

Telamedic - A Telehealth Platform

Sugandh S. Bagaria, Manideep Chinthireddy,
Aditya Deshmukh, Kate Livesey, Lilit Sargsyan

Executive Summary

In the context of the current COVID-19 situation, telemedicine has become a popular digital tool for providing the necessary care to patients while keeping them and doctors safe. Furthermore, telehealth platforms are real time-savers for both patients and doctors, as they allow both groups of stakeholders to access and provide medical services respectively at their own convenience, while also ensuring quality patient-doctor interactions and accelerating related administrative services such as collecting data on a patient's condition prior to the initial patient intake, sharing medical forms, maintaining visit records, issuing prescriptions, other related documentation as well as executing payments, placing insurance claims, etc.

To provide users with the promised flexibility, the design of the telehealth platform should be kept simple and functional at the same time for easy and quick use. In this regard, one of the first steps to be undertaken is the task analysis from the perspectives of the two groups of users: patients and doctors. In the light of the above-mentioned the following basic functions have been selected for task analysis: sign up, scheduling appointments, waiting room, pre-screening patients, and finally online visits with patients.

Due to the lack of possibility to conduct a contextual inquiry with doctors and patients to directly observe them using telemedicine services, we conducted our task analysis by retrospectively analysing video recordings, namely online demo videos and tutorials from different telehealth platforms. Our ultimate goal is to match the design of our prospective platform with user needs and capabilities.

Scope of the Analysis

Upon initial research, we have chosen to analyse the following five tasks that are common throughout many telemedicine applications:

1. signing up for the telemedicine application and registering the team from the doctor's perspective;
2. scheduling appointments from the doctor's and patient's perspective;
3. set-up and management of the virtual waiting room;
4. collection of pre-screening information by the doctor;
5. online visits, during which the doctor diagnoses, issues prescriptions, and refers patients to other specialists, if necessary.

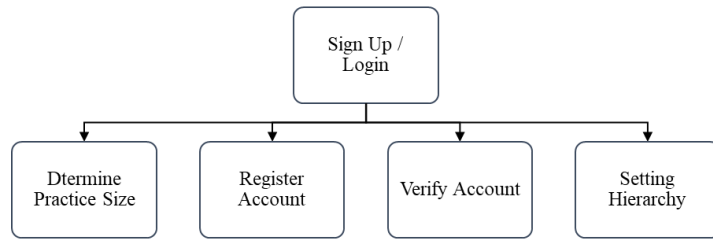
Task 1 - Sign Up

Signing up allows doctors to create accounts with the application. By doing this, the doctor is then able to access patient records, schedule appointments, host meetings, follow up with previous patients, and have all other functions and features of the application. The main goal for this task is to register the doctor quickly and correctly and be able to have the entire practice registered as well.

1. *Determine the practice size* Before beginning to register themselves, the doctor must determine how many participants of the practice will be active on the telemedicine application.

Upon launch of the application, the doctor is asked how many accounts they need, and the number is chosen by clicking on the correct range.

2. *Register Account* After determining the correct number of accounts that are needed, the doctor is then to register their own account. They input their name, the practice name, and their email, along with any other credentials into the input fields. The software will then prompt the doctor to verify their account before allowing access.



3. *Verify Account* Upon submitting their information, the doctor will receive an email with a link to verify their account for set up. By clicking on this link, the application knows that the account is valid and is then able to allow the doctor full access to the database and meetings.

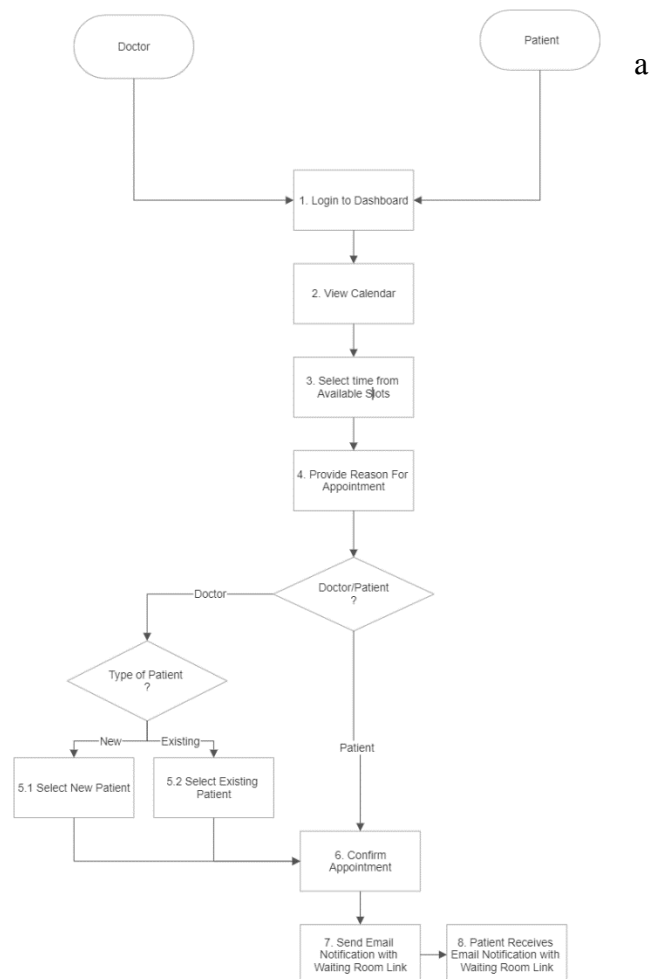
4. *Establish practice hierarchy* As more accounts become registered to the practice, the system will then ask to

establish a practice hierarchy, allowing doctors full access to patient records, as well as medical billers and receptionists, to see only the information required for their job.

Task 2 - Scheduling Appointments

Scheduling online appointments is pivotal to successful doctor's practice. It also eliminates wasted time and increases offices' efficiency. In this task, a doctor can plan what his schedule will be for the entire week/month in advance. The patient on the other side can reserve a non-conflicting appointment comfortable to his schedule. This task ensures the maximum use of time for both the patient and the doctor.

1. *Log into dashboard* The doctor logs into his dashboard when s/he receives a request from a patient. The doctor has access to most of the features here. The doctor can see his schedule and appointments. S/he can also write and reply to messages received from patients. S/he can write prescriptions and other relevant information. The patient can see his information on the patient portal. S/he can also see his/her appointments, the doctor's availability and schedule



appointments. S/he can also access his/her medical records provided by the doctor and send messages if required.

2. *View Calendar* In the calendar view, the doctor can see his past and future scheduled appointments with time. S/he can add a note, schedule, and cancel an appointment.

Figure 2: HTA for Task-2

The patient can access the calendar of the available doctors with time slots. S/he can pick a time slot of preferred time that is available to book an appointment with the doctor. The calendar also displays the past appointments and upcoming appointments of the patient with the designated doctor.

3. *Selecting time from available slots* The physician can book appointments from the slots s/he is working and available. S/he can have multiple patients on one day but with no similar time. The patient can book a doctor from the available times from the list of doctors. A patient can have multiple appointments in a day but with different doctors and at different times.

4. *Provide reason for appointment* Both patients and doctors can add reasons for the appointment as needed.

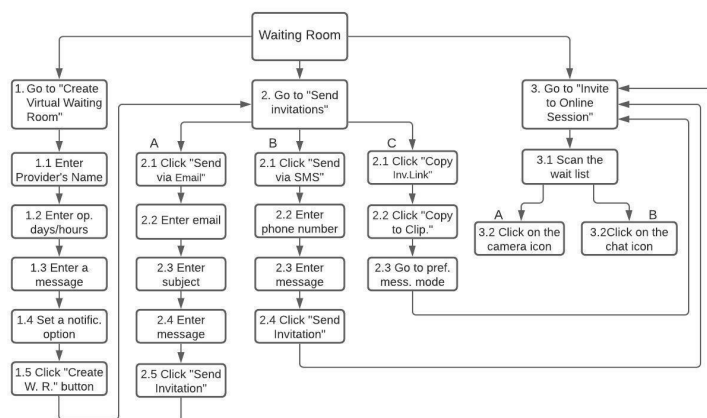
5. *Type of patient* The doctor has an option of choosing from a new and existing patient. The doctor has the ability to create a new patient. S/he can input basic information about the patient. The doctor can also select an existing patient from the drop-down menu. S/he will save time by not inputting details manually.

6. *Confirm appointment* The doctor and the patient can confirm appointments from this section. Both will make sure it has the details of the confirmed appointment.

7. *Send email notification with Waiting Room link* The task sends an email to the patient with the appointment details. It also has a link to join the waiting room of the doctor for the upcoming appointment.

Task 3- Waiting Room

The analysis of the existing websites and observation of real users interacting with them has enabled us to identify the following three major tasks under the general “Waiting Room” function: 1. creating the waiting room, 2. sending the patient an invitation to the waiting room, 3. inviting the patient in to join the online session. Each of these tasks is further decomposed into smaller subtasks.



1. *Creating the Waiting Room* Once signed up, the doctor proceeds to create his/her virtual Waiting Room. This subtask consists of the following lower-level subtasks: clicking on the “Create My Waiting Room” button, entering the doctor’s name in the relevant field, setting up the doctor’s operating days and hours either manually or choosing

from a dropdown menu, entering in the relevant field a custom message for times not available for patient visits (optional) and clicking on the relevant radio button to set an SMS notification option (Yes/No). Afterward, the doctor clicks on the “Create my waiting room” button. Next, the doctor can proceed to send invitations.

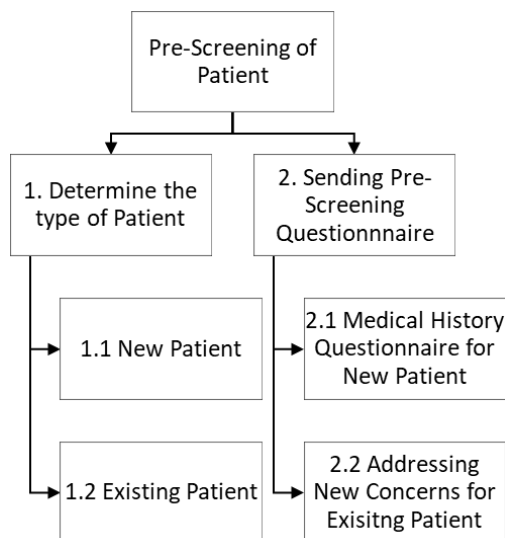
2. *Sending invitations* To send an invitation, the doctor goes to the dashboard, clicks on the “Invite patient” button, after which s/he is presented with three options: Send via Email, b) Send via SMS, c) Copy the Invitation Link. The next step is to click on the appropriate option. If the doctor chooses to send the invitation via email, s/he needs to complete the following actions: enter the patient’s email in the relevant field either manually or choosing from a dropdown menu (for previously registered patients), enter the email subject (optional) in the relevant field, then enter the email body including a custom message and the date and time of the online visit, after which s/he clicks the “Send invitation” button. If the doctor clicks the “Send the invitation via SMS” button, the subsequent actions are to enter the patient’s phone number either manually or choosing from a dropdown menu (for previously registered patients), entering a custom message and the date and time of the online visit in the field below, after which the doctor clicks the “Send invitation” button. If the doctor chooses “Copy the Invitation Link”, s/he clicks the “Copy to Clipboard” button, after which s/he can go to a preferred mode of messaging system to share the link with the patient.

3. *Inviting the patient to join the online session* To let the waiting patients join the online session, the doctor goes to the dashboard, where s/he can see the waiting patients’ data in the “Currently in the Waiting Room” section. The doctor looks through the patients’ dedicated sections, where s/he can see each patient’s name, condition, and wait time. Next, the doctor clicks on the camera icon in the patient’s dedicated section to let the patient join the session. Another course of action the doctor can take instead of inviting to join the online session is to click on the text chat icon near the camera icon to communicate with the patient via texting.

Task 4 - Pre-screening of Patients

The pre-screening of a patient is a significant process as doctors should know about the medical history of the patient before meeting the patient. The task of doing the pre-screening can be broken down into two sub-tasks. First, identifying the type of patient, and second, sending the pre-screening questionnaire. Before sending the pre-screening questionnaire, the doctor must have added the questionnaire to the system. The analysis of the task will allow us to gather data

about how doctors request the pre-screening information from patients. The analysis will give us an idea of how to design the function in the app so that it can be more convenient for both doctors and patients.



1. *Determining the type of patient* is an important task before sending the questionnaire. The two types of patients are new patients and existing patients.

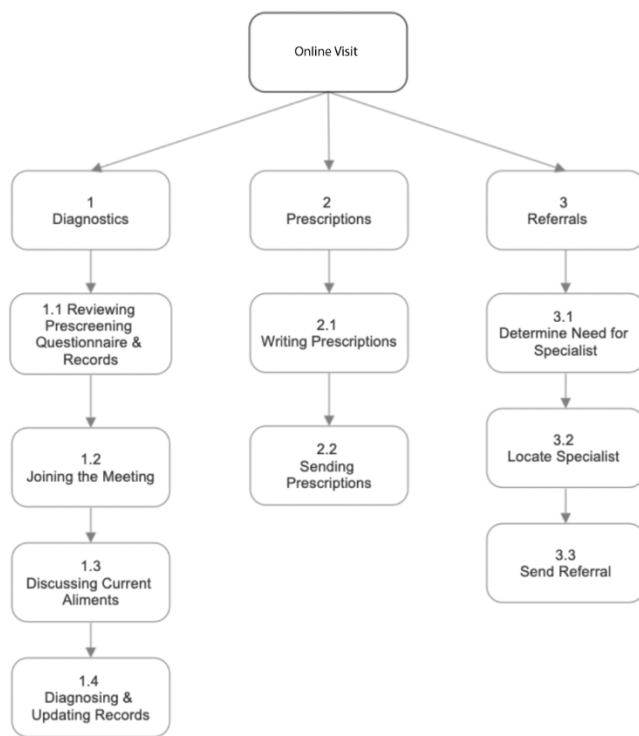
This will determine if pre-screening is required for the patient and what questions to be asked in the questionnaire.

2. *Sending the pre-screening Questionnaire*

The doctor will send a link or form of the pre-screening questionnaire through email once an appointment is confirmed with the patient. If the patient is new, then the doctor will send a full questionnaire to know the medical history of the patient. But if it's an existing patient coming for new concerns then the doctor will have the medical history, so the doctor will send relevant pre-screening questions to the patient through email.

Task 5 – Online Visit

The primary function of the fifth task, Online Visit, is to allow doctors and patients to meet virtually face to face, enabling the doctor to help the patient with their current ailments and needs. This primary function can be broken down into three main goals, 1. diagnosing a patient, 2. writing prescriptions, and 3. sending referrals, along with their subtasks.



The analysis of this task allows us to gather information about how patients and doctors meet, and how to design a meeting room that allows for the simplicity of getting the patient's needs taken care of as soon as possible.

1. *Looking over Pre-Screening questionnaires and patient records* Prior to joining the meeting, the doctor is given access to the patient's records along with the pre-screening questionnaire, allowing them to get an understanding as to why they are meeting with the patient. The doctor is able to make and edit notes as needed during this time. During the predetermined meeting time, the doctor clicks on the meeting button to allow the patient to join the call. When both parties are ready and available, they are brought into a video chat meeting where they are able to see each other. After joining the

call, the patient is able to discuss their current ailments with the doctor. The doctor is then able to get a deeper understanding as to why they are meeting and how they can help the patient. Using video, voice, and current notes, the doctor is able to get a full understanding of the current alignment of the patient. After concluding by listening to the patient's current needs, the doctor is then able to make a diagnosis and update the patient's current records with the diagnosis as well as the course of action needed by clicking on the patient's name that brings up their chart.

2. *Writing prescriptions* Upon diagnosing the patient, the doctor is able to write prescriptions for the patient by clicking on the appropriate icon. This will take the doctor to a secure pop-out screen allowing them to write the needed prescription for the patient. The doctor is then able to ask the patient where they would like to send the prescription for pick up by choosing from a drop-down list of nearby pharmacies. If the patient’s chosen pharmacy does not show up on the drop-down list, the doctor is able to enter it manually as well. After the address is confirmed to be correct, the doctor presses send to send the prescription to the pharmacy. The patient will receive a notification that the prescription has been sent.

3. *Determine need for specialist* In the case that the doctor is not skilled in a particular area that the patient requires assistance in, or that the diagnosis requires a specialist the physician is able to write a referral for the patient by clicking on the referral button. The referral screen will bring up multiple options, such as choosing a specialty and determining the location of the patients willing to travel as well as if their insurance is taken at the specialist. Once a specialist has been found, the doctor will send over a referral by clicking on the send referral button at the bottom of the search screen. The patient will receive a notification that a referral has been sent.

Attribution Table

Attributes of Task	Existing Design	Probable Solutions
Task 1 Login/Signup	Doctors/patients will login with username and password	They can skip this step by either entering their mobile number or Face ID or Touch ID.
Task 2 Scheduling Appointments	Patients can cancel the appointment from the calendar.	The patient is not allowed to cancel at the last moment.
Task 3 Waiting Room	a) There is no limit for the patient waiting time in the current design. b) There is no option for inviting external stakeholders not signed up in the system such as translators, patients’ accompanying relatives, etc. via a separate link prior to the online session.	a) A notification/reminder should be sent to the doctor about the next scheduled patient’s waiting time. b) Introduce an option for inviting external guests via a separate link prior to the online session.
Task 4 Pre-Screening Questions	No reminder to fill out the pre-screening questionnaire.	Sending a reminder to fill the pre-screening questionnaire 24 hours prior to appointment.
Task 5 Joining the meeting	Patients currently need to have multiple visits with doctors in order to see specialists.	Allowing doctors to send referrals directly from the meeting room, allowing

		patients quicker access to specialists.
--	--	---

Brainstorming

Brainstorming was one of the techniques that we used to develop some ideas and also curate the ideas we have got from each of us as a team. During our research, we have focused on the current existing platforms on what they do not have or what best can be done, or how this application can be pushed further to enhance the user experience. Each of the individuals was given some time to write what is missing in the platforms, what can be done better in those. This way, we came up with several suggestions and ideas to improve the product. While most products have the desired features, they are missing some features, such as patients waiting in the waiting room and not knowing how much time should wait, they cannot allow the family members/other people within the call so that they can speak to the doctor, missing questionnaire reminders, etc.

Prototype- *Tele-a-medic* Application

In this report, we have focussed on designing the prototype for the telehealth care application, with all the features that this application enables us to meet the doctor virtually, get prescriptions, perform payments in a better way that is reliable to all the users in remote areas as well, thus we have called it as “Tele-a-medic”.

Each of the five functions that we have discussed have two phases, one is patient side and other is doctor side. In each function below, we have discussed the design principles, the functionalities each of them offer by breaking them into smaller tasks. After several brainstorming sessions, we have ensured that a perfect colour palette has been chosen with the mood that colour sets so that the patient seems to feel peaceful and calm while using the application. Each of the colour, icons and font will have their pleasantness while using the application and it is consistent across the complete application both from doctor’s and patient’s side. Discussing each of the functions individually below.

Function 1: Signup/Login

We analyzed the first task in the application to be signup/login, which includes both from the doctor and patient sides. Coming to the doctor’s side, if the doctor is already part of the application, then he/she would log in to the application to view his appointments/messages/other details. Else, he/she would register his details (*Image 1.1*) such as Name, practice name, role at the practice, etc. On the patient side, we followed the same procedure as that to log in, in case if the patient is registering for the first time, then the patient should enter the basic details (*Image 1.2*) such as Name, phone email, and also Insurance Name and provider.

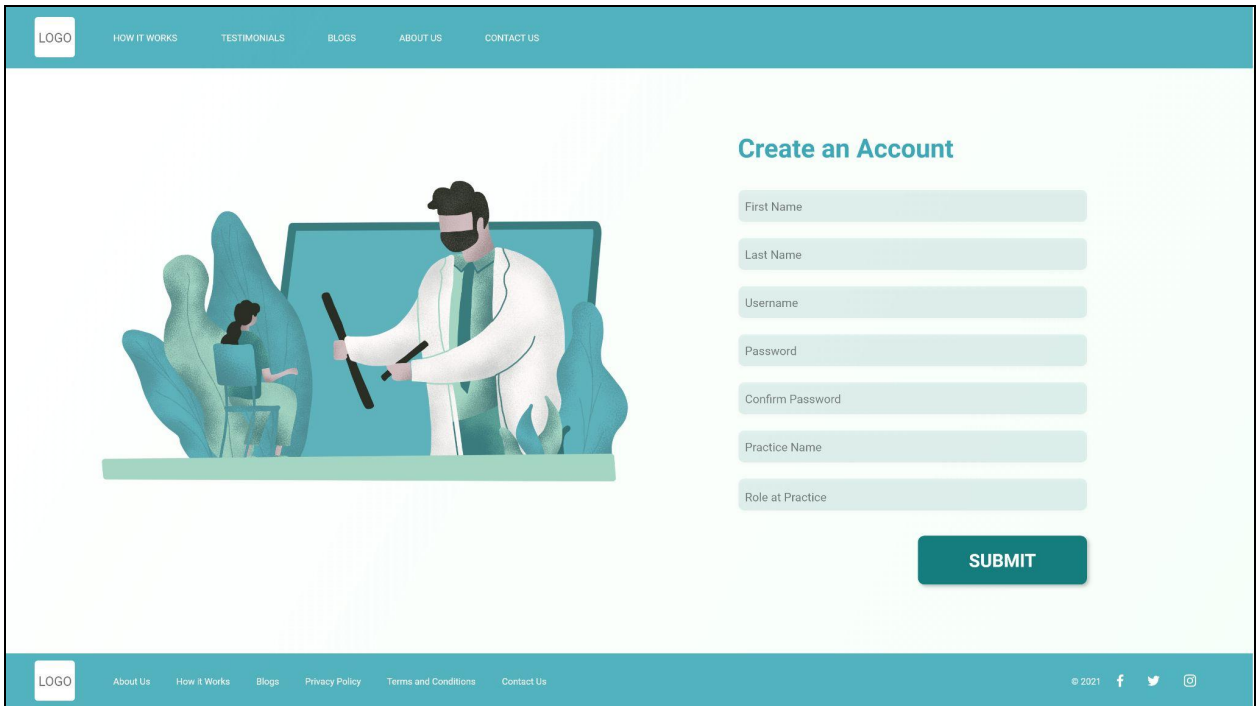


Image 1.1: Doctor Signup page

The primary task that we focussed on, in this telehealth application is “Login/Signup”. This step allows the doctors to login into the doctor’s portal and patients to move into the patient's portal. While entering the details, we have used the input boxes to collect the data. These buttons are well known to all the current users because of their usage in wide platforms, social media accounts, etc., making them satisfy the design principle, knowledge of the world. We also have a submit button with a different color, which makes it unique across the page to ensure that the user clicks it to submit all the fields data.

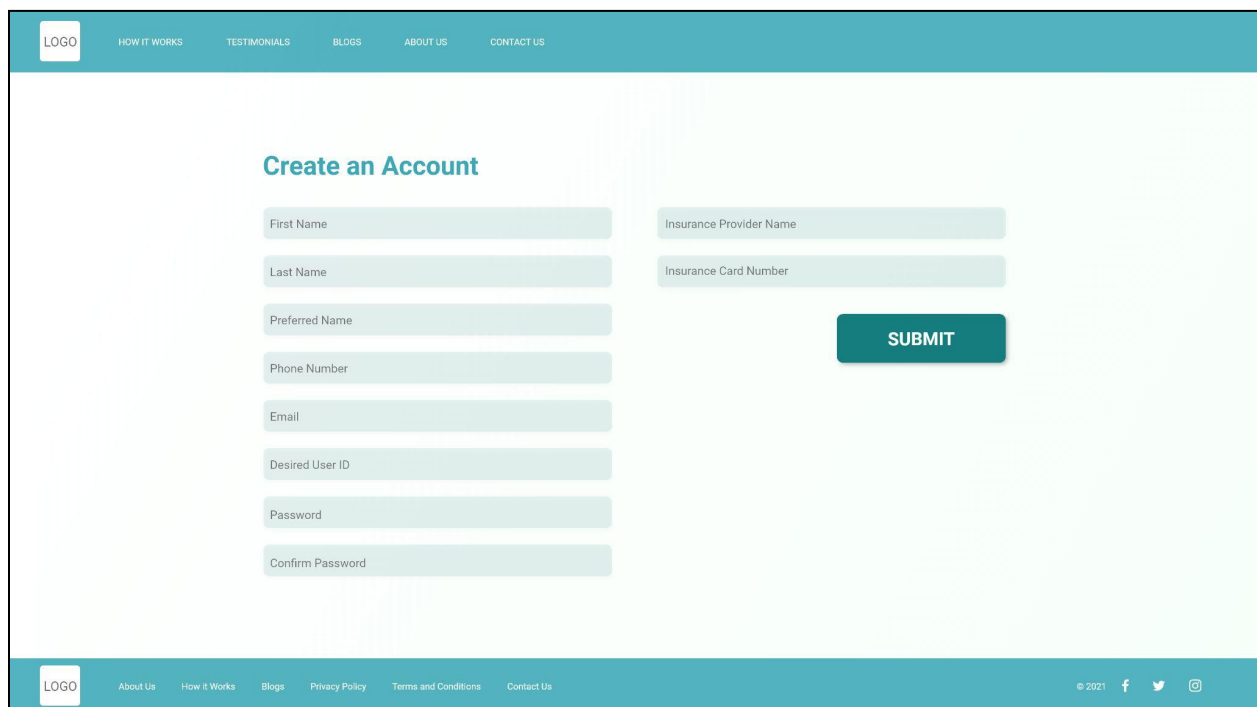


Image 1.2: Patient Signup Page

Function 2: Scheduling Appointments

Simplified scheduling saves time. The platforms we analyzed did not have scheduling features at the doctor's side. We incorporated this feature in our application where a doctor can also schedule an appointment when he receives a request from the patient. The doctor can schedule the appointment from his dashboard and in the calendar. The patient can schedule the appointment from his dashboard by choosing a time from the list of available time slots.

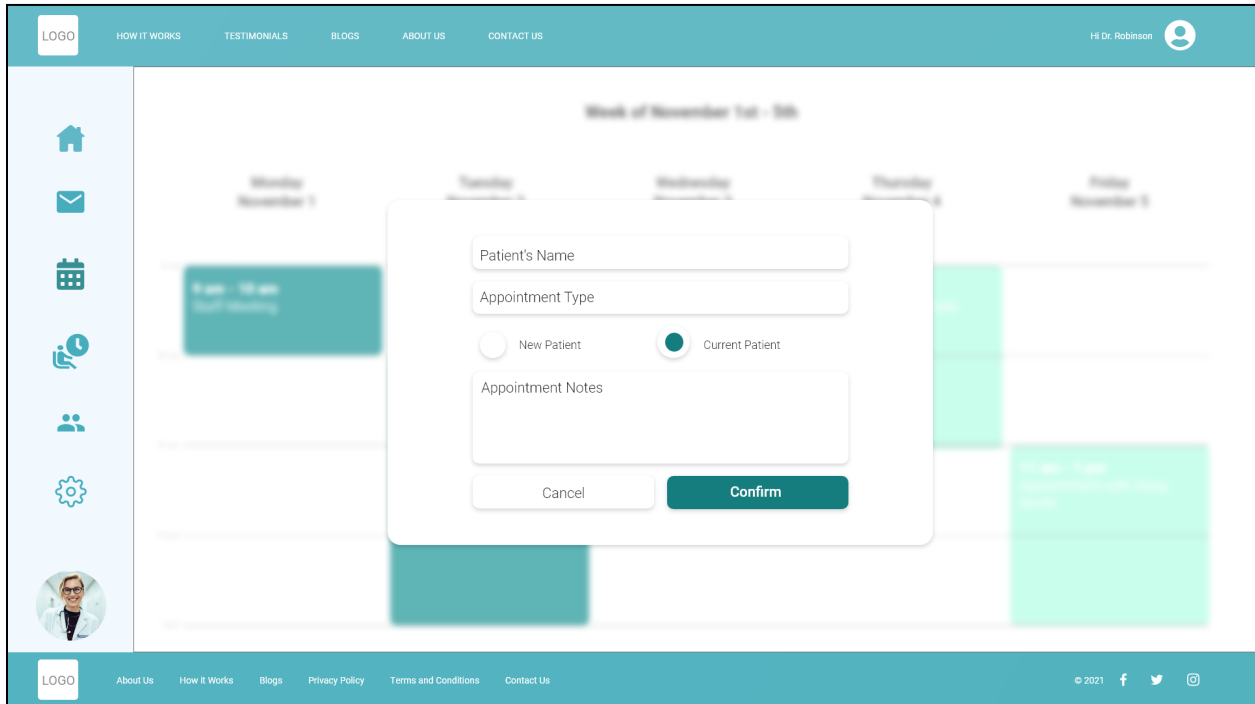


Image 2.1 : Doctor's Scheduling Page

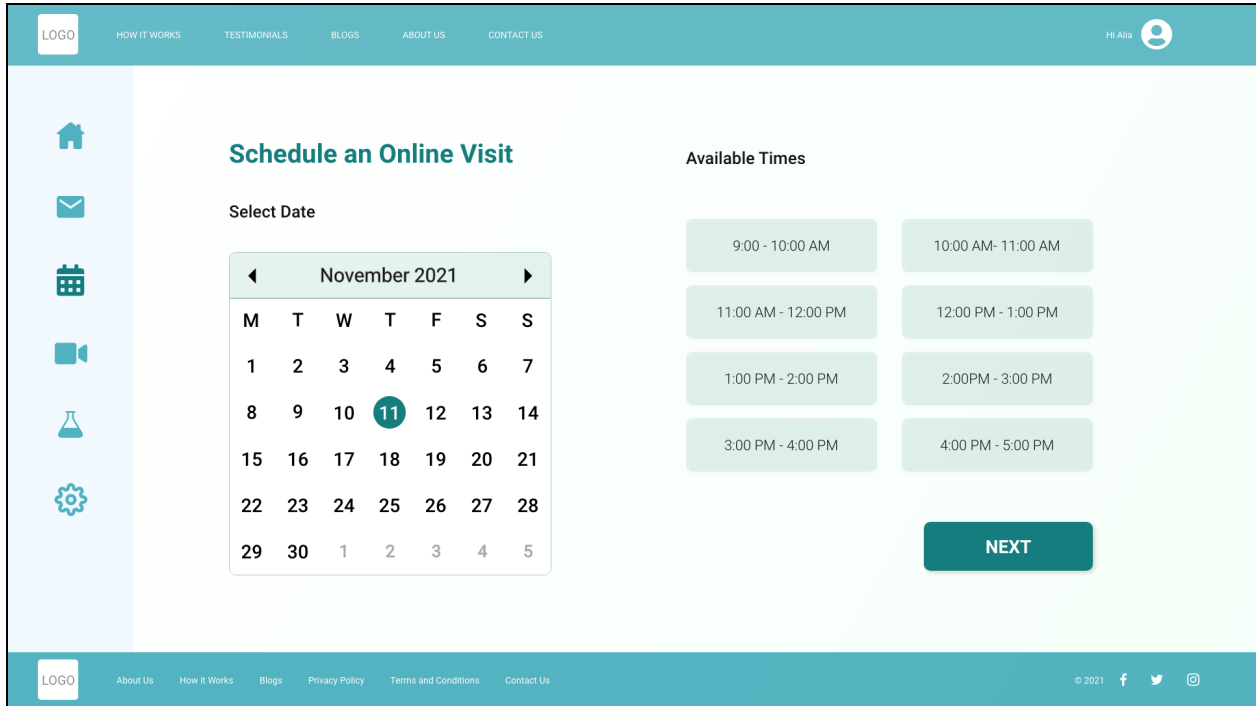


Image 2.2 : Patient Scheduling Page

We have applied the design principle of consistency and knowledge in the world in the process of scheduling in our application. The colors, shapes of buttons, and icons used are similar in every aspect. The navigation bar on the top and on the left side is consistent at both the doctor and the patient side.

Function 3: Pre-screening

The next function we reviewed was the ability to prescreen the Patient before the appointment using questionnaires. We analyzed other apps as the basis for this flow. Doctors can send the patient a pre-screening questionnaire after scheduling the meeting. We found this function has some major issues. The first being the doctor didn't have the choice of selecting the type of patient for the pre-screening questionnaire. Like if the appointment is scheduled for the follow-up patient, still the patient has to do the pre-screening which is meant for the new patient. Another issue we found was, in the existing prescreening, the patient was not able to describe which body part is paining.

Our prototype addresses these issues in the following ways. After scheduling the appointment by the patient with the doctor, the doctor will send the pre-screening questionnaire depending upon the type of patient. The doctor will select the type of patient by clicking the

radio button. And he can edit the questions by clicking on the edit button.

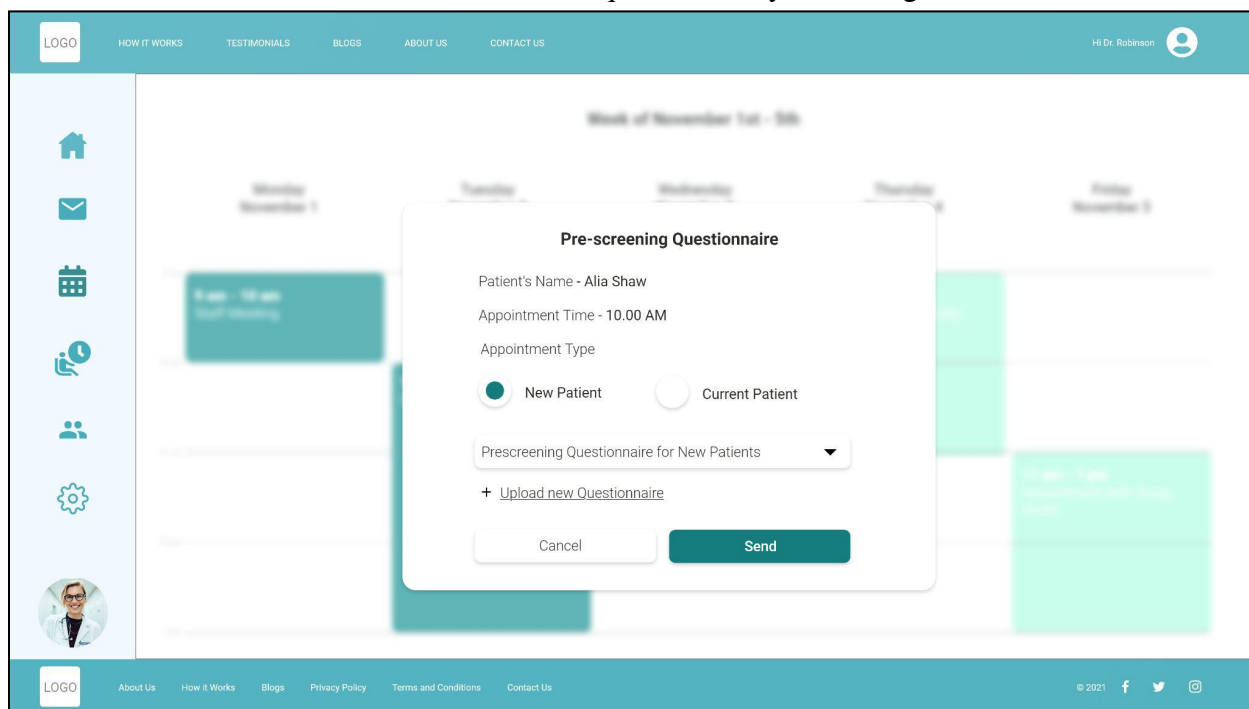


Image 3.1: Sending Pre-screening Questionnaire

In the prescreening questionnaire, to describe which body part of the patient is paying we added the 3D model of the human body. The patient will be able to select the body part by clicking on the 3D model. He will also be able to zoom in on the body model to select the specific location. This will allow the patient to select the specific pain points on the body.

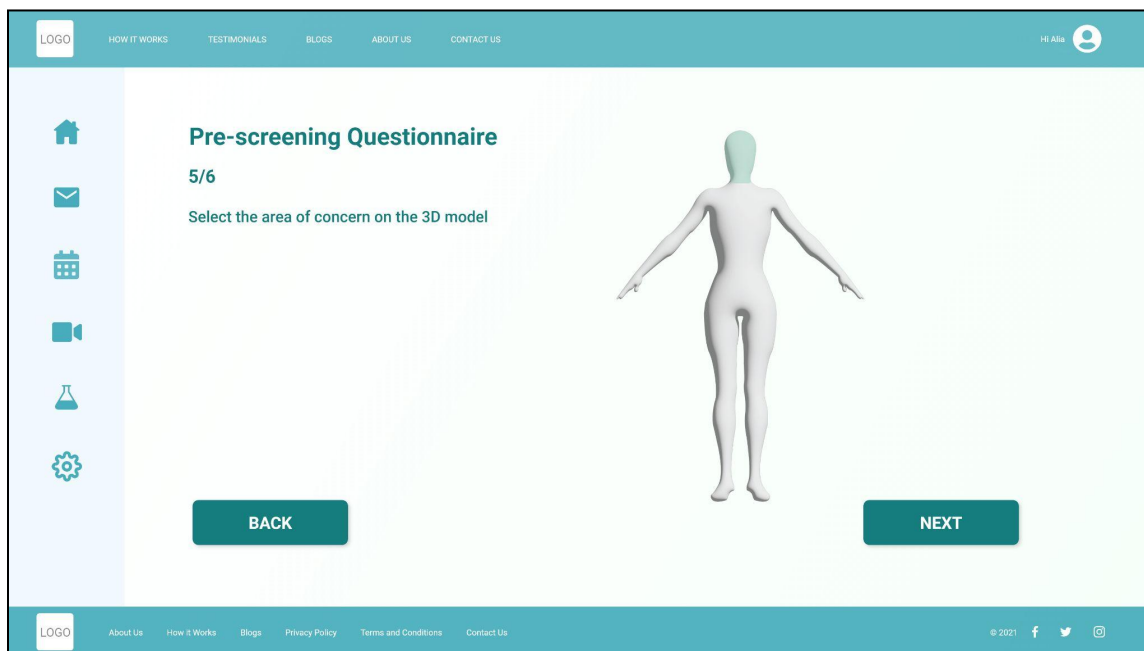


Image 3.2: 3D Model during prescreening

In terms of design, the guiding principle is the principle of the moving part. This states that the moving element(s) of any display of dynamic information should move in a spatial pattern and direction that is compatible with the user's mental model of how the represented element actually moves in the physical system. We used this design principle in the 3D model of the human body during the pre-screening questionnaire.

Function 4: Sending Invitations

A virtual waiting room is designed to reduce the amount of time spent by the healthcare provider and the patient on housekeeping issues such as the check-in process and completion of necessary paperwork prior to the visit. Hence, sending online invitations (including registration/consent forms) is a critical function to ensure the efficiency of the telehealth experience. This is one of the functions our design is aimed at improving. Our task analysis revealed that most of the existing telehealth services do not have a dedicated section from where a clinician can directly send an invitation to the patient. The healthcare provider often has to copy the waiting room URL and use the regular messaging system such as their email account to share it with the patient. Even though few telehealth platforms have a built-in messaging system for sending invitations, they lack an option for simultaneously sharing the invitation link with an accompanying person (e.g. family member or translator) prior to the visit. Besides, there is no option for including the online registration form in the invitation. So the healthcare provider has to spend additional time on sending separate messages for sharing the invitation with the patient, accompanying person, and sending the registration form. Our design addresses this gap consolidating these three subtasks into a single task [Figures 4.1, 4.2], thus minimizing information access cost. This design principle states that "it costs time and effort to "move" selective attention from one display location to another to access information... The information access cost may also include the time required to proceed through a computer menu to find the correct "page" [...] good designs are those that minimize this cost by keeping frequently accessed sources in locations where the cost of traveling between them is small" (Lee et al., 2017: 247-248). We applied this principle to add two new features to the existing designs.

First, we designed a separate section for sending invitations. We have provided three options: Send via Email, Send via SMS, and Cop the URL in case the healthcare provider needs to share the invitation via an external messaging system. In our design, the clinician accesses the "Send Invitations" section of the portal by clicking the relevant button from her dashboard. To minimize the time spent by the clinician on creating and sending one invitation to the patient and another one to the external guest (if applicable), we have added an input field in the same invitation form for entering the external guest's data such as the email address or phone number. To further simplify the process, once the patient's and the guest's data have been added to the system, the next time the healthcare provider has to invite them, she does not need to manually type the email or phone number. Instead, when she enters the first letter(s) of the email address or the first figure(s) of the phone number, the email/phone number will be prompted by the system and automatically filled in with one click.

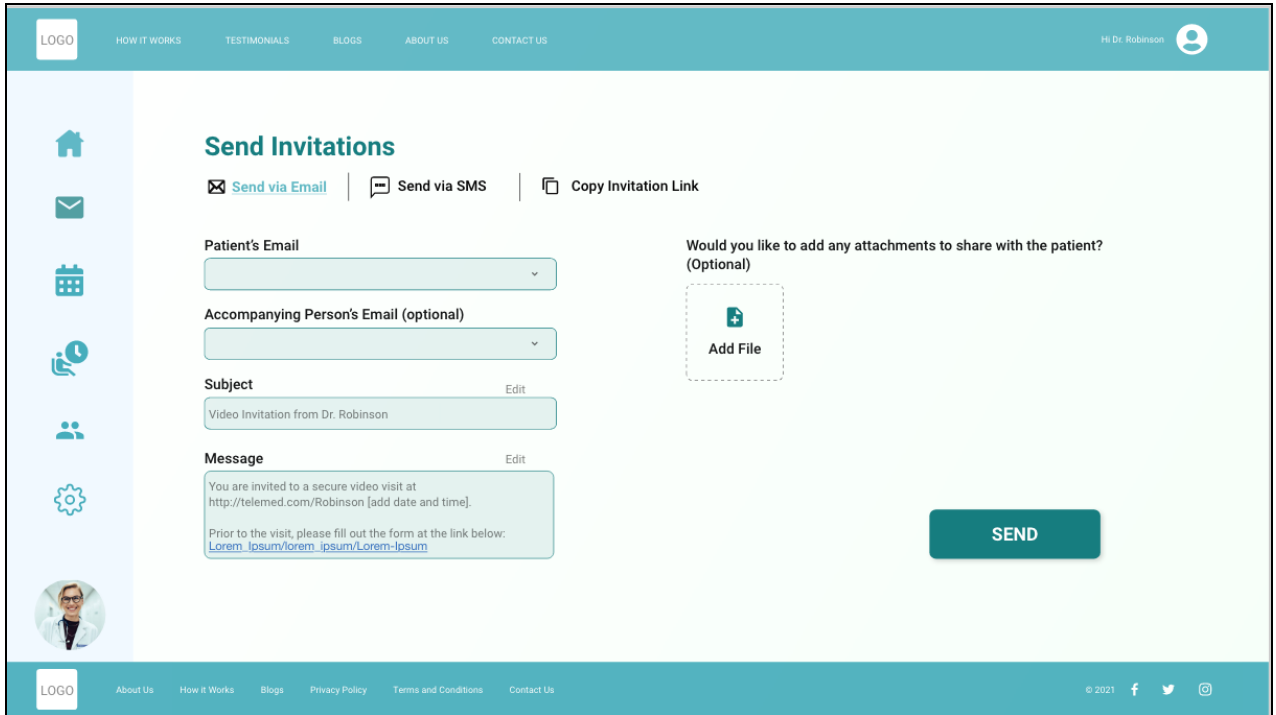


Image 4.1. Sending Invitations via Email

Here we also applied the heuristic of recognition rather than recall (Lee et al., 2017:342) to minimize the clinician's memory load in terms of not having to retrieve the address/phone number from her working memory. This will additionally reduce the amount of time required for the task completion. After filling in the patient's and external guest's data, the clinician scans the custom message field, where a standard invitation text is automatically generated by the system, including the waiting room URL to join the online session and placeholders for manually entering the date and time of the session. Next, the link to the online registration form is automatically provided by the system. All that is left for the healthcare provider to do is just click the "Send" button. A feature for adding attachments, if relevant, is provided too. Thus, with just one click the healthcare provider can simultaneously share invitations with different participants of the session and handle important digital paperwork.

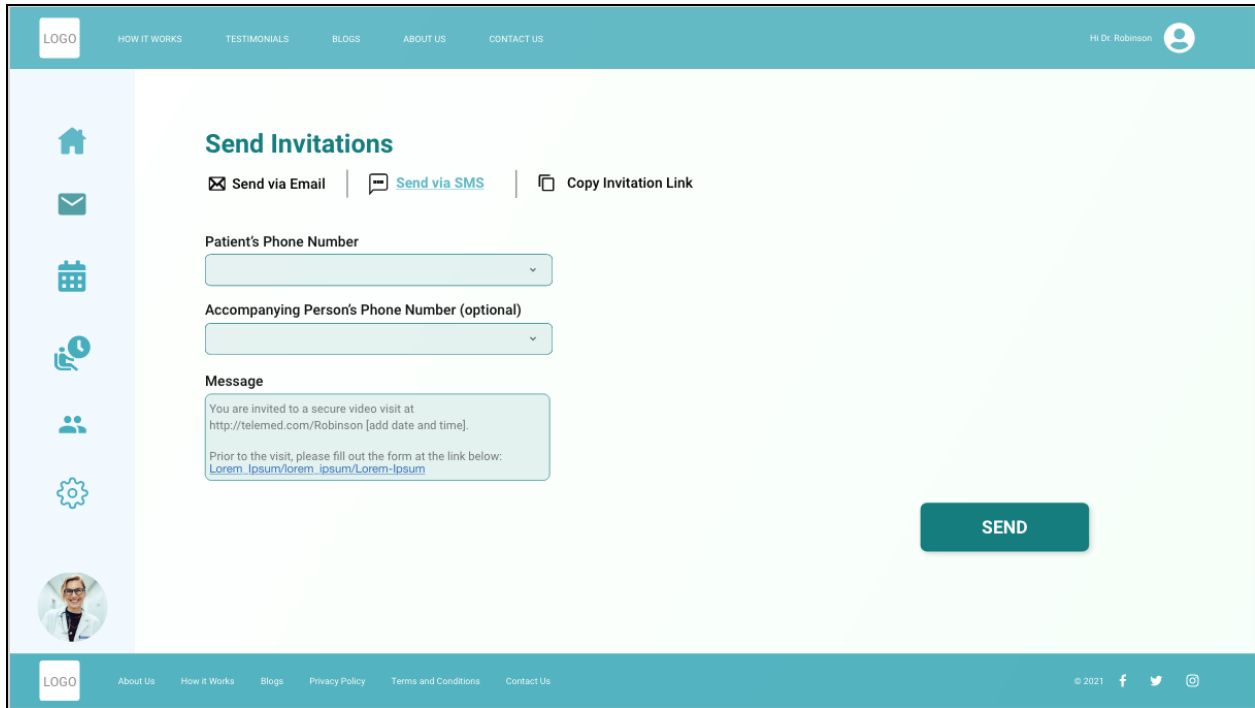


Image 4.2 Sending Invitations via SMS

Function 5: Joining the Meeting

The final function we observed was the function of having a virtual meeting. This feature is the core of Telehealth. During this function, the patient and the doctor are able to meet face to face to discuss current issues of the patient, the main task of the function, as well as access a 3D model of the human form to discuss pain points, as well as send messages, prescribe medications and send out referrals for specialists or testing, or subtasks of the function.

In the case of design for the virtual meeting, we wanted to keep the interface as simple as possible, making sure that almost anyone could use it, exercising the design principle of considering aesthetics and simplicity, by making sure to “eliminate irrelevant elements because they compete with the relevant” (Lee et al., 2017: 343). In terms of the patient perspective [Figure 5.1], we kept it very simple. The main information, the video call, is the primary focus of the page, with secondary focuses of being able to adjust the video or audio, as well as access the 3D model to discuss a current location of a pain point or being able to send a chat message.

For the perspective of the doctor, [Figure 5.2] we kept the same simple patient-user face but added the key subtasks that the doctor would need during the call. In addition to being able to have the same features as the patient, we added the features of e-Prescribe, refer to a specialist, refer for testing, as well as viewing patient records, choosing to utilize the design principle of simplifying and structuring task sequences by “split(ing) the information into multiple steps or screens” (Lee et al. 2017: 344). The doctor is able to continue to focus on the patient and their immediate needs, but also is able to continue with the important side tasks that accompany the visit.

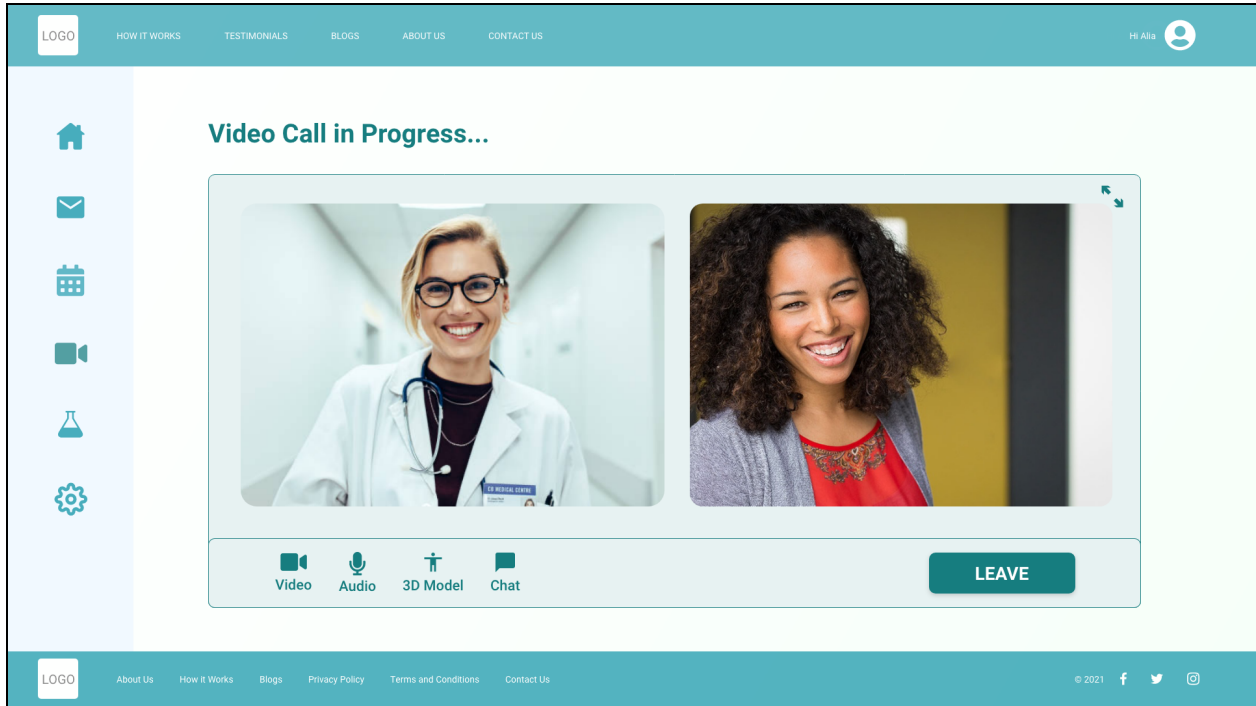


Image 5.1. Online Visit: The Patient Perspective

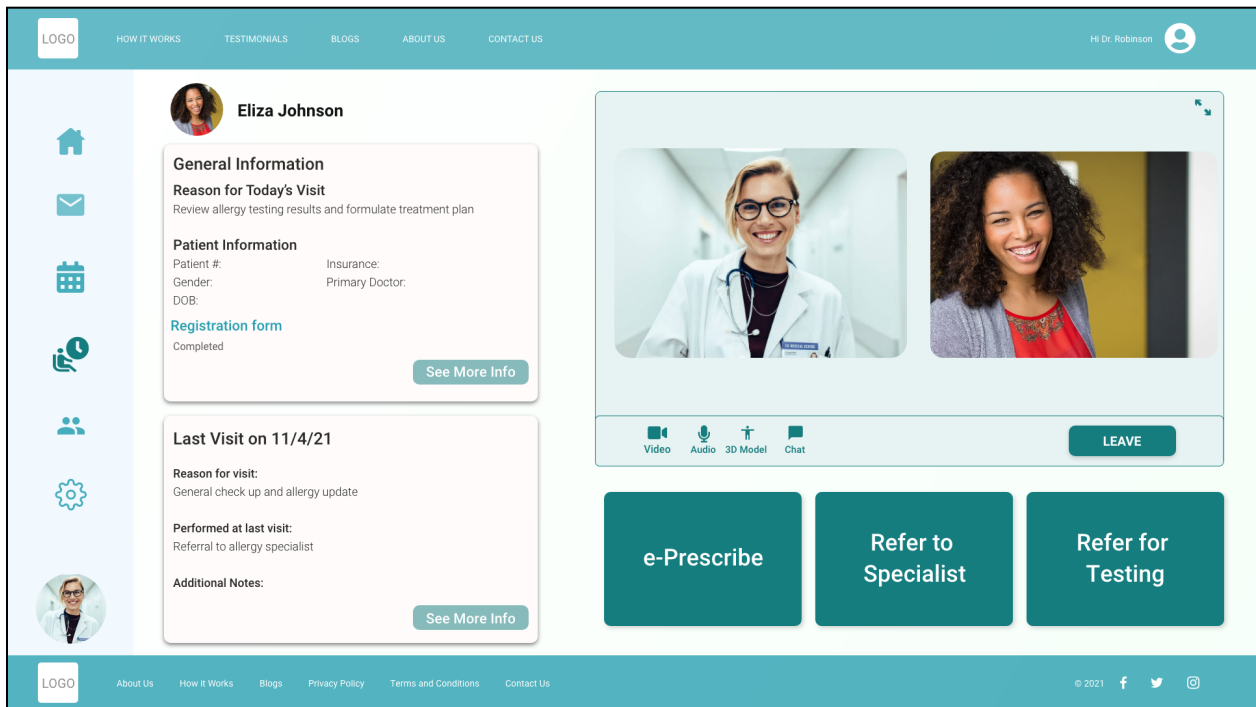


Image 5.2. Online Visit: The Doctor Perspective

2. User Profiling

The participants for the usability testing are selected based on the personas and the target audience we decided earlier. The participants for our designed system's usability testing are selected based on age, language, existing computer and internet skills, and experience.

After the COVID-19 pandemic, the care providers and patients started to use more telehealth services. 95% of the health centers reported using telehealth during the COVID-19 pandemic. There is surely an increase in the number of people using telehealth services.

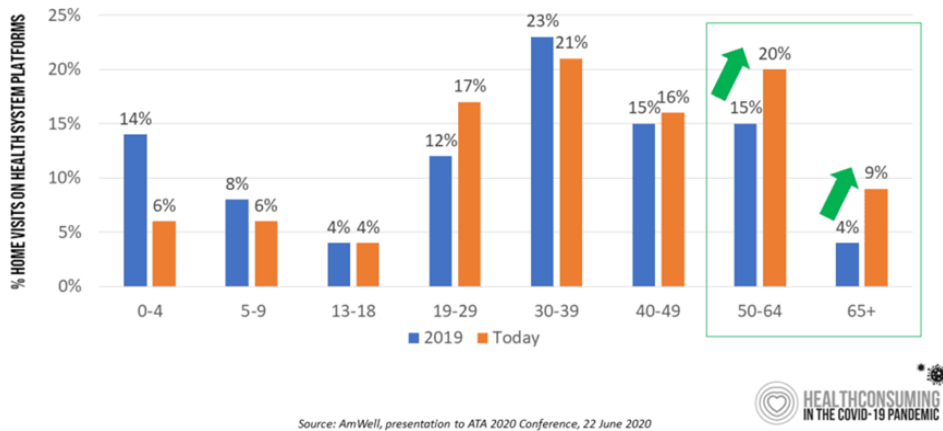


Fig 1. Percent rise in the use of telehealth within last two years

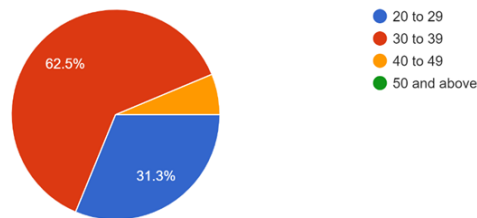


Fig 2. Percent of participants in the age group

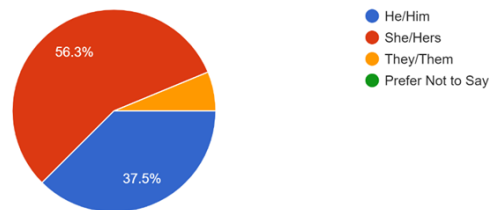


Fig 3. Percent of participants who are male and female

The target users for our telehealth website are patients and doctors. The user group for this application doesn't include a specific group of people but encompasses all the people from different age groups, backgrounds, and gender. For the usability testing of our project, we have considered people from the age groups 20-30 years, 30-40 years, 40-50 years, because this group accounts for a higher number of people who use telehealth services.

3. Usability Testing

The conducted usability testing helped to accomplish four major goals: 1) identify the problems in the design of the telehealth website, 2) reveal opportunities for improvement, 3) learn about the users' preferences, and 4) measure the users' satisfaction with the designed telehealth platform. A usability testing questionnaire was prepared prior to the testing. The users were presented with different task scenarios and asked to complete the designed tasks. Two methods of assessing the usability of the design were applied: quantitative and qualitative. The users were asked to test the prototype both in the capacity of a doctor and a patient and share their feedback as well as rate their experience. The following tasks were selected for the usability testing:

Doctor Portal

1. Sign up and log into the user account
2. Check the scheduled appointments
3. Send a patient and his accompanying person a message inviting them to an online visit
4. Manage the Virtual Waiting Room

Under this task the users were asked to:

- 4.1. check if the scheduled patients have checked into the Doctor's Virtual Waiting Room
- 4.2. scan the list of online patients and the coming appointments and select the relevant patient for joining the session
- 4.3. inform the next online patient in real-time when they will be able to see her.

5. Conduct an online session

Under this task the users were asked to:

- 5.1. start the online session with the waiting patient
- 5.2. locate the patient's registration form during the session
- 5.3. refer the patient to a different specialist
- 5.4. provide the patient a referral for a lab testing
- 5.5. Prescribe medication.

Patient portal

1. Sign up and log into the user account
2. Schedule appointments

Under this task, the users were asked to:

- 2.1 request an online visit with the doctor
 - 2.2 reschedule/cancel their appointment.
3. Complete and submit the pre-screening questionnaire

Under this task, the users were asked to:

- 3.1 locate and access the prescreening questionnaire shared by the doctor
 - 3.2 complete the questionnaire identifying the aching part of the body by using the 3D model of the human body.
4. join the scheduled online session.

4. Qualitative and Quantitative Methods

Qualitative Method: The qualitative method of usability testing is used to identify what works and what does not work in the interface, and the best way to do it is to observe the testing participants while they interact with the prototype and simultaneously provide feedback. While the quantitative data have statistical significance (Budiu 2017), the advantage of the qualitative method is that it helps to actually understand the reasons underlying the problems specified and ratings obtained through the quantitative data collection tools. Moreover, qualitative usability testing allows to reveal 85% of the usability problems by testing the prototype only with five participants (Nielsen 2000).

Qualitative Method Used: Proceeding from the above-mentioned considerations, we have conducted a round of *contextual inquiry-type usability testing* to evaluate our prototype. In order to create a natural setting for more reliable results, we situated the requests to complete the selected tasks in short scenarios that “set the stage for the action and provide a bit of explanation and context for *why* the user is ‘doing X’” (McCloskey 2014):

Example A: Doctor Portal

Task 5 – Online Session

Scenario: You have a scheduled online visit with a patient. The patient is waiting for you to see her. Start the online session.

During the session, you

- 5.1. need to view her registration form (*Note for the facilitator: the aim of testing this function is to assess the performance of the task of locating the Registration form on the screen*)
- 5.2. decide the patient needs to be seen by a dietologist (*Note for the facilitator: the aim of testing this function is to assess the performance of the task of locating the button for referrals and completing the referral form*);

5.3. decide the patient needs to take a blood test (*Note for the facilitator: the aim of testing this function is to assess the performance of the task of locating the button for lab referrals and completing the referral form*);

5.4. need to prescribe dietary supplements (*Note for the facilitator: the aim of testing this function is to assess the performance of the task of locating the e-Prescribe button and issuing the prescription form*).

Example B: Patient Portal

Task 3 – Prescreening

Scenario: Your doctor has shared a pre-screening questionnaire with you. You need to

3.1 access and complete the questionnaire before your appointment. (*Note for the facilitator: the aim of testing this function is to assess the performance of the task of locating and completing the questionnaire*).

3.2 indicate on the 3D model of the human body the area where you have discomfort. (*Note for the facilitator: the aim of testing this function is to assess the efficiency of the 3D model aided diagnosis*).

The think-aloud protocol method was used to collect the users' feedback. The users tested the prototype and simultaneously commented on the prototype as well as answered the facilitator's questions from the previously designed testing questionnaire.

Quantitative Method: Although the quantitative data do not offer deep insights into the causes of the usability problems, they help to reveal common patterns, minimize randomness and measure the usability of a design in terms of such metrics as the task-completion time, success rate, number of errors as well as satisfaction ratings (Budiu 2017). Also, the fact that the quantitative methods involve a large pool of participants representing the target audience helps to minimize bias and ensure objective testing results.

Quantitative Method Used: A remote unmoderated usability test was conducted to collect quantitative data. An *online survey* was prepared in *Google Forms* and was shared with the testing participants together with the link to the high-fidelity prototype in *Adobe XD*. The participants were asked to test the prototype at the shared link and self-report the testing results by answering a set of standard usability questions and rating their experience in terms of different attributes on a rating scale from 1 to 5. The responses collected through the online survey helped us measure the users' satisfaction with their experience as well as identify the common usability problems and improvement needs.

5. Development of survey questions

In order to collect quantitative data on our prototype, a survey was developed. The main goals of the survey were to understand how visually appealing the prototype was, how easy to navigate and intuitive the Telehealth interface is, and as well as collecting data on who was most likely to

use the prototype if it were an actual product. The users were first shown the prototype and then asked to fill out the survey, and allowed to insert any additional critique, praise, or concern at the end of the survey. By focusing our questions in this manner, we were able to focus on the usability of our application and were then able to find some pain points in our current design.

The survey questions are as follows:


Your Age

20 to 29 30 to 39 40 to 49 50 and Above


Pronouns you identify yourself with

He/Him She/Her They/Them Prefer not to say

Was it easy to use the application?


1 - Easy to Use Hard to Use - 5

How intuitive did you find this app to be?


1 - Not Intuitive Very Intuitive - 5


Are you able to understand the contents displayed on the application?

Yes No

Were you able to navigate through the application with ease?

Yes No

Rate the color palette used in the application



1 - Pleasing Not Pleasing - 5

Can you explain your rating in the above question?

Do you think that the app has all the necessary features?

Do you think the functions are well integrated?

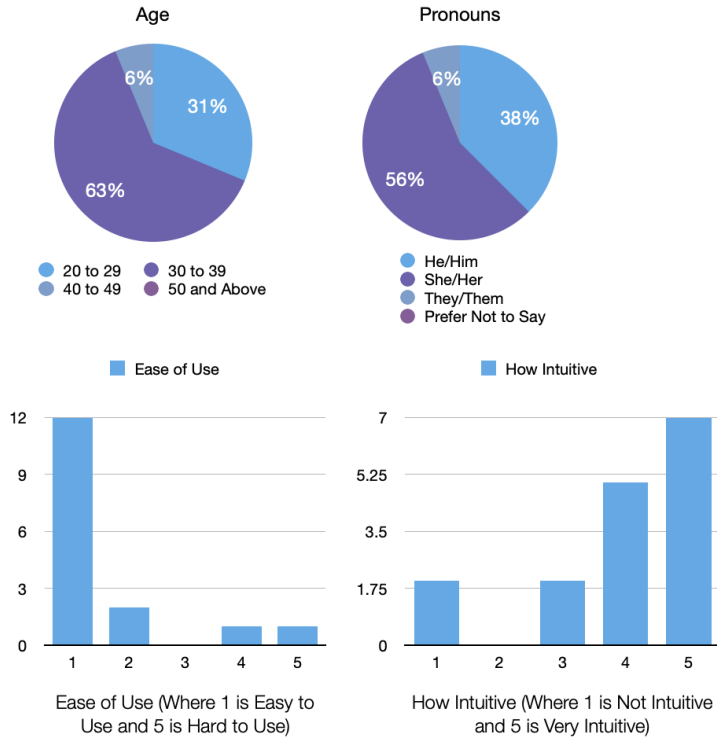
Overall, how satisfied are you with the application?

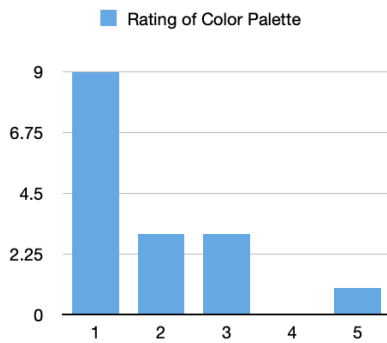

1 - Not Satisfied Satisfied - 5

Do you have any suggestions or feedback for the application and its design?

6. Survey

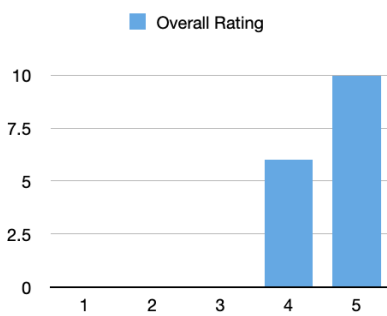
The results and analysis of the survey are as follows:





Rating of Color Palette (Where 1 is Pleasing and 5 is Not Pleasing)

Color Palette Rating Explanation
1 - seemed easy on the eyes
1 - the colors are easy to see and they are calm colors that help reduce stress when doing tasks some might seem stressful
3 - it's a very hospital wall green
5 - same theme throughout the app isn't appealing bright colors high have been a good option
2 - the light colors in the calendar make the text difficult to read



Overall Rating (Where 5 is very Satisfied)

Suggestions and Feedback
Intergrate a feature for the blind/visually impaired. While this set up works great as a visual for deaf/HoH individuals, it doesn't seem to have an audio feature to read aloud for blind/visually impaired individuals
Prescribing and referring should come up along side the video component of the application so that the doctor can still remain in the call while doing side tasks
As it's a portal for doctor/user their picture can be made a bit smaller and use space to provide more useful information
I would like to see a feature which can follow up my medicine taking, if I still have any concerns, I can always check back on the website

7. Problems identified

While we have seen that most of the people liked the way the functions are integrated within the prototype both for the doctor and patient portals along with the color palette, we have also received valuable constructive feedback, which is presented below. Some of the feedback represents the problems and some are recommendations to improve the telehealth platform.

Problems :

- One or two features such as full screen in the meeting, movement of the 3D model weren't working when clicked [Severity - Medium].
- It was difficult to locate the option for joining the online session in the patient portal: an option should be designed to join the session directly from the dashboard/home page [Severity - Medium].
- The button for scheduling new appointments should stand out: it could be made salient by marking it with a different color or style [Severity - Low]
- A feature for printing the Confirmation is missing [Severity - Low]
- Accessibility - Color scheme does not translate well for color blindness [Severity - High].

Missing features - Movement in 3D model, full screen in the meeting

Some users have mentioned that they have features that are not working.

Solution: As this is a prototype, we have included only a few features, but we're ready to implement those features in our next iteration of the design stages.

Difficulty in joining the call directly

While we have the "Join the call" option under the video tab, one of our users found it difficult to locate it.

Solution: When there is an active call, there should be a notification. Also, we would like to add an icon at the left corner of the page so that the color changes to green if it's active, otherwise, it should be blue.

Scheduling new appointments should stand out with different color

Users believed that scheduling appointments should stand out with a different color.

Solution: We change the color palette for scheduling appointments.

A feature for printing confirmation is missing

Solution: We are planning to include all the confirmations in the account section and provide a printing option for the user. We will also add an alert on the screen when the appointment is confirmed.

Accessibility

While our application focuses on people at home or at remote locations, one of the users pointed to the problem that the colors are not accessible by people with colorblindness.

Solution: This was the issue with the highest severity and we would like to add this feature in our next iteration, then test with the users accordingly.

8. Benefits and Limitations of Usability Testing

Benefits of Usability Testing

- Finding out if users are able to complete the tasks at hand successfully without any problems
- Measuring the amount of time taken by each user to complete a specific task
- Assessing the user satisfaction
- Identifying improvements to enhance the current prototype in the early development stage
- Testing the performance of the prototype to catch errors

Limitations

- Bias—both conscious and unconscious

- Level of experience with the product
- User's understanding of technology
- User's ability and knowledge of mobile devices
- The prototype is close to a real product but it will not have every function working

9. Summary

As you can see above, we have focussed on designing a telehealth platform that supports users with

- Supporting online scheduling;
- Ability to update the patients' needs/information/materials;
- Showing multiple video camera views including from the doctors' user end (e.g., face) and patients' user end (e.g., face);
- Supporting real-time doctor-patient communication interaction tools (e.g., raising hand feature, pre-diagnose questionnaire taking, patient explaining/demonstrating problems; doctors giving evaluation results/suggestions, etc.).
- Point out to the place where they are having pain or problem so that doctors can view it and diagnose accordingly.

After brainstorming sessions and satisfying the design principles, we were able to conclude a design that supports all the features listed above. Some of the features such as reminding the user about the prescreening questionnaire, informing the user about the waiting time in the meeting room, accessing the 3D model during the meeting were unique features that do not exist in the current markets.

Coming to the usability testing, we were able to identify some of the problems which range from high severity to low severity, we would be working on the changes in the next iterations and repeat our design process ideation, prototyping and testing. This continuous method of iteration will enable us to enhance our website with more features and functionalities.

References

1. Lee J.D., Wickens C.D., Liu Y., Boyle L.N., *Designing for People: An Introduction to Human Factors Engineering*, CreateSpace: Charleston, SC, 2017.
2. *Doctor App Demo* by Medici App, available at <https://www.youtube.com/watch?v=JYER8eVQ9A&t=189s> last accessed on September 29, 2021.
3. *EvergreenHealth*. Evergreen Health, 2021, available at <https://www.evergreenhealth.com/patients-visitors/my-navigator-patient-portal/> last accessed on September 25, 2021.
4. *eVisit*. eVisit 2021, available at <https://evisit.com/platform/overview/> last accessed on September 28, 2021.
5. *How to use Medeo* by Medeo, available at <https://www.youtube.com/watch?v=SJ9yII6iS7k> last accessed on October 3, 2021.
6. *Maven Clinic Co.* Maven 2021, available at <https://www.mavenclinic.com/> last accessed on September 27, 2021.
7. *Teladoc Health, Inc.* Teladoc 2021, available at <https://www.teladoc.com/> last accessed on September 27, 2021.
8. *Telemedicine* by Johns Hopkins, available at <https://www.youtube.com/watch?v=zNHq9gD2uqc&t=31s> last accessed on October 1, 2021.
9. *VidHealth*. Vidhealth 2020, available at <https://vidhealth.com> last accessed on October 4, 2021.
10. *Vivadox*. Vivadox 2020, available at <https://vivadox.life> last accessed on October 1, 2021.
11. *VSee Clinic*. VSee 2021, available at <https://www.vsee.com/> last accessed on September 27, 2021.
12. Allen Jamie, *Benefits and Limitations of Doing Usability Testing with your Colleague*, published on July 9, 2018 available at <https://www.uxmatters.com/mt/archives/2018/07/benefits-and-limitations-of-doing-usability-testing-with-your-colleagues.php>, last accessed on December 3, 2021.
13. Budiu Raluca, *Quantitative vs. Qualitative Usability Testing*, published on October 1, 2017 by NN/g Nielsen Norman Group, available at <https://www.nngroup.com/articles/quant-vs-qual/>, last accessed on December 1, 2021.
14. McCloskey Marieke, *Turn User Goals into Task Scenarios for Usability Testing*, published on January 12, 2014 by NN/g Nielsen Norman Group, available at <https://www.nngroup.com/articles/task-scenarios-usability-testing/>, last accessed on December 2, 2021.
15. Nielsen Jakob, *Why You Only Need to Test with 5 Users*, published on March 18, 2000 by NN/g Nielsen Norman Group, available at <https://www.nngroup.com/articles/why-you-only-need-to-test-with-5-users/>, last accessed December 4, 2021.

16. Image source: *How Telehealth and Health Equity Can Survive after COVID-19*, available at <https://liberatehealth.meddecision.com/how-telehealth-and-health-equity-can-survive-after-covid-19/>, last accessed on December 6, 2021.

Appendix A: Prototype Walkthrough

Doctor's Portal

Login/Sign Up



Log In to Your Account

[Forgot Your Password?](#)

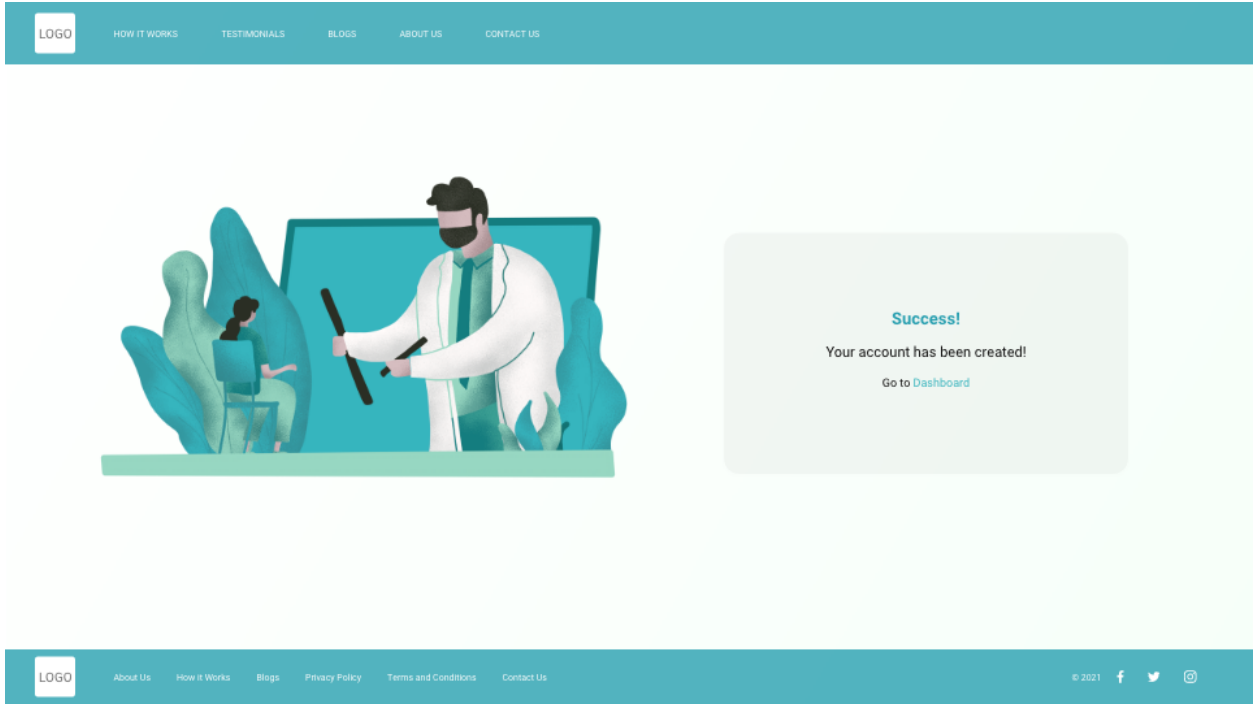
LOGIN

[Sign Up](#)

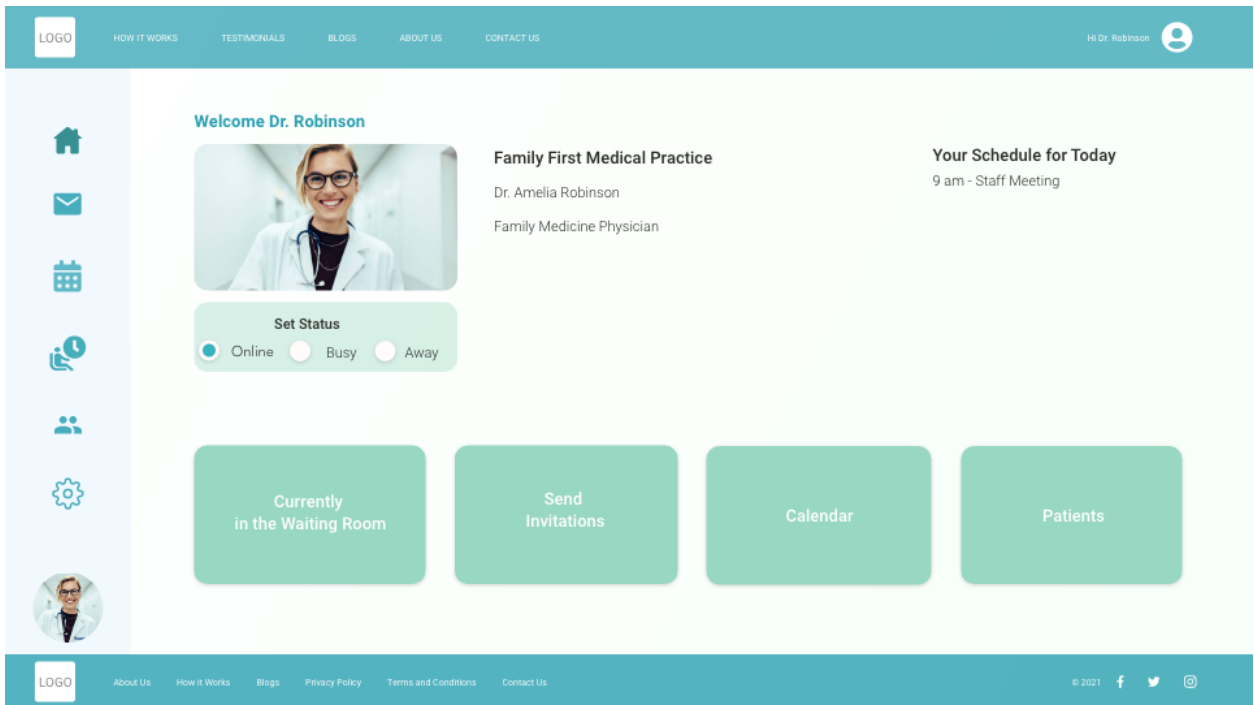


Create an Account

SUBMIT



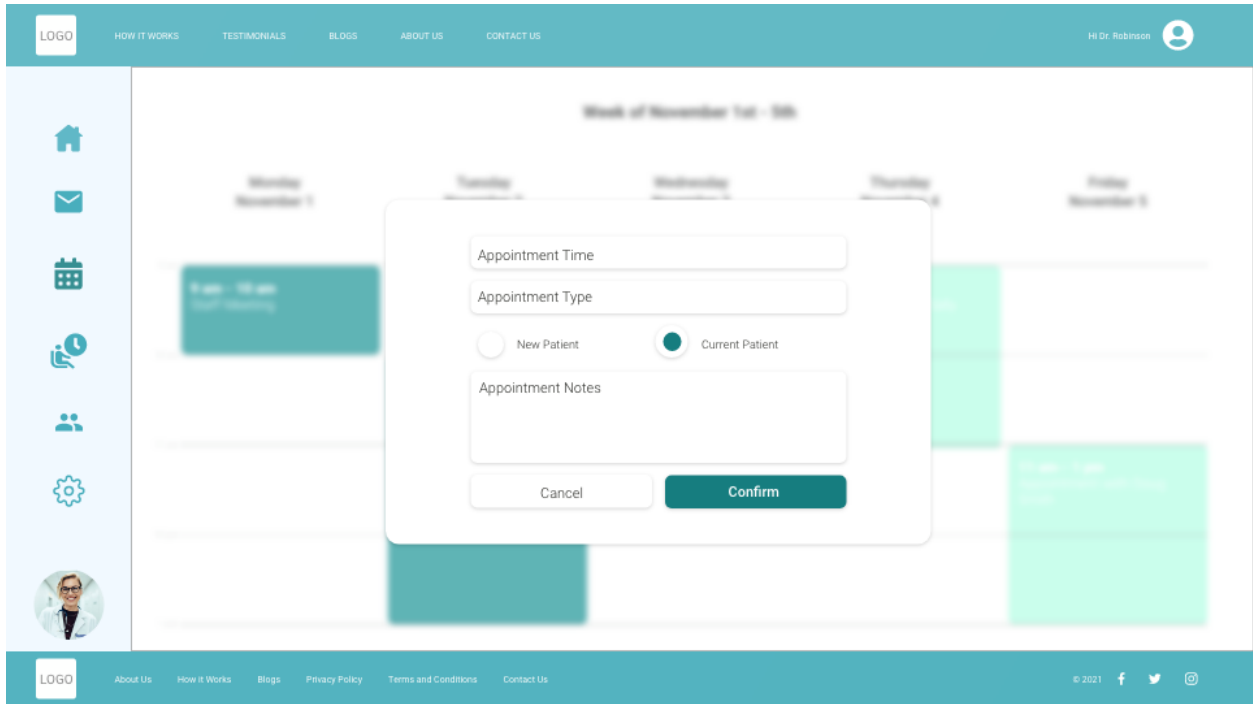
Doctor's Dashboard



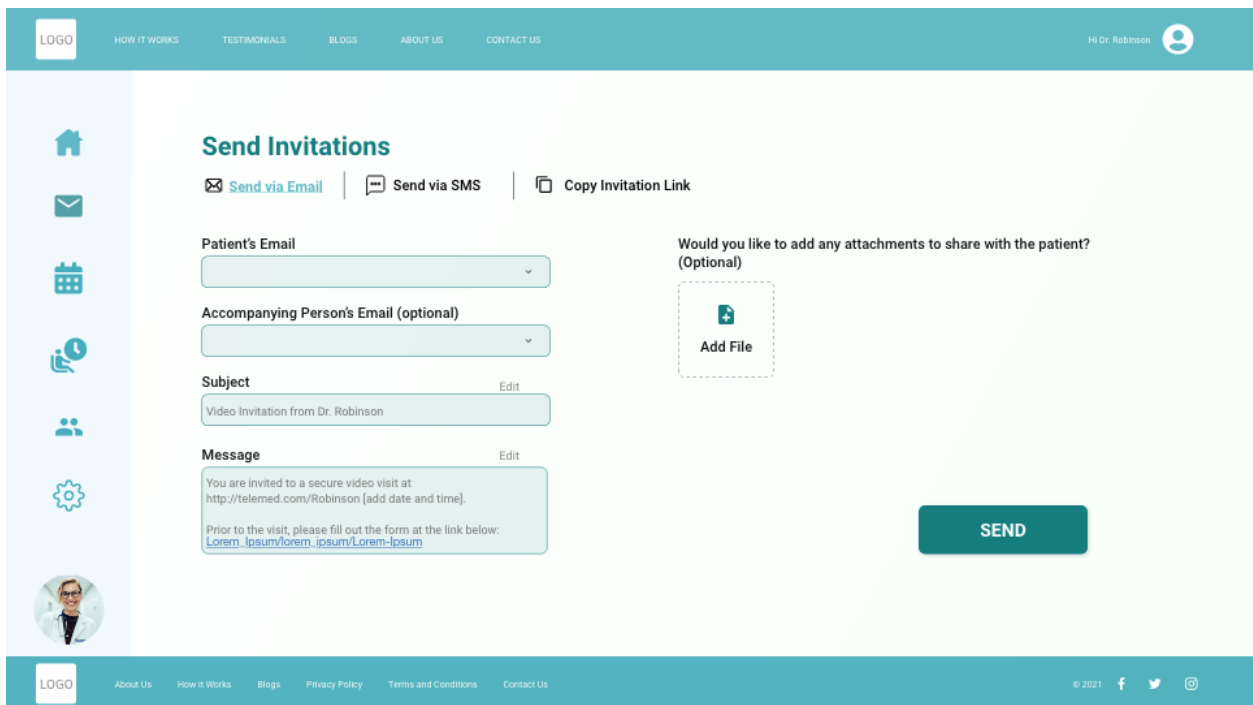
Scheduling Appointments

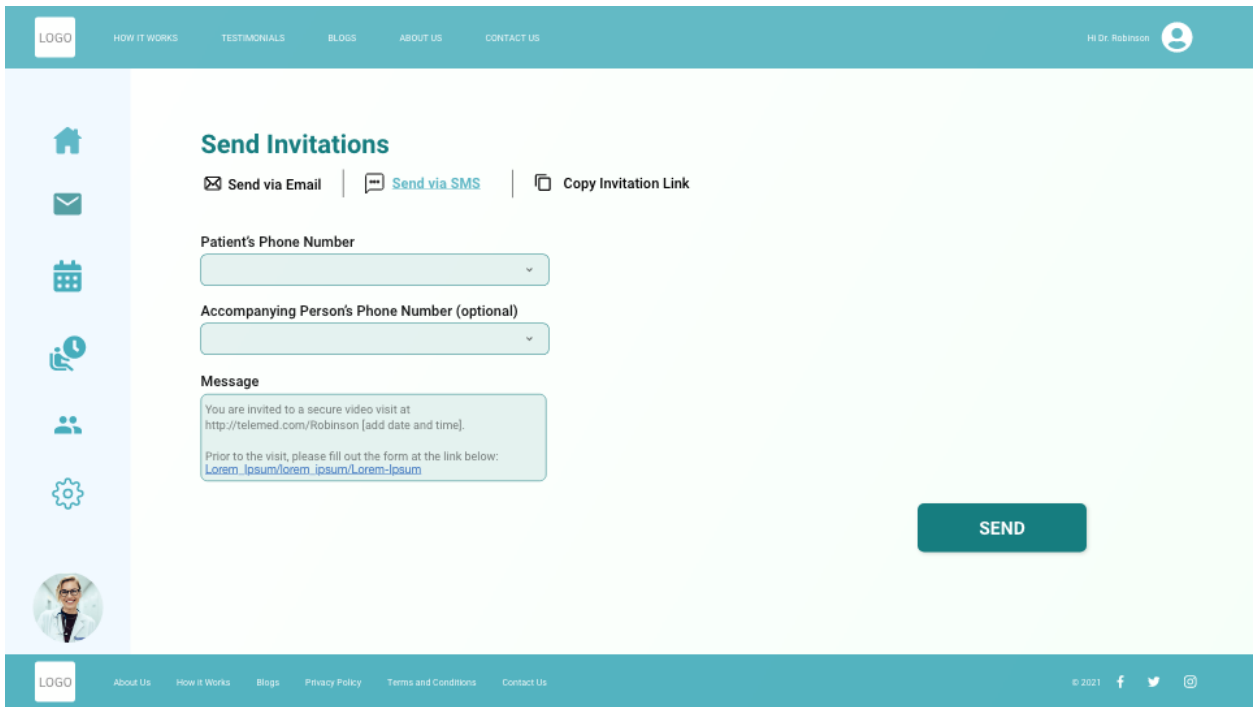
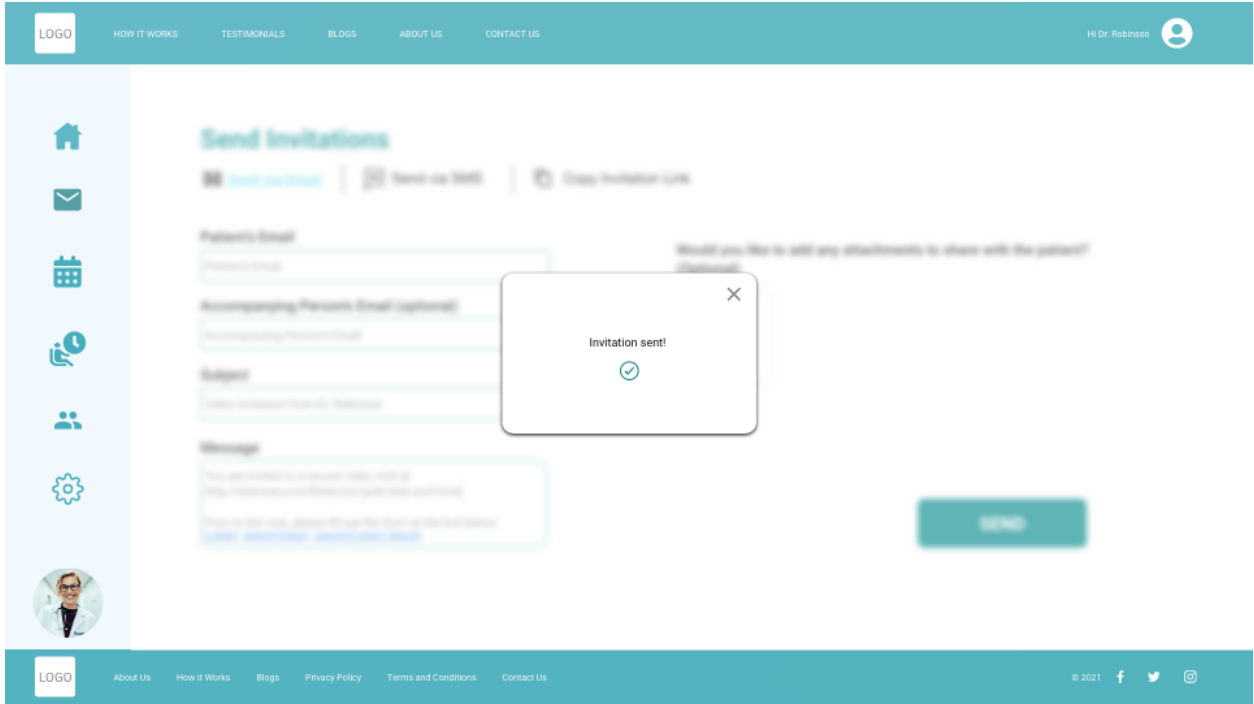
The screenshot displays a web-based appointment scheduling interface. At the top, there is a teal header with a logo on the left and navigation links: "HOW IT WORKS", "TESTIMONIALS", "BLOGS", "ABOUT US", and "CONTACT US". On the right side of the header, it says "Hi Dr. Robinson" next to a user profile icon. Below the header is a sidebar with icons for home, messages, calendar, a clock, people, and settings, along with a circular profile picture of a doctor. The main area shows a calendar for the "Week of November 1st - 5th". The days are Monday through Friday. The time slots are marked from 9 am to 1 pm. Appointments are shown as colored blocks: a dark teal block on Monday from 9 am to 10 am labeled "9 am - 10 am Staff Meeting"; a dark teal block on Tuesday from 10 am to 1 pm labeled "10 am - 1 pm Surgery"; a light green block on Thursday from 9 am to 11 am labeled "9 am - 11 am Appointment with Sally Johnson"; and a light green block on Friday from 11 am to 1 pm labeled "11 am - 1 pm Appointment with Doug Smith". At the bottom, there is a teal footer with the logo, navigation links: "About Us", "How It Works", "Blogs", "Privacy Policy", "Terms and Conditions", and "Contact Us", and social media icons for Facebook, Twitter, and Instagram, along with the text "© 2021".

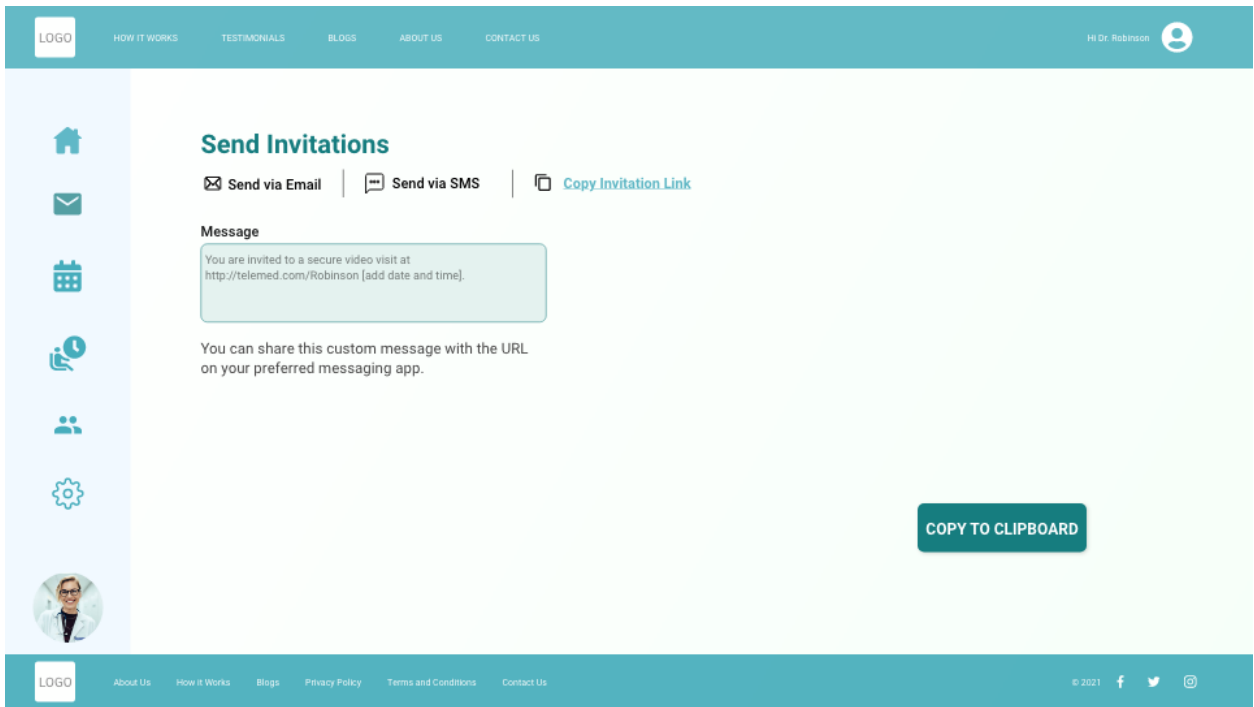
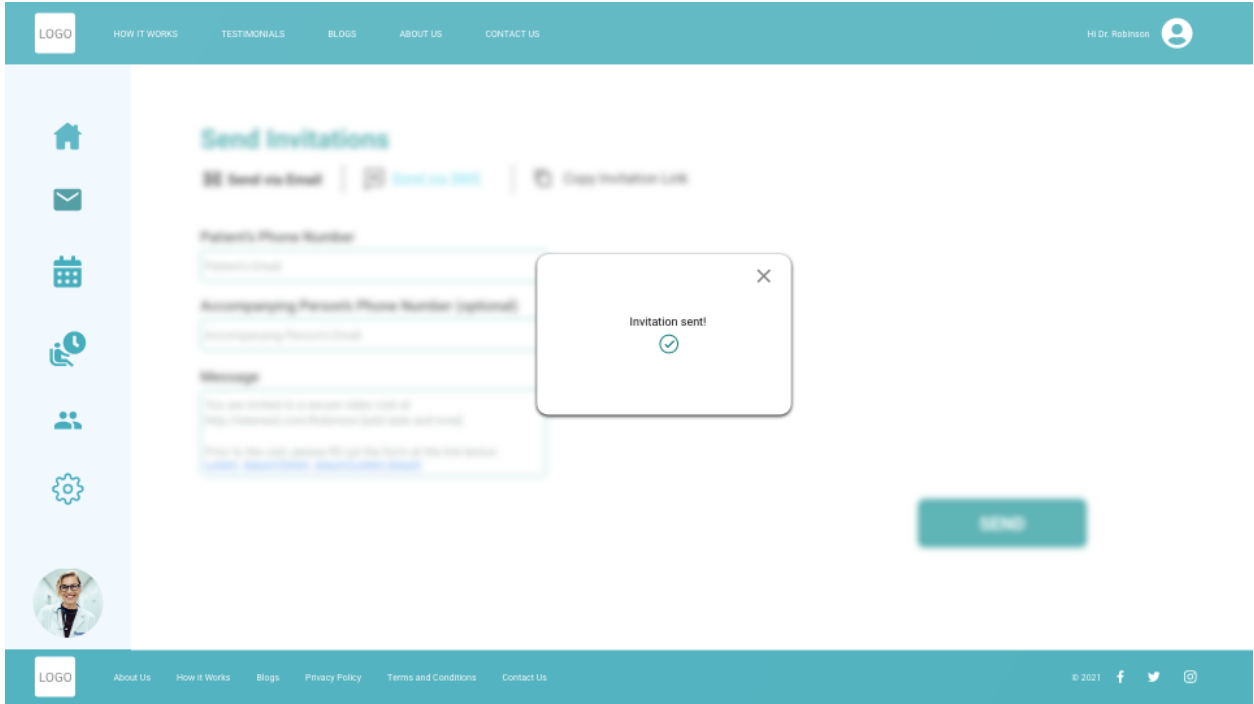
This screenshot shows the same web-based appointment scheduling interface as above, but with a modal form open in the center. The background calendar is blurred. The modal form has a white background and a rounded border. It contains the following fields and options: "Appointment Time" (text input), "Appointment Type" (text input), "New Patient" (selected radio button) and "Current Patient" (unselected radio button), and "Patient's Email for Questionnaire" (text input). At the bottom of the modal are two buttons: "Cancel" and "Confirm". The rest of the interface, including the header, sidebar, and footer, remains visible in the background.

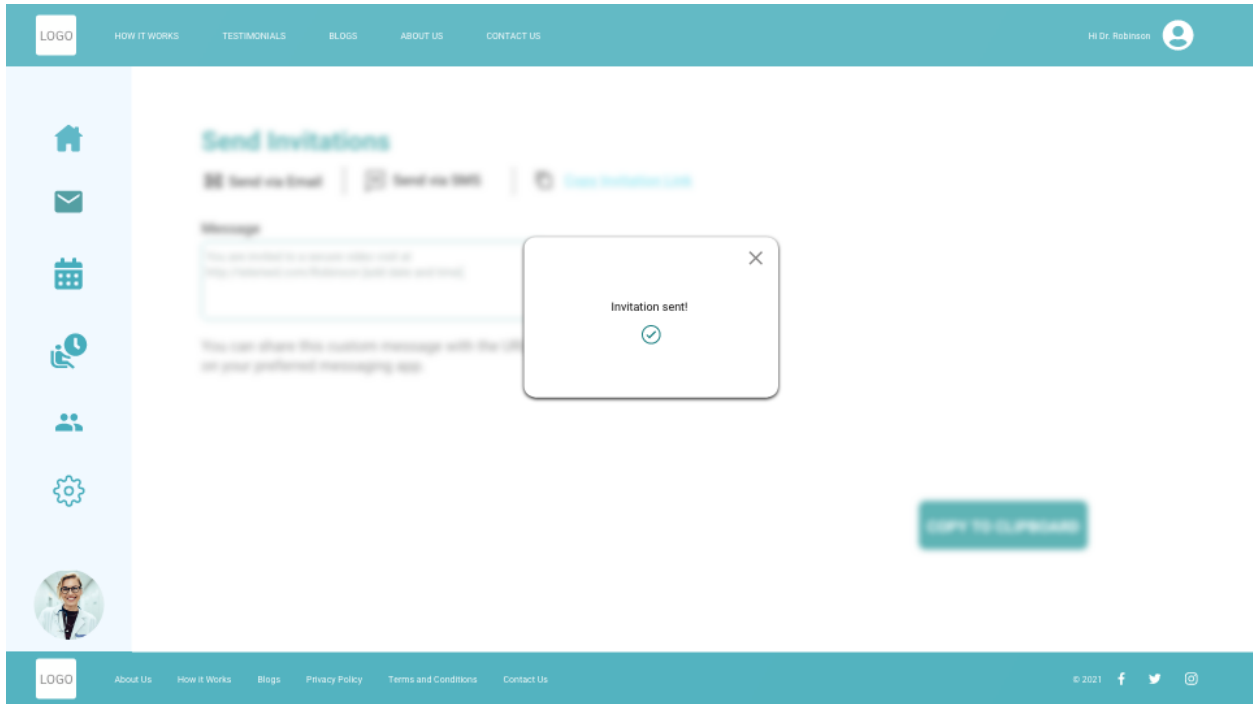


Sending Invitations

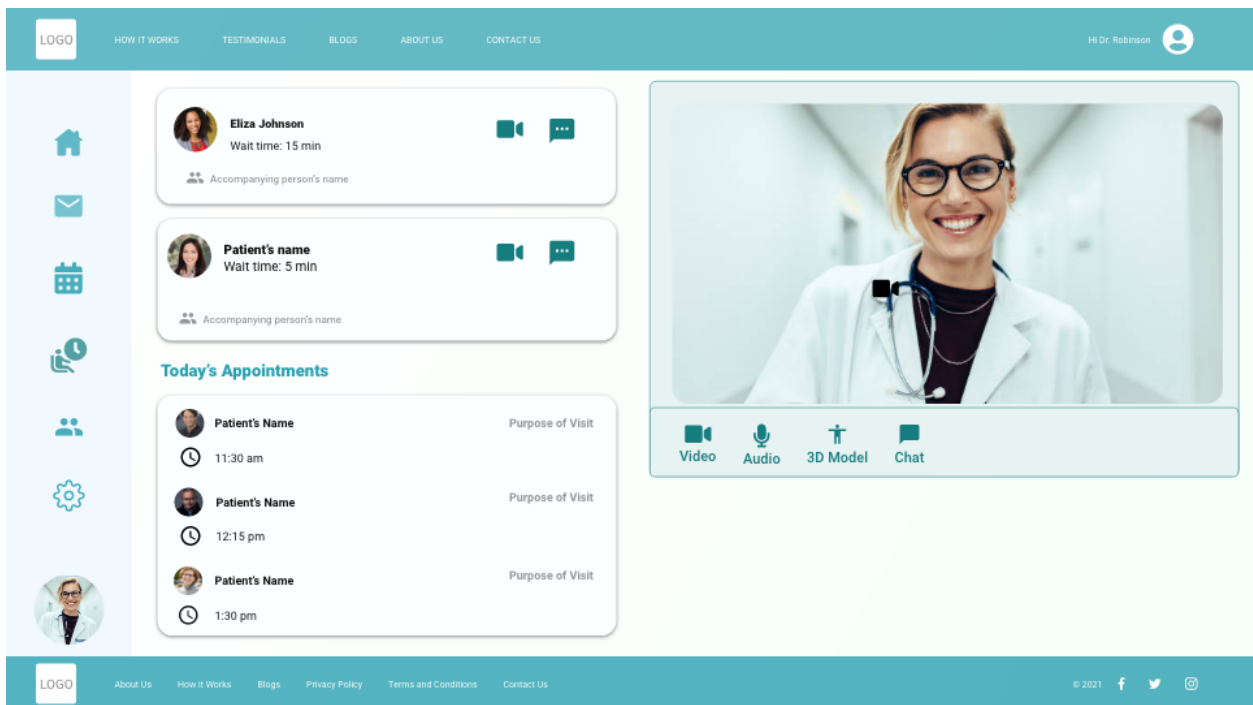

















Waiting Room



Online Session

LOGO HOW IT WORKS TESTIMONIALS BLOGS ABOUT US CONTACT US Hi Dr. Robinson 

 **Eliza Johnson**

General Information

Reason for Today's Visit
Review allergy testing results and formulate treatment plan

Patient Information
Patient #: _____ Insurance: _____
Gender: _____ Primary Doctor: _____
DOB: _____

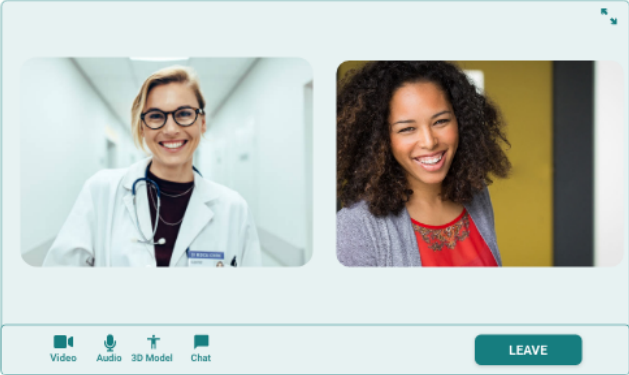
Registration form
Completed [See More Info](#)

Last Visit on 11/4/21

Reason for visit:
General check up and allergy update




Performed at last visit:
Referral to allergy specialist

Additional Notes: [See More Info](#)











Video Audio 3D Model Chat [LEAVE](#)


[e-Prescribe](#) [Refer to Specialist](#) [Refer for Testing](#)

LOGO About Us How It Works Blogs Privacy Policy Terms and Conditions Contact Us © 2021   

e-Prescribe




LOGO HOW IT WORKS TESTIMONIALS BLOGS ABOUT US CONTACT US Hi Dr. Robinson 

















 **Eliza Johnson**
Patient ID: _____
Gender: _____
Age: _____
Insurance: _____


Medications [Add](#) [Refill](#)

Prescription	Physician	Entry Date	Status

LOGO About Us How It Works Blogs Privacy Policy Terms and Conditions Contact Us © 2021   

LOGO HOW IT WORKS TESTIMONIALS BLOGS ABOUT US CONTACT US Hi Dr. Robinson 



Eliza Johnson
 Patient ID:
 Gender:
 Age:
 Insurance:

Prescription Form

Medication name and strength*

Dosage*

Qty*	Unit*	Refills*
<input type="text"/>	<input type="text"/>	<input type="text"/>

Instructions (optional)




Diagnosis*


Instructions to Pharmacy (optional)








Date of Issue


[Add more](#) [Prescribe](#)

[Download](#) [Print](#) [Save](#) [Save & Close](#)

LOGO About Us How It Works Blogs Privacy Policy Terms and Conditions Contact Us © 2021   

LOGO HOW IT WORKS TESTIMONIALS BLOGS ABOUT US CONTACT US Hi Dr. Robinson 



Eliza Johnson
 Patient ID:
 Gender:
 Age:
 Insurance:

Prescription Form

Medication name and strength*

Dosage*

Qty*	Unit*	Refills*
<input type="text"/>	<input type="text"/>	<input type="text"/>

Instructions (optional)

Diagnosis*


Instructions to Pharmacy (optional)




Date of Issue

[Add more](#) [Prescribe](#)

[Download](#) [Print](#) [Save](#) [Save & Close](#)

Prescription Form Sent!



LOGO About Us How It Works Blogs Privacy Policy Terms and Conditions Contact Us © 2021   

Patient's Portal

Login/Sign Up

LOGO

[HOW IT WORKS](#)

[TESTIMONIALS](#)

[BLOGS](#)

[ABOUT US](#)

[CONTACT US](#)



Log In to Your Account

[Forgot Your Password?](#)

LOGIN

[Sign Up](#)

LOGO

[About Us](#)

[How it Works](#)

[Blogs](#)

[Privacy Policy](#)

[Terms and Conditions](#)

[Contact Us](#)

© 2021



LOGO

[HOW IT WORKS](#)

[TESTIMONIALS](#)

[BLOGS](#)

[ABOUT US](#)

[CONTACT US](#)

Create an Account

SUBMIT

LOGO

[About Us](#)

[How it Works](#)

[Blogs](#)

[Privacy Policy](#)

[Terms and Conditions](#)

[Contact Us](#)

© 2021



LOGO HOW IT WORKS TESTIMONIALS BLOGS ABOUT US CONTACT US

Success!

Login to your account

User ID


Password

[Forgot Your Password?](#)

LOGIN

LOGO About Us How It Works Blogs Privacy Policy Terms and Conditions Contact Us © 2021 f t i

Patient's Dashboard

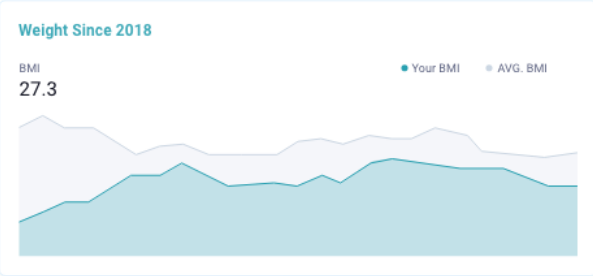
LOGO HOW IT WORKS TESTIMONIALS BLOGS ABOUT US CONTACT US Hi Alia 

Good Morning, Alia

Weight Since 2018

BMI
27.3

● Your BMI ■ AVG. BMI




Notifications / Messages







No New Messages

Schedule an Appointment **Check My Current Medications** **View Patient History**

LOGO About Us How It Works Blogs Privacy Policy Terms and Conditions Contact Us © 2021 f t i

Scheduling Appointments

LOGO HOW IT WORKS TESTIMONIALS BLOGS ABOUT US CONTACT US Hi Alla 

Appointments

Upcoming Appointment Details

Date & Time
11th Nov 2021, 10:00 AM - 11:00 AM

Reason
Cough

[JOIN](#) [RESCHEDULE](#)

[CANCEL](#) [PRESCREENING](#)

[NEW APPOINTMENT](#)

Past Appointments Details

Date & Time
10th Nov 2021, 10:00 AM - 11:00 AM

Reason
Cough

[DETAILS](#) [MEDICATIONS](#)




Date & Time
10th Nov 2021, 10:00 AM - 11:00 AM


Reason
Cough







[DETAILS](#) [MEDICATIONS](#)

November 2021

M	T	W	T	F	S	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	1	2	3	4	5

LOGO About Us How it Works Blogs Privacy Policy Terms and Conditions Contact Us © 2021   

LOGO HOW IT WORKS TESTIMONIALS BLOGS ABOUT US CONTACT US Hi Alla 

Schedule an Online Visit

Select Date

November 2021

M	T	W	T	F	S	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	1	2	3	4	5

Available Times




9:00 - 10:00 AM 10:00 AM - 11:00 AM


11:00 AM - 12:00 PM 12:00 PM - 1:00 PM







1:00 PM - 2:00 PM 2:00PM - 3:00 PM

3:00 PM - 4:00 PM 4:00 PM - 5:00 PM

[NEXT](#)

LOGO About Us How it Works Blogs Privacy Policy Terms and Conditions Contact Us © 2021   

LOGO HOW IT WORKS TESTIMONIALS BLOGS ABOUT US CONTACT US Hi Alia 

Schedule an Online Appointment

Who is this visit for?
Prior to this visit, please ensure medical history is updated with the most current information.

1 Alia
 2 Balvan (Alia's Son)




Reason for the scheduling
Select the reason for your visit


Description
Add your description for your visit here







Would you like to add any attachments to share with the provider? (Optional)
Add File

Visit Method
 Video Phone
In case of video call, please check your email for the link. And in case of phone call, you will receive the call from doctor's clinic.

NEXT

LOGO About Us How it Works Blogs Privacy Policy Terms and Conditions Contact Us © 2021   

LOGO HOW IT WORKS TESTIMONIALS BLOGS ABOUT US CONTACT US Hi Alia 

Schedule an Online Appointment

Who is this visit for?
Prior to this visit, please ensure medical history is updated with the most current information.

1 Alia
 2 Balvan (Alia's Son)

Reason for the scheduling
Select the reason for your visit

Description
Add your description for your visit here

Would you like to add any attachments to share with the provider? (Optional)
Add File

Visit Method
 Video Phone
In case of video call, please check your email for the link. And in case of phone call, you will receive the call from doctor's clinic.

NEXT




Appointment Details

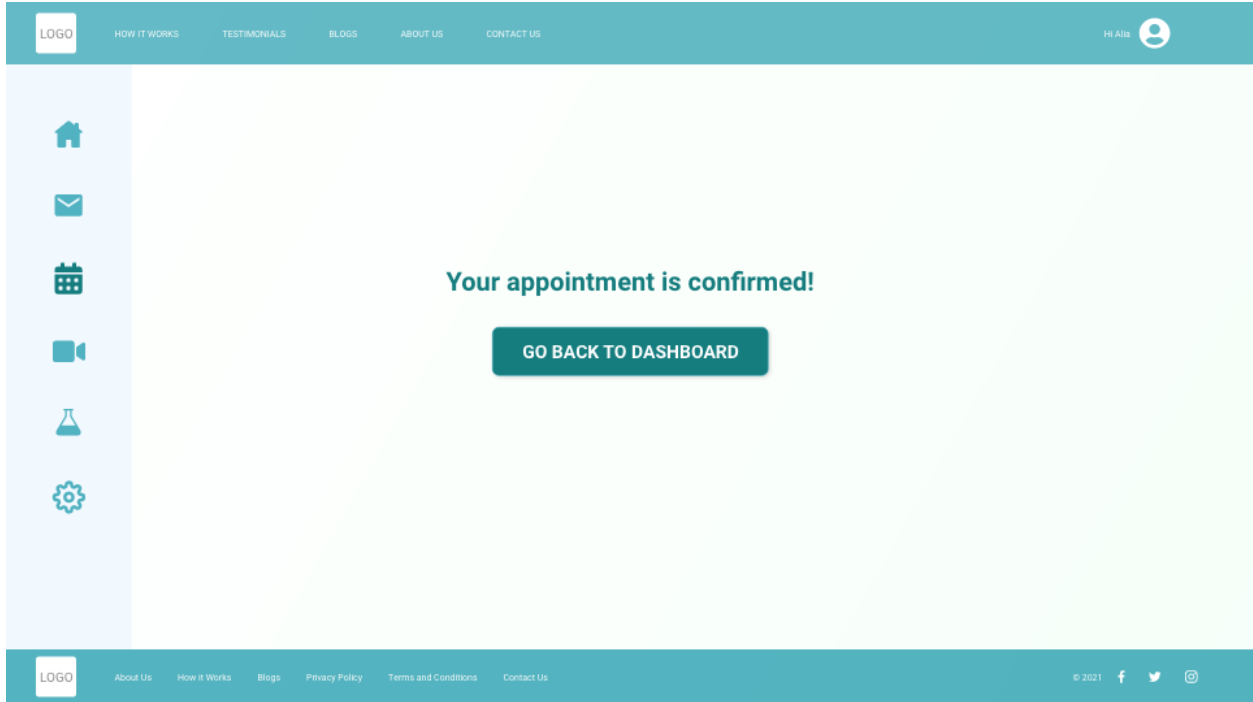
Date & Time
11th Nov 2021, 10.00 AM - 11.00 AM

Reason
Cough

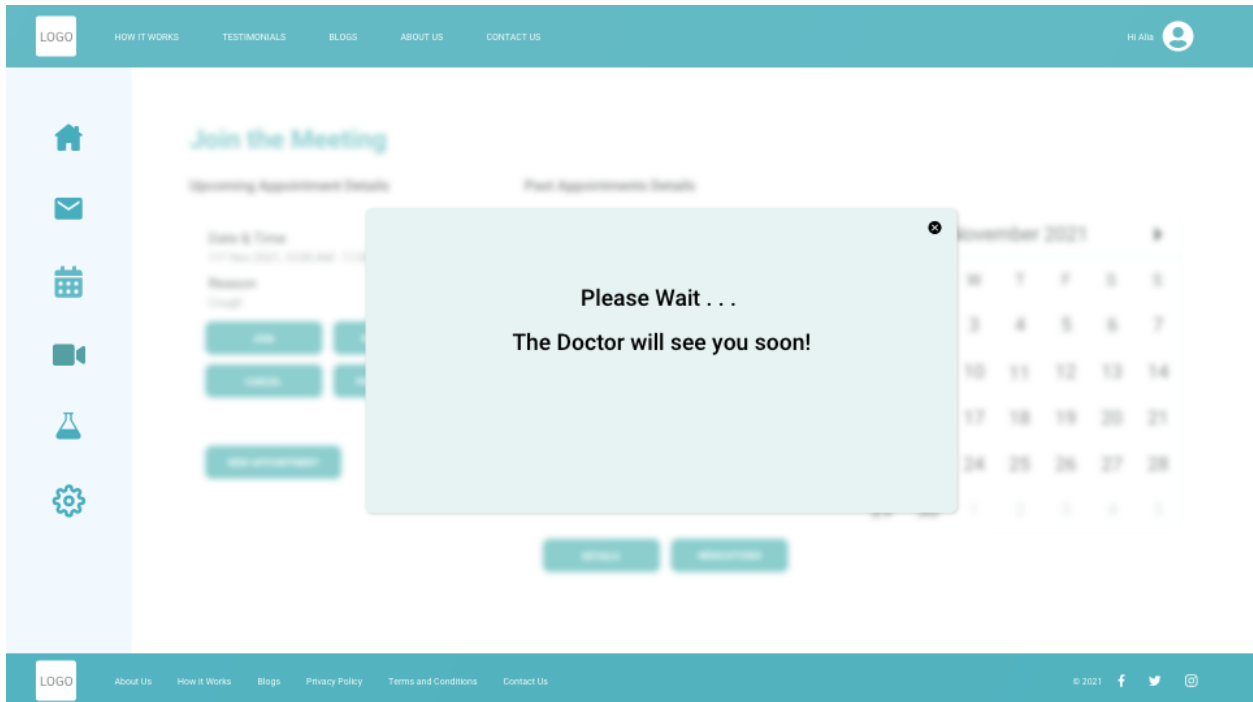
Visit Method
Video

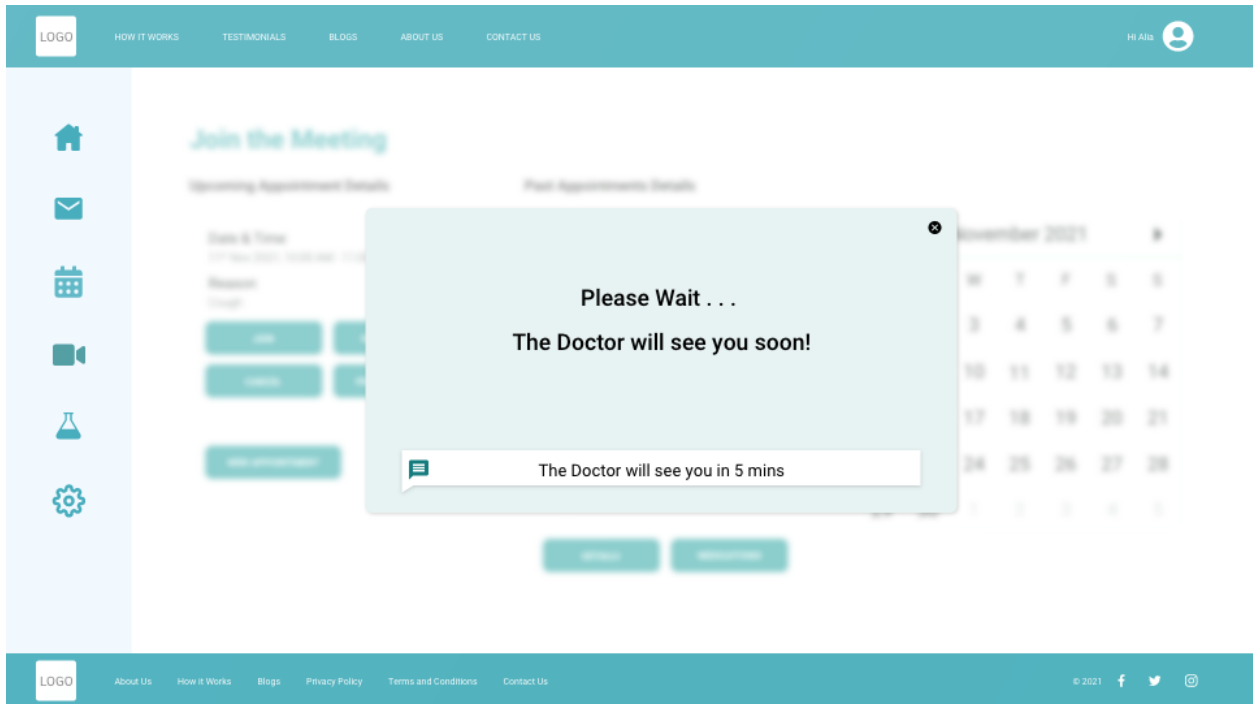
CONFIRM

LOGO About Us How it Works Blogs Privacy Policy Terms and Conditions Contact Us © 2021   

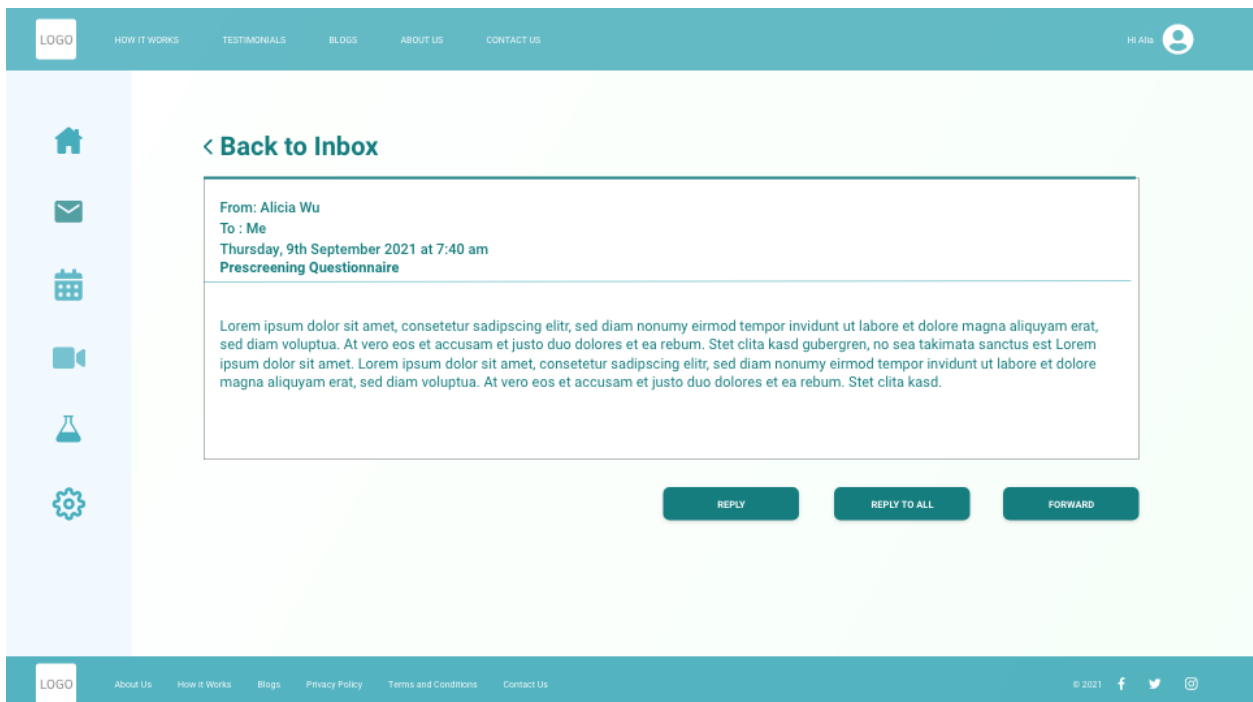


Waiting for the Online Session












Messages



Pre-screening Questionnaire

LOGO HOW IT WORKS TESTIMONIALS BLOGS ABOUT US CONTACT US Hi Alta 

Pre-screening Questionnaire




1/6


Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam?







Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam

Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam

NEXT

LOGO About Us How it Works Blogs Privacy Policy Terms and Conditions Contact Us © 2021   

LOGO HOW IT WORKS TESTIMONIALS BLOGS ABOUT US CONTACT US Hi Alta 












Pre-screening Questionnaire







2/6

Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam?

BACK **NEXT**

LOGO About Us How it Works Blogs Privacy Policy Terms and Conditions Contact Us © 2021   

LOGO HOW IT WORKS TESTIMONIALS BLOGS ABOUT US CONTACT US Hi Alla 




Pre-screening Questionnaire


3/6







Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam?

Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum.

BACK **NEXT**

LOGO About Us How it Works Blogs Privacy Policy Terms and Conditions Contact Us © 2021   

LOGO HOW IT WORKS TESTIMONIALS BLOGS ABOUT US CONTACT US Hi Alla 




Pre-screening Questionnaire


4/6







Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam?

Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum.

BACK **NEXT**

LOGO About Us How it Works Blogs Privacy Policy Terms and Conditions Contact Us © 2021   

LOGO HOW IT WORKS TESTIMONIALS BLOGS ABOUT US CONTACT US Hi Alla 

- 
- 
- 
- 
- 
- 




Pre-screening Questionnaire


4/6







Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam?

Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum.

BACK **NEXT**

LOGO About Us How it Works Blogs Privacy Policy Terms and Conditions Contact Us © 2021   


LOGO HOW IT WORKS TESTIMONIALS BLOGS ABOUT US CONTACT US Hi Alla 

- 
- 
- 
- 
- 
- 




Pre-screening Questionnaire


5/6







Select the area of concern on the 3D model



BACK **NEXT**

LOGO About Us How it Works Blogs Privacy Policy Terms and Conditions Contact Us © 2021   


LOGO HOW IT WORKS TESTIMONIALS BLOGS ABOUT US CONTACT US Hi Ala 




Pre-screening Questionnaire

6/6


Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam?







Lorem Ipsum 

BACK **SUBMIT**

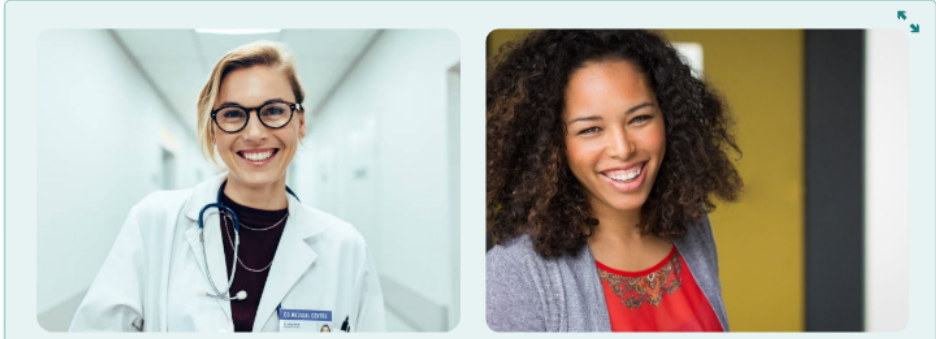
LOGO About Us How it Works Blogs Privacy Policy Terms and Conditions Contact Us © 2021   





Online Session




LOGO HOW IT WORKS TESTIMONIALS BLOGS ABOUT US CONTACT US Hi Ala 

Video Call in Progress...

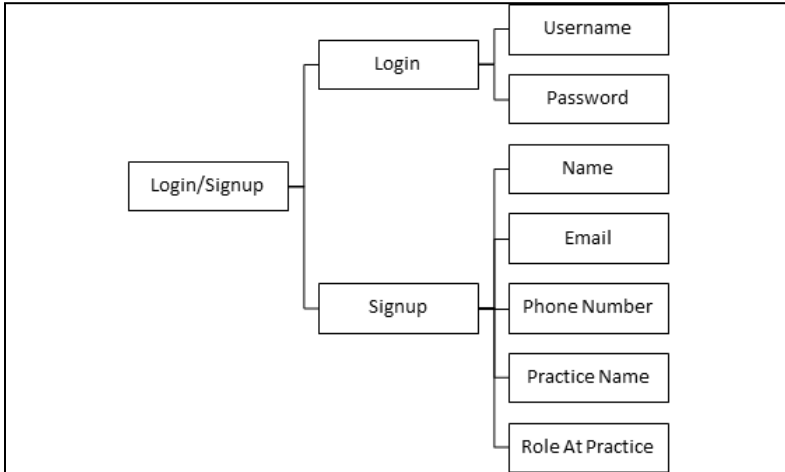


 Video  Audio  3D Model  Chat **LEAVE**

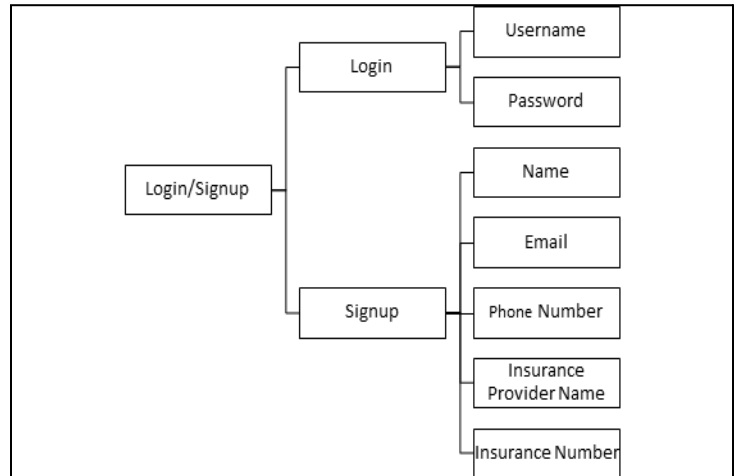
LOGO About Us How it Works Blogs Privacy Policy Terms and Conditions Contact Us © 2021   

Appendix B - HTA of the Selected Functions

Login/Sign Up for Doctor and Patient- HTA

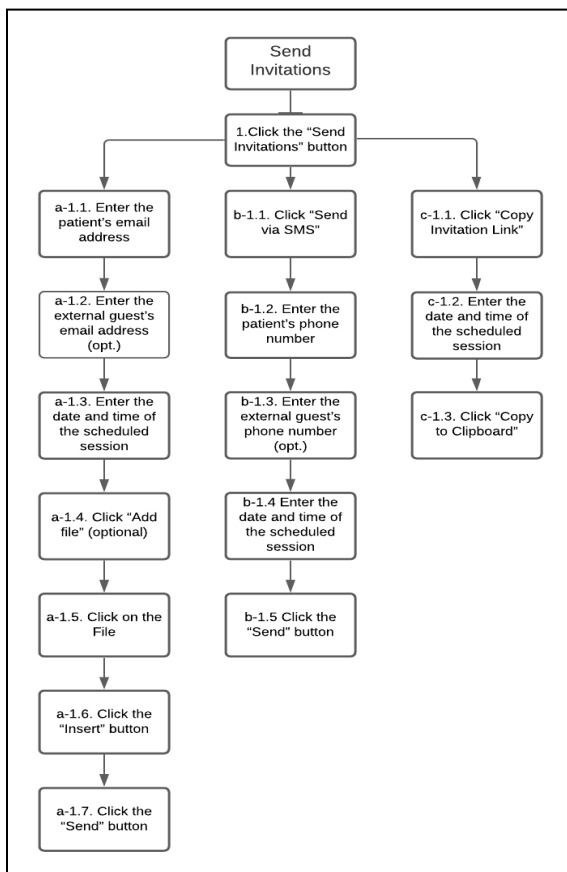


Doctor

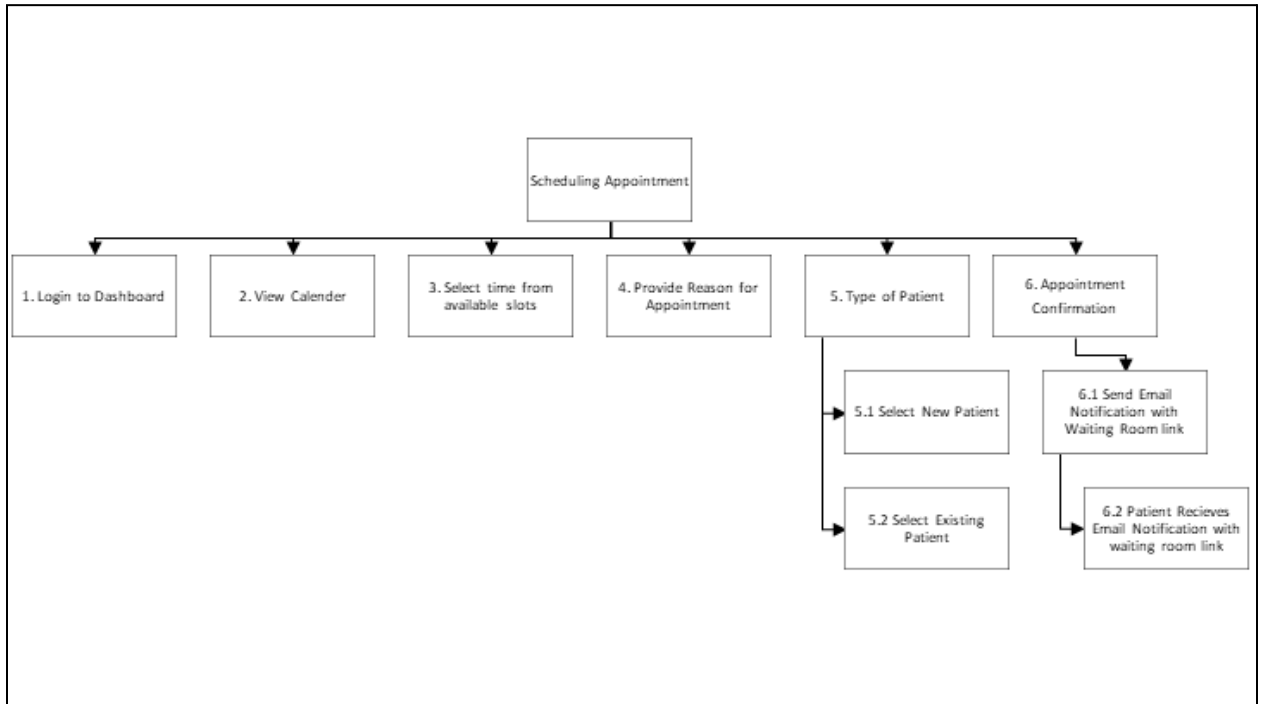


Patient

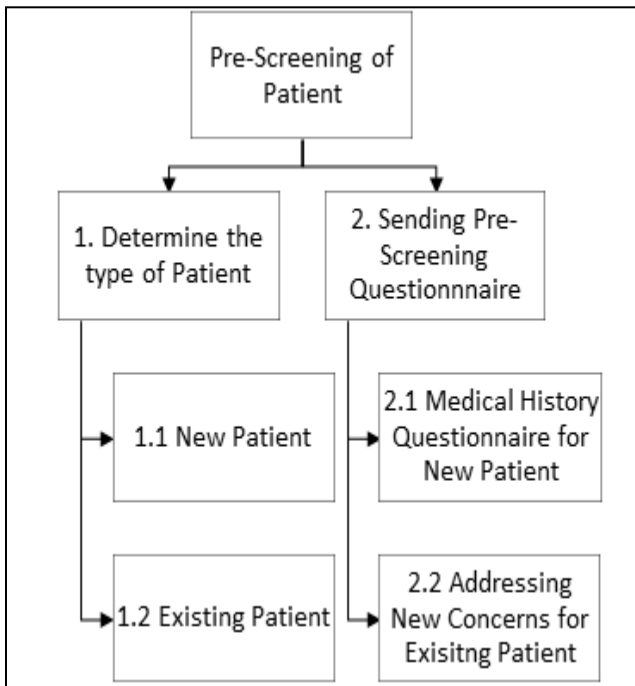
HTA for Sending Invitations :



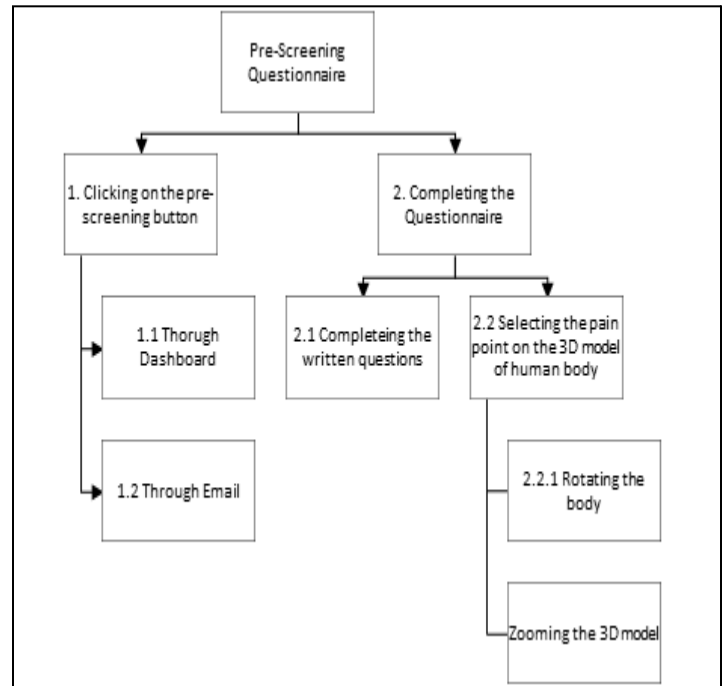
Scheduling Appointments HTA:



Pre-screening Doctor - HTA

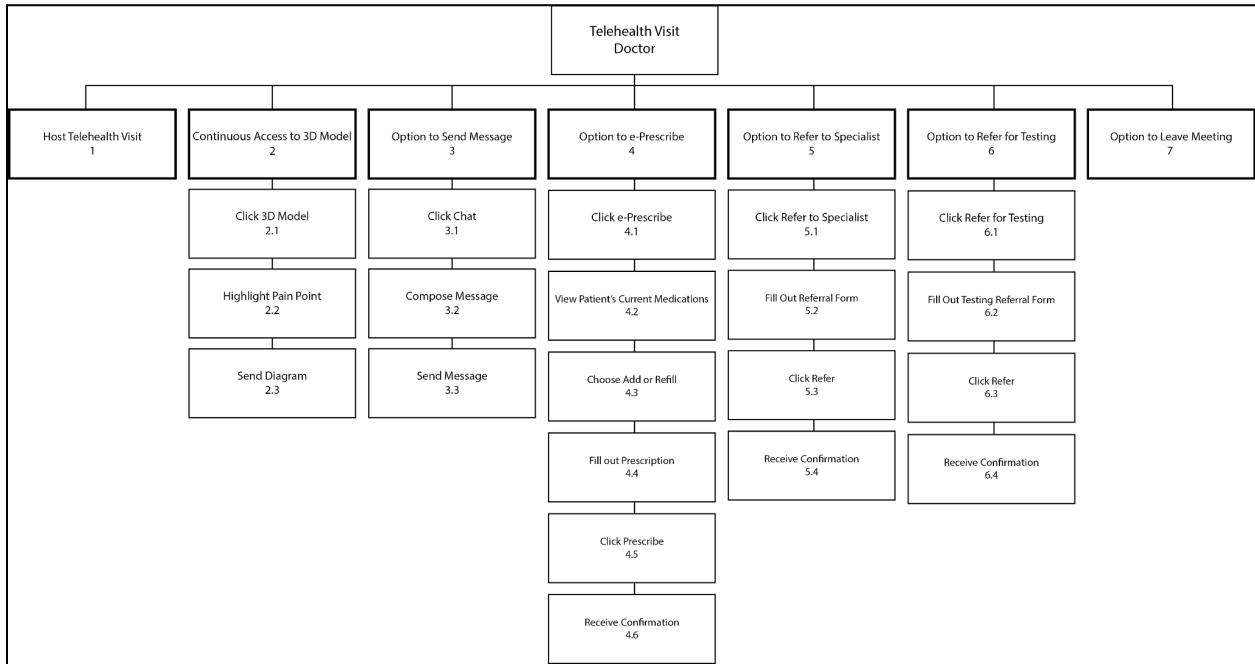
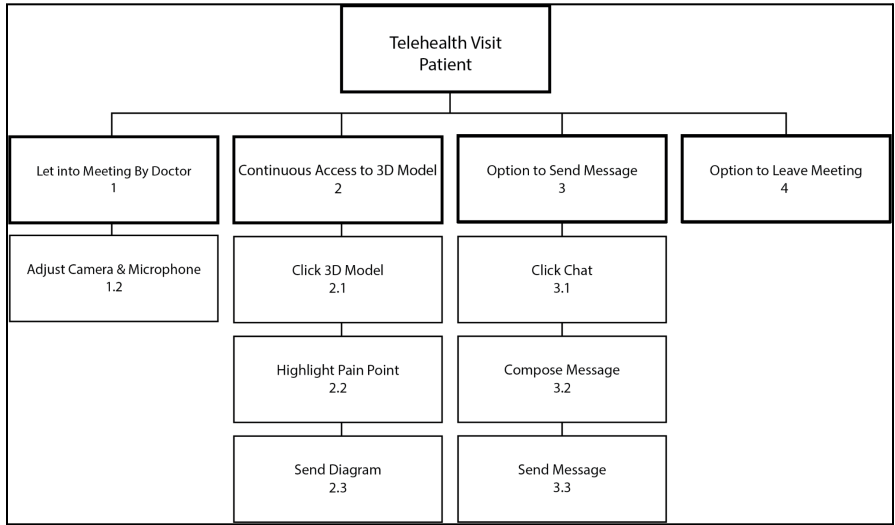


Doctor



Patient

Joining the Meeting- HTA:



Appendix C - Information Requirements: HTA Tables

Function 1 : Login/Sign Up

Task	Perceptual Requirements	Cognitive Requirements	Psychomotor Requirements
<i>1. Login(for both doctor and patient)</i>			
Enter Username and Password	Locate username and password	Remember username and pay attention to password, then click login	Fingers typing letters, hand moving mouse and fingers clicking mouse
<i>2.Signup(Doctor side)</i>			
Enter Name, Email, phone number, role at practice and practice name.	Locate the fields with Name, email, phone number, role at practice and practice name	Confirm if you have filled all details and also ensure they are correct	Hand moving mouse, fingers clicking mouse
<i>2. Sign Up(Patient Side)</i>			
Enter Name, Email, phone number, Insurance name and insurance number	Locate the fields with name, email, phone number, insurance number and insurance name	Confirm all fields are filled and they are correct	Hand moving mouse, fingers clicking mouse, fingers typing on keyboard.

Function 2: Scheduling Appointments

Task	Perceptual Requirements	Cognitive Requirements	Psychomotor Requirements
<i>1.Scheduling Appointment from the Doctor Side</i>			
Go to Calendar	Locate time slot with date	Confirm time slot and date	Fingers using keyboard to type, fingers clicking the mouse
Choose Appointment Type	Locate New or Existing Patient	Confirm the type of patient selected	fingers clicking the mouse
Confirming the Appointment	Check the details of the patient	Locate Confirm button and if the appointment made is correct	Eyes moving across the screen, fingers clicking the mouse

<i>2.Scheduling Appointment from the Patient Side</i>			
Go to Calendar	Select time and date	Confirm time and date	Fingers using keyboard to type, fingers clicking the mouse
Reason for Appointment	Write reason for appointment	Check if the reason selected is correct	Fingers using keyboard to type, fingers clicking the mouse
Confirming the Appointment	Check the time and date of the appointment	Locate confirm button with the appointment details	Eyes moving across the screen, fingers clicking the mouse

Function 3: Prescreening

Task	Perceptual Requirements	Cognitive Requirements	Psychomotor Requirements
<i>1.Sending a pre screening questionnaire to the patient(Doctor Side)</i>			
1. Selecting the schedule appointment button from the menu	Locate Icon on the sidebar menu	Confirm icons are selected to on	Hand moving mouse, fingers clicking the mouse
<i>2.Determining the type of patient</i>			
2.1 Selecting New Patient	Locating the type of patient	Confirm the name is selected correctly	Click on the type section moving your hand with the mouse and clicking the mouse with your finger
2.2 Selecting the Existing Patient	Locating the type of patient	Confirm the name is selected correctly	Click on the type section moving your hand with the mouse and clicking the mouse with your finger
2. Sending the questionnaire	Locating the button on the screen	Confirming the button is correct	Click on the button by moving your hand with the mouse and clicking the mouse with your finger
<i>3.Sending Pre-Questionnaire</i>			

3.1 Sending Questionnaire to the new patient	Locating the questionnaire for a new patient in the dropdown menu	Confirming the selected is the correct one	Click on the button by moving your hand with the mouse and clicking the mouse with your finger
3.2 Sending Questionnaire to the existing patient	Locating the questionnaire for an existing patient in the dropdown menu	Confirming the selected is the correct one	Click on the button by moving your hand with the mouse and clicking the mouse with your finger
2. Prescreening Questionnaire(Patient)			
1. Clicking the pre screening Questionnaire Button	Locating the button on the screen	Confirming the selected button is correct	Click the button by moving your hand with your finger
1.1 Clicking the press screening button on the dashboard	Locate the button on the Dashboard	Confirm the located button is correct	Hand moving mouse, fingers clicking mouse
1.2 Clicking the pre screening link from the inbox	Locate the link in the inbox	Confirming the link is corrected	Hand moving the mouse, fingers clicking the mouse, eyes searching for link
2 Completing the questionnaire	Locating and reading the questions on the screen	Confirm the written question is correct	Writing or selecting the answer by using a hands-on mouse or keyboard
2.1 Completing the written questions by selecting the radio button or writing them on text box	Locating the button or text box on the screen	Confirm the written or selected answer is correct	Writing or selecting the answers by using a hands-on mouse or keyboard
2.2 Selecting the pain points on the 3D model of human body	Locating the body part on the 3D model	Confirm the body part	Hands moving the mouse and finger-clicking mouse.
2.2.1 Rotating the 3D model	Locating the button to rotate the body	Confirm the button	Hands moving the mouse by holding the button on the mouse with fingers

2.2.2 Zooming the 3D model	Locating the body part on which zooming should be done	Confirming the body part	Fingers on the scroll and button
----------------------------	--	--------------------------	----------------------------------

Function 4: Sending Invitation

Task	Perceptual Requirements	Cognitive Requirements	Psychomotor Requirements
<i>4. Sending Invitations</i>			
<i>a-4. Send Invitations (via Email)</i>			
a-4.1. Click the “Send Invitations” button	Locate the “Send Invitations” button in the Doctor’s dashboard	Confirm that you want to send an invitation	Eyes looking for the “Send Invitations” button. Hand moving the mouse, finger clicking the mouse
a-4.2 Enter the patient’s email address	Locate input field for the patient’s email address (for a new patient); Scan the email address(es) automatically offered by the system (for a current patient)	Confirm the patient’s email address has been entered correctly	Eyes looking for/at the input field, fingers typing the address and/or clicking the mouse/tapping the touchpad
a-3.3 Enter the external guest’s email address (optional)	Locate input field for adding the external guest's email address ; Scan the email address(es) offered by the system	Confirm the external guest’s email address has been entered correctly	Eyes looking for/at the input field, fingers typing the address and/or clicking the mouse/tapping the touchpad
a-3.4 Enter the date and time of the scheduled session in the Message field	Locate the placeholders for the date and time in the Message field	Confirm the date and time have been entered correctly	Eyes looking for/at the input field, fingers typing the date and time
a-3.5 Click “Add file” (optional)	Locate the “+” icon for adding the file	Confirm the right list of files has been opened	Eyes looking at the “+” icon, finger clicking the mouse/tapping the touchpad

a-3.5.1 Click on the File	Locate the file to be attached	Confirm that the correct file has been selected	Eyes looking for the right file, finger clicking the mouse/tapping the touchpad
a-3.5.2 Click the “Insert” button	Locate the “Insert” button	Confirm you want to add the file	Eyes looking for/at the “Insert” button, finger clicking the mouse/tapping the touchpad
a-3.6 Click the “Send” button	Locate the “Send” button	Confirm you want to send the invitation	Eyes looking for/at the “Send” button, finger clicking the mouse/tapping the touchpad
<i>b-3 Send Invitations (via SMS)</i>			
b-3.1. Click the “Send Invitations” button	Locate the “Send Invitations” button in the Doctor’s dashboard	Confirm that you want to send an invitation	Eyes looking for the “Send Invitations” button Hand moving the mouse/finger sliding over the touchpad, finger clicking the mouse or tapping the touchpad
b-3.2. Click “Send via SMS” link	Locate the “Send via SMS” link	Confirm this is the preferred method of sending invitations	Eyes looking for the “Send via SMS” link Hand moving the mouse/finger sliding over the touchpad, finger clicking the mouse or tapping the touchpad

b-3.3. Enter the patient's phone number	Locate the input field for adding the patient's phone number (for a new patient); Scan the phone number(s) automatically offered by the system (for a current patient)	Confirm the patient's phone number has been entered correctly	Eyes looking for/at the input field, fingers typing the address and/or clicking the mouse/tapping the touchpad
b-3.4 Enter the external guest's phone number	Locate the input field for adding the external guest's phone number; Scan the phone number(s) automatically offered by the system	Confirm that the external guest's phone number has been entered correctly	Eyes looking for/at the input field, fingers typing the address and/or clicking the mouse/tapping the touchpad
b-3.4. Enter the date and time in the Message field	Locate the placeholders for the date and time	Confirm the date and time have been entered correctly	Eyes looking for/at the input field, fingers typing
b-3.5. Click the "Send" button	Locate the "Send" button	Confirm you want to send the invitation	Eyes looking for/at the "Send" button, finger clicking the mouse/tapping the touchpad
<i>c-3. Copy Invitation Link</i>			
c-3.1. Click the "Send Invitations" button	Locate the "Send Invitations" button in the Doctor's dashboard	Confirm you want to send an invitation	Eyes looking for the "Send Invitations" button Hand moving the mouse/finger sliding over the touchpad, finger clicking the mouse or tapping the touchpad

c-3.2. Click “Copy Invitation Link” link	Locate the “Copy Invitation Link” link	Confirm this is the preferred method of sending invitations	Eyes looking for the “Copy Invitation Link” link Hand moving the mouse/finger sliding over the touchpad , finger clicking the mouse or tapping the touchpad
c-3.3. Enter the date and time of the scheduled session in the Message field	Locate the placeholders for the date and time	Confirm the date and time have been entered correctly	Eyes looking for/at the input field, fingers typing the date and time
c-3.4. Click “Copy to Clipboard”	Locate the “Copy to Clipboard” button	Confirm that you want to copy the invitation link	Eyes looking for/at the “Copy to Clipboard” button, finger clicking the mouse/tapping the touchpad

Function 5 - Joining a Meeting

Task	Perceptual Requirements	Cognitive Requirements	Psychomotor Requirements
<i>1. Letting into Meeting By Doctor (Patient Side)</i>			
1.2 Adjust Camera and Microphone	Locate Camera and Microphone Icons	Confirm icons are selected to on	Hand moving mouse, fingers clicking mouse
<i>2. Continuous Access to 3D Model</i>			
2.1 Click 3D Model	Locate 3D Model Icon	Confirm 3D Model Icon is selected	Hand moving mouse, fingers clicking mouse
2.2 Highlight Pain Point	Locate correct body part currently in pain	Confirming correct body part is selected	Hand moving mouse, fingers clicking mouse, eyes searching for body part
2.3 Send Diagram	Locate send button	Confirming that send button is selected	Hand moving mouse, fingers clicking mouse
<i>3. Option to Send Message</i>			
3.1 Click Chat	Locate chat Icon	Confirming that chat icon is selected	Hand moving mouse, fingers clicking mouse

3.2 Compose Message	Locate text box	Confirming that imputed text is correct	Hand moving mouse, fingers clicking mouse, fingers typing
3.3 Send Message	Locate send button	Confirming that send button is selected	Hand moving mouse, fingers clicking mouse
<i>4. Option to Leave Meeting</i>			
4. Leave Meeting	Locate leave button	Confirming that meeting is over, confirming that leave button is selected	Hand moving mouse, fingers clicking mouse, eyes searching for leave button
<i>1. Host Telehealth Visit(Doctor's Side)</i>			
1. Host Telehealth Visit	Locate meeting Icon	Confirm meeting icon is selected	Hand moving mouse, fingers clicking the mouse
<i>2. Continuous Access to 3D Model</i>			
2.1 Click 3D Model	Locate 3D Model Icon	Confirm 3D Model Icon is selected	Hand moving mouse, fingers clicking the mouse
2.2 Highlight Pain Point	Locate correct body part currently in pain	Confirming correct body part is selected	Hand moving the mouse, fingers clicking the mouse, eyes searching for body part
2.3 Send Diagram	Locate send button	Confirming that send button is selected	Hand moving mouse, fingers clicking the mouse
<i>3. Option to Send Message</i>			
3.1 Click Chat	Locate chat Icon	Confirming that chat icon is selected	Hand moving mouse, fingers clicking mouse
3.2 Compose Message	Locate text box	Confirming that input text is correct	Hand moving mouse, fingers clicking mouse, fingers typing
3.3 Send Message	Locate send button	Confirming that send button is selected	Hand moving mouse, fingers clicking mouse
<i>4. Option to e-Prescribe</i>			
4.1 Click e-Prescribe	Locate e-Prescribe button	Confirming that e-Prescribed is selected	Eyes searching for button, hand moving mouse, fingers clicking mouse

4.2 View patient's current medications	Reading over provided information	Confirming that suggested medication is not already prescribed /won't conflict with existing medications	Eyes reading, hand moving mouse, fingers clicking mouse
4.3 Choose add or refill	Locate either add or refill	Confirming correct button is selected	Eyes searching for button, hand moving mouse, fingers clicking mouse
4.4 Fill out prescription	Reading over form	Confirming correct information is inputted	Eyes reading, hand moving mouse, fingers clicking mouse, fingers typing
4.5 Click prescribe	Locate prescribe button	Confirming that prescribe is selected	Hand moving mouse, fingers clicking mouse
4.6 Receive confirmation	Observe confirmation popup	Processing visual clues	Eyes searching for pop-up
<i>5. Option to Refer to Specialist</i>			
5.1 Click refer to specialist	Locate refer to specialist button	Confirming correct button is selected	Hand moving mouse, fingers clicking mouse
5.2 Fill out Referral Form	Reading over form	Confirming correct information is inputted	Eyes reading, hand moving mouse, fingers clicking mouse, fingers typing
5.3 Click refer	Locate refer button	Confirming refer button is selected	Hand moving mouse, fingers clicking mouse
5.4 Receive confirmation	Observe confirmation popup	Processing visual clues	Eyes searching for pop-up
<i>6. Option to Refer for Testing</i>			
6.1 Click refer for testing	Locate refer for testing button	Confirming correct button is selected	Hand moving mouse, fingers clicking mouse, eyes scanning
6.2 Fill out testing referral form	Reading over form	Confirming correct information is inputted	Eyes reading, hand moving mouse, fingers clicking mouse, fingers typing
6.3 Click Refer	Locate refer button	Confirming refer button is selected	Hand moving mouse, fingers clicking mouse

6.4 Receive confirmation	Observe confirmation popup	Processing visual clues	Eyes searching for pop-up
<i>7. Option to Leave Meeting</i>			
7. Leave Meeting	Locate leave button	Confirming that meeting is over, confirming that leave button is selected	Hand moving mouse, fingers clicking mouse, eyes searching for leave button