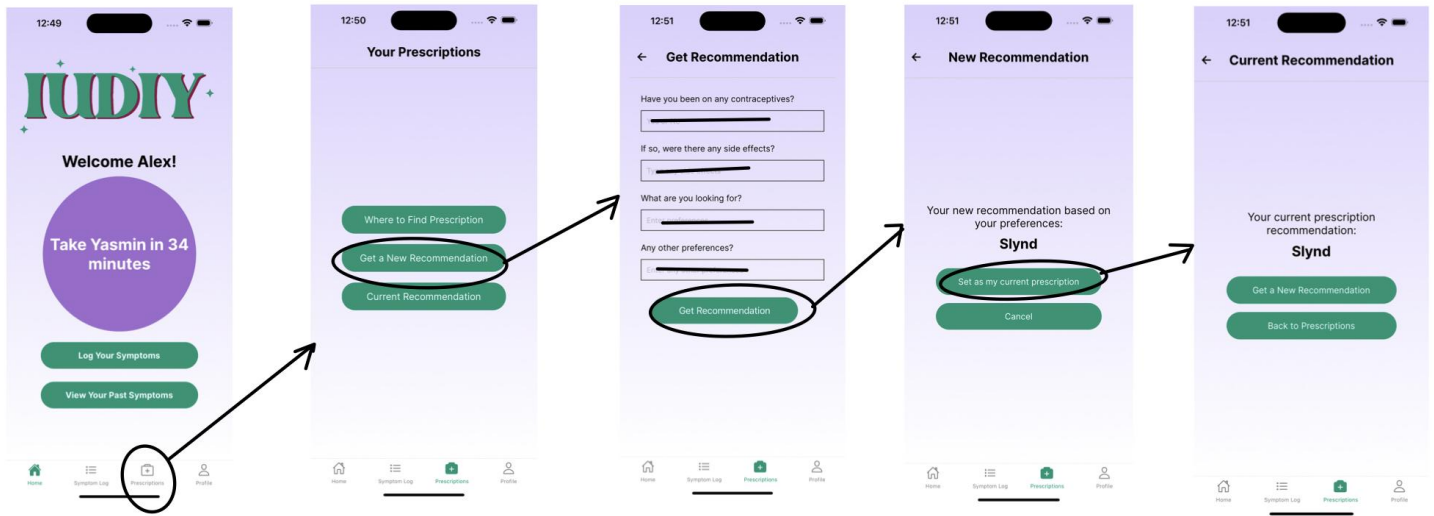
Click "Prescriptions"

-----> Click "Where to find Prescriptions"

-----> Select pin on map

-----> Review details of pharmacy

Complex: Change your current contraceptive recommendation.



Click "Prescriptions" -----> Click "Get A New Recommendation" -----> Input Personal Preferences -----> Click "set as my current prescription" -----> See the updated page

QR code & link to react prototype:
<exp://u.expo.dev/update/f2b98d33-9ceb-4d85-b83a-7fedba96a569>



Values in Design

Designing IUDIY prompted us to carefully consider the values we wanted to embed into the app at every stage, and we were deliberate in choosing these values. We identified our four main values:

1. Accuracy
2. Accessibility
3. Privacy
4. Personalization

Accuracy

As an app working in the healthcare space, we aim to empower users to find the right prescription by enabling them to understand the wealth of options available in the contraception space. Providing individuals with accurate and safe choices for family planning is key to our mission. This was encoded into our design as we position ourselves as a complement to working with healthcare professionals to find the best contraceptive method for a specific user rather than as a separate solution to replace physicians completely. We encoded this value into our product by utilizing an iterative approach to contraceptive recommendation through daily check-ins to ensure that if a prescription isn't optimal for a user that case can be quickly identified and rectified through a re-recommendation based on symptoms experienced, and the existing preferences and medical history profile.

Accessibility

Access to contraception should be available to all users regardless of background, location or socioeconomic status. Our project was an opportunity to make it easier for contraception users to find a method that works for them, based on their preferences in a way that we hope increases access. Furthermore, we solidified this approach utilizing location-based services to help users find nearby pharmacies where they could get their specific recommended contraceptive for increased access.

Privacy

Individuals should have the freedom to make their family planning decisions without judgment. To ensure privacy protection, data minimization methods and encryption should be utilized. Although, encryption of data is out of scope of this class, we employed data minimization

methods e.g. only asking questions to enhance the contraceptive recommendation rather than to gather data for non-consensual reasons. Furthermore, we designed privacy into our system by requiring users to make an account with a password to increase user protection.

Personalization

Contraceptive solutions should be tailored to meet each person's needs, preferences, and medical history. Many women feel that the women's health industry places a one-size fits all approach to finding contraceptives with only several medications being prescribed despite the hundreds of contraceptives that exist. This value is at the heart of our value proposition as we at multiple points personalize the journey of finding the right contraceptive (through daily symptom check-ins, and through the medical history, preferences and family history questionnaire).

In an ideal world, it would be simple to encode all these values into a product. However, in pursuit of one value, we sometimes sacrifice another. We are largely referring to two main value tensions:

1. **Privacy and Personalization:** We aim to minimize data collection, but we also want to have comprehensive set of user data to find the perfect contraceptive fit. This tension makes it difficult to enlist this data minimization policy, without sacrificing personalization.
2. **Accessibility and Personalization:** We aim to find the best contraceptive fit, but a less common contraceptive might not be accessible at all price points, with all insurances, and in all geographies. Thus, by allowing for this deep personalization aspect, it is impossible to allow for ultimate accessibility.

It is not possible to resolve these tensions without prioritizing values. So, ultimately, we hope to prioritize personalization as that is the key to our value proposition, but we hope to add as many features as possible to ensure the product is as accessible and private as possible.

Final Prototype Implementation

Tools Used

For the final prototype, we used React Native to code the frontend, Supabase to construct the backend, and Expo to visualize our code as an iOS app.

React Native is one of the most popular frameworks for mobile app development and has both advantages and disadvantages. The key advantages include cross-platform development, allowing a single codebase for both iOS and Android, reducing development time and costs. It has a strong community and a rich ecosystem of libraries and tools, which makes development easier. React Native generally performs well for most applications and offers live and hot reloading, enabling immediate viewing of changes without full app rebuilding. On the downside, React Native may not be ideal for apps needing intense native functionality or complex animations. Plus, it sometimes struggles with compatibility issues following new iOS and Android updates. Lastly, reliance on third-party libraries can lead to maintenance and update issues, as not all libraries are well-maintained.

As for using Supabase for backend, it's known for its ease of use, offering a simpler and more user-friendly approach to database management compared to traditional databases. It integrates well with other tools and services, making it a flexible choice. Supabase also provides real-time capabilities, which can be a major advantage for apps requiring instant data updates. However, there are drawbacks. Supabase is relatively new in the market, which means it may lack some advanced features found in more established platforms. This can limit its suitability for complex, large-scale applications. Being new also means a smaller community and fewer resources or tutorials available, which could pose challenges for developers seeking support.

Wizard of Oz Techniques

In this project, we refrained from developing an algorithm that matches the preferences and medical history logged by the user to a contraception recommendation. Right now, when a user navigates to the 'Prescriptions' page, clicks 'Get New Recommendation,' and inputs their preferences, the app just provides a recommendation for a birth control called Slynd, regardless of the preferences logged.

The main reason we didn't want to attempt this algorithm is because none of our team members have extensive knowledge of the side effects of every birth control pill available in the

market. We didn't want to develop an algorithm without having medical professionals weigh in and felt like we wouldn't have been able to do this during the time period of this class.

Hard-Coded Techniques

As mentioned above, we weren't able to develop a proper matching algorithm that provides the user with a prescription recommendation based on their preferences and medical history. As a result of this, the birth control names that are displayed under 'Current Prescription' and after going through the 'Get a New Recommendation' flow are two random birth controls hard coded in. The birth control listed under 'Current Prescription' is a commonly prescribed one, whereas the one listed under the new recommendation is less common.

Because we're not working with actual prescriptions that the user inputs, the coordinates and pharmacies listed under 'where to find prescriptions' are random locations that don't have any data associated with them. Ideally, in a fully functioning version of the app, we would display actual pharmacies that have the prescription set under 'current recommendation' in stock, but currently they're random proof-of-concept coordinates.

Reflection & Next Steps

CS147 has been a transformative journey, providing us with invaluable insights, particularly in the realms of healthcare development and the intricacies of the design thinking process.

Main Learnings

From Design Thinking Process

This quarter we learned the effectiveness of the design thinking process in uncovering insights and designing to tackle real user pain points. Within this process there were two main learnings we uncovered:

1. *User-Centered Design*

At various stages of the development process, we attempted to anticipate users' preferences, only to find that accurately predicting user needs is challenging. We learned that a more effective approach is to allow users to guide the design process by addressing their pain points directly, rather than making assumptions beforehand. To ensure a user-centered approach, we implemented robust empathy processes at multiple levels, starting with empathy mapping at the beginning and generating "How Might We" statements for use during low-fidelity usability testing. This inclusive approach ensured that users were actively involved at every stage of the design process.

2. *The Power of the Heuristic Evaluation*

The heuristic evaluation toolkit allowed us to get closer to understanding how to build effective task flows that were user intuitive and effective. Nielsen pushed us to design in an intuitive way that was easy to use. We were all shocked at how much this evaluation process elevated our task flows.

From Accessible Healthcare Studio Theme

As a group we had limited exposure to building in the healthcare space, and so within this process there were two main learnings we came away with:

1. *Difficulty Encoding Accessibility*

Implementing accessibility proved to be more challenging than we initially anticipated. While we aimed to capture accessibility by enabling users, regardless of their geographical location, to receive recommendations on the most convenient place to pick up their contraceptive method, we realized that accessibility encompasses numerous

dimensions. Our choice of a specific color scheme, for instance, unintentionally excluded certain menstruators. This experience emphasized that when incorporating accessibility into design, it's essential to brainstorm all potential forms of exclusion and systematically address each one to enhance overall accessibility and inclusion. It underscored the comprehensive nature of accessibility and highlighted the importance of intentionality in the design process.

2. *Specific Interview Strategies within Healthcare*

We gained insights into the challenges of building within the healthcare space, where individuals are often hesitant to openly discuss their issues due to privacy concerns. Consequently, we found it necessary to invest more time in establishing rapport with interviewees to create an environment where they felt comfortable sharing their healthcare experiences. While this approach proved effective in eliciting valuable insights, it also resulted in slightly longer interview durations than initially anticipated.

From Our Project

1. *Coding an App*

Before this class, none of our team members had experience coding an app. This course provided an excellent opportunity for us to delve into the process of building an app and learn how to style it using a medium-fi prototype as a guide.

Future Steps

If we were able to extend this project beyond the ten-week quarter, our biggest focus would have been developing an algorithm that actually provides recommendations. Again, knowledge of contraception and its various side effects was limited, making it impossible to develop a matching algorithm without the consultation of a medical team. Our matching algorithm would have to take both the input under 'medical history' and 'family medical history' on the home page and also the preferences inputted under the 'get new recommendation' to provide the user with a specialized prescription. These prescription changes would also allow us to ensure that the map on the prescriptions screen also displays accurate information.

Moreover, we would have appreciated additional time to refine the style and design of our app. While considerable effort went into developing the flows and backend, and although we dedicated attention to the visual design, having the opportunity to conduct user testing on our high-fidelity prototype would have been valuable. This would enable us to identify any potential heuristic violations in the final version that might require adjustments.

Final Remarks

Our team extends heartfelt thanks and gratitude to the teaching team for their unwavering support throughout this quarter, guiding us from the initial stages of need-finding to the intricacies of coding in React. It has been a truly pleasurable and transformative experience. We express our deepest appreciation, with special recognition to our TA, Amelia Leon, and Professor Landay.