MY UX PORTFOLIO

Senior User Experience Researcher

Prepared By: Wayne Hosley

Welcome to my Portfolio

My name is Wayne Hosley. I'm a Senior User Experience Researcher **and** an UX educator.

I help companies innovate products and experiences that solve real problems.

To achieve this, I use both human factors and user experience methods such as user research, user journey maps, risk analyses, usability testing and prototyping to help inform and guide the product development process.

I am an expert communicator, problem solver and creative thinker.

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Project #1
Usability Study on a New Self-Injector Pen

A successful drug delivery system should be easy to use, intuitive and efficient. Our team conducted a late-stage formative usability evaluation on the BD Vystra™ disposable pen to evaluate if these objectives were met.
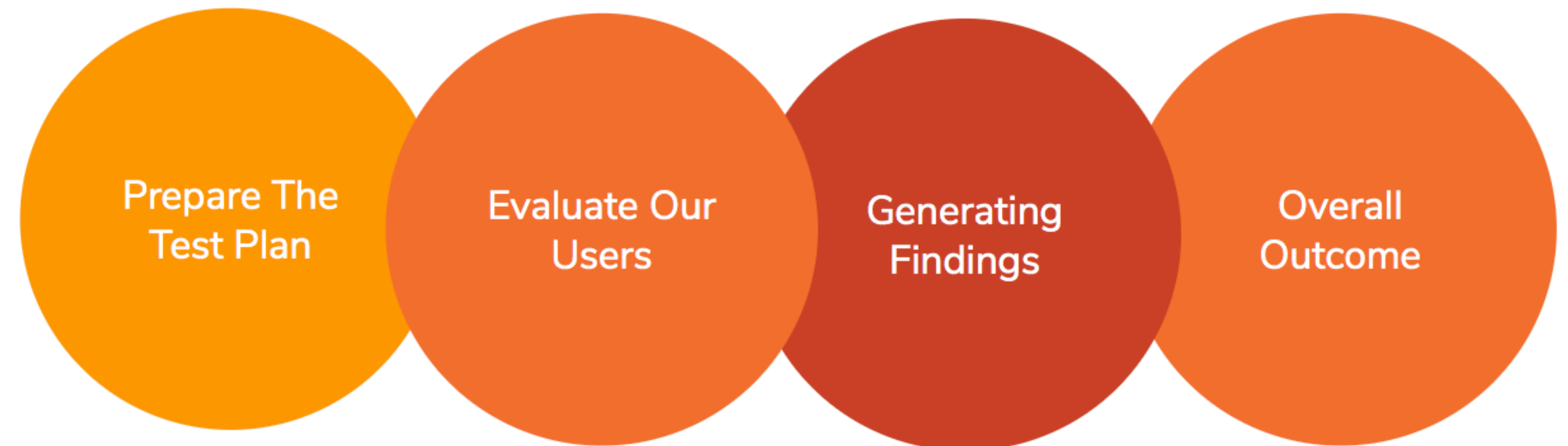
Formative Usability Study
BD Vystra™ Self-Injector Pen

Challenge

The challenge was to evaluate if the BD Vystra™ disposable pen could be used without repeating patterns of user error. Secondly, the other challenge was to evaluate the comprehension of the Instructions For Use (IFU) and determine whether prior training needed to be considered.

Process

Prepare The Test Plan

Evaluate Our Users

Generating Findings

Overall Outcome

Role & Responsibilities

- Led the formative usability evaluation, including test preparation, evaluation, analysis and reporting.

Define Our Users

The BD Vystra™ disposable pen is intended as a device to be used across different medical indications and patient groups. Therefore, our focus was on selecting relevant user properties that can reasonably be expected from a wide range of users. As a result, our team defined six user groups.

Group	Definition (abbr.)	Screening criteria and target composition
1	Health care professionals (HCPs)	• All registered diabetes specialist nurses
2	Caregivers (CGs)	• People who perform injections for patients who are too young or patients who have severe conditions relating to groups 4–6 • People with full command of their physical and mental abilities and who are deemed to be healthy and fit to provide assistance to person receiving drug • Two people naïve to self-injection devices; remainder with varying degrees of experience
3	Adolescents (ADs)	• Spread of participants between 12 and 18 years of age • Two people naïve to self-injection devices; remainder with varying degrees of experience
4	Diabetics with retinopathy (DR)	• Spread of participants between 18 and 70 years of age • Participants with varying degrees of experience with self-injection devices
5	Diabetics with neuropathy (DN)	• Spread of participants between 18 and 70 years of age • Participants with varying degrees of experience with self-injection devices
6	Patients with arthritis (AR)	• Two people naïve to self-injection devices; remainder with varying degrees of experience

Prepare The Evaluation Plan

Recruitment

Our goal was to recruit a set of eight participants per user group, with the aim of reaching a minimum of five active participants per user group.

Facility & Equipment

Evaluations will be conducted in a test room in a hospital or medical center. The equipment for this study will include:
- Mannequins, used for the injections performed by user groups 1 and 2
- Injection pads, used for the injections performed by user group 3, 4 and 5
- The BD Vystra™ disposable pen injector with water-filled cartridges
- Mounted cameras

Procedure

Participants will participate in an individual 60-minute session. Participant will be asked to:
1) Sign a consent form
2) Listen to background information & study brief
3) Conduct the handling evaluations
4) Answer questions about their experiences and background

Prepare The Evaluation Plan (Cont'd)

Evaluation Tasks

- Inject 60 units (to simulate a large injection) into the (mannequin or injection pad)
  Subtask: Attach Needle, Prime, Select dose, Inject, Hold and Dispose of needle.

- Watch a 1-minute news summary

- Inject 20 units (to simulate a small injection) into the (mannequin or injection pad)
  Subtask: Attach Needle, Prime, Select dose, Inject, Hold and Dispose of needle.

Data Collection Measures

The collection measures will include a combination of qualitative and quantitative measures. The usability metrics for this evaluation are:

- Injection Success Rate
- Degree of Confidence when using the Device
- Degree of Comfort when using the Device
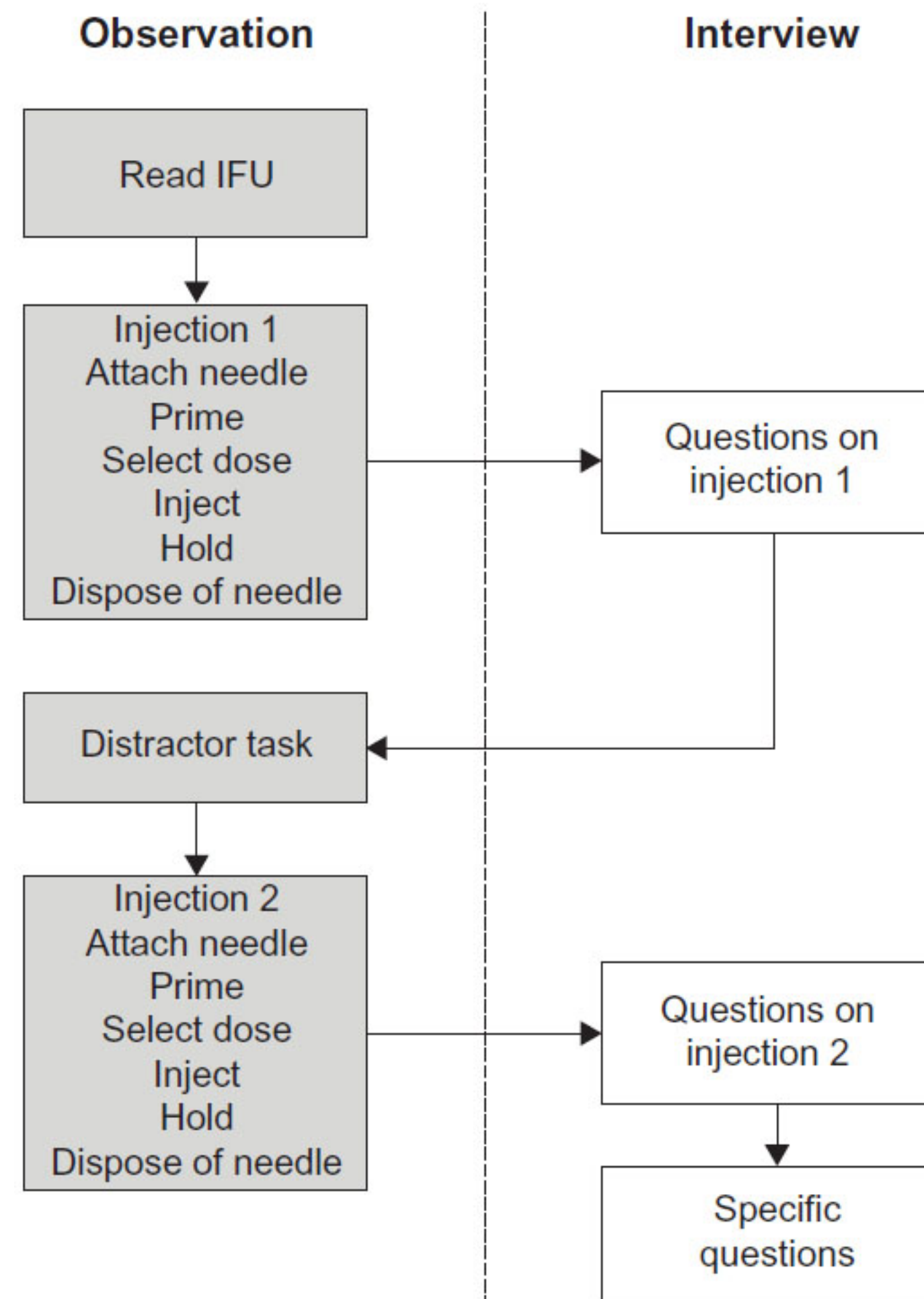- Degree of Usefulness of the IFU
- Degree of Difference In Error Rate Per Injection Among Volume & User Group

Conduct The Evaluation With Users

My team and I observed and noted all use errors, near misses, or deviations from the IFU procedure during the evaluation. The flow of the evaluation was as follow:

Our Participants

43 participants were recruited, of which 36 completed the evaluation. The minimum number of five participants per group was reached in 5 of the 6 groups. Overall, 78% of the participants were female, 81% had previous experience using pen injectors, and 28% suffered from some kind of impairment.

The characteristics of the participants in the evaluation are presented below:

Group	n	Sex	Age, years	Handedness	Pen experience	Self-reported impairments
1. Health care Professionals (HCPs)	7	7 female, 0 male	32–51, mean 42	0 left-handed, 7 right-handed	0 naïve, 7 experienced	None
2. Caregivers (CGs)	5	4 female, 1 male	19–46, mean 39	0 left-handed, 5 right-handed	0 naïve, 5 experienced	None
3. Adolescents (ADs)	8	6 female, 2 male	10–17, mean 15	2 left-handed, 6 right-handed	0 naïve, 8 experienced	None
4. Diabetics with retinopathy (DR)	5	3 female, 2 male	25–66, mean 41	0 left-handed, 5 right-handed	1 naïve, 4 experienced	All reported some degree of blurriness of vision in one or both eyes
5. Diabetics with neuropathy (DN)	4	3 female, 1 male	35–57, mean 47	1 left-handed, 3 right-handed	1 naïve, 3 experienced	1 with numbness in hands, 1 with throbbing in hands, 2 without any impairments
6. Patients with arthritis (AR)	7	5 female, 1 male	60–77, mean 66	3 left-handed, 4 right-handed	5 naïve, 2 experienced	4 with soreness or pain in hands, 3 without any impairments
Overall	36	28 female, 8 male	10–77, mean 41	6 left-handed, 30 right-handed	7 naïve, 29 experienced	10 with impairments, 26 without

Were Users Successfully Able To Complete The Injections?

All participants except two in the Arthritic patients' group (Group 6) were successful (i.e., required no assistance) in performing the **first injection**, which corresponded to a **94% success rate**. Everybody succeeded in performing the **second injection**, meaning a **success rate of 100%** for this injection.

	HCPs (n=7 for both injections)	CGs (n=5 for 1st and n=4 for 2nd injection)	ADs (n=8 for both injections)	DR (n=5 for both injections)	DN (n=4 for both injections)	AR (n=7 for both injections)	Total (n=36 for first and n=35 for second injection)
First injection	7 (100%)	5 (100%)	8 (100%)	5 (100%)	4 (100%)	5 (71%)	34 (94%)
Second injection	7 (100%)	4 (100%)	8 (100%)	5 (100%)	4 (100%)	7 (100%)	35 (100%)

How Confident Were Users While Using The Device?

Overall, 69% of the participants reported that they strongly agree with the statement that they felt confident in using the BD Vystra™ disposable pen, whereas 22% reported that they would agree with this statement. The combined rating for the two categories was **92%** of all participants.

	HCPs (n=7)	CGs (n=5)	ADs (n=8)	DR (n=5)	DN (n=4)	AR (n=7)	Total (n=36)
Strongly agreed	5	2	6	3	4	5	25 (69%)
Agreed	2	2	2	2	0	0	8 (22%)
Combined	7 (100%)	4 (80%)	8 (100%)	5 (100%)	4 (100%)	5 (71%)	33 (92%)

How Comfortable Were Users While Using The Product?

Overall, 28% of participants rated the BD Vystra™ disposable pen as a very comfortable to use device, whereas 47% rated it as comfortable to use, giving a combined result of **75%** of participants rating the device as at least to be **comfortable to use**.

Only 8% of the participants rated it as uncomfortable to use, with the remaining 17% rating the degree of comfort as neutral.

	HCPs (n=7)	CGs (n=5)	ADs (n=8)	DR (n=5)	DN (n=4)	AR (n=7)	Total (n=36)
Very comfortable	1	1	2	3	2	1	10 (28%)
Comfortable	3	2	5	1	1	5	17 (47%)
Combined	4 (57%)	3 (60%)	7 (88%)	4 (100%)	3 (75%)	6 (86%)	27 (75%)

Did Users Find The IFU Useful?

Overall, 75% of the participants rated the IFU as very helpful and 25% as somewhat beneficial bringing the total to **100%** of participants finding the IFU to varying degrees helpful.

	HCPs (n=7)	CGs (n=5)	ADs (n=8)	DR (n=5)	DN (n=4)	AR (n=7)	Total (n=36)
Very helpful	6	4	6	3	3	5	27 (75%)
Somewhat helpful	1	1	2	2	1	2	9 (25%)
Combined	7 (100%)	5 (100%)	8 (100%)	5 (100%)	4 (100%)	7 (100%)	36 (100%)

Was There A Significant Difference In Error Rate Per Injection Among Volume & User Group?

- The error rate varied significantly between user groups, ranging from 3.75 (highest) errors per participant for the first injection in the DN group to 1.00 (lowest) for the second injection in the CG group.

- The overall rate was 2.39 for the first and 1.94 for the second injection, equivalent to an improvement of 19% between the injections.

- Also, this improvement or learning effect varied across the user groups, with the CG group showing the largest (39%) and the HCP group showing the lowest (11%) learning effect.

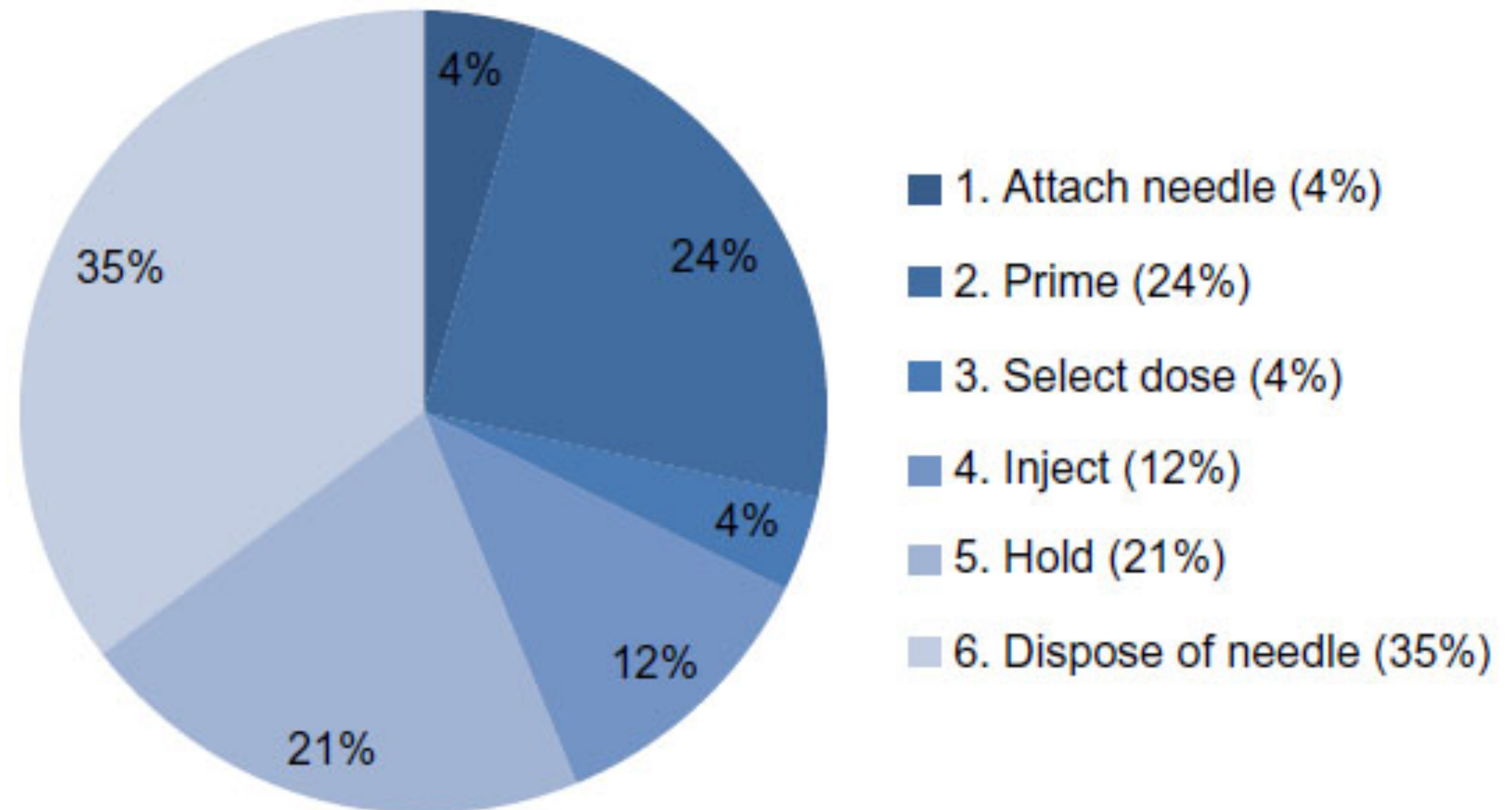| User step	HCPs (n=7 for both injections)		CGs (n=5 for first and n=4 for second injection)		ADs (n=8 for both injections)		DR (n=5 for both injections)		DN (n=4 for both injections)		AR (n=7 for both injections)		Total (n=36 for first and n=35 for second injection)	
	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
1. Attach needle	0	0	1	1	1	0	0	0	0	1	3	0	5	2
2. Prime	1	2	2	1	6	3	3	2	5	3	4	5	21	16
3. Select dose	0	0	0	0	0	0	0	0	0	0	4	2	4	2
4. Inject	2	2	1	1	2	1	1	2	1	0	2	2	9	8
5. Hold	4	3	2	1	3	4	3	1	3	3	3	2	18	14
6. Dispose of needle	2	1	2	0	6	7	6	6	6	6	7	6	29	26
Sum over all steps	9	8	8	4	18	15	13	11	15	13	23	17	86	68
Rate (occurrence/n)	1.29	1.14	1.60	1.00	2.25	1.88	2.60	2.20	3.75	3.25	3.29	2.43	2.39	1.94
Reduction in rate between first and second injections	11%		38%		17%		15%		13%		26%		19%	

When Were Users Most Likely To Experience Use Error?

The largest proportion (35%) of all potentially relevant errors occurred when disposing of the needle (step 6), and significant proportions were observed when priming (step 2, 24%) and holding after injection (step 5, 21%).

Attaching the needle (step 1, 4%), selecting the dose (step 3, 4%), and injecting (step 4, 12%) were associated with fewer errors or deviations.

Pie chart:
- 4%
- 24%
- 35%
- 4%
- 12%
- 21%

Legend:
- 1. Attach needle (4%)
- 2. Prime (24%)
- 3. Select dose (4%)
- 4. Inject (12%)
- 5. Hold (21%)
- 6. Dispose of needle (35%)

Overall, Were Any Design Improvements Necessary?

Although a substantial number of user errors and deviations from the IFU procedure were observed, most of the error was associated with the use of the needle rather than the pen injector itself. A noteworthy fraction of errors and deviations were also due to experienced users sticking to their (erroneous) habits rather than not understanding or misinterpreting the instructions.

Overall, Were Any Design Improvements Necessary? (Cont'd)

As a result, the BD Vystra™ disposable pen together with the IFU could be safely and efficiently used by all user groups without any training. Supported evidence includes:

- An overall success rate in performing injections above 90% for the first injection and 100% for the second injection.
- An overall degree of confidence in using the device above 90% across all participants and user groups.
- An overall degree of comfort in using the device above 90% across all participants and user groups.
- An overall IFU appreciation percentage of 100% by the participants.

Therefore, the observation that all tested user groups can safely and efficiently use the device provides security that the device and IFU in their current form will pass future summative testing. There are no further improvements for this device needed at this time.

Project #2
Booking.com UX Analysis & Redesign

Booking.com is a travel site that collects and lists places around the world to make it easy for users to find and book accommodations when people travel. However, many people complained that booking.com provides a poor user experience. Therefore, I challenged myself to optimize and redesign the user experience of booking.com's landing page.
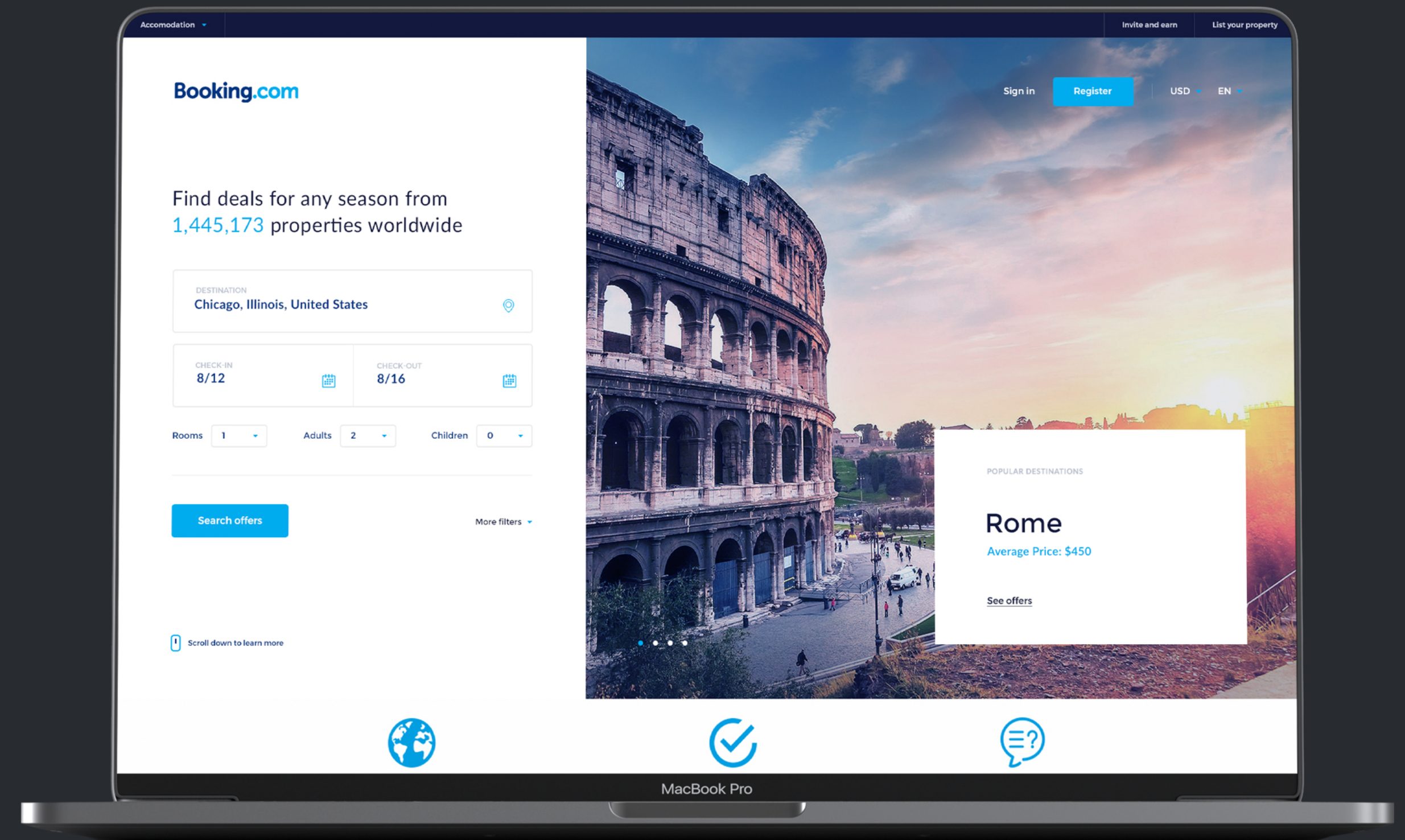
UX Analysis & Redesign
Booking.com

Challenge

Currently, booking.com carries a complex information architecture. Critical content for some of the major user goals camouflages with an overwhelming amount of content on the page resulting in a negative user experience with the site.

Process

Evaluate The Current IA

Empathize With Our Users

Revise The IA

Generating Designs

Generating High-Fidelity Design
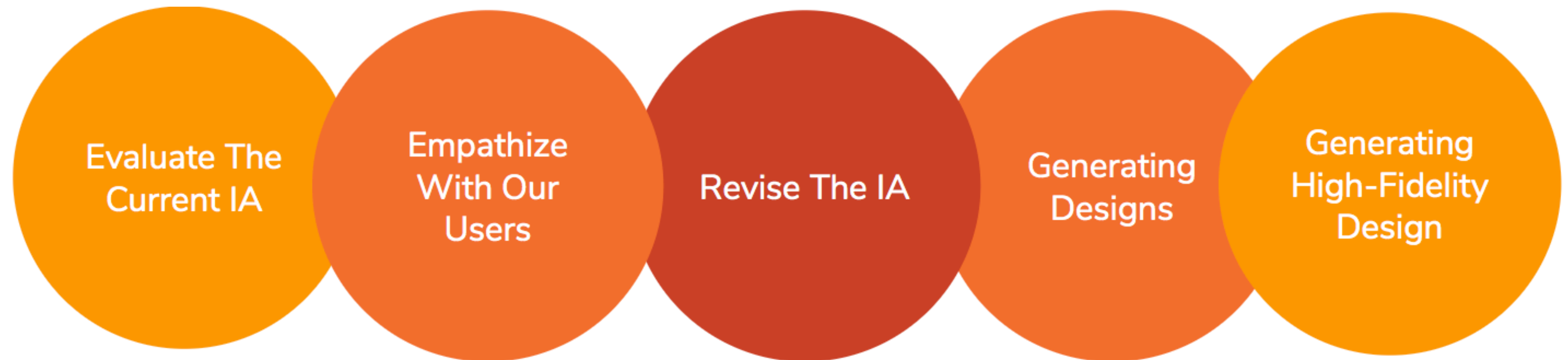
Roles & Responsibilities

- Redesigned the user interface for booking.com's landing page implementing UX methods such as user interviews, card sorts, user flows, mock-ups and more.

UX Analysis & Redesign
Booking.com

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Visualization Meets IA

To better understand and visualize the general IA of booking.com's landing page, I mapped out their current content into the following sections.

Goal: To collect a list of all the content presented on the landing page.
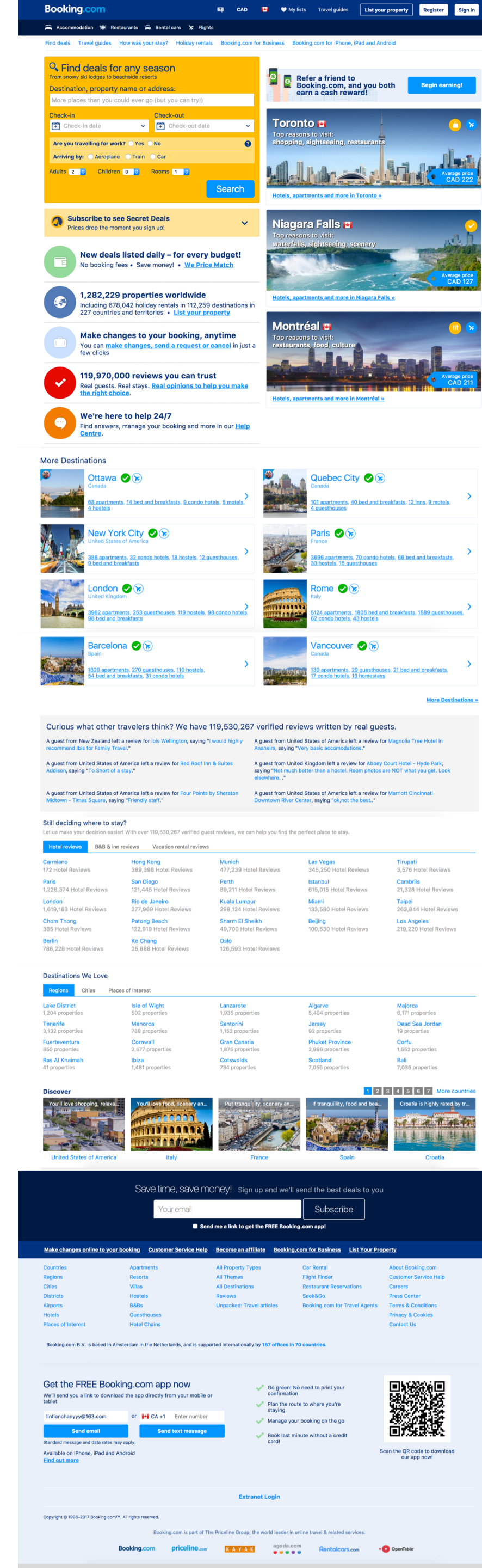
Navigation

Quick Booking Section	Refer a Friend | Get Cash Back
	Recommended Destination
Credibility	

Just Booked

More Destinations
Popular Nearby Destinations

Latest Review

Reviews Worldwide
(Hotel Reviews, B&B & Inn Reviews & Vacation Rental Reviews)

More Destinations
(Regions, Cities & Places of Interest)

Recommended Countries

Subscribe

Sitemap

CTA Download The App

Footer

UX Analysis & Redesign

Booking.com

User Interviews

User interviews are a great tool to extract information from users about their experiences and thoughts. The primary goals for this method were to:

- Understand the user's goals and pain points
- Evaluate the desktop version of booking.com
- Revise the information architecture based on the feedback from our users

UX Analysis & Redesign
Booking.com

User Interview Conclusion

Overall, the responses to the user interviews were as follow:

1. Participants' ages ranged from 24 - 35 years old.

2. All of the participants traveled at least 3 times or more times a year.

3. Participants confirmed that they use Airbnb, Priceline.com, Booking.com and Expedia for travel accommodations. Interestingly, none of the participants chose booking.com as their favorite.

4. Participants' reasoning for their favorite accommodation sites:
   - **Airbnb**: "simple layout", "easy to use", and "provides a delightful overall experience.
   - **Priceline.com**: "nice layout", "less clutter", "cheap prices", and "useful filters".
   - **Expedia**: "cheap options", "clean layout", "powerful search engine", "easily usable for first time travelers", and "better UX".

5. All participants confirmed that they have used booking.com before. Additionally, 3 out of 5 participants added that they have used booking.com in the last 3 months.
   - **Likes**: "Cheap accommodations", "Powerful search engine", "Nice reviews" and "Options".
   - **Dislikes**: "Complicated layout", "Confusing navigation", "Misleading content" and "Constant distractions".

UX Analysis & Redesign

Booking.com

Landing Page Perception

Participants had a chance during the session to evaluate and browse booking.com's landing page on desktop while observing their behaviors and asking relevant questions.

1. What is your first impression of this page?
   - **Cluttered**: "It's (the content) all over the place as I mentioned before"
   - **Wordy**: "This page has too much to read!"
   - **Distracting**: "I don't want to see all of the information before I search for it"

2. What do you like most about this landing page?
   - **Quick Booking Section**: "This is why I am here for the most part!"

3. What do you like least about this landing page?
   - Three level navigation
   - Too many distractions (graphics and icons)
   - Overwhelming number of links to read
   - Everything camouflages together (Nothing stands out)
   - Some content looks clickable when it is not
   - All the pictures look similar. It doesn't look attractive to press if that is the end goal.

UX Analysis & Redesign

Booking.com

Card Sort

Card sorts are a method used to help design or evaluate the information architecture of a product.

During the user interviews, 5 participants organized content items into what was most to least important/useful to them to view on a travel site's landing page.

Outcome: One of the prominent issues with the site is the variety of ways users can view redundant content. The overall result from the card sort is:
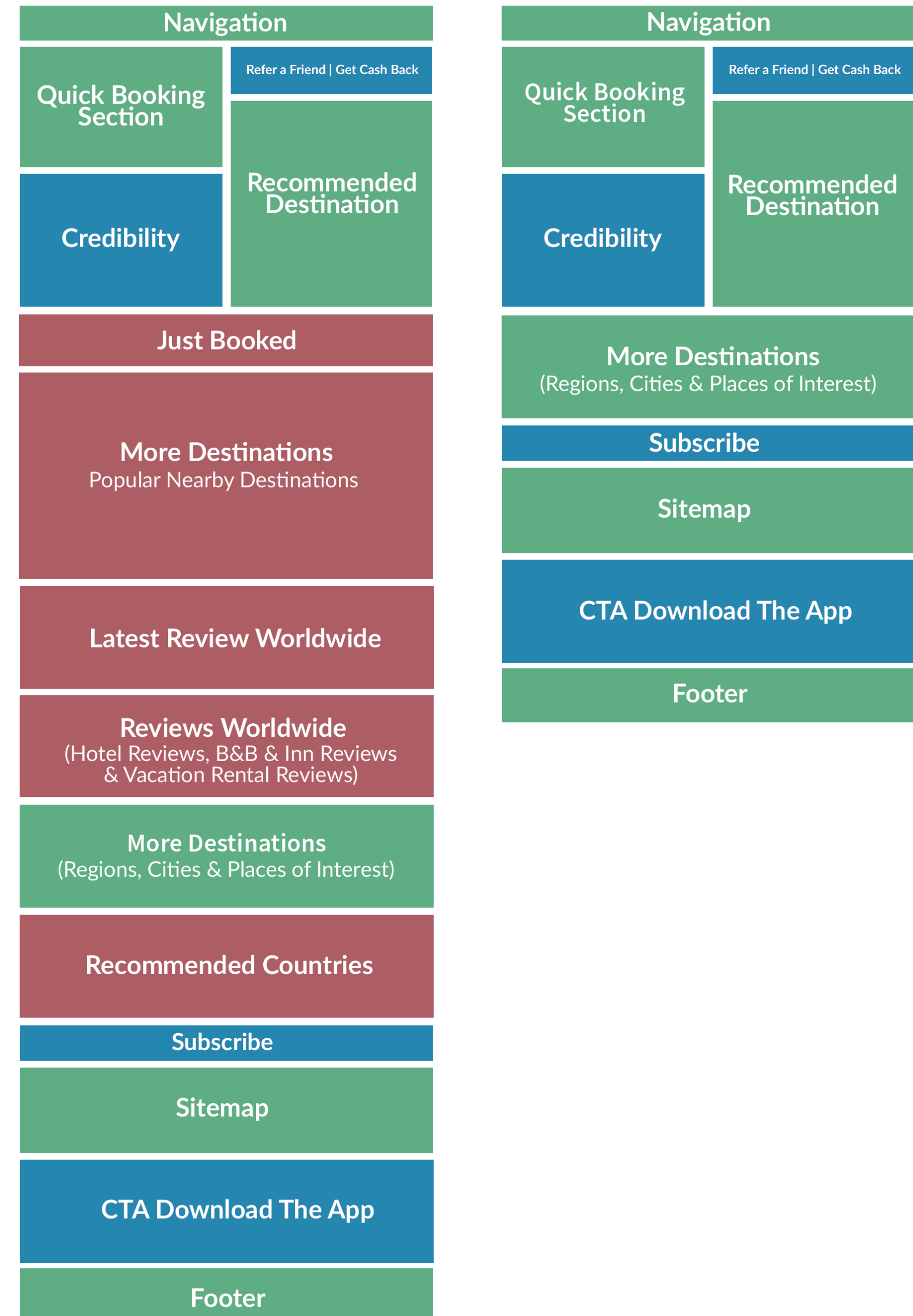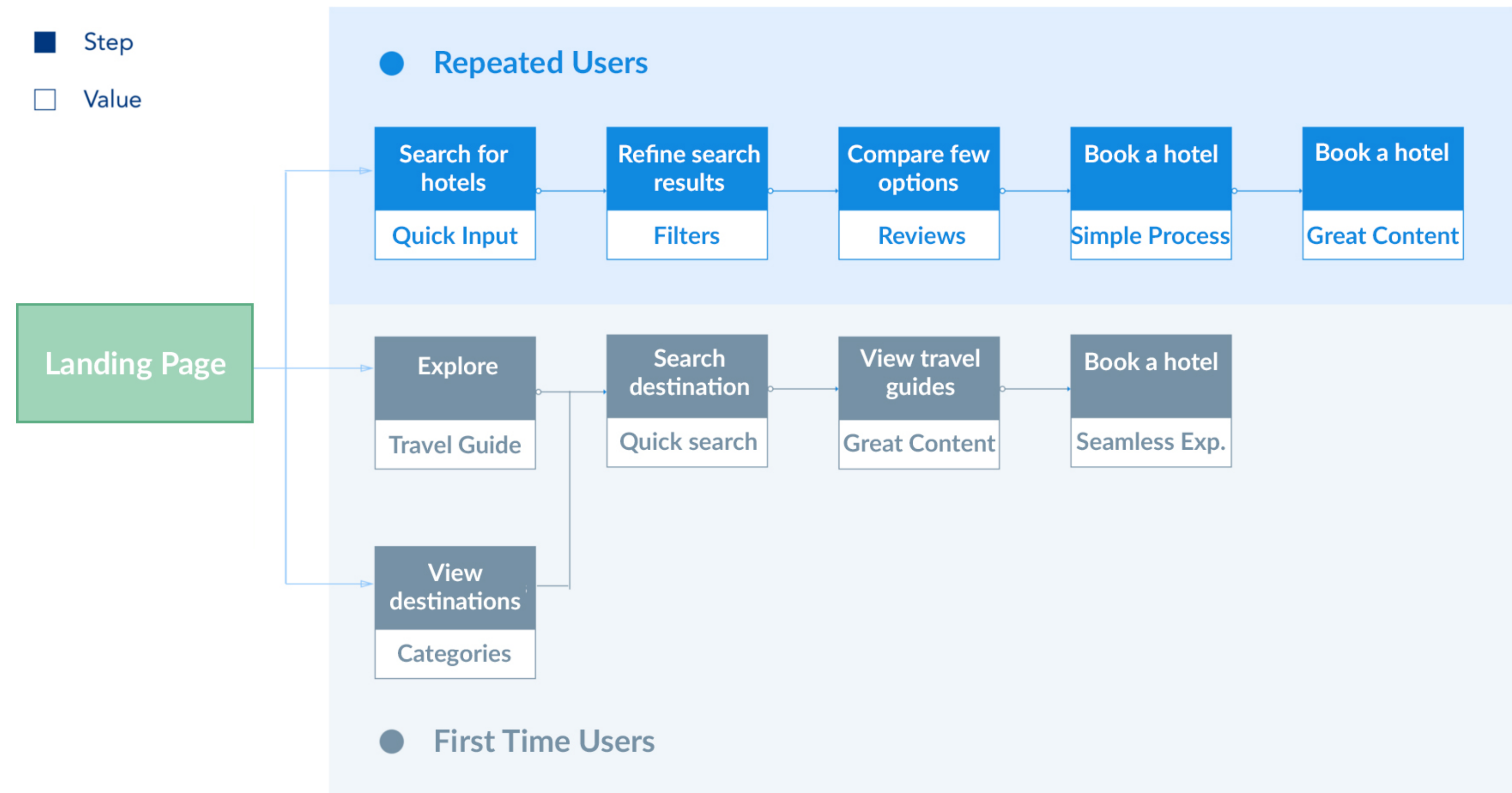
UX Analysis & Redesign

Booking.com

User Flow

By determining the path user follows through the site, it allowed me to see possible the blueprints of the experience that I can further optimize. Therefore, I ideated on the ideal user flows for booking.com's landing page. As a result, I placed users into two groups according to their different needs.

1. First Time Users: The users who don't know where to go
2. Repeated Users: The users who know where to go

Let's Eliminate The Confusing Content

It is vital to remember that the landing page is a collection of information pieces that is there to serve the user needs. Therefore, I focused on what I plan to remove from the current landing page and why I would like to remove it?

Reviews

Realizations: Reviews are only beneficial to the users when they narrow down the results and compare between few options. It is rare that users would click on random reviews on the landing page before even searching.

UX Analysis & Redesign
Booking.com

Let's Eliminate The Confusing Content (Cont'd)

Call to Actions (CTAs)

CTAs are crucial to marketing success. However, it is not enough to design eye-catching CTAs and place them everywhere. Users will find these CTAs as distracting and out of place. So I made a few changes to the CTAs' placement:

1. "Subscribe to get discount" – When searching/booking accommodations
2. "Refer a friend to get cash back" – After successfully booking accommodations
3. "Download the app" – When using a mobile device

Recommended Destinations

Recommendations can be useful to users who don't know where to go. However, when users try to explore and click on a recommended destination, do they want to see a list of hotels right away?

Recommendation: I would suggest to place them inside of travel guides. Booking.com has a fantastic travel guides page where you can find great information of a destination, like "Things to do", "Best times to visits", "Average prices" and more.

UX Analysis & Redesign
Booking.com

Remove The Clutter For A Better User Experience

Quick Booking Section	Credibility	Travel Guides	Lastest Reviews (worldwide)	Lastest Reviews (Popular Cities)
Register & Sign In	Upgrade Account	Property Listings	Subscribe	Recommended Countries
Refer a Friend	Recommended Cities in Canada	Find Deals	Recommended Cities	Recommended Regions | Places of Interest

☐ Keep

▢ Remove

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UX Analysis & Redesign
Booking.com

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Simplified & Organized For A Better Information Architecture & User Experience

Booking Section
- Destination
- Date
- Guest

Account
- Sign in
- Register

Credibility
- Free Cancellation
- +1M Properties
- +100M Reviews

Explore
- Popular destinations

CTA
- Subscribe
- List your property
- Refer a friend

UX Analysis & Redesign

Booking.com

Sketches

With a new information architecture, I brought the findings to life through annotated, low-fidelity and mid-fidelity designs. The intention behind this stage was to create a goal-oriented layout, based on the newly-proposed, intuitive information architecture.

Sketches are a great method to create as many alternatives of the layout as quickly as I could.

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Wireframes

Through this constant ideations, the strongest ideas moved from sketches to wireframes using Sketch.

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High-Fidelity Design

Lastly, I created a high-fidelity mock-up as the final deliverable. The high fidelity screens established a realistic experience to encourage useful feedback.
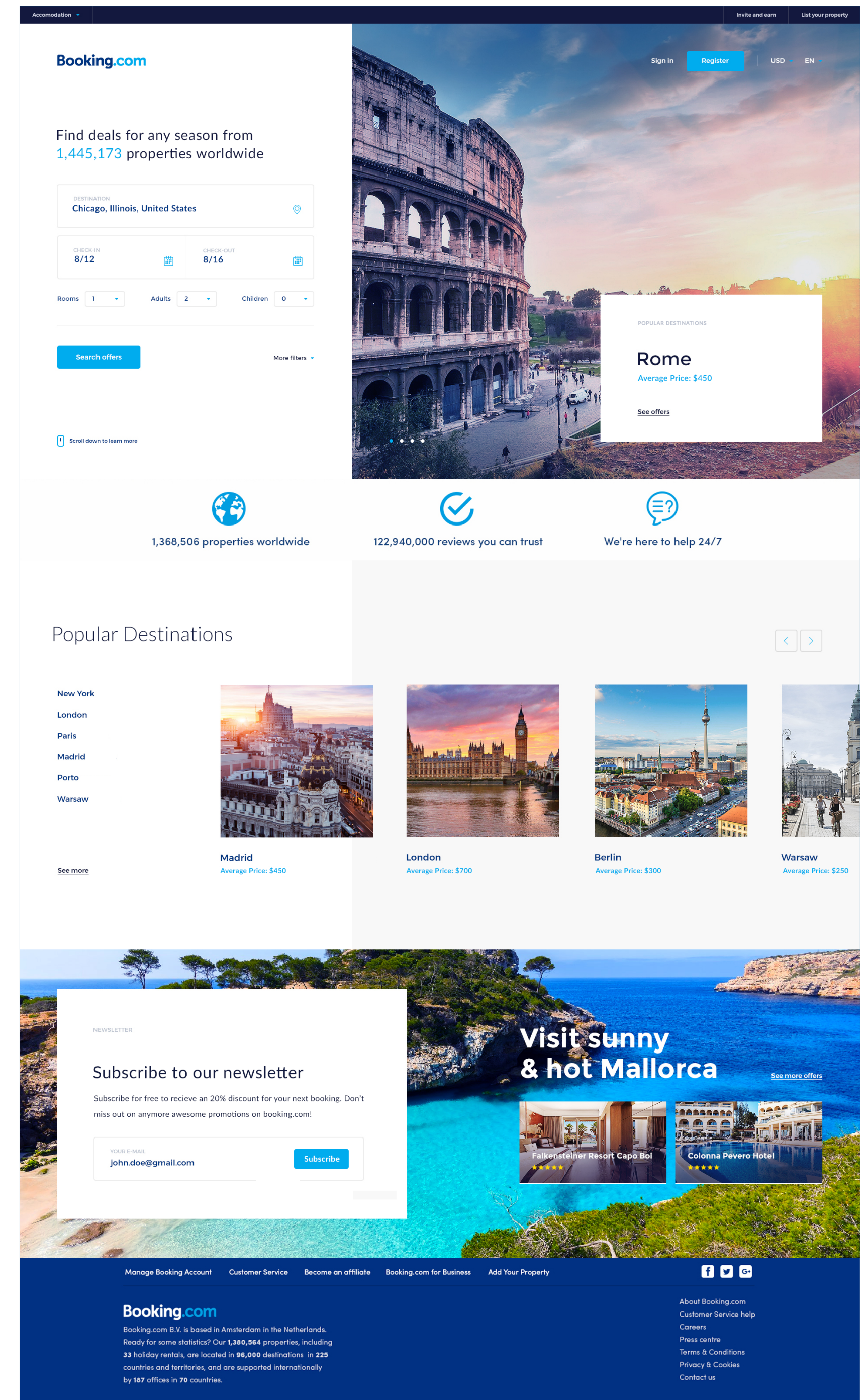
UX Analysis & Redesign

Booking.com

Comparison (Old Design vs. New Design)
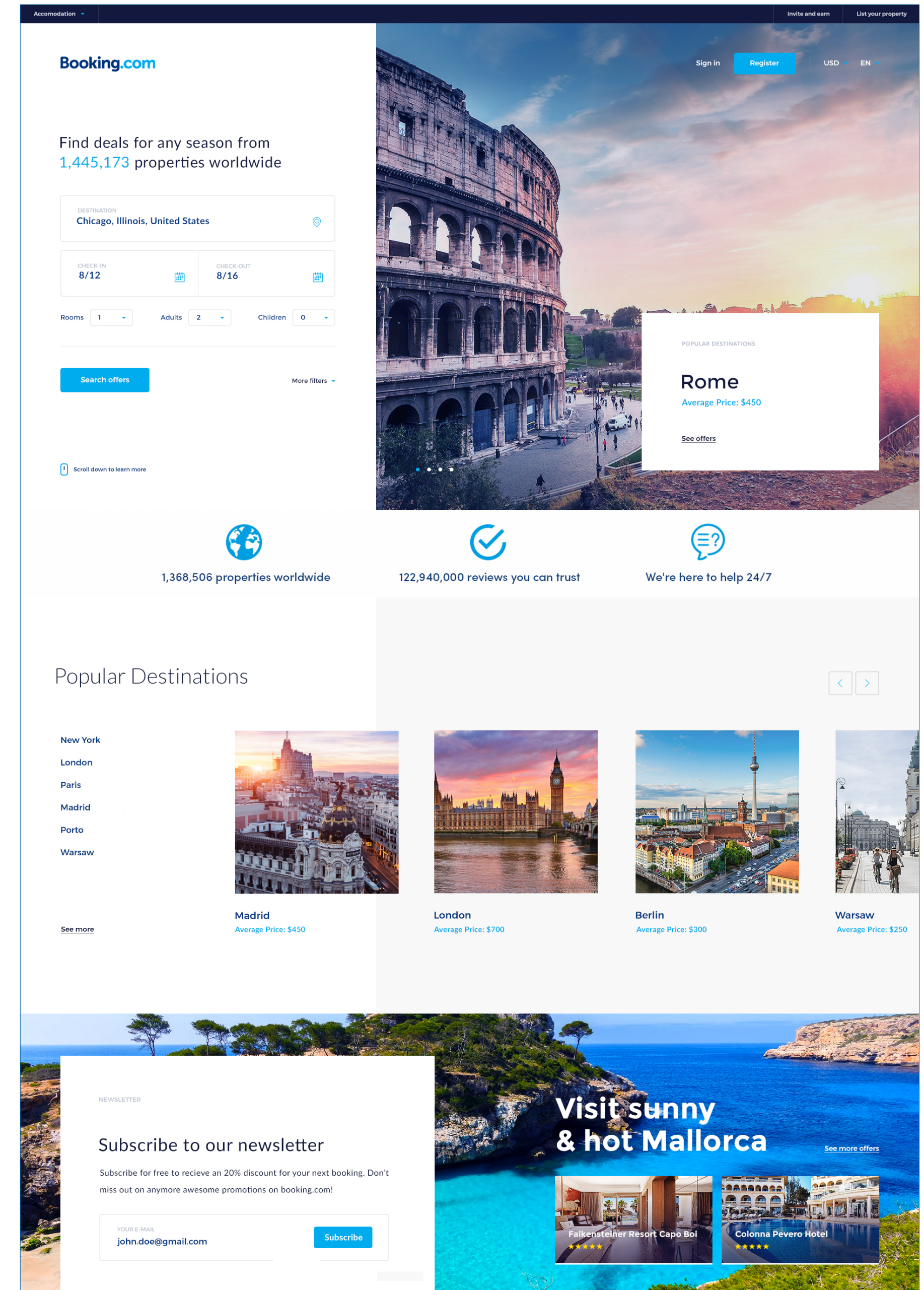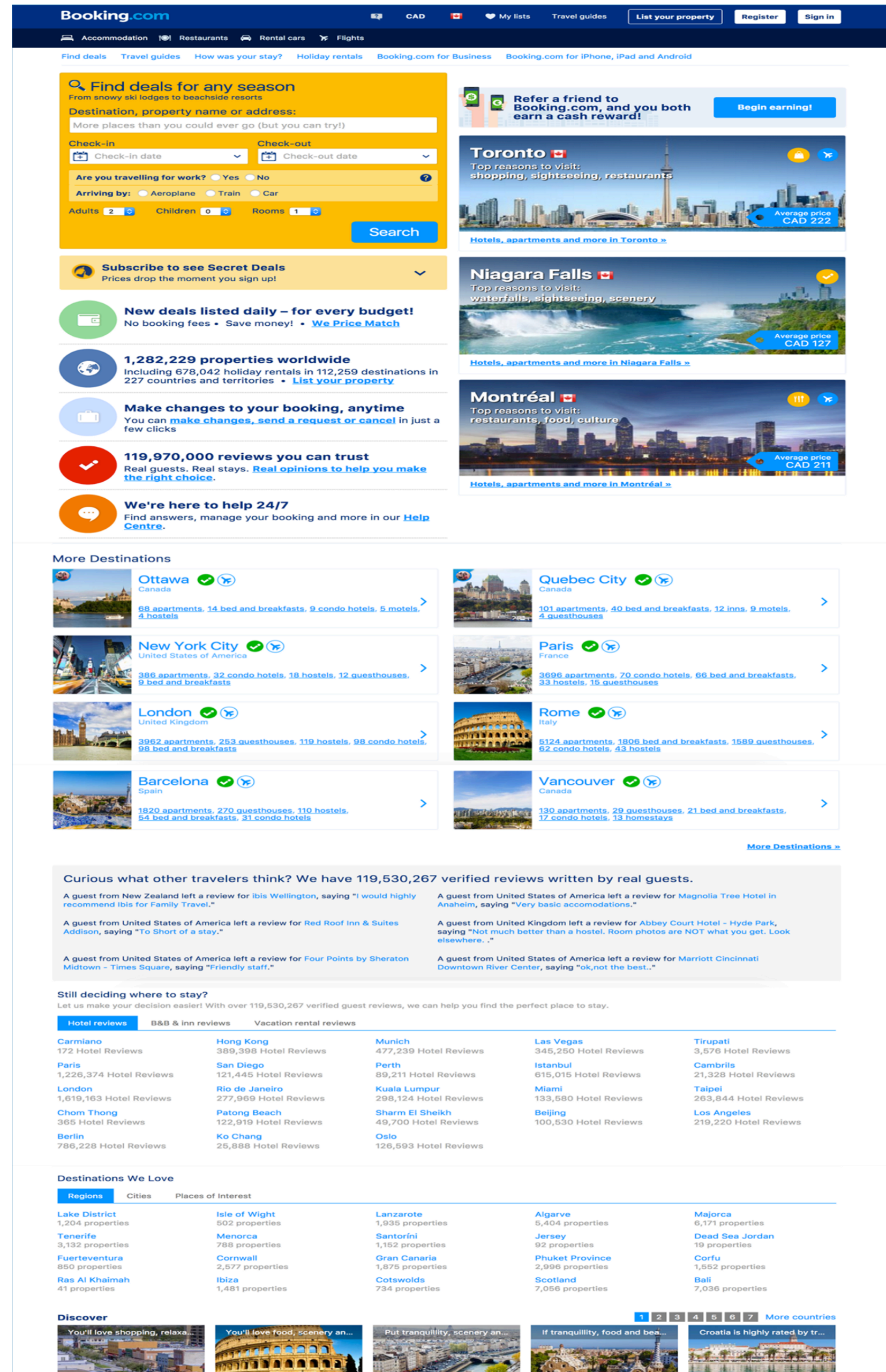
Project #3
Turning Empathy Into a Practical Digital Solution

When a child is admitted to the hospital, parents usually accompany their child and participate in the care. Parents commonly report that their primary needs are rarely met for trust, information, support, and guidance. To address this complex issue, my team and I created an app solution that provided parents with reassurance and information through proper education and communication.

CareExperience +

SIGN UP   SIGN IN

E-mail
mariowinfiel@ |

Password

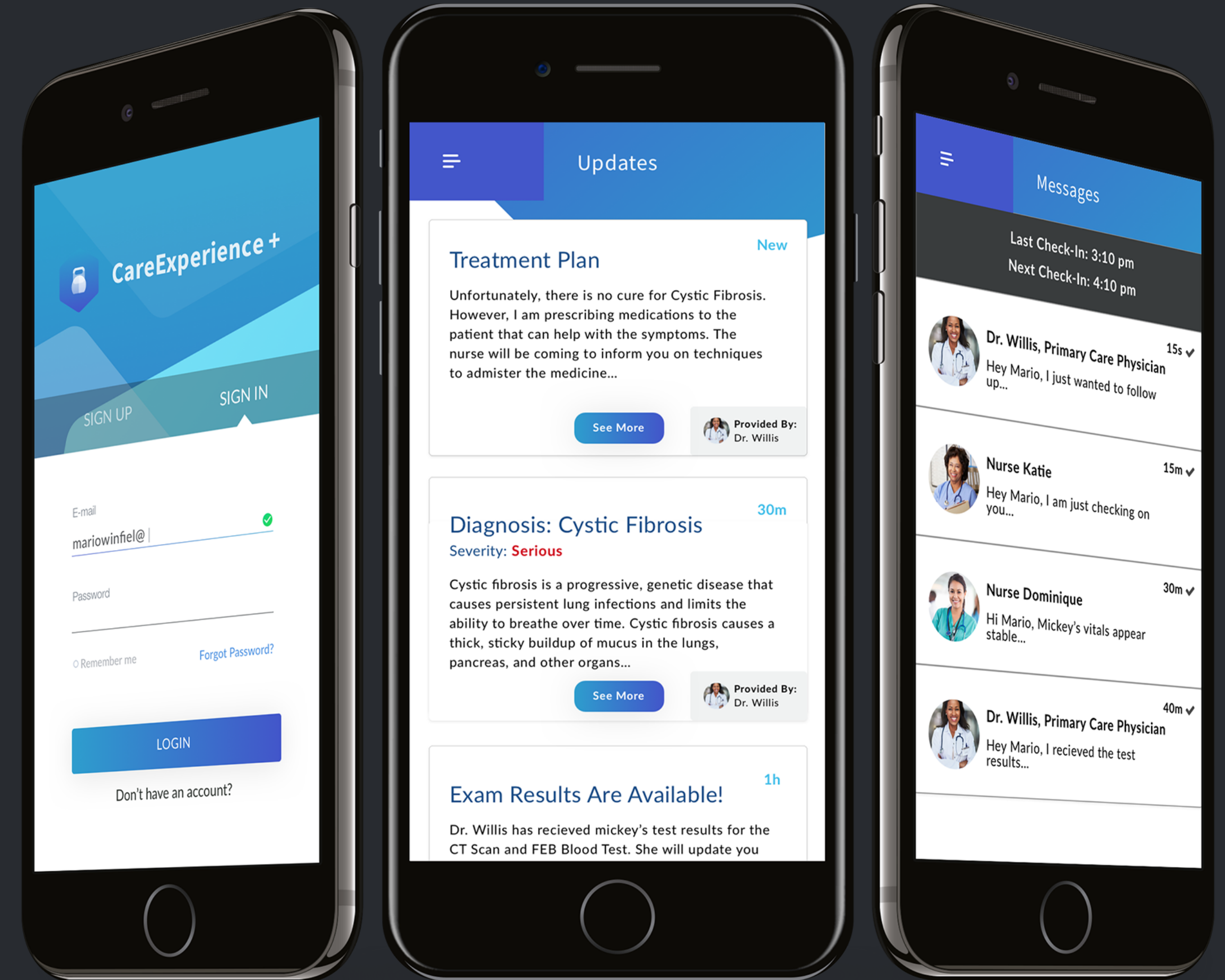Remember me   Forgot Password?

LOGIN

Don't have an account?

Updates

Treatment Plan   New

Unfortunately, there is no cure for Cystic Fibrosis. However, I am prescribing medications to the patient that can help with the symptoms. The nurse will be coming to inform you on techniques to admister the medicine...

See More   Provided By: Dr. Willis

Diagnosis: Cystic Fibrosis   30m
Severity: **Serious**

Cystic fibrosis is a progressive, genetic disease that causes persistent lung infections and limits the ability to breathe over time. Cystic fibrosis causes a thick, sticky buildup of mucus in the lungs, pancreas, and other organs...

See More   Provided By: Dr. Willis

Exam Results Are Available!   1h

Dr. Willis has recieved mickey's test results for the CT Scan and FEB Blood Test. She will update you

Messages

Last Check-In: 3:10 pm
Next Check-In: 4:10 pm

Dr. Willis, Primary Care Physician 15s ✓
Hey Mario, I just wanted to follow up...

Nurse Katie   15m ✓
Hey Mario, I am just checking on you...

Nurse Dominique   30m ✓
Hi Mario, Mickey's vitals appear stable...

Dr. Willis, Primary Care Physician 40m ✓
Hey Mario, I recieved the test results...

An App for Families with Hospitalized Children

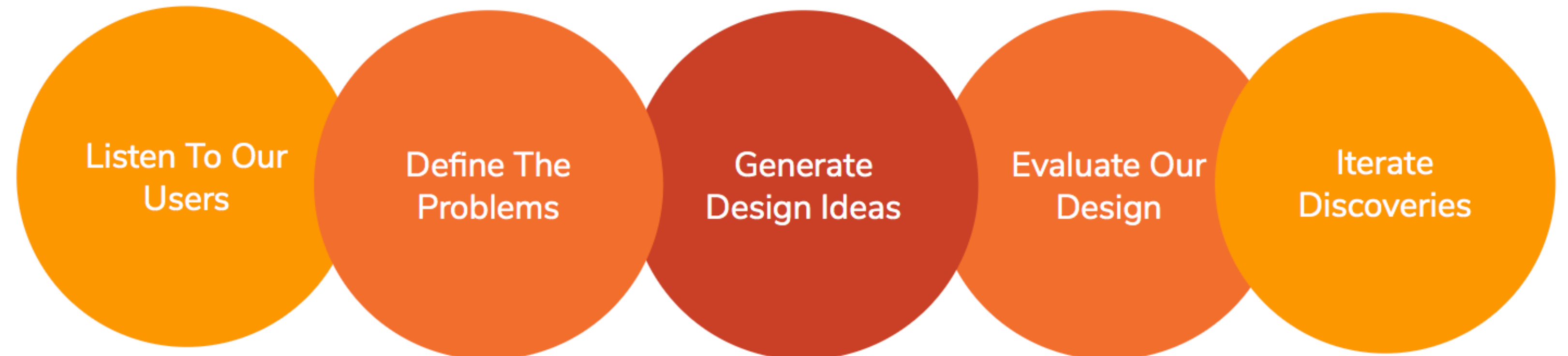## Context

When a child is admitted to the hospital, parents usually accompany their child and participate in the care. Parents commonly report that their primary needs are rarely met for trust, information, support, and guidance.

Process

| Listen To Our Users | Define The Problems | Generate Design Ideas | Evaluate Our Design | Iterate Discoveries |

My Roles & Responsibilities

- Led in the creation of a design solution which included UX methods such as user journey mapping, empathy mapping, a persona, wireframing, usability evaluations and more.

Understanding our user's story?

User Interviews are a way to listen to our users. It provides awareness to biased information, correct information, and more importantly, incorrect misconceptions.

Our team discovered:
- High levels of stress in this situation result in difficulties with eating and sleeping.

- Parents and caregivers worry about not being with other children and figuring out how to make sure they are taken care of.

- The financial burden of hospital bills/lost wages can weigh on the family, especially for the parents or caregivers.

- Though rare, clear and frequent communication from hospital staff provided a sense of control and security.

- Lack of communication from the hospital staff was extremely frustrating.

- Medical providers would mention that all the info families needed was online, but was always difficult to find and comprehend.
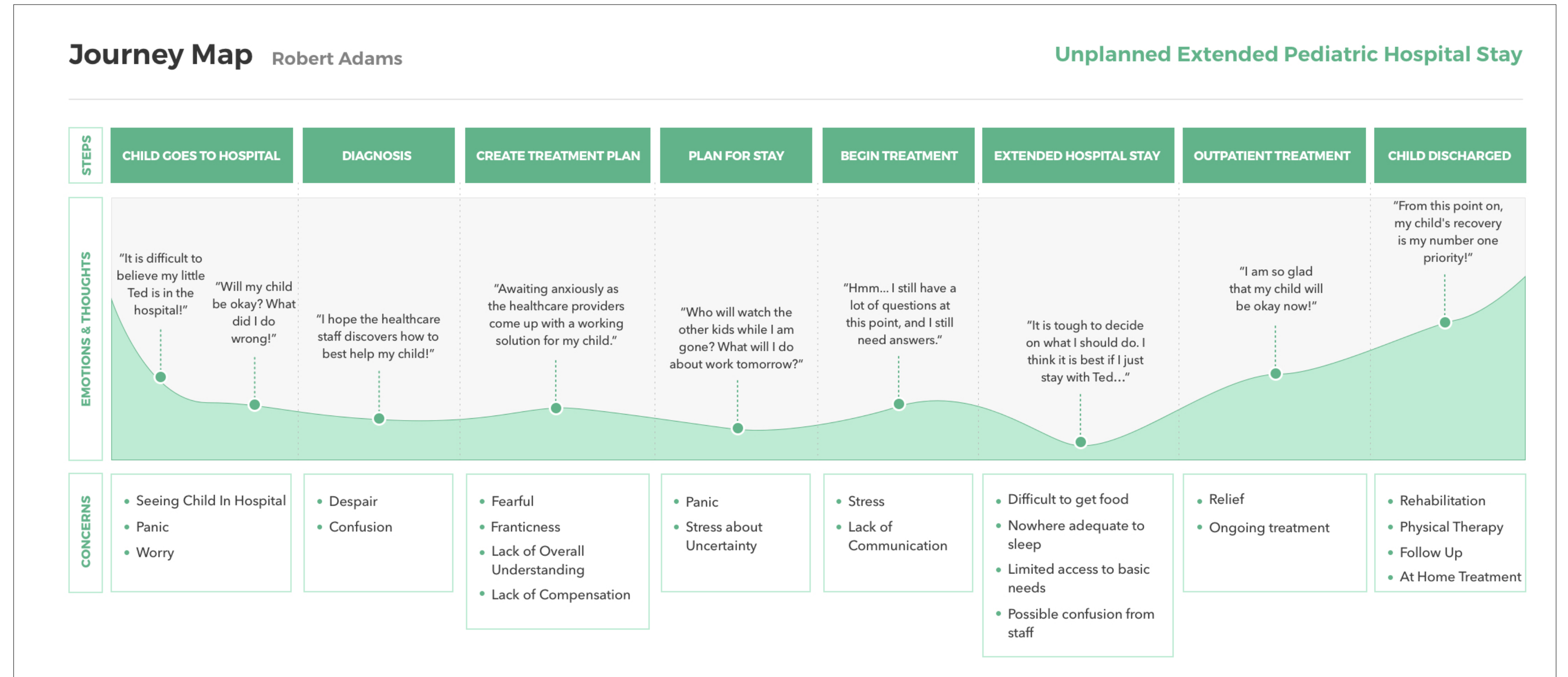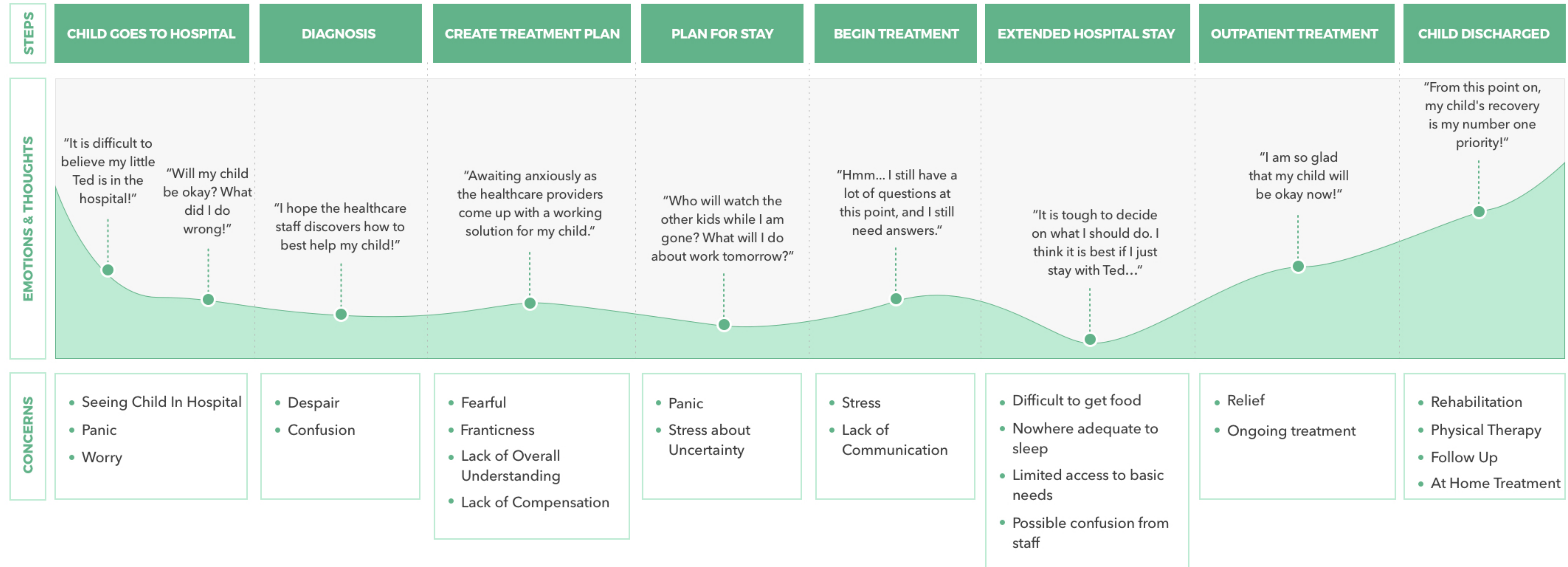
Where do our users need us to step in?

Understanding the primary pain points, I took all of the findings and created a user journey map with emotional states and annotated thoughts.

Journey Map Robert Adams

Unplanned Extended Pediatric Hospital Stay

STEPS							
CHILD GOES TO HOSPITAL	DIAGNOSIS	CREATE TREATMENT PLAN	PLAN FOR STAY	BEGIN TREATMENT	EXTENDED HOSPITAL STAY	OUTPATIENT TREATMENT	CHILD DISCHARGED

EMOTIONS & THOUGHTS

"It is difficult to believe my little Ted is in the hospital!"

"Will my child be okay? What did I do wrong!"

"I hope the healthcare staff discovers how to best help my child!"

"Awaiting anxiously as the healthcare providers come up with a working solution for my child."

"Who will watch the other kids while I am gone? What will I do about work tomorrow?"

"Hmm... I still have a lot of questions at this point, and I still need answers."

"It is tough to decide on what I should do. I think it is best if I just stay with Ted…"

"I am so glad that my child will be okay now!"

"From this point on, my child's recovery is my number one priority!"

CONCERNS

CHILD GOES TO HOSPITAL	DIAGNOSIS	CREATE TREATMENT PLAN	PLAN FOR STAY	BEGIN TREATMENT	EXTENDED HOSPITAL STAY	OUTPATIENT TREATMENT	CHILD DISCHARGED
• Seeing Child In Hospital • Panic • Worry	• Despair • Confusion	• Fearful • Franticness • Lack of Overall Understanding • Lack of Compensation	• Panic • Stress about Uncertainty	• Stress • Lack of Communication	• Difficult to get food • Nowhere adequate to sleep • Limited access to basic needs • Possible confusion from staff	• Relief • Ongoing treatment	• Rehabilitation • Physical Therapy • Follow Up • At Home Treatment

Journey Map Robert Adams

STEPS	CHILD GOES TO HOSPITAL	DIAGNOSIS	CREATE TREATMENT PLAN	PLAN FOR STAY	BEGIN TREATMENT	EXTENDED HOSPITAL STAY	OUTPATIENT TREATMENT	CHILD DISCHARGED

EMOTIONS & THOUGHTS

"It is difficult to believe my little Ted is in the hospital!"

"Will my child be okay? What did I do wrong!"

"I hope the healthcare staff discovers how to best help my child!"

"Awaiting anxiously as the healthcare providers come up with a working solution for my child."

"Who will watch the other kids while I am gone? What will I do about work tomorrow?"

"Hmm... I still have a lot of questions at this point, and I still need answers."

"It is tough to decide on what I should do. I think it is best if I just stay with Ted…"

"I am so glad that my child will be okay now!"

"From this point on, my child's recovery is my number one priority!"

CONCERNS

CHILD GOES TO HOSPITAL	DIAGNOSIS	CREATE TREATMENT PLAN	PLAN FOR STAY	BEGIN TREATMENT	EXTENDED HOSPITAL STAY	OUTPATIENT TREATMENT	CHILD DISCHARGED
• Seeing Child In Hospital • Panic • Worry	• Despair • Confusion	• Fearful • Franticness • Lack of Overall Understanding • Lack of Compensation	• Panic • Stress about Uncertainty	• Stress • Lack of Communication	• Difficult to get food • Nowhere adequate to sleep • Limited access to basic needs • Possible confusion from staff	• Relief • Ongoing treatment	• Rehabilitation • Physical Therapy • Follow Up • At Home Treatment

With a complete mental model of what our users were going through, it clearly illustrated the role that poor communication with medical staff played on the entire experience. Therefore, this problem became our primary concern to solve.

An App for Families with Hospitalized Children

Solving the problem that provides the maximum value!

Our users felt communication with hospital staff was clearly the most distressing factor besides the state of their child. Also, when parents or caregivers have children in extended hospital stays, the hospital staff often communicates conflicting or confusing information. What we realized was:

- Addressing this issue would help alleviate some tertiary problems. Our users would repeatedly forgo access to essential amenities (food, shower, sleep, etc.) because they were afraid if they left, they might miss an important update.

- With a mobile-friendly place to have access to the most up to date information, we would provide a little more freedom to these families to take care of not just their child, but themselves as well.

Cultivating empathy for our users

The process of making the empathy map was quite emotionally affective as I adopted the state of mind that one would have in such a troubling situation. At anytime I needed to remind myself of who I am designing for, I returned to the empathy map as a resource.

THINK AND FEEL?

despair of situation - worry for child - physical discomfort due to hunger - concern about getting necessities - confusion from money stress - concern for non-present family members - frustration with hospital staff

HEAR?

support from loved ones - sound of equipment explanations from staff - inconsistent treatment info from staff - child crying, nurses coming/going and child talking

SEE?

child in serious bad state - lots of hospital equipment - other patients - patients information about condition - doctors, nurses and other hospital staff - amenities available to visitors

SAY AND DO?

staying as close to the child as possible - requests for updates & info on child's condition or treatment - trying to find food - trying & struggling to sleep- finding access to amenities - expressing concerns to hospital staff - coordinating family and work arrangements

PAIN

child in a suffering state - lack of knowledge about what is wrong with child - lack of support & compassion - not eating due to lack of access to convenient food options - lack of consistency & professionalism from staff - lack of access to basic amenities

GAIN

possible access to amenities on site - proactive services and resources - clear, honest, compassionate communication from staff - support from other loved ones - parents not having to leave to get food

An App for Families with Hospitalized Children
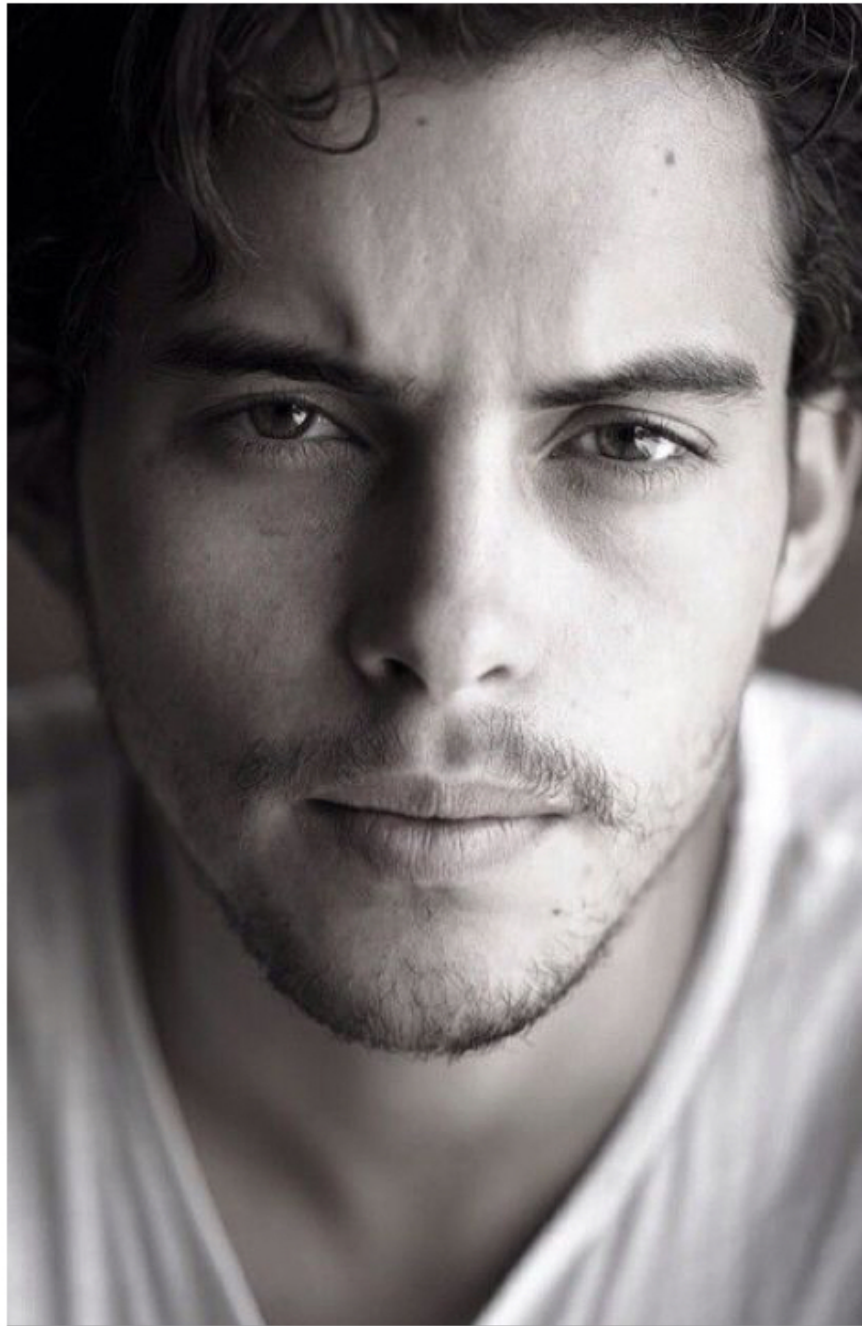
Giving a Face to our Users

To better understand the behaviors and motivations of our users, personas were created a reliable and informative representation of our users. Being able to recall this information from our users can prove to be useful in the design phase.

USER PERSONA

Robert Adams

"When I am wondering about the state of my child, I want to be communicated with clearly, frequently, and compassionately by the hospital staff so that I can have control over my child's well being and avoid adding to my own stress and emotional suffering."

GOALS

- To have an active role in decisions regarding my child's treatment.
- To have access to key information as soon as it becomes available.
- To feel like I'm paid attention to and respected.

MOTIVATIONS

- I want to be the best father to my child (to me this means sacrificing to protect my child).
- I love my son more than anything and his happiness and well-being is my first priority.

PAIN POINTS

- Lack of empathy and compassion from healthcare staff.
- Lack of communication about child's condition and treatment options and plans
- Lack of understanding of procedures and medications being administered

AGE	37
JOB TITLE	Project Manager
STATUS	Widower
LOCATION	Portland, ME

Defining the Product

Now that I understand who I am designing for and the specific problem I am going to solve, I can develop a map to determine the MVP and ultimately shape the features that would provide the most value to our users. Overall, the primary functions will be:
- The feed of information about the status of the child
- The place to access important medical records
- The ability to send questions to medical staff

Goals

Improve Communication with Healthcare Staff

Take an active role in the child's healthcare

Methods of Communication

Access of Information

MVP

Alerts & Notifications

Status Updates

Last check-in & next check-in

Q&A

Test Results

Security

2nd Release

Direct Messages

Hospital Customer Service

Timeline / Calendar

Billing Info

Google / MD Integration

Search Feature

Realtime Board
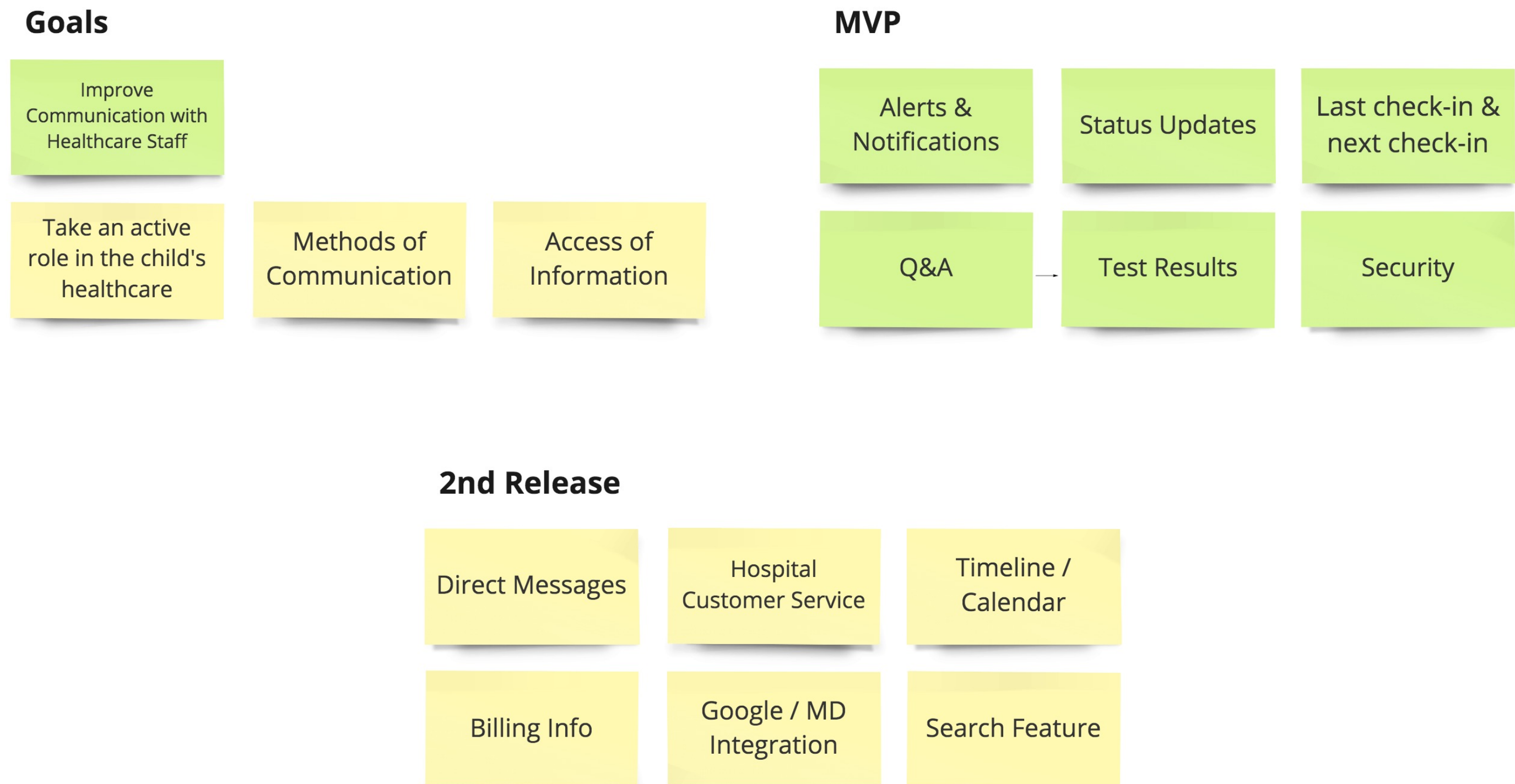
An App for Families with Hospitalized Children

01: Problem & Process

02: Research

03: Define

04: Design

05: Evaluate

06: Iterate
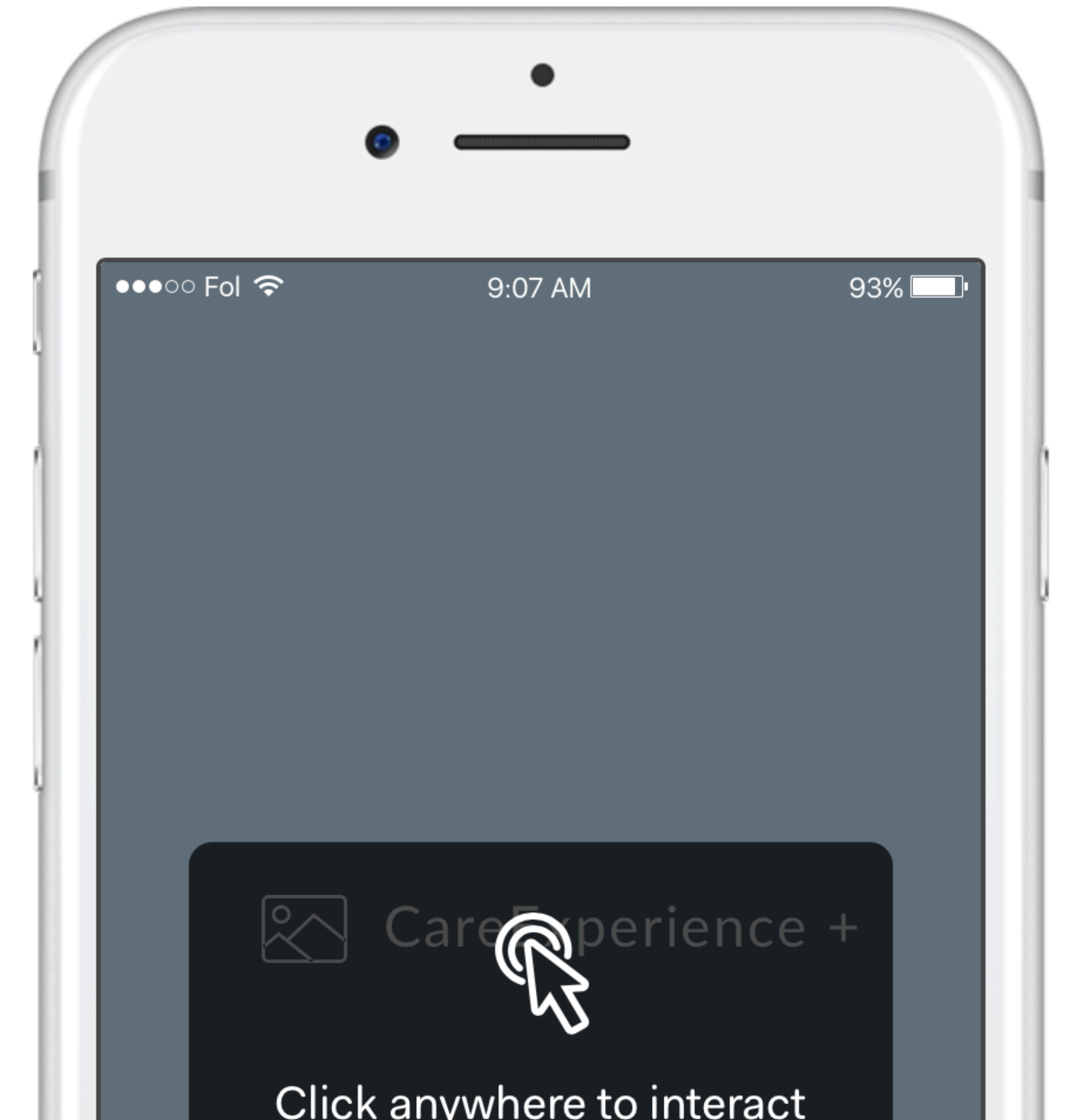
Defining the site's navigational structure

The sitemap was created to show the hierarchical structure of the app. It was used to ensure content is in places users would expect to find it.

Gathering Design Ideas through Sketches

Sketches are a great method to create as many alternatives of the layout as quickly as I could.

1 Pre-Welcome Screen 　 2 Login Screen 　 3 Sign-Up Screen 　 4 Update Screen 　 5 Menu Screen
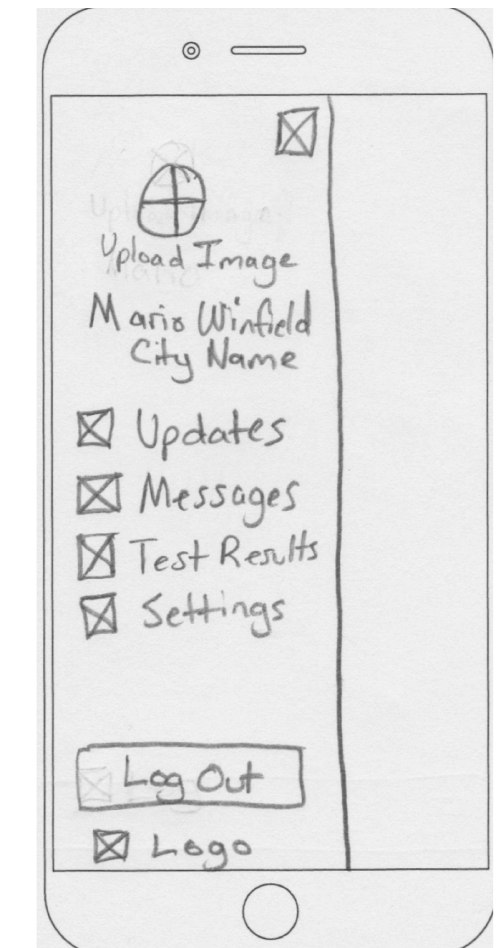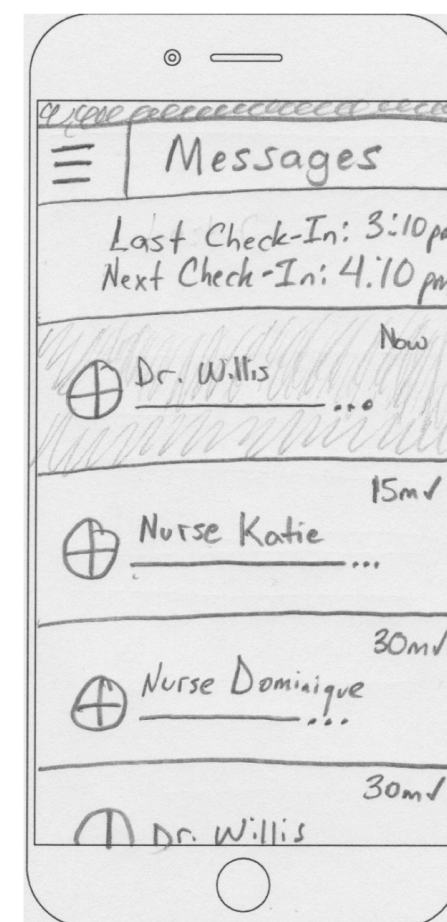
6 Messages Screen 　 7 Messages Screen (State #1 - Tapped) 　 8 Test Results Screen 　 9 Test Result Screen (State #1 - Tapped) 　 10 Settings Screen

Refining Design Ideas through Wireframes

Through this constant ideations, the strongest ideas moved from sketches to wireframes using Sketch.
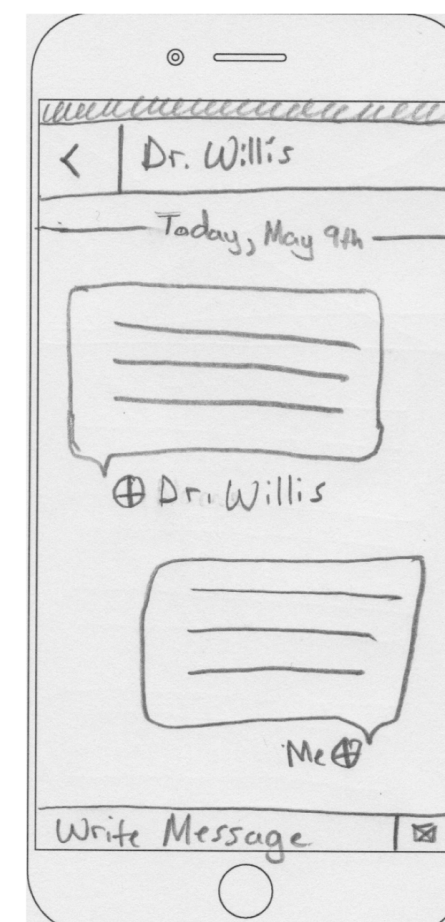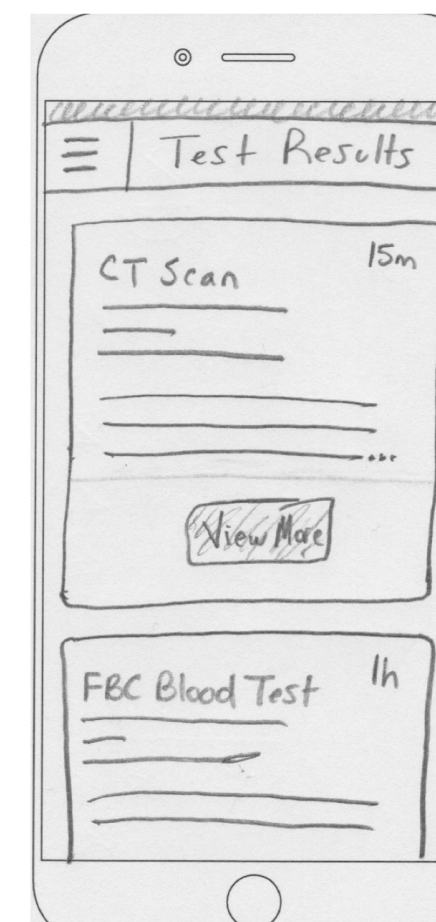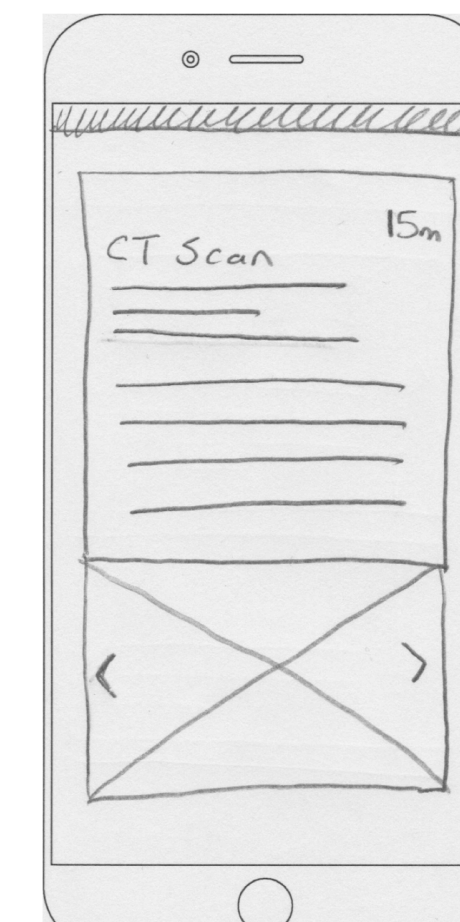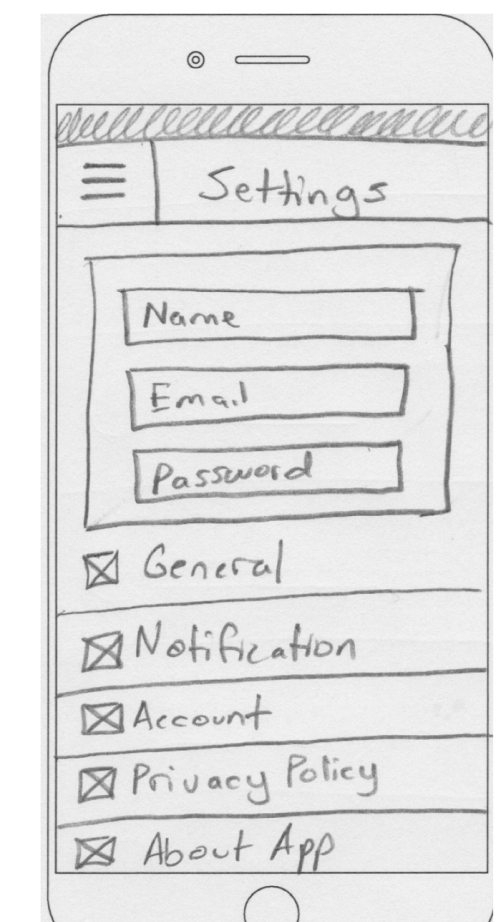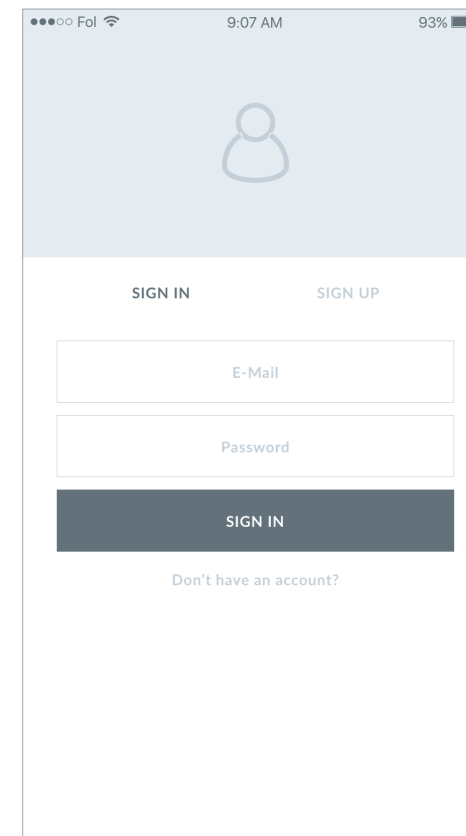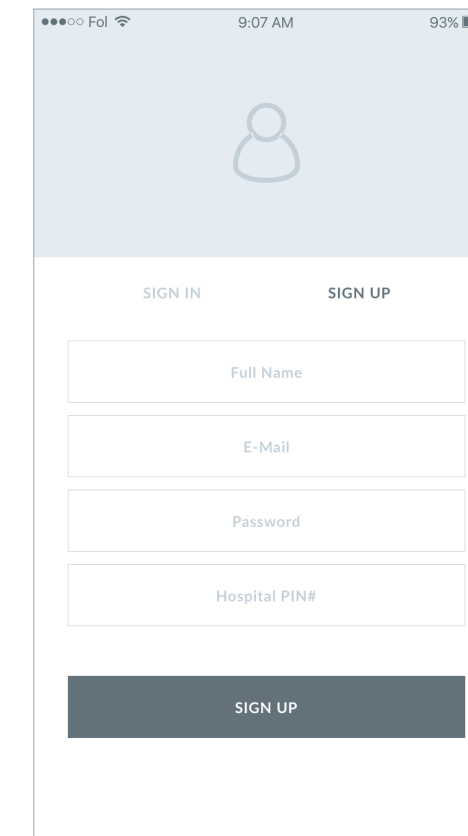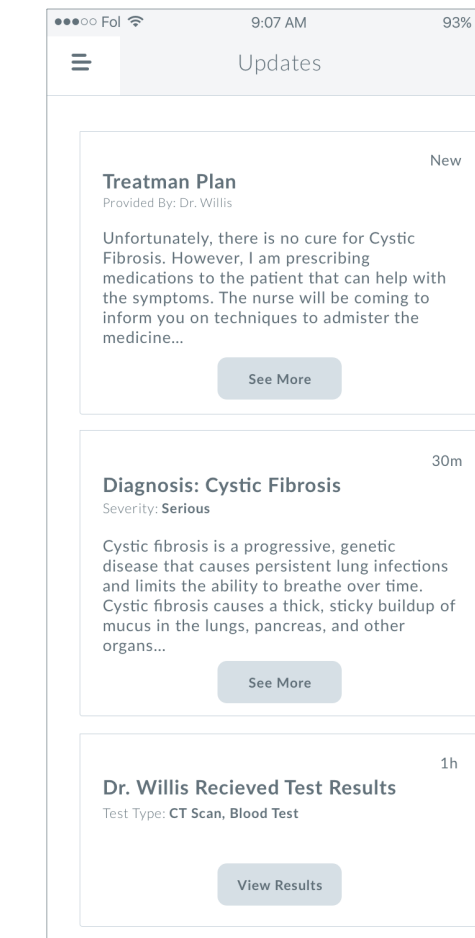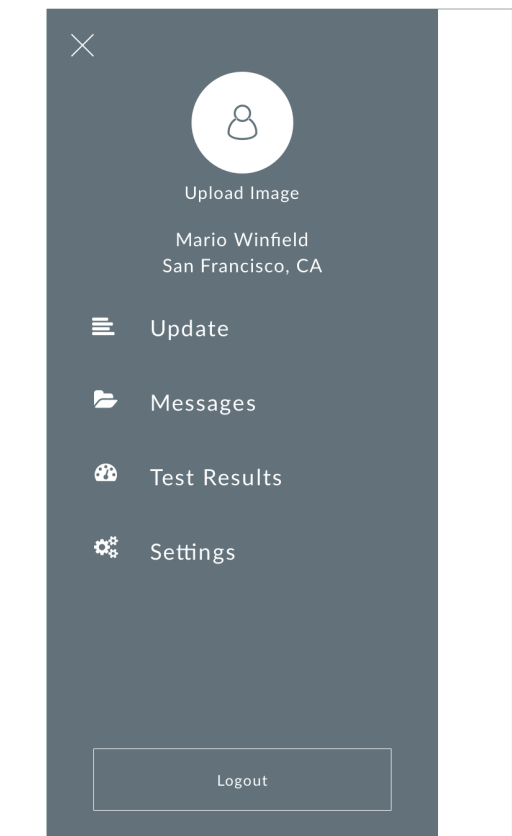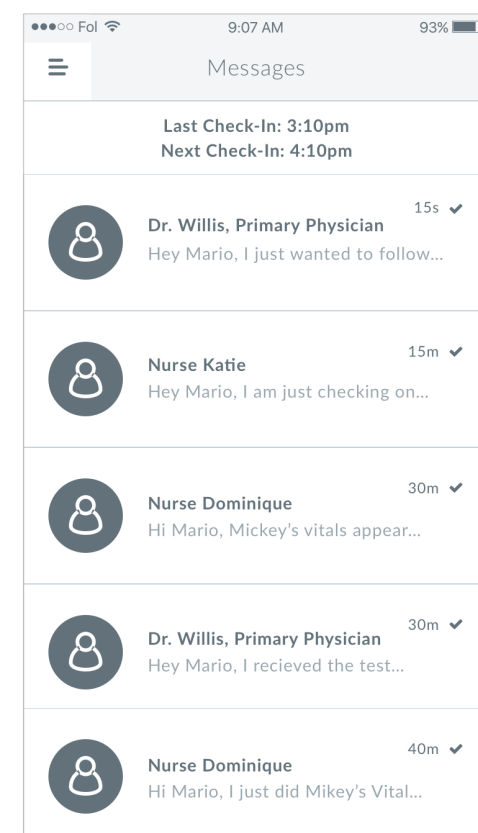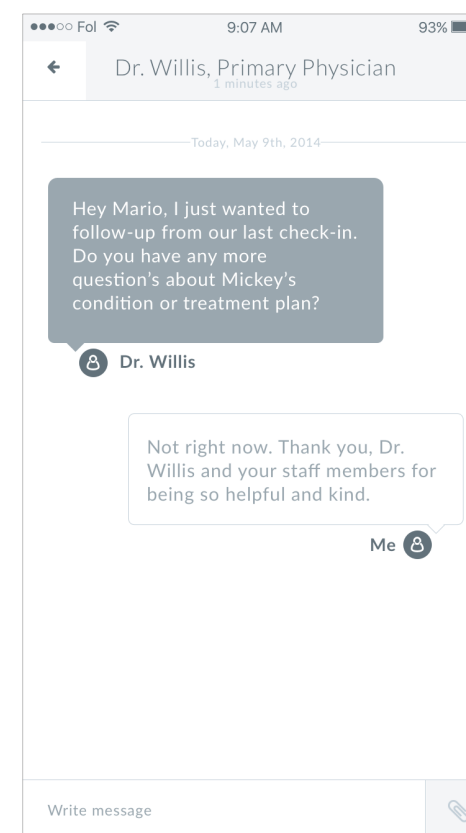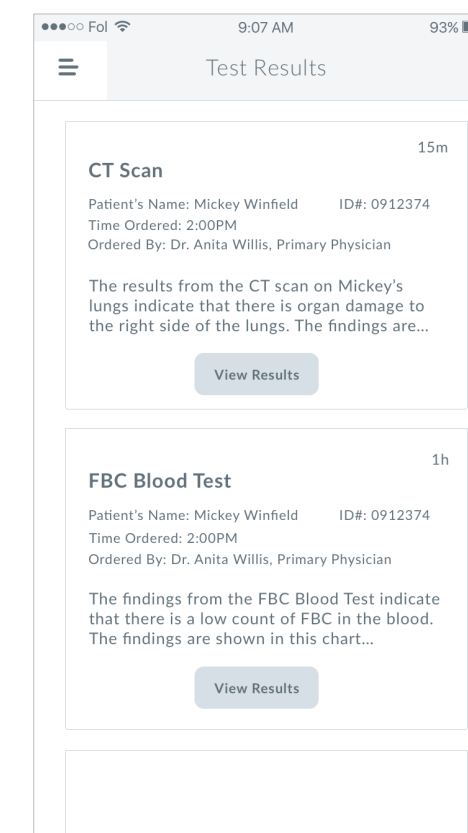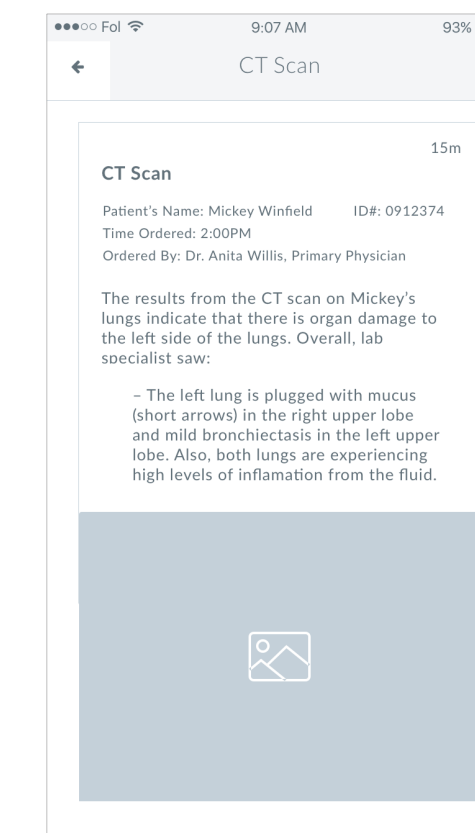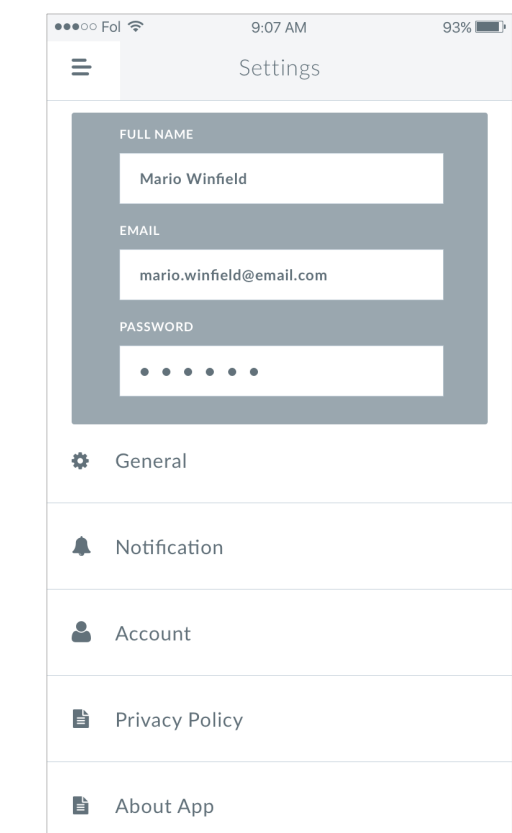
1. Pre-Welcome Screen
2. Login Screen
3. Sign-Up Screen
4. Update Screen
5. Menu Screen
6. Messages Screen
7. Messages Screen (State #1 - Tapped)
8. Test Results Screen
9. Test Result Screen (State #1 - Tapped)
10. Settings Screen

An App for Families with Hospitalized Children

www.waynehosley.com

Does the current design need any improvements?

Usability Evaluations were conducted after the design process. The results from the evaluation indicated that users found the overall app effective, efficient, and satisfactory. However, users revealed a few problems in current readability in font sizes and a small area of the site's navigation.

Active Prototype Link:
https://marvelapp.com/33ahebh

●●●○○ Fol 📶   9:07 AM   93% 🔋

Care Experience +

Click anywhere to interact

An App for Families with Hospitalized Children

Iterations into the polished design

After the usability evaluation, I iterated design changes into the next prototype. The high fidelity screens established a realistic experience to encourage useful stakeholder feedback.

Active Prototype Link:
https://marvelapp.com/3b9ajb8

CareExperience +

Click anywhere to interact
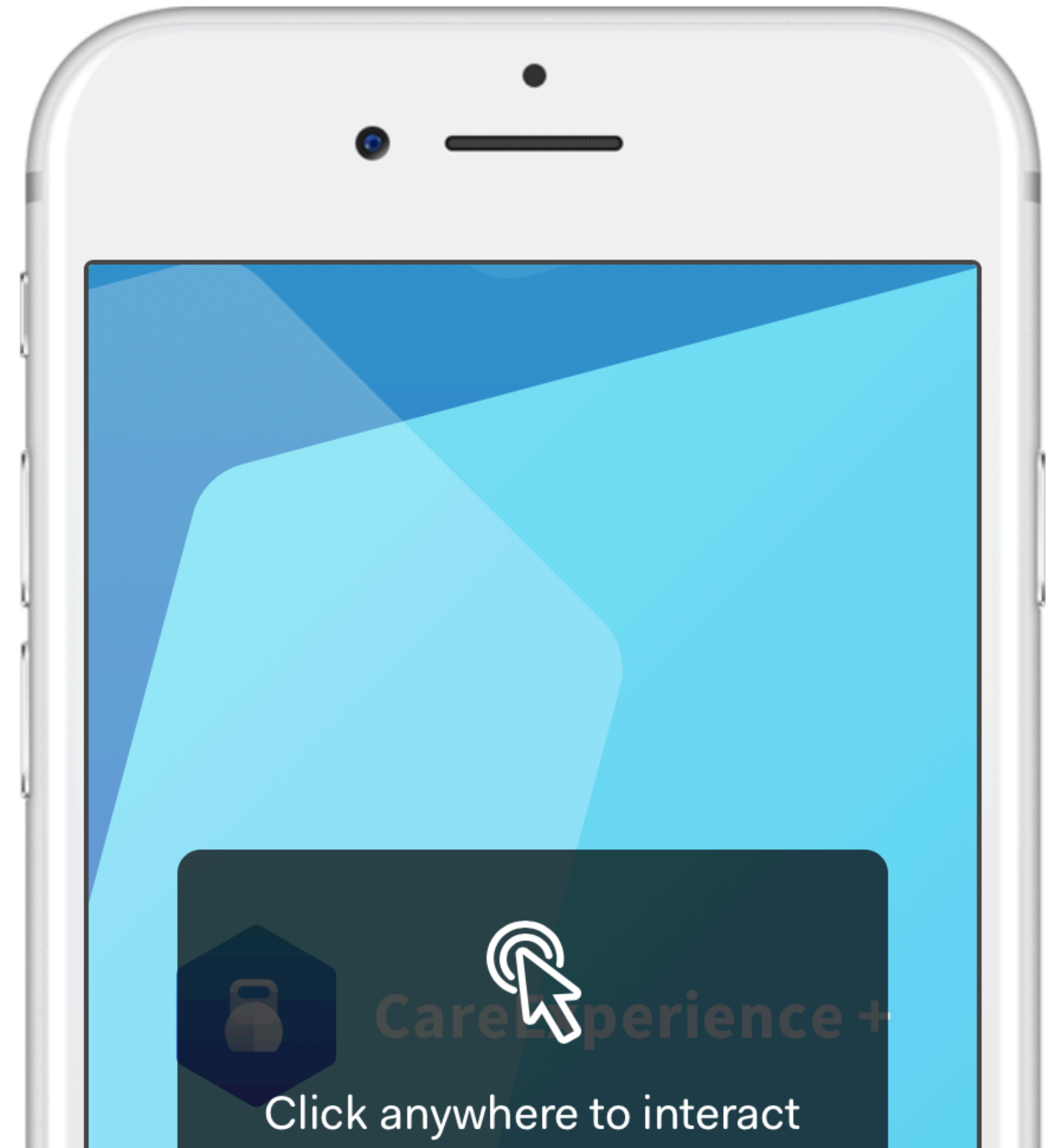
Project #4
Cognitive Rehabilitation Study for Brain Injury

Brain injuries (BI) are recognized as a major public health concern by the Centers for Disease Control. While there were multiple commercial games that therapists rated as effective for physical goals, there were very few that addressed the Speech-Language Pathologists' (SLP) cognitive-related goals.

The aim of this exploratory user research was to examine how a driving simulation game might provide Speech Language Pathologists (SLPs) with an additional evidence-based commercial game option when working with their patients who have had a brain injury (BI). Research has indicated that cognitive skills required for safe driving are aligned with top SLP goals.

Cognitive Rehabilitation For Brain Injury

Challenge

Speech-Language Pathologists' (SLP) have limited evidence-based commercial game options to address their top therapy goals. Therefore, the aim of this exploratory user research was to examine how a driving simulation game might provide Speech-Language Pathologists (SLPs) with an additional evidence-based commercial game option when working with their patients who have had a brain injury (BI).

Process

Prepare Evaluation Plan → Collect Data → Analyze Data → Report Findings
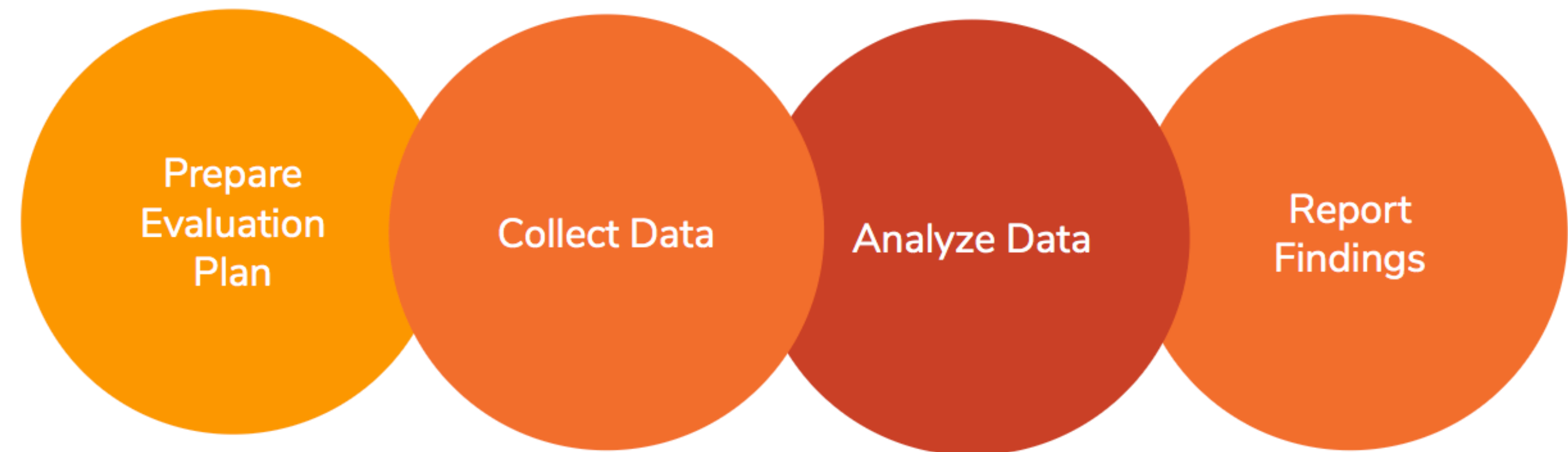
Roles & Responsibilities

- Conducted user observations.
- Kept track of all research materials and logs on participants' progress.
- Worked closely with a faculty member and other research assistants in the analysis and reporting phase of the research.

Participants and the New Focus Program

Participants considered for inclusion were identified as:

1. capable of understanding informed consent
2. having the ability to play the driving game and complete our assessments
3. expressing interest in the study
4. not having permission to drive a 'real' car during the study

Clients entered the New Focus program with varied needs and abilities. Therapists evaluated clients as they were admitted to the program and on a bi-yearly basis. This is the demographics of our seven participants including their cognitive scores:

Pseudonym	Age	Gender	Approx. time since BI at study start	Experience playing commercial video games	Experience with driving video games	Cognitive Scored 0-119**
Keri	28	F	5 years	Some experience prior to BI	Some experience prior to BI	86.6%
Harriet	23	F	4 years	Experience with Nintendo when she was younger	Some experience prior to BI	83.2%
Sidney	25	M	5 years	Current player of Sony PlayStation games	Some experience prior to BI	75.6%
Francis	29	M	15 years	Current player of Sony PlayStation games	No experience	72.3%
Quinton	38	M	2 years	Some experience prior to BI	Some experience prior to BI	71.4%
Michone	37	F	2 years	Some experience prior to BI	No experience	64.7%
Andy	30	M	13 years	Some experience prior to BI	No experience	55.4%

**The cognitive assessment scores were from May 2016 (about halfway through the study).

Data Collection Procedure

Data collection occurred between February to September. We were on site Mondays and Wednesdays during the 12:30 - 1:15 pm and 1:30 - 2:15 pm sessions.

To create an engaging driving experience, we set up two game carts with 50" televisions, racing seats that were designed for the Forza Xbox One game and racing wheels for Xbox One (by HORI) with a gas pedal.
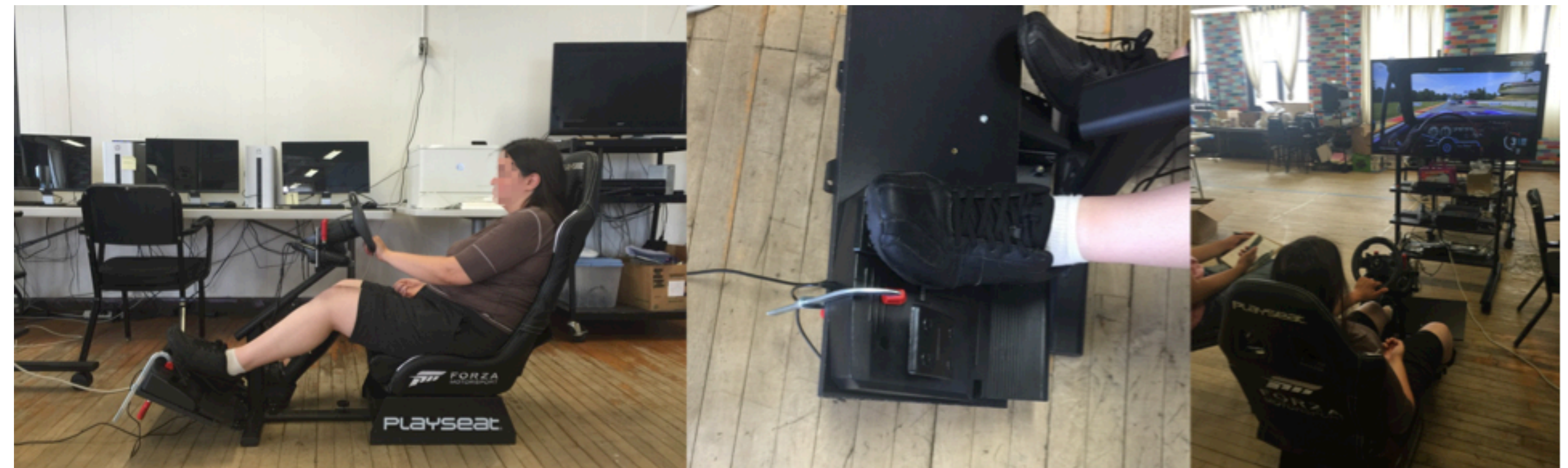
Cognitive Rehabilitation For Brain Injury

Cognitive Assessments

We used three interactive programs (in the same sequence) in the Brain Baseline app on iPad minis to assess our three dependent variables (attention/ concentration, visual working memory, and processing speed).

1. To assess processing speed, our team used the 'Speed' program. The interactive program displayed a red dot on screen for about 5-seconds at random intervals. Users could press either the left or right button with the goal of pressing the buttons as soon as they saw the red dot.
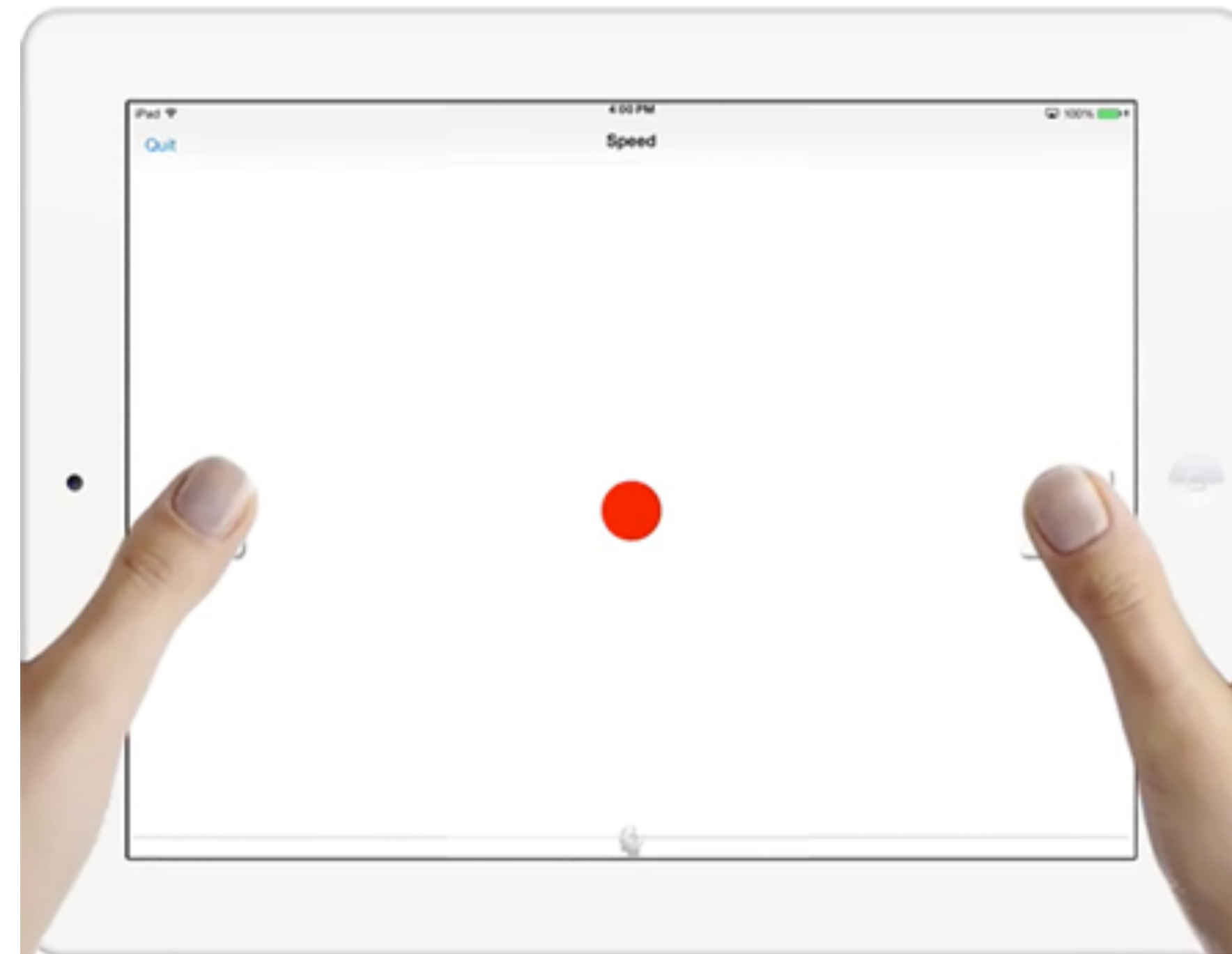
Cognitive Assessments (Cont'd)

2. To assess short-term visual memory, we used the 'Visual Short Term Memory' (VSTM) program. The program first flashed four square color blocks for about 2-seconds on screen and then displayed one color block indefinitely. The program required users to determine if one block matched any one of the four previously displayed blocks.
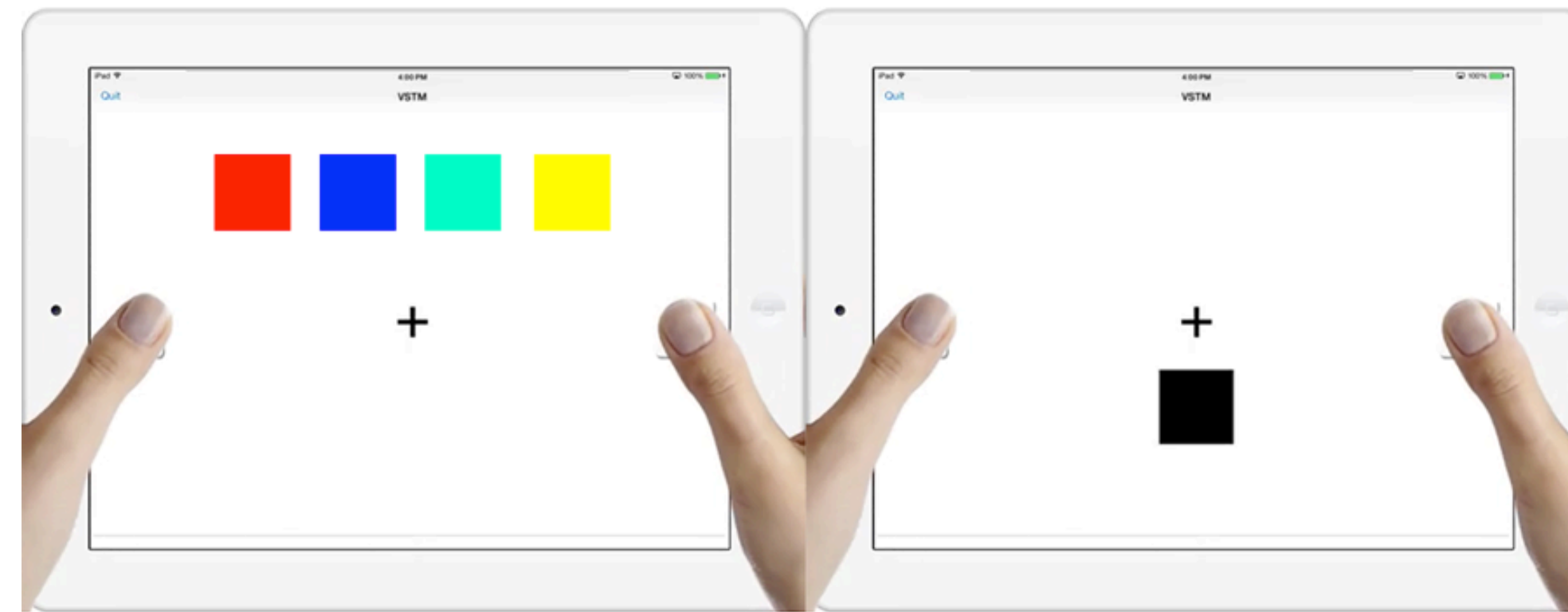
3. To assess concentration/attention, we used the Flanker program. Flanker flashed five arrows for about 2-seconds on screen and required users to identify the direction of the middle arrow.
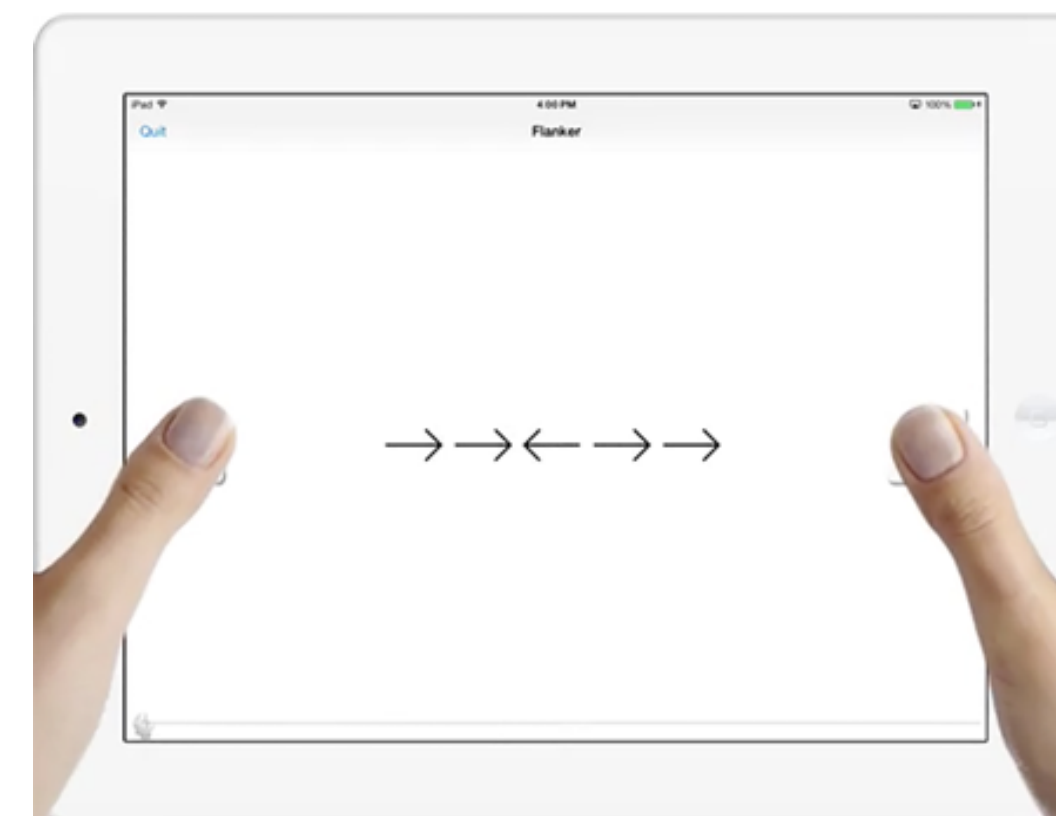
**Cognitive Rehabilitation
For Brain Injury**

Placement & Longevity

Participants were assigned into four driving cohorts. Each cohort drove for three 2-week periods with six weeks off between driving periods. We assessed the dependent variables 12 times:

   a. One week before each driving period (3 baseline assessments)
   b. On Wednesdays after a shortened driving session (6 driving assessments)
   c. In the third week after a driving session (3 post-study assessments).

Beginning with the second driving session, we also noted two subjective observations:

   1. Level of engagement (from 1-5)
   2. Level of help needed in playing the game (from 1-5).

**Cognitive Rehabilitation
For Brain Injury**

Hypotheses

We focused on 3 hypotheses.

1. We hypothesized an overall improvement in cognitive scores from the original baseline to the last post-study in the three goals; we expected that all the participants would show some improvement, in part because they would improve with increased familiarity of the cognitive assessment tasks regardless of driving.

2. We expected higher cognitive scores during the driving treatment periods compared to before or after the treatment periods

3. We hypothesized that the use of driving simulations would benefit people who were less cognitively impacted by their BI more than those who were highly impacted.

Data Analysis Procedure

While we scheduled 12 assessments, two participants missed at least one session. To compensate, we averaged the driving session assessments.

1. To test the first hypothesis (overall improvement), we conducted a Wilcoxon signed-ranked test for a non-parametric two group comparison with related samples between the original baseline and the last post-study assessment for each assessment type (speed, VTSM and attention).

2. To test the second hypothesis (peak performance during driving sessions), we created three scores for each assessment type: (1) average driving assessments combined; (2) average baseline assessments combined; and (3) average post-study assessments combined. We conducted individual Wilcoxon Signed Ranked tests to compare (a) driving to baseline assessments and (b) driving to post-study assessments.

3. To test the third hypothesis (driving will benefit people who were less cognitively impacted), we conducted a non-parametric correlation using Spearman's rho that assessed the correlations among clients' cognitive scores (as assessed by Anixter) to their overall average assessments.

The Results Of Our Research

The results from our objective measures were somewhat mixed.

1. From the first baseline assessments to the final post-study assessments, we only saw improvement in the speed processing scores, and those were not significant. We expected that just learning effects of the assessment programs alone would result in overall improvement. However, as the figure below indicates, the total baseline scores (taken one week before the three driving sessions) demonstrated higher scores than the post-study scores (taken three weeks after the three driving sessions).
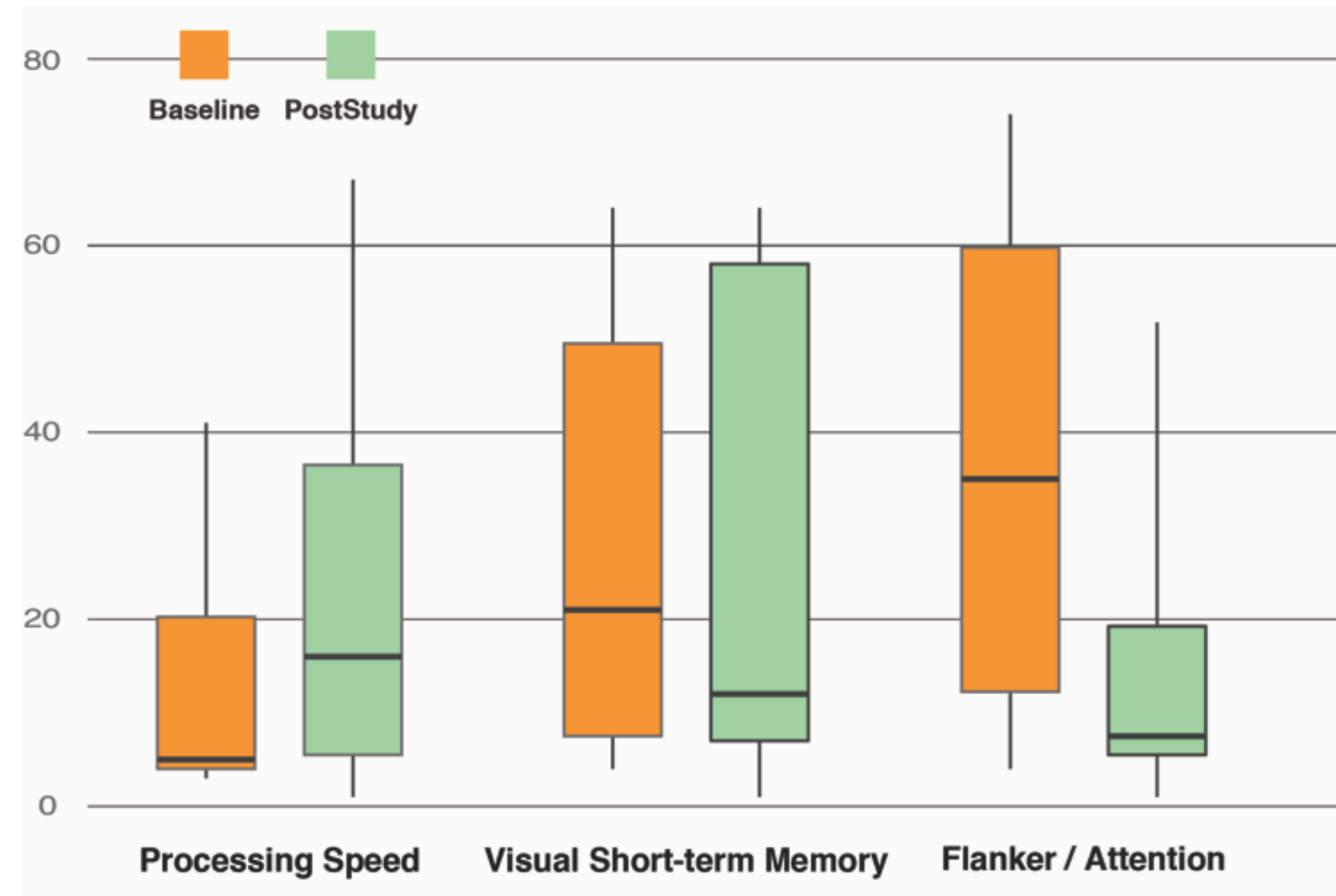
The Results Of Our Research (Cont'd)

2. Our second hypothesis, that the assessment scores would peak during driving sessions when compared to baselines and post-study, was somewhat supported for speed processing and attention. The highest assessment scores were during driving sessions, followed by post-study for both measures. However, the scores were essentially flat for visual short-term memory, see the figure below. As a result, this finding indicated that driving simulations may have benefits for improving speed processing and attention for people who have had a brain injury, but that a larger study is needed to investigate the full potential.
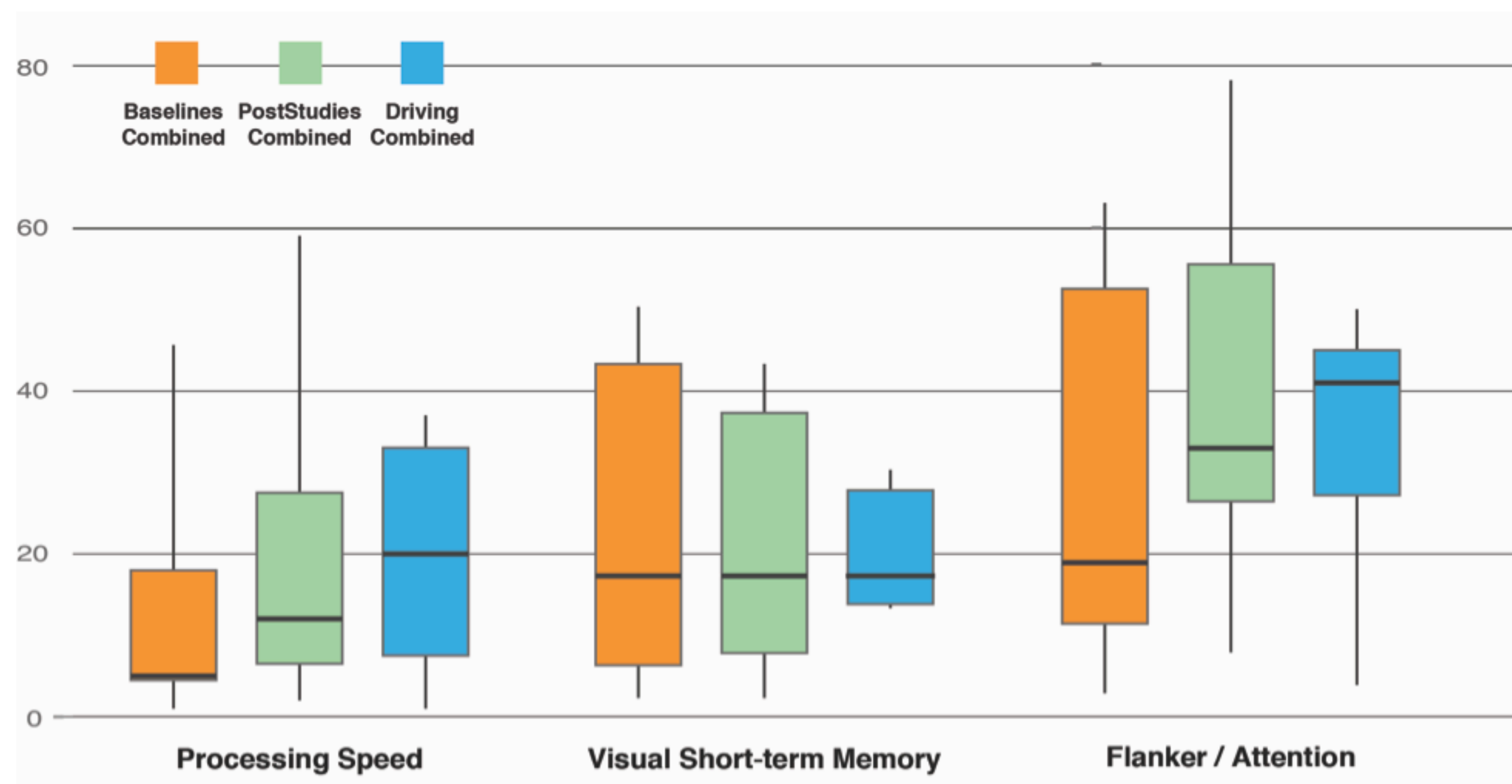
**Cognitive Rehabilitation
For Brain Injury**

The Results Of Our Research (Cont'd)

3. Finally, our last hypothesis that the clients' cognitive scores (as assessed by Anixter) would correlate with their assessment scores was not supported. This finding indicated that any potential benefits of the driving simulation on speed processing and attention do not appear to be related to overall cognitive functioning.

How Could We Make This Research Study Better?

Overall, our findings were promising but somewhat disappointing. Our small sample size limited the strength of our findings; i.e., our initial power analysis found that for a medium effect size of .28, and collecting assessments at 12 intervals that we would need a sample size of 15 to use repeated measures ANOVA for each assessment (p<.05 assumed). Unfortunately, we could not recruit enough people from the clientele at the Anixter Center.

Moving forward, we suggest several modifications to reproduce this study:

1. Use alternative instruments for assessing the dependent measurements. The Brain Baseline app had limitations that included: (1) some participants had difficulty holding the iPad and using their thumbs due to partial hand paralysis; and (2) participants became bored with the Brain Baseline apps over the 12 assessments.

2. Use a control group that is not driving. While we did not see any significant learning effects as reflected by the original baseline and final post-study scores, a closely matched control group who took the assessments without driving would have been a good addition to the study. However, a matched control group is always a challenge in such a diverse audience.

Recognition

Accepted into the ACMSIGCHI Annual Symposium on Computer–Human Interaction in PLAY (CHI PLAY) 2017

- CHI PLAY is an international and interdisciplinary conference (by ACM SIGCHI) for researchers and professionals across all areas of play, games and human-computer interaction (HCI). This area is known as "player-computer interaction."

Cognitive Rehabilitation Potential of a Driving Simulation Game for Brain Injury: A Pilot Study

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Abstract
The aim of this exploratory work was to examine how a driving simulation game might provide Speech Language Pathologists (SLPs) with an additional evidence-based commercial game option when working with their patients who have had a brain injury (BI). Research has indicated that cognitive skills required for safe driving are aligned with top SLP goals. Seven participants who had a BI played Xbox One 'Forza Motorsport 6' driving simulation game for three 2-week periods with six weeks off between driving periods (18 weeks total). Participants enjoyed the driving sessions and did not find the game difficult. We found a marked (but not statistically significant) improvement in two of the top SLP goals, (1) attention/concentration and (2) processing speed, during the periods that the participants were driving. However, participants did not demonstrate overall improvement in any of the top SLP goals we examined over the 18-week study. In future work, we plan to perform a similar study with a larger sample size and improved experimental design to strengthen the reliability and validity of our findings.

Author Keywords
Games; brain injury; rehabilitation; cognitive goals, speech-language pathologist.

Thank You For Your Time

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