

Improve User Experience For Chronic Patients

A comparison between America and
China's Telehealth

Author: Xueyue Wu

ID Code: 10701624

Supervisor: Giovanna Di Rosario

Academic Year 2021-2022

SCHOOL OF DESIGN

LM in COMMUNICATION DESIGN

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ABSTRACT

La popolazione cinese continua a invecchiare per tanto il numero di pazienti affetti da malattie croniche in Cina aumenterà notevolmente in futuro. La disponibilità di risorse mediche adeguate e un ottimo livello della gestione delle cure di malattie croniche avranno un impatto fondamentale sul tenore di vita e sul benessere dei pazienti con malattie croniche. Pertanto, comprendere le esigenze dei pazienti con malattie croniche in Cina e migliorare il sistema di gestione delle stesse attraverso Telehealth potrebbe essere uno dei modi efficaci per riallocare razionalmente le risorse mediche. Questa tesi discute principalmente come sviluppare la gestione delle malattie croniche nella piattaforma di telemedicina e come migliorare l'esperienza dell'utente e dei pazienti con malattie croniche. La tesi, dopo aver presentato lo scopo e la motivazione della ricerca, offre un panorama sulla letteratura inerente la telemedicina, il suo stato di sviluppo negli Stati Uniti e in Cina, la definizione di malattie croniche e lo sviluppo della gestione delle malattie croniche. Discute, poi, sia le differenze e le caratteristiche dello sviluppo della telemedicina negli Stati Uniti e in Cina, che le possibilità e le tendenze dello sviluppo della gestione delle malattie croniche nella telemedicina. Confrontando l'esperienza dei pazienti affetti da malattie croniche negli Stati Uniti e in Cina su piattaforme rappresentative di telemedicina,

questa tesi riassume i problemi e le sfide attuali della gestione delle malattie croniche nella telemedicina. Infine, l'ultima parte della tesi si concentra principalmente sui bisogni medici dei pazienti cinesi con malattie croniche, ne definisce il profilo utente, gli obiettivi e le aspettative attraverso questionari e interviste. Qui vi si descrive l' utilizzo di strumenti digitali per trasformare le idee in visualizzazioni, si riesplora il sistema e si cercano soluzioni per migliorare l'esperienza dei pazienti delle piattaforme di Telemedicina.

Parola chiave: Esperienza Utente, Esperienza del Paziente, Telehealth, Telemedicina, Cura Malattie Croniche

ABSTRACT

As China's population ages, the number of patients with chronic diseases will increase significantly in the future. The availability of adequate healthcare resources and a high level of chronic care management will have a crucial impact on the living and well-being of patients with chronic diseases.

Therefore, understanding the needs of chronic patients in China and upgrading Telehealth's chronic care system is an effective way to reallocate healthcare resources rationally. This thesis mainly concentrated on developing chronic care management on Improving customer experience for chronic patients.

The thesis is structured in four parts. The first part introduces the scope and motivation for studying the field. The second part provides a literature review on the definition of Telehealth, its current development in the United States and China, the definition of chronic disease, and the development of chronic disease management. The differences in the development of Telehealth in the U.S. and China as well as the characteristics, the possibilities and development trends of chronic disease management in Telehealth are discussed. In the third part, we summarize the current issues and challenges of Telehealth chronic disease management by comparing the user experience of chronic disease patients in

the United States and China on a representative Telehealth platform. In addition, we focus on the healthcare needs of Chinese chronic disease patients, define user profiles, goals and expectations through questionnaires and interviews. In the final part, use digital tools to visualize ideas and re-explore systems to improve the user experience on the Telehealth platform. Furthermore, an attempt is made to map the trends and future of Chronic care management in Telehealth.

Keywords: User experience, Customer Experience, Telehealth, Telemedicine, Chronic Care, Internet hospital, Virtual Care

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The lengthy process of finishing this paper on Telehealth and user experience has taught me a great deal, and I am indebted to many people. I want to thank my professor Giovanna Di Rosario for her guidance during the completion of my dissertation; her patience, politeness, and support were inspiring. This has been an unforgettable experience. I want to thank Politecnico di Milano for providing these instructional materials. I am extremely glad for the time I spent on campus, as the lecturers and students were so kind, and I gained a great deal of knowledge. This event has altered the course of my life, and I shall begin the next phase of my life with fond recollections of Milan. Additionally, I'd like to thank my family, their love brought me to Milan, and their love and encouragement gave me tremendous strength.

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Introduction

Research Background

Following more than a decade of rapid growth, Telehealth appears more relevant to people than ever before. During Covid-19, the Telehealth platform had unprecedented user coverage and several users. People are using telemedicine increasingly, driven by the epidemic, but there is still a great demand for access to care that cannot be satisfied online. Telehealth is facing a need for transformation in its development. The gradual coverage from the treatment of common diseases to chronic diseases and the use of digitalization and machine learning to increase the accuracy of diagnostic results play a key role in developing more users and fostering user habits. It is becoming increasingly convenient for wearable health testing devices to manage health.

With the deepening ageing of society, Telehealth possesses a huge market potential and advantages in chronic disease management. Based on the data from iRsearch, more than 95% of Telehealth users in China are satisfied with the combination of Internet and medical care and express interest in using or purchasing the product. More than one-third of users think Telehealth can be used for scenarios such as common diseases, chronic diseases or post-illness monitoring and rehabilitation, but not suitable for serious diseases.

During the Covid-19 pandemic, users' consumption habits changed significantly. They rely more on the Telehealth platform, and their demand for exercise rehabilitation, diet matching and home monitoring has increased significantly.

China's excellent medical resources are mainly concentrated in first-tier major cities, with uneven and insufficient total resource distribution. People spend considerable time making appointments, waiting for appointments, and picking up medications. The shortage of doctor resources in 3A grade hospitals, where people prefer to go for medical treatment out of trust, further aggravates the insufficient and uneven distribution of medical resources. China's 3A grade hospitals are currently attempting to provide more online consultation options. From the patient's perspective, patients with common diseases can receive satisfactory medical services more quickly and at a lower cost. Patients with chronic diseases can reduce their commuting time during follow-up appointments. From the physician's side, providing online access increases mobility and reduces commute time, and physicians can receive more compensation and clinical opportunities based on their schedule. To further provide better healthcare services, the government has introduced policies to promote the development of online healthcare. Currently, the service of online medical consultation is well developed, percent of patients nationwide have used online

medical treatment, and user habits are being further strengthened. However, many aspects of online healthcare services still need to be improved to enhance the user experience. How to make the triage system more complete, make the diagnosis more accurate, make the appointment consultation prescription pickup link more user-friendly, and let users enjoy better health management are the the issues that need to be addressed in online healthcare.

Motivation

This thesis aims to enhance remote chronic disease management by examining the user experience of chronic disease management in Telehealth in the United States and China, as well as to predict the future trends of chronic disease management in the digital era. By studying the current needs of Chinese users for chronic disease treatment and combining Telehealth's features with the local healthcare system, we try to develop and explore more convenient and effective personal disease solutions.

With more than a decade of development, Telehealth has played an essential role in people's daily life. Especially during Covid-19, when medical resources in brick-and-mortar hospitals are scarce, and there is a high risk of infection, Telehealth has come into the lives of more and more people as telemedicine has met the demand for remote access to medical care. China has more than 900 Telehealth platforms and 298 million users until 2021. The Telehealth platform diagnoses common diseases and allows people to get prescriptions and medication at a lower price. However, services related to chronic diseases are still in the early stages of development. With 50 million people with chronic diseases in China, there is a significant market demand and growth prospect for chronic disease management in Telehealth.

In addition, the primary users of Telehealth are currently between 20 and 30 years old. How to attract higher age groups, provide them with a smooth user experience and develop user habits becomes a challenge for Telehealth's sustainable development in China. For older patients, the confusing interface and unclear flow of the Telehealth platform can cause frustration and low satisfaction, which can lead them to discontinue using this platform. Providing a smooth user experience and personalized chronic disease management solutions for older patients is critical. In the United States, the Telehealth industry has grown over the years and has a wide reach with users of all ages. Studying their industrial development and characteristics can be valuable in improving the Telehealth user experience for users in China. These factors motivated my interest to write a thesis about improving the user experience of chronic care management in Telehealth by researching the system workflow and UI/UX design of the Telehealth industry in the United States and China.

Objective & Research Question

The purpose of the thesis is to redesign a Telehealth application for chronic care patients to solve the problems of the confusing review process and single function of the previous Telehealth platform. After studying the popular Telehealth platforms in the US and China, we summarize the needs and dilemmas of chronic disease patients using Telehealth and try to extend and develop more features to improve chronic disease management. China currently has a large population of chronic disease patients who rely heavily on follow-up visits to 3A grade hospitals. Providing follow-up visits, prescriptions, and medication through Telehealth can alleviate the current shortage of medical resources. At the same time, it is challenging to guide middle-aged and elderly users. They are willing to use Telehealth to complete remote medical visits independently and reduce the frustration in the user experience.

The main research questions

In this thesis, we study the user experience and critical insight of chronic disease patients on Telehealth through case studies and questionnaire, analyze the problems and advantages of the mainstream platform Telehealth in the US and China, and study how to improve Telehealth user experience and

develop health management habits for Chinese chronic disease patients.

The goals to be achieved

Complete the UI and UX design of the Telehealth Application for chronic disease patients, and improve the user experience of services, including health data management, online consultation, and follow-up consultation.

Research Approach

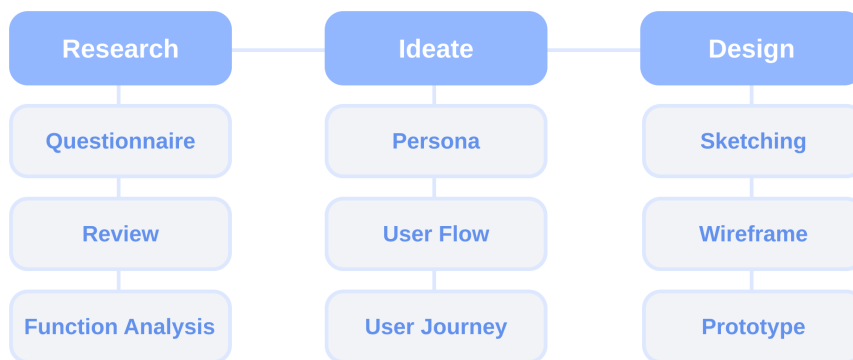


Figure 1 The Research Approach

This user experience research is divided into three steps. Different design methods and tools are used in each part to set goals and find solutions. In user experience research, by organizing an online questionnaire for chronic patients in China, the thesis analyses their feeling, user behaviors, types of disease, medical treatment, consumption and income, then summarize the insight. Furthermore, two case studies on competitor analysis help understand the user flow and experience. Based on customer reviews, Telehealth platform's advantages and issues can be found. After case studies, thesis started to create persona and empathy map for target groups. By translating customers' behaviors to visualization to define the problem and set a goal.

During the design phase, the thesis uses digital tools like sketch and Figma to create a wireframe and prototype. The wireframe must demonstrate the interface in different scenarios according to the user flow. Furthermore, redefine the service and functions for the target group to improve user experience.

Thesis Structure

Chapter I

Chapter I introduces the basic definition of Telehealth and its development history in the United States and China. Through data research on the market demand, population served, ecosystem, business model and generally provided medical services of Telehealth in the United States and China, the advantages and disadvantages of Telehealth are summarized in the comparison, and the current problems are proposed, and solutions are derived. The trend and future of Telehealth are explained by comparing the two countries' different healthcare systems and development characteristics. Then the thesis explains what chronic disease management is and what services it needs to provide to users compared to other treatments. The study investigates the number of patients with chronic diseases in the United States and China and the size of the industry that assists them. It analyzes the needs of patients with chronic diseases and medical support resources.

Furthermore, it also investigated what chronic disease treatment management services Telehealth could develop to provide convenient and affordable services to more patients in the future to enhance their life satisfaction.

Chapter II

Through case study research, we analyze Amwell, a leading Telehealth company in the U.S., and Alibaba Health in China. Amwell mainly provides common disease diagnosis and chronic disease management services. It has a large number of users and is also the Telehealth platform with the highest user ratings. Alibaba Health offers more services than just common diseases, such as pharmacy chain delivery services, health lectures, health food stores, and even patient communities. It is currently one of the Telehealth Apps with the largest number of users in China. These two typical Telehealth platforms can be used to analyze the current problems of chronic disease management on Telehealth and explore how to improve the user experience and the way for future development. Then, the thesis investigates the needs of Chinese chronic disease patients for chronic disease treatment and hospital follow-up services through a questionnaire, defines the problems that need to be solved in Telehealth's chronic disease management based on the user

process analysis of case study, and propose design solutions and implementations.

Chapter III

In the design part, the thesis defines the improvement that must be solved in chronic patients' user flow and creates a new prototype and interface using Figma. At last, the shortcomings that still exist in Telehealth's chronic care management are summarized, as well as the outlook of the future trend of integrating online and offline services by combining with artificial intelligence technology.



Literature review

1

1.1 What is Telehealth



Figure 2 The Components Of Telehealth

The most basic engagement of eHealth involves telecommunications and virtual technology to deliver health care outside of traditional facilities. The Telehealth industry is a combination of health care and Internet technology. It allows the long-distance patient and physician communication, such as health care, health advice, reminders, education, intervention, monitoring and remote admissions.

When rural areas, lack of transport, mobility, conditions due to outbreaks, epidemics or pandemics, decreased funding, or a lack of staff restrict access to healthcare, Telehealth may provide service and education remotely. Telehealth could

discuss the case over live video; have physical therapy through digital monitoring instruments; home monitoring by a continuous sending of patient health data; test result being forwarded to different facilities for diagnosis by specialist; face to face online conference.

Telehealth requires good Internet access, reliable broadband connection, and broadband mobile communication technology of at least the *fourth generation*(4G) or *long-term evolution* (LTE) are the technological breakthroughs it has been waiting for. Scientists and medical experts had more opportunities and dynamic tools to conduct remote treatment. With the improvement of the Internet, Telehealth usage has become more widely feasible.

Telehealth has four main methods to deliver the message and connect physicians with patients: store-and-forward, remote monitoring, real-time interactive, and live video. Store-and-forward involves acquiring medical data such as medical images and lab tests and then transmitting this data to a physician or medical specialist. It does not require presence at the same time. The digitization of information made sending, receiving, managing and storing data much more effortless. Physicians would analyze the results of physical examinations for patients by relying on a history report and images or audio information. Through remote monitoring, such as self-

monitoring or testing, people can manage chronic diseases or specific conditions at home, such as heart disease and diabetes mellitus. Medical professionals may monitor a patient remotely using various technological devices to have health outcomes and lower costs. Real-time interaction has been used in a wide range of clinical disciplines, providing patients with management, diagnosis, counselling and monitoring. Live video in Telehealth connects users at different locations for communication between people in real-time.

With the natural advantages of the Internet, Telehealth can reach more users, providing medical services with less appointment time, lower costs and more flexible locations than traditional brick-and-mortar hospitals. In the face of severe and rare diseases, Telehealth allows joint consultations with specialists from various departments of different hospitals, breaking through geographical limitations and bringing a chance of cure to patients with rare diseases. Telehealth was used more often during the Covid-19 pandemic in 2020. The application of Telehealth creates more possibilities for future infectious disease control and prevention in the face of pandemic infections.

1.2 History of Telehealth

1.2.1 Development of Telehealth in US

The Development of Telehealth in U.S.

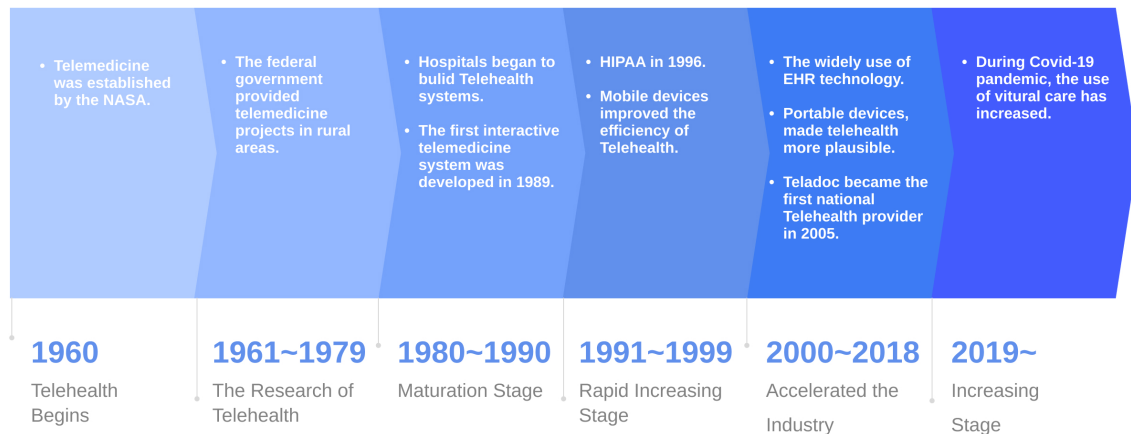


Figure 3 The Development Of Telehealth In U.S.

In the United States, space travel and the National Aeronautics and Space Association (NASA) pushed Telehealth forward and got its first modern upgrade in the 1960s. Biometric data was transmitted back to scientists on Earth during this time via a telemetric link. In 1972, the federal government provided funding for seven telemedicine research and development projects to explore how the technology could be used to overcome challenges to healthcare in rural areas. From the 1980s to the 1990s, Telehealth projects started to take off but failed to enter mainstream healthcare. Because state funding was beginning

to run low, many hospitals began launching their Telehealth systems. In 1989, the first interactive telemedicine system over standard telephone lines was developed and launched by MedPhone Corporation. As Telehealth expanded in 1990, a system such as MedNet was established. The chatting system allowed live audio and visual, so the doctor on the other side could see and hear what is happening. Also, with the help of monitoring devices, health care beyond hospitals improved, which means people were being helped efficiently. The concept of Telehealth has since spread, with Telehealth popping up all over the United States and many physicians joining the ranks of telemedicine. In the United States, all formal telemedicine procedures must comply with the *Health Insurance Portability and Accountability Act of 1996 (HIPAA)*. In terms of health privacy and security, HIPAA rules place great importance on the privacy of personal health information, stipulating that no one has access to information they are not supposed to have, and that doctors cannot access patient health information outside of the consultation session.

After 2000, portable devices, like laptops and mobile phones, made Telehealth more plausible. Then Telehealth industry expanded into health promotion, prevention and education. In the 2010s, integrating smart home Telehealth technologies, such as health and wellness devices and software, accelerated

the industry. By increasingly adopting the use of self-tracking and cloud-based technologies, the innovative data analytic approaches have increased the speed of Telehealth delivery. In 2015, the *Electronic Medical Record* (EHR) was widely used in the health care system, which means digitising medical information. With the advancement of technology, Telehealth is becoming a new means of healthcare in addition to the traditional doctor's visit, allowing patients to consult a doctor off-site from home instead of going directly to a hospital or clinic. About 15% of physicians in the United States currently accept telemedicine patients. Telemedicine use soared after COVID-19, and this upward trend is likely to continue. Faced with the risk of infection from a large-scale epidemic, patients with chronic conditions such as heart disease and diabetes tend to stay out of the hospital and reduce the risk of infection. Telemedicine, virtual visits and other digital health technologies play a key role in this scenario. The demand for telemedicine has increased dramatically in the U.S. healthcare system. Before the outbreak of COVID-19, about 4% of outpatient visits were telemedicine visits. During the outbreak, 85% of consultations were telemedicine visits, and long-term developments of COVID-19 are likely to continue this trend. Large insurers are incorporating technologies such as health data testing and digital coaching into insurance reimbursement, which can inform patients in real-time about

what behaviors affect blood sugar levels and allow people to care for themselves better.

1.2.2 Development of Telehealth in China

The Development of Telehealth in China

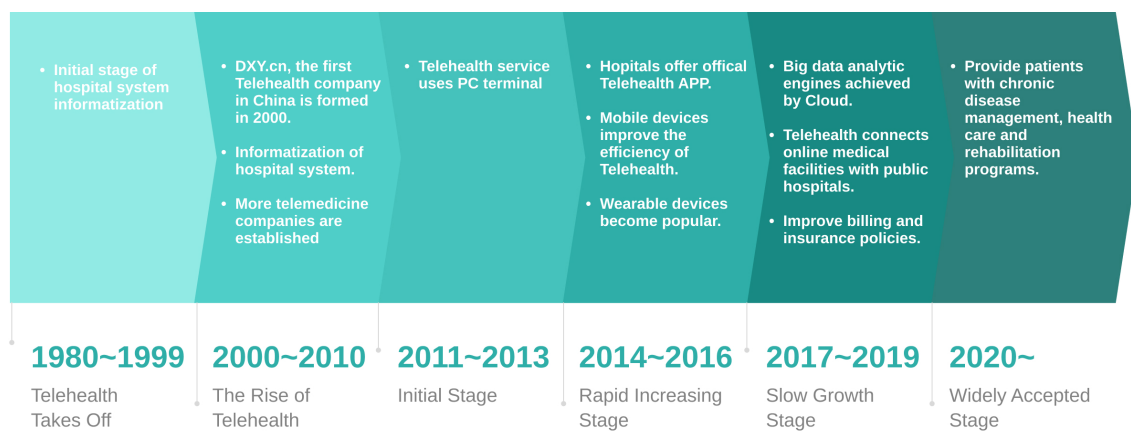


Figure 4 The Development Of Telehealth In China

China first engaged in medical eHealth in the 1980s, integrating computers and hospital workflows. 2000 saw the launch of the famous Internet medical website Dingxiang Yuan, the first Telehealth company in China, which marked the rise of the Internet medical industry. Over the next decade, Telehealth continued to flourish. Between 2011 and 2013, as Internet technology became more popular and developed, more big Internet healthcare companies were established, such as Chunyu Doctor Company, founded in 2011.

Telehealth, at this stage, mainly used computer-based appointment registration, telephone consultation, and patient self-diagnosis services to enhance doctor-patient communication. Between 2014 and 2016, the wave of startup financing spread to the healthcare industry, and with the influx of funds, Telehealth ushered in rapid development. During this period, public hospitals launched official mobile applications to provide online medical services such as outpatient follow-up. Mobile smart devices have greatly improved the efficiency of Internet healthcare. After that, the Telehealth industry began to explore various commercial profit models, and investments became rational.

On the other hand, due to the reduction of national policy support, the Telehealth industry, in general, developed slowly. With the General Office of the State Council releasing the Opinions of the General Office of the State Council on Promoting the Development of "Internet + Medical Health" in 2018, the status of Telehealth and its standards were established. The management system and medical insurance payment policy of Internet healthcare have been gradually improved. Internet hospitals were allowed to prescribe for common and chronic diseases and hand prescriptions to third-party platforms for drug delivery, which undoubtedly encouraged more people to use online consultation. During the COVID-19 pandemic in 2020, the advantages of Telehealth were further exploited to avoid the gathering of

high-risk people while reducing the pressure of physical hospital visits and meeting the demand for home treatment and medication for patients with minor and chronic diseases. In this stage, with the development of digitalization, the scope of Internet healthcare extended from in-hospital to out-of-hospital, providing patients with a broader range of healthcare services such as chronic disease management, health care and rehabilitation programs.

1.3 Telehealth industry in US

According According to the WHO, 2020-2030 could be the decade of redefining the Telehealth system. Globally, the Telehealth industry is accelerating. In the United States, the telemedicine industry has developed rapidly in the past ten years. Many companies have been established, including Teladoc Health, American Well, Grand Rounds, and More Health. Based on a verified Market research report, the global telemedicine market was valued at \$21.17 billion in 2019 and is forecast to reach \$71.44 billion by 2027. According to the U.S. Centers for Disease Control and Prevention (CDC), there are 1.25 billion outpatient visits in the United States each year, one-third of which can be resolved through Telehealth. In the United States, high cost motivates the development of Telehealth. The cost with primary care doctors each time is about \$106, while the fee on Teledoc is around \$60. The huge gap between online and offline medical costs active the Telehealth industry. In addition, Telehealth can avoid the long waiting time after appointments and improve the convenience of medical treatment. On the other hand, the average annual salary of doctors in the United States is about 210,000 US dollars, and doctors on Telehealth in the United States is about 175,000 US dollars, so Telehealth may improve doctors' income.

Operating mode

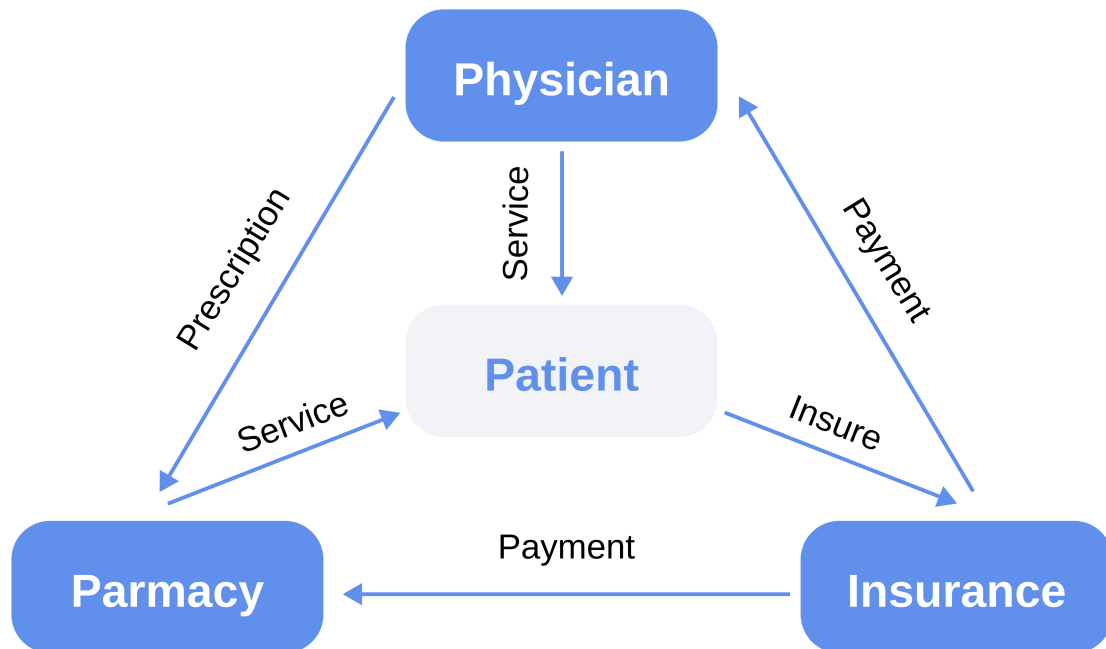


Figure 5 The Operating Mode Of Telehealth In US

In the United States, the Telehealth industry comprises three parties: the medical platform of medical groups, the medical enterprise platform, and the medical platform of medical insurance companies. The technical support is mainly from Internet medical enterprises. Telehealth realizes the medical treatment and diagnosis at home. In the closed loop of diagnosis, medicine, insurance, and patients, patients are insured, doctors provide medical services, and insurance pays for prescription and diagnosis. Insurance is the primary payer

of medical expenses, as the main payer of medical activities has a solid ability to pay.

Trend

Creating a network of specialist doctors through Telehealth to provide experts from different departments for the treatment of rare diseases and severe diseases; for common diseases and chronic diseases, increasing patients' convenience in receiving routine care. Improving access, especially for behavioral health and speciality care. Improving care models and health outcomes, particularly for those with chronic conditions or needing post-acute care support.

1.4 Telehealth industry in China

In 2019, China's population over 65 had reached 12.6%. According to WHO standards, the proportion of the population over 65 exceeding 7% will mark the entry of an ageing society. As the population ages, reliance on healthcare will increase dramatically. Using the Internet, Telehealth can cover more people with high-quality medical care. According to *the Statistical Report on Internet Development in China*, since December 2021, the number of users of Telehealth in China has reached 298 million, with significant user growth.

Operating mode

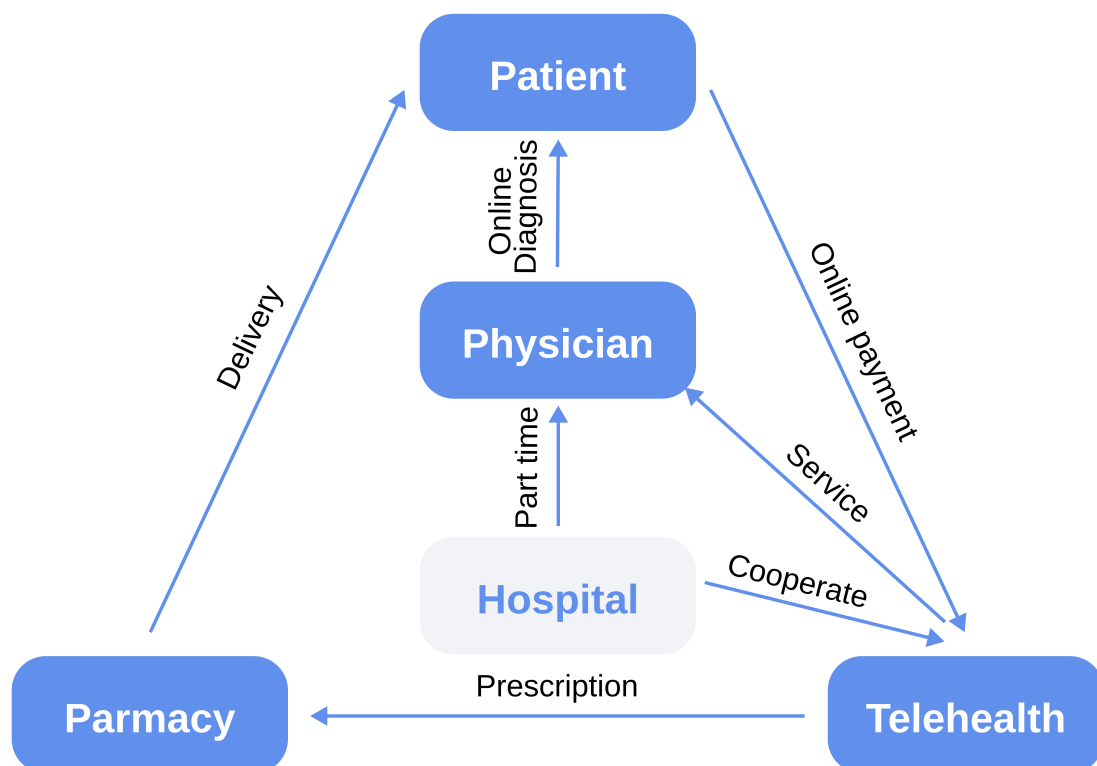


Figure 6 The Operating Mode Of Telehealth In China

In China, the Telehealth platform is not dependent and must rely on hospitals to achieve complementary advantages and resource sharing. The operating model is "Internet + Hospital". Telehealth platforms share doctors and medical resources with hospitals but are managed by the company. Registered doctors on the Telehealth platform must be full-time doctors in 2A and 3A grade hospitals. In China, 2A and 3A grade hospitals are generally located in more populous towns and have the best medical resources. Telehealth gives hospital doctors more flexible work locations and additional income.

Trend

The primary revenue of Internet hospitals is formed through visiting, prescription refills, health care products, and personal medical derivative consumption. Currently, most of Telehealth's revenue comes from online pharmacies. It is estimated that by 2028, the scale of online pharmacies will reach 50 billion CNY.

Saving time and money are two essential pain points for Telehealth users. Health insurance is the most critical payment method for the healthcare industry. Improving Telehealth medical insurance payment can bring many chronic disease

prescription refills and online diagnosis and treatment to Telehealth. In 2019, according to the *Guiding Opinions of the National Medical Insurance Administration on Improving Internet + Medical Service Prices and Medical Insurance Policies*, the policy began to support insurance payment on Telehealth. However, most platforms are still unable to use insurance, leading to users' Lack of motivation. Without payment through insurance, it will be difficult for the industry to develop. During the Covid-19 panic, the real-name system on Telehealth began to promote insurance payments.

1.5 What is chronic disease

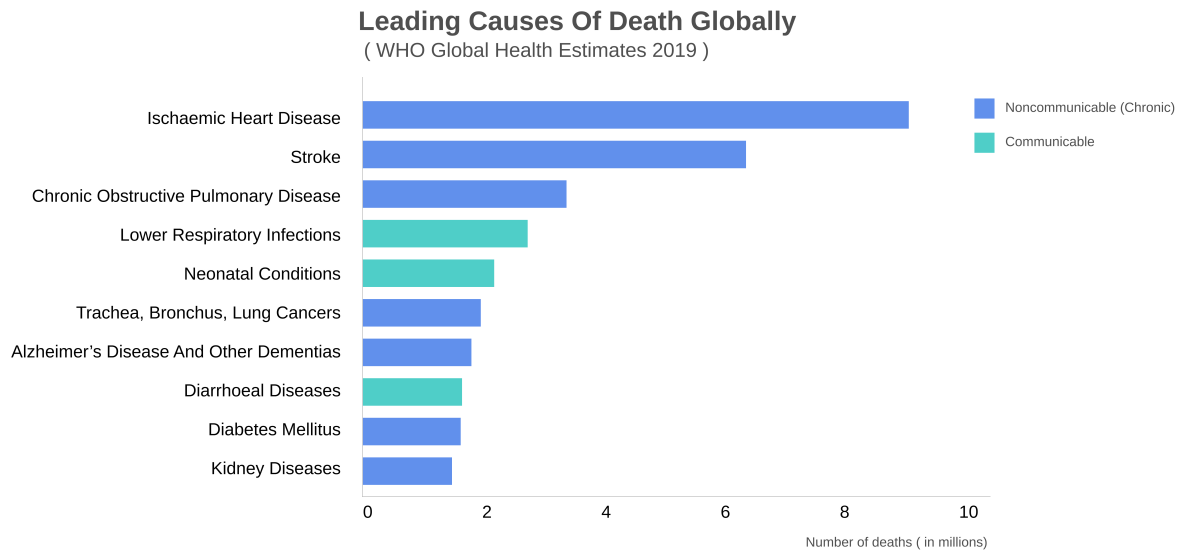


Figure 7 The Leading Causes Of Death Globally

Noncommunicable disease (NCDs), also known as a chronic disease, is a physical or mental health condition. Chronic diseases last one year or more, require ongoing medical attention or limit activities of daily living or both. The primary type of chronic diseases is cardiovascular diseases, cancers, chronic respiratory diseases and diabetes. These diseases are driven by unhealthy lifestyles, unplanned urbanization, and population ageing. Tobacco use, physical inactivity, unhealthy diet and the harmful use of alcohol will increase the risk of chronic disease.

According to World Health Organization (WHO), chronic diseases kill 41 million people yearly, equivalent to 71% of all deaths globally. Cardiovascular diseases account for most chronic disease deaths, or 17.9 million people annually, followed by cancers (9.3 million), respiratory diseases (4.1 million), and diabetes (1.5 million). These four groups of diseases account for over 80% of all chronic disease deaths. Previous data has shown that people with chronic conditions face more financial problems and functional limitations, have worse health outcomes, and spend more on the health care system. Chronic disease is a heavy burden not only for patients but also for the health care system. It confirms that the prevalence of multiple chronic conditions is highest among older adults. To relieve the impact of chronic disease on individuals and society, a comprehensive approach is needed requiring all sectors, including health, finance, transport, and education.

1.5.1 Chronic disease in US

According to the CDC, chronic disease is one of the most prevalent conditions in the United States and adds to exorbitant health care expenses. In the United States, heart disease, cancer, stroke, respiratory illness, injuries, diabetes, alzheimer's disease, influenza and

U.S. health expenditure as percent of GDP 2005-2020

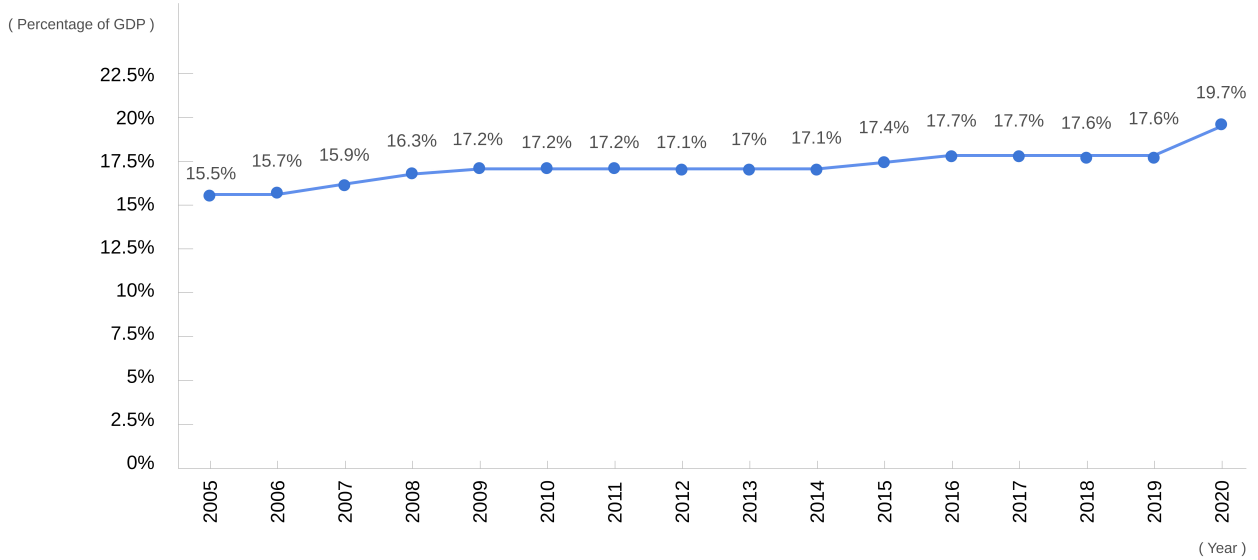
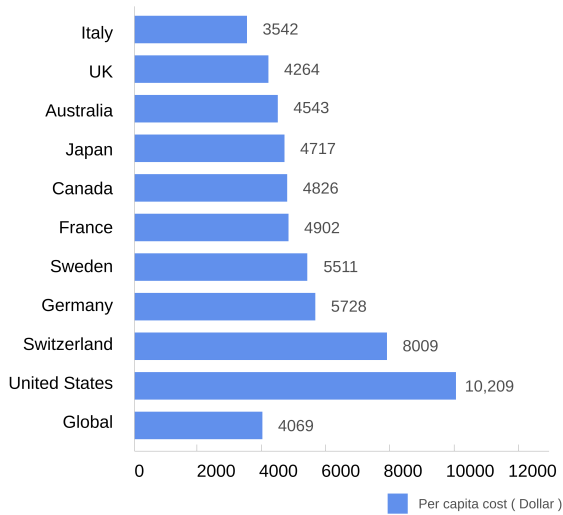


Figure 8 U.S. Health Expenditure As Percent Of GDP

World Healthcare Per Capita Cost 2018

(Peterson center on healthcare)



Physician Shortfall Range Prediction 2018-2033

(AMCC report 2021)

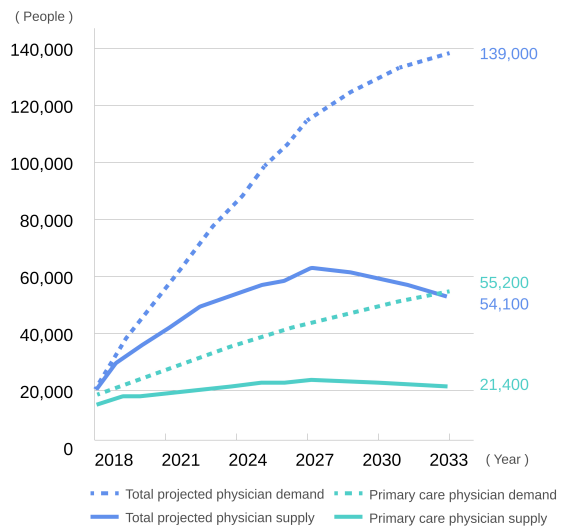


Figure 9 Medicare Funding And Physician Shortage In US

pneumonia, renal disease, and septicemia are the top 10 health concerns due to the ageing trend.

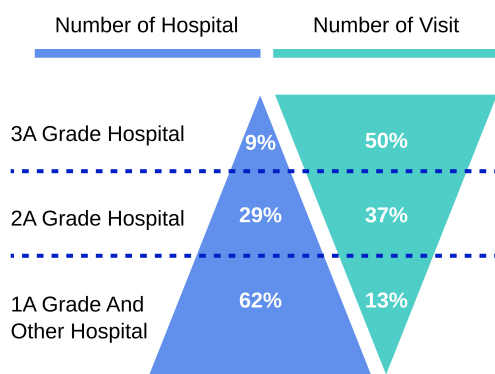
According to statistics from CDC, approximately 45% (133 million) of Americans have a chronic ailment, and this figure is expanding. More than 1.7 million deaths occur annually in the United States due to heart disease, cancer, stroke, chronic obstructive pulmonary disease, and diabetes, which account for two-thirds of all deaths. Today, sixty per cent of Americans have at least one chronic disease, while forty per cent have two or more. Multiple chronic diseases provide increasing health concerns as people age. Chronic diseases damage the public's health and quality of life and impose a considerable financial burden. Chronic diseases incur substantial expenses. Moreover, chronic diseases account for 75% of overall Medicare funding in the United States or an average of \$5,300 annually. Further, according to new data published today by the AAMC (Association of American Medical Colleges), the United States could see an estimated shortage of between 37,800 and 124,000 physicians by 2034, including shortfalls in both primary and specialty care.

1.5.2 Chronic disease in China

According to 2020 data, the highest-rated 3A grade hospitals have the highest number of attendees, carrying 49.8% of the

country's medical needs. However, the number of 3A grade hospitals only accounts for 19% of the total. The shortage of excellent doctors and medical resources, mainly located in large cities, has given rise to many medical resources. As the problem of the ageing population increases, the number of patients with chronic diseases and their high demand for follow-up visits have strained hospital resources.

Medical Source Distribution In China 2020



Number Of Physician And Nurse Per 1000 person
(World Health Organization)

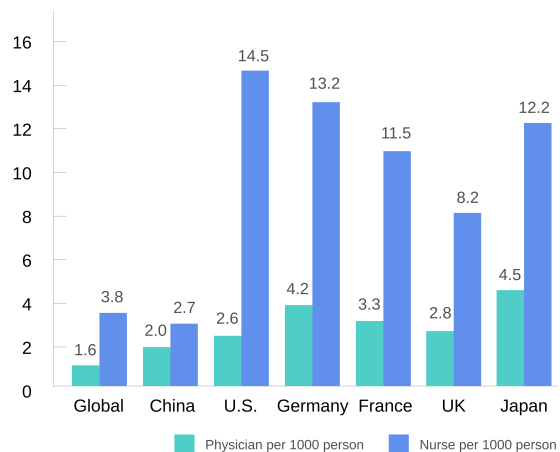


Figure 10 Medical Source Distribution And Physician Shortage In China

In China, hospitals are the primary treatment channel for patients with chronic diseases. The primary treatment for chronic diseases is long-term regular medication to control the condition, most of which need to be diagnosed by a doctor and available through prescription. Although China's graded care is gradually advancing, there is still room for

improvement. Some chronic disease medications are unavailable at community hospitals and pharmacy chains, resulting in patients making follow-up visits to 3A grade hospitals. In order to reduce the number of visits to 3A hospitals for patients' prescriptions, hospitals allow a single follow-up visit for patients with stable conditions to be prescribed medications for treatment within 12 weeks. Chronic disease management is also evolving in large pharmacy chains. Many pharmacies provide patients with rapid self-testing and health management services for chronic disease-related items such as blood glucose, blood pressure, uric acid, and lipids.

As China's economic and social development and the level of health services continue to rise, the average life expectancy of residents continues to increase. As the ageing of the population, the base of patients with chronic diseases in China will continue to expand. The situation of chronic disease prevention and control remains serious. However, at the same time, as medical facilities in China continuously improve, the number of medical institutions is rising. Pharmacies are gradually developing the layout of chronic disease management, and residents are gradually becoming health conscious and preventing chronic diseases through health checkups and other means. In addition, the rise of the Internet-based chronic disease management model has

dramatically facilitated the management and treatment of chronic diseases for patients.

According to the *Report on the Status of Nutrition and Chronic Diseases of the Chinese Population 2020*, deaths due to chronic diseases accounted for 88.5% of total deaths in China in 2019. The proportion of deaths from cardiovascular and cerebrovascular diseases, cancer, and chronic respiratory diseases is 80.7%. In addition to causing death, chronic diseases also lead to complications that significantly affect patients' quality of life. For example, the proportion of eye complications in diabetic patients is 34.3%, and about 1.1% are blind. The survey shows that among patients with chronic diseases in China, the number of people with hypertension is more than 300 million.

The per capita medical cost of diabetes in Chinese public hospitals in 2019 was CNY 7,932.88, an increase of CNY 158.98 from 2018; the per capita medical cost of hypertension was CNY 6,415.19, an increase of CNY 92.65 from 2018; and the per capita medical cost of cerebrovascular disease was CNY 10,886.37, an increase of CNY 444.66 from 2018.

1.6 What is chronic care management

According to the definition from CDC, chronic care management refers to a series of interventions and measures to achieve enhanced disease control, prevent disease deterioration, control overall healthcare costs, and improve patients' quality of life. Chronic disease management is a systemic project that includes the management of chronic diseases and the guidance of patients' cognition, psychological status and lifestyle, and the management of the social environment in which they live.

Long-term chronic care management includes detecting, screening and treating these diseases and providing access to palliative care for people in need. Case shows that the more early health care provided to patients, the lower cost they spend on treatment. To WHO, chronic care management interventions are essential for achieving the global target, which is a 25% relative reduction in the risk of premature mortality from chronic diseases by 2025, and the target of a one-third reduction in premature deaths from chronic diseases by 2030.

Chronic care management services are extensive, including structured recording of patient health information, keeping comprehensive electronic care plans, managing care

transitions and other care management services, and coordinating and sharing patient health information promptly within and outside the practice. Chronic care management benefits patients in terms of ongoing health and wellness support increased access to appropriate medical resources, enhanced communication with members of their care team, reduced emergency room visits and hospitalization or readmissions, and increased engagement in their healthcare.

1.6.1 Chronic Care management in Telehealth

Telehealth for patients at home refers to using Internet medical platforms or the Internet to provide chronic disease management services, with every aspect of the service completed on the Internet. Telehealth is in the early stage of development in chronic disease management. The chronic disease management services are mainly blood glucose management, blood pressure management, lipid management, cancer and tumour management, etc. The main chronic diseases include heart disease, hypertension, cerebrovascular disease, diabetes and tumour. These diseases are characterized by significant population size and easy body data monitoring, allowing patients to monitor and manage their health conditions independently. More patients can complete their medical consultations at home through the continuous improvement of the Telehealth industry chain.



2

User experience of chronic care management in Telehealth

2.1 Design & define

2.1.1 The design approach

The redesign of the Telehealth Application progress is divided into three parts, the research phase, the ideate phase, and the design phase.

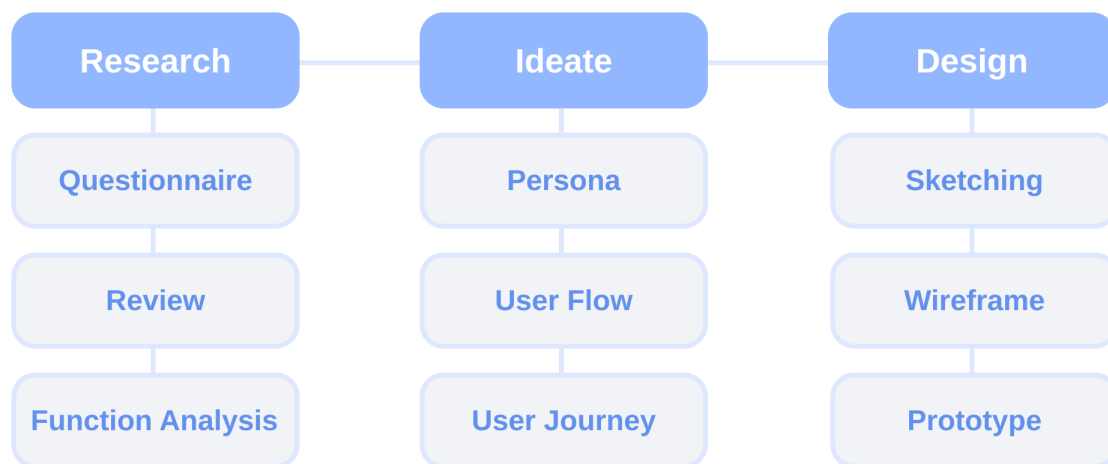


Figure 11 The Design Approach

In the research phase, questionnaire and user experience research explore the feeling and customer behaviors of chronic patients. Through the questionnaire responses, to figure out what service and functions Telehealth need to provide to chronic disease patients and which services people use most in Telehealth. By researching two case studies, understanding the user flow and function structure in Telehealth. In the ideate phase, try to summarize the case study's user flow that needs improvement. Explore and

redefine the user experience for chronic care management on Telehealth. In the design phase, using design tools like sketch and Figma to create wireframes and prototype.

2.2 Data analysis

2.2.1 Online questionnaire data analysis

In order to investigate the attitude of Chinese urban chronic disease patients towards Telehealth and understand their treatment needs and concerns, we distributed a 15-question questionnaire on chronic disease patients' consultation behaviors, and received 83 questionnaires in total. The respondents of this questionnaire were people who live in urban areas and currently have chronic diseases that require long-term and regular treatment.

Questions

1. The relationship between the respondent and the patient is
2. Patient's gender
3. Patient's age
4. City of residence
5. Patient's monthly income
6. Which chronic disease does the patient have
7. How many chronic diseases the patient suffers from
8. The frequency of the patient's follow-up care

9. Which institutions to visit
10. Whether there is a follow-up consultation with a different doctor
11. The time required for a follow-up consultation
12. Whether the patient have used Telehealth platform
13. Whether the patient is willing to try the follow-up service on Telehealth with doctors from 2A or 3A Grade hospitals
14. What are patients' concerns about Telehealth
15. What kind of follow-up consultation is expected by the Telehealth?

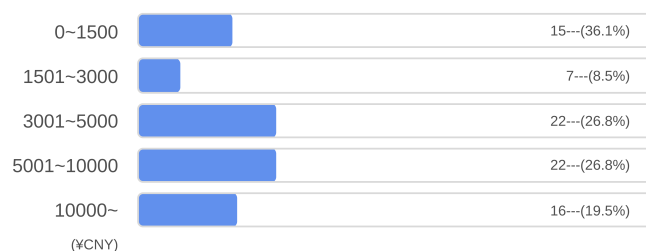
Patient's Gender

83 responses



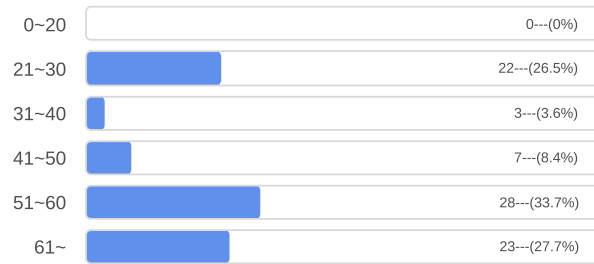
Patient's Monthly Income

83 responses



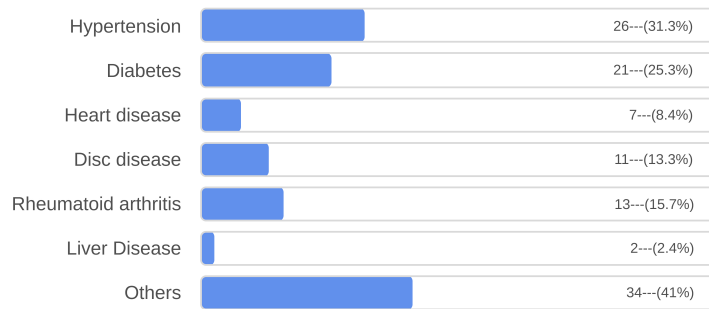
Patient's Age

83 responses



Which Chronic Disease Does The Patient Have

83 responses



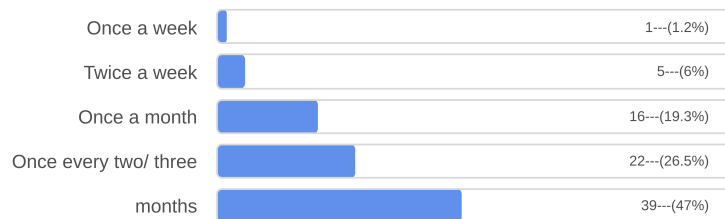
How Many Chronic Diseases The Patient Suffers From

83 responses



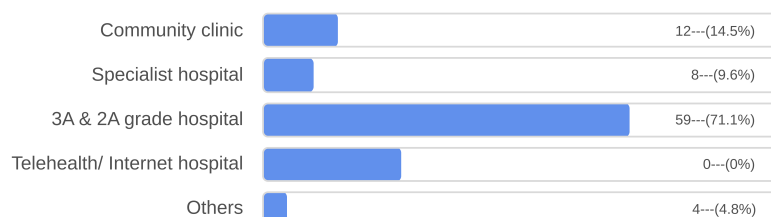
The Frequency Of The Patient's Follow-up Care

83 responses



Which Institutions To Visit

83 responses



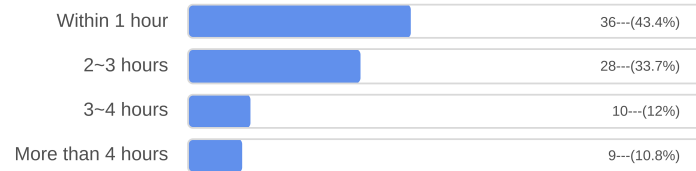
Whether There Is A Follow-up Care With Different Doctors

83 responses



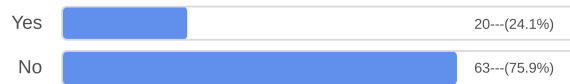
The Time Required For A Follow-up Consultation

83 responses



Whether The Patient Have Used Telehealth Platform

83 responses



Whether The Patient Is Willing To Try The Follow-up Service On Telehealth With Doctors from 2A or 3A Grade Hospitals

83 responses



What Are Patients' Concerns About Telehealth

73 responses

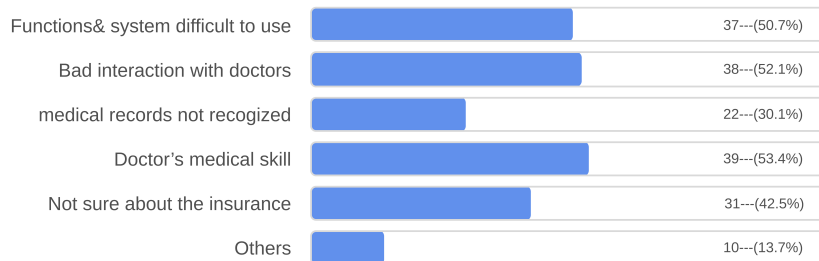


Figure 12 The Responses From Questionnaire

We can draw many interesting conclusions based on the answers of patients with chronic diseases.

61.4% of chronic disease patients in the survey are over 40 years old, and interestingly 26.5% of young people between 21 and 30 years old suffer from chronic diseases. It shows a trend toward younger patients with chronic diseases, and younger people are paying attention to their health problems earlier. According to the data, the questionnaires recovered were mainly from economically developed regions such as Beijing, Shanghai and Guangdong, and 47.6% of the patients had a relatively good economic status with an income before 3000 to 10000. However, it is noteworthy that there are still 18.3% of patients who only have a low income of less than 1500 per month, which is far below the average personal income in first-tier cities, and the cost of treatment is a heavy burden for them. 55.4% of users had at least one chronic condition, and 45.6% had multiple chronic conditions. Patients with chronic diseases mainly suffer from hypertension, diabetes, rheumatoid arthritis, lumbar disc herniation and other diseases. 55.4% of users had at least one chronic condition, and 45.6% had multiple chronic conditions. It means that they require joint consultations. More than half of the patients had the experience of registering to see different physicians in a single follow-up visit.

To obtain prescriptions, treatments, and medications, 19.3% of patients had a monthly follow-up, 26.5% had a two- to three-month follow-up, and 47% had a longer follow-up interval. 71.1% of patients chose to go to Grade 2A or 3A hospitals. These hospitals generally have better medical resources but are also more crowded, resulting in more extended visits. Regarding the time needed for follow-up, 43.4% of patients took less than an hour, 33.7% took 2 to 3 hours, and 10.8% took 4 hours or more to complete the follow-up. 75.9% said they had not used an Internet medical platform, but if the platform offered the service of a doctor from a Grade 2A or 3A hospital for follow-up, 53% of the respondents would be willing to try it. Those worried about the Internet medical platform mainly think that the platform's mobile app is complicated and inconvenient to use. In addition, they are worried about the poor communication with doctors, and they are also worried about the doctors' professionalism and service quality. Another concern is that they are unsure whether they can use medical insurance.

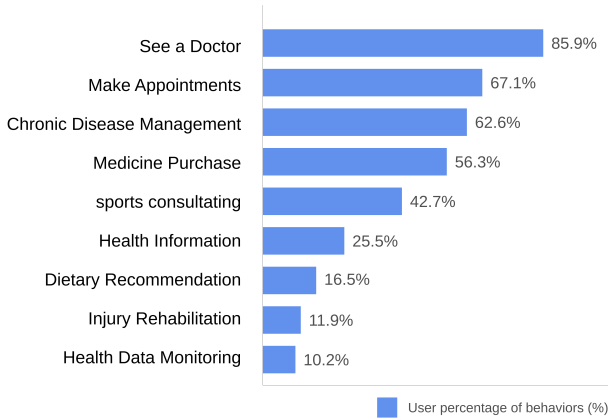
2.2.2 User experience of Telehealth in China

In 2020, iResearch Inc conducted a questionnaire survey on the main behaviours and interests of Telehealth users in China who have used one or more types of Telehealth in the past year. A total of 1275 responses were received to this

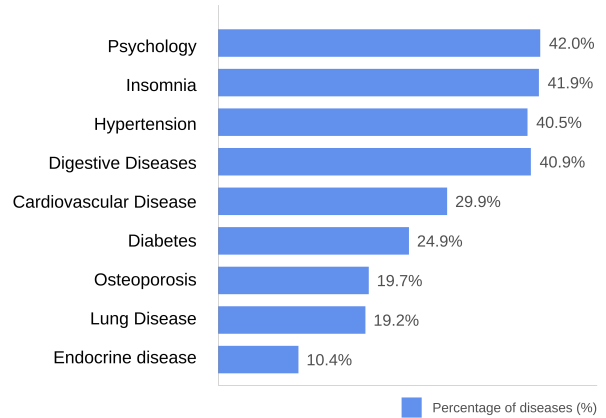
questionnaire. Based on the data, Telehealth users in China are willing to use Telehealth for common and chronic diseases. Most users use Telehealth for medical consultation, scheduling to see a doctor and chronic disease management. Diseases such as psychology, insomnia, hypertension, Digestive diseases, and cardiovascular diseases have more patients on Telehealth because they are more suitable for online consultation. Users of Telehealth are more concerned about the diseases they suffer from and search for information about their health. In addition to essential medical services, it is becoming a trend for users to use Telehealth more for reading health information and health management.

Based on the *47th China Statistical Report on Internet Development*, as of December 2020, the proportion of Chinese netizens using mobile phones to access the Internet reached 99.7%. Mobile phones are more popular than desktop computers and laptops. The proportion of netizens aged 20 to 49 is higher than that of other age groups. The proportion of netizens over 50 reached 26.3%, and the Internet further penetrated the middle-aged and elderly groups.

Main Behaviors On Telehealth
(multiple choice)



Top Diseases Users Care About On Telehealth
(multiple choice)



Type Of Disease Willing To Use On Telehealth
(multiple choice)

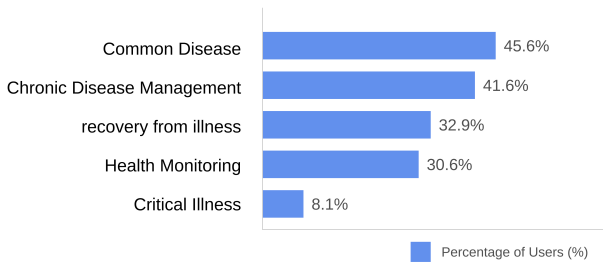
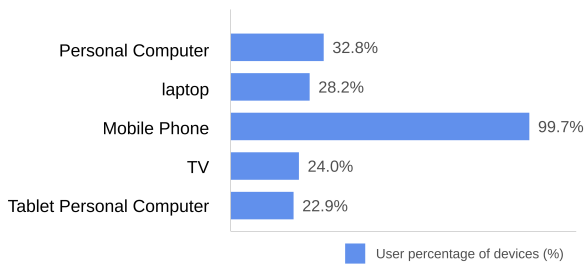


Figure 13 User Experience Of Telehealth In China

The Use Of Internet Device In China
(December 2020)



Age Distribution Of Netizen In China
(December 2020)

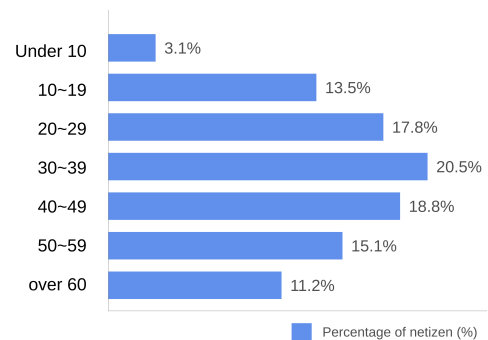


Figure 14 Internet Device And Netizen Age Distribution In China

2.2.3 Key findings

According to the patient's answer, most people feel interested in using Telehealth for follow-up visits. Especially younger patients with high digital sensitivity are more willing to try Telehealth. Patients are more likely to use Telehealth for common diseases and chronic diseases. Some patients feel worried and frustrated if the Telehealth user flow is confusing and complicated. Besides, they are concerned a lot about the medical treatment quality and service of Telehealth. In China, people receive better medical resources in 2A and 3A grade hospitals. By using doctors from 2A & 3A grade hospitals, Telehealth builds trust between the platform and patients. About 99.7% of the netizen in China use mobile phones to surf the Internet, which means that compared to the website, mobile applications are much more user-friendly to most users.

Key insight

- Save time and money
- Easy-to-use interface
- Well qualified doctor
- Using insurance
- Improve the processing of Telehealth visit
- Simplify the medical functions
- Face-to-face video conversation

2.3 Case studies

To improve the user experience of chronic care management, the case study will mainly focus on Amwell and Alibaba Health. Amwell and Alibaba Health are representative Telehealth companies from U.S. and China and are also famous for online chronic care management. The analysis begins with customer reviews, service, function, user flow, issue and advantage.

2.3.1 Amwell

Amwell is a telemedicine company based in Boston, Massachusetts, connecting patients with doctors over secure video. Amwell offers 24-hour teleconference access to licensed and qualified physicians, known as chronic care management. It provides people with service from primary care and urgent care to high acuity specialty consults and telepsychiatry. The platform can fully connect provider's workflow with patients. Providers can launch Telehealth directly from their native Electronic Health Record (EHRs) , and also payer eligibility and claims systems.



Figure 15 Logo Of Amwell

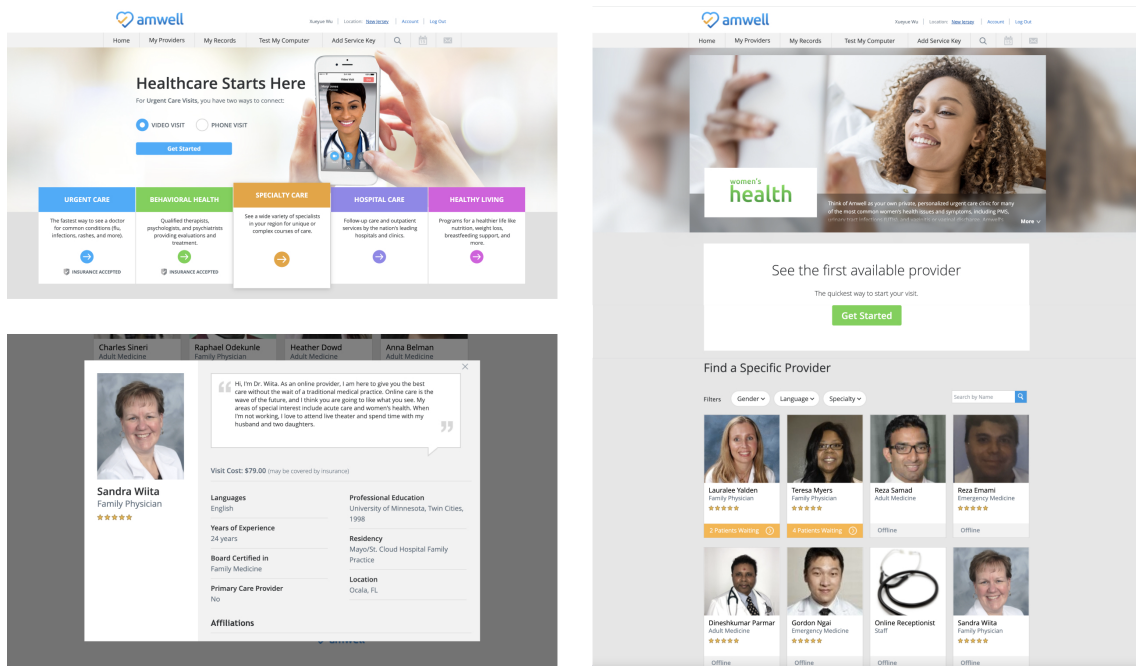


Figure 16 Website Of Amwell

Customer Reviews

Ratings and Reviews

4.9 out of 5

33.7K Ratings



Figure 17 Amwell's Rating In App Store

Good reviews

Key words: Fast, patient, cheap, convenient

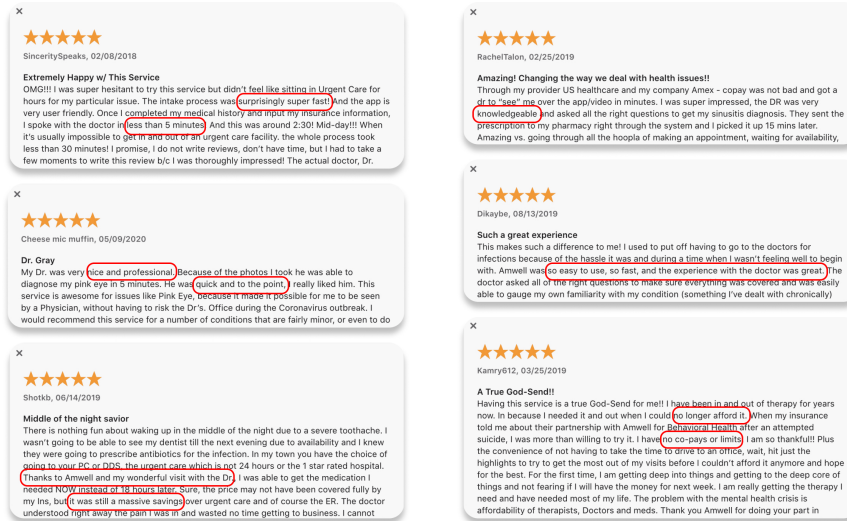


Figure 18 Good Reviews Of Amwell In App Store

Bad reviews

Key words: Cancel, waiting for long time, App crashed, bad interaction

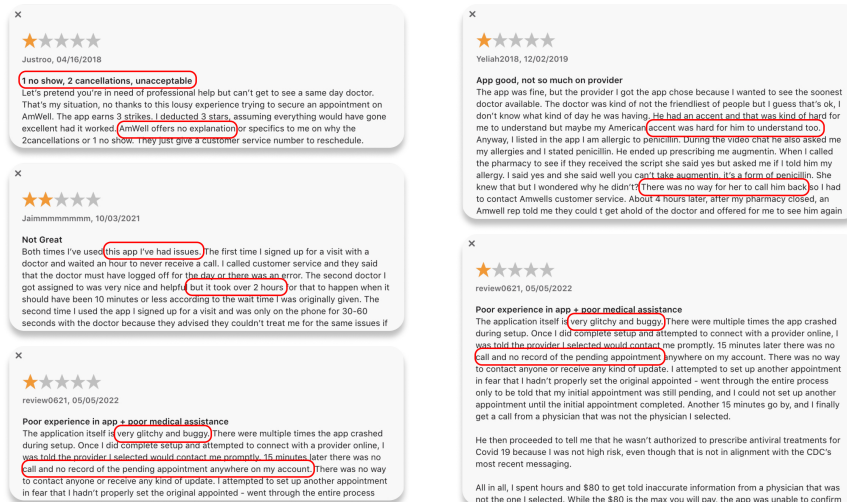


Figure 19 Bad Reviews Of Amwell In App Store

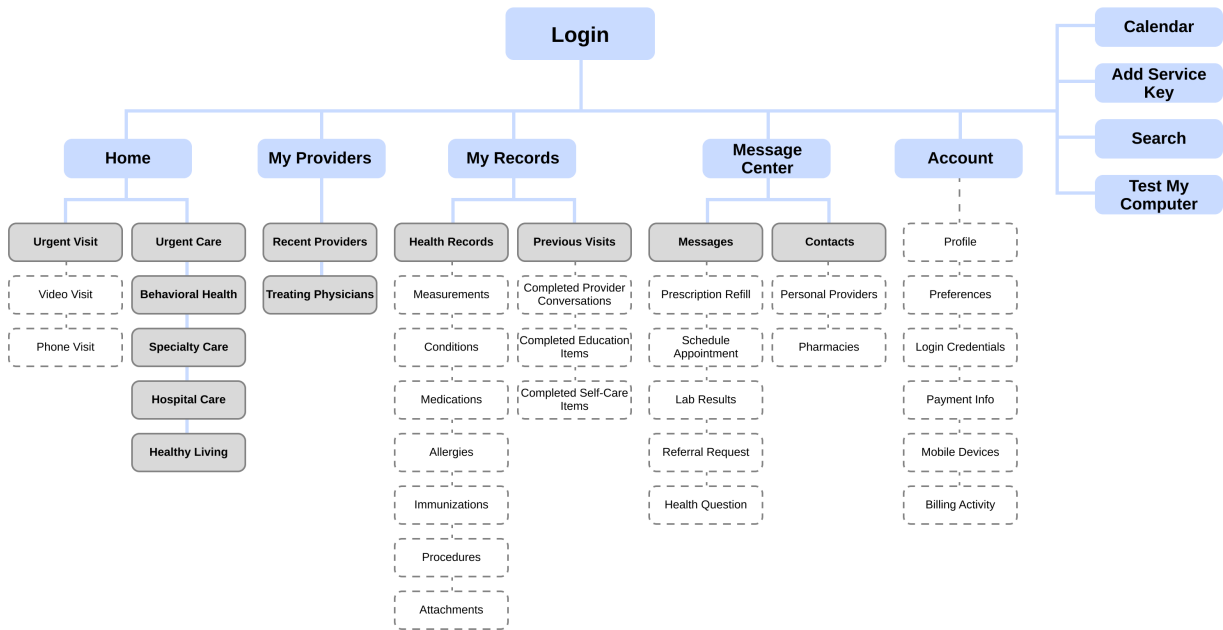


Figure 20 Functions & Service Of Amwell Website

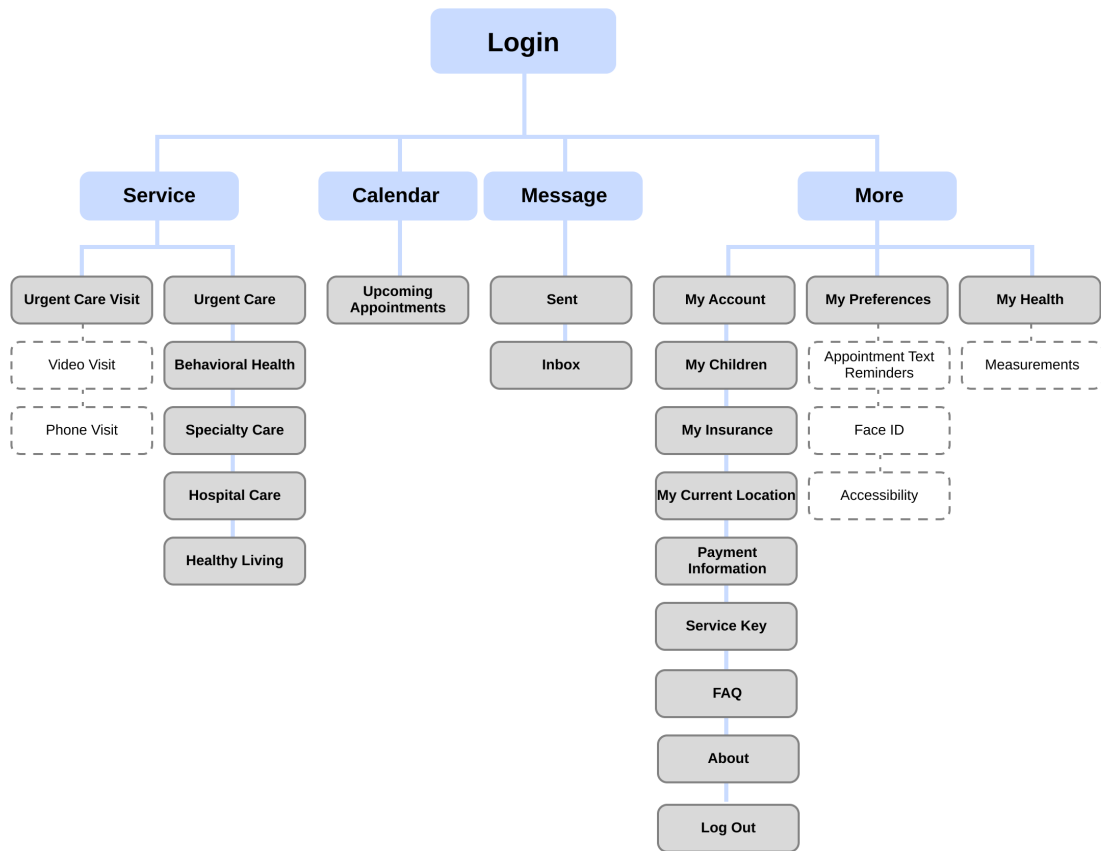


Figure 21 Functions & Service Of Amwell APP

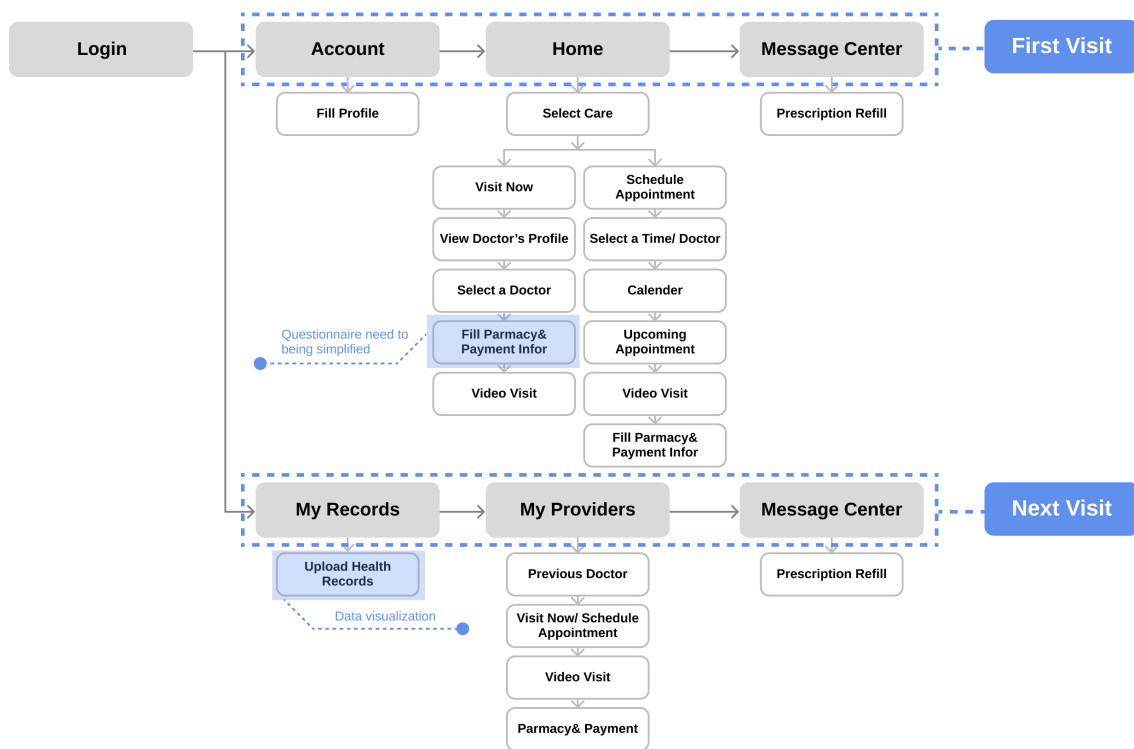


Figure 22 User Flow Of Chronic Patients On Amwell Website

Amwell's diagnosis and treatment service is mainly video, and urgent has video and voice call services. Users can obtain services through applications and websites. Additional services on the Amwell website include classified inbox messages, follow doctors and health records. Users who use the mobile app may not get complete follow-up care. In addition, on the webpage, patients need to describe the symptoms of the disease after making an appointment. Simplifying the process and adding more guidance can enable patients to describe their condition better. The main advantages and issues are summarised in the following parts based on the customer review and chronic patients' user flow.

Advantages:

UI/UX

- Brief Interface
- Simple direct-viewing
- simplify operation and use

Performance

- Different types of messages are separated
- Good video visit experience
- Complete and personalized health records management
- Support different languages
- Provide 24/7 service

Issues:

UI/UX

- Low Interaction
- Low intelligent

Performance

- Minimal functions on the app
- Measurements on the app are confusing
- Complete health records only on the website
- No automatic login, flashback on app
- Unknown waiting time
- Processing of collecting disease info costs too much time
- Limited insurance plan and co-pay

2.3.2 Alibaba Health

Alibaba health is one of the best-reviewed Telehealth companies in China. It provides services such as online consultation, health information, vaccine appointment, patients' community, appointment service, and medicine delivery. To ensure service quality and user experience, Alibaba Health provides patients with specialists and experts, completed consultation service, and a strict evaluation system.



Figure 23 Logo Of Alibaba Health App



Figure 24 Interface Of Alibaba Health App

Customer Reviews

Ratings and Reviews

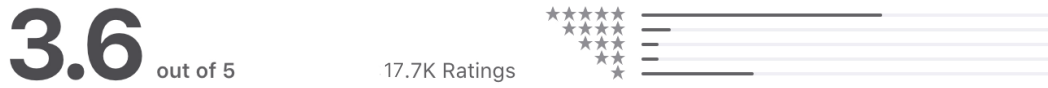


Figure 25 Alibaba Health's Rating In App Store

Good reviews

Key words: Fast, famous doctor, professional, cheap, save time

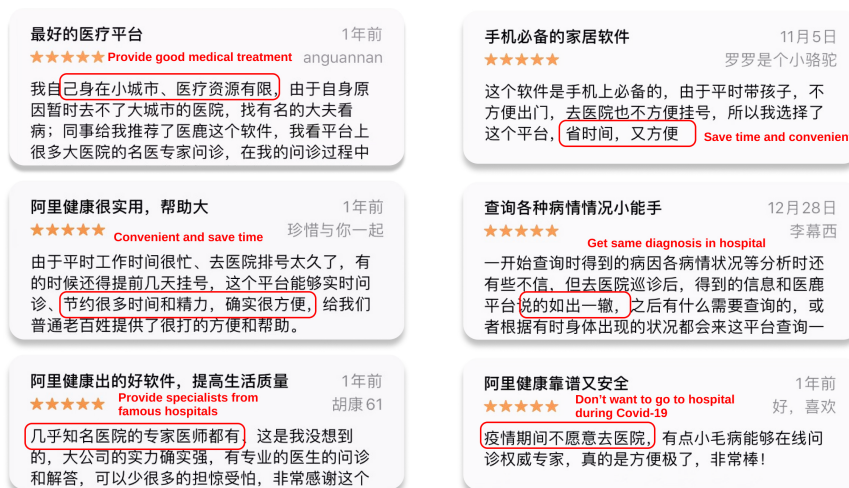


Figure 26 Good Reviews Of Alibaba Health In App Store

Bad reviews

Key words: Limited conversation with doctor, unknown waiting time, App crashed, too much advertisements, no insurance support

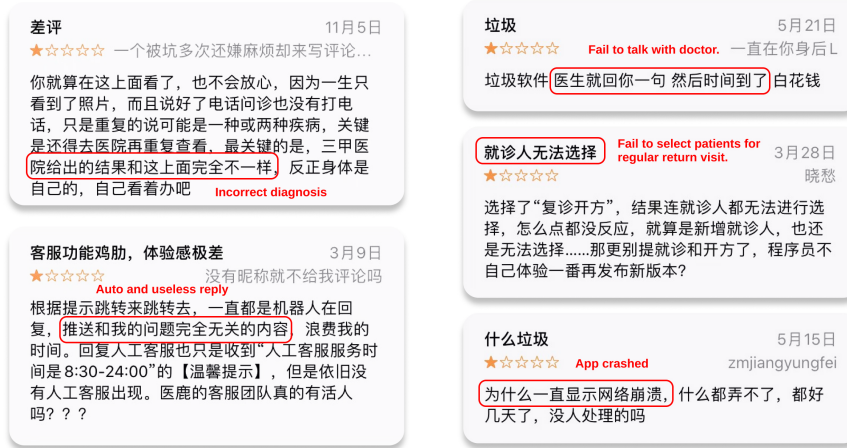


Figure 27 Bad Reviews Of Alibaba Health In App Store

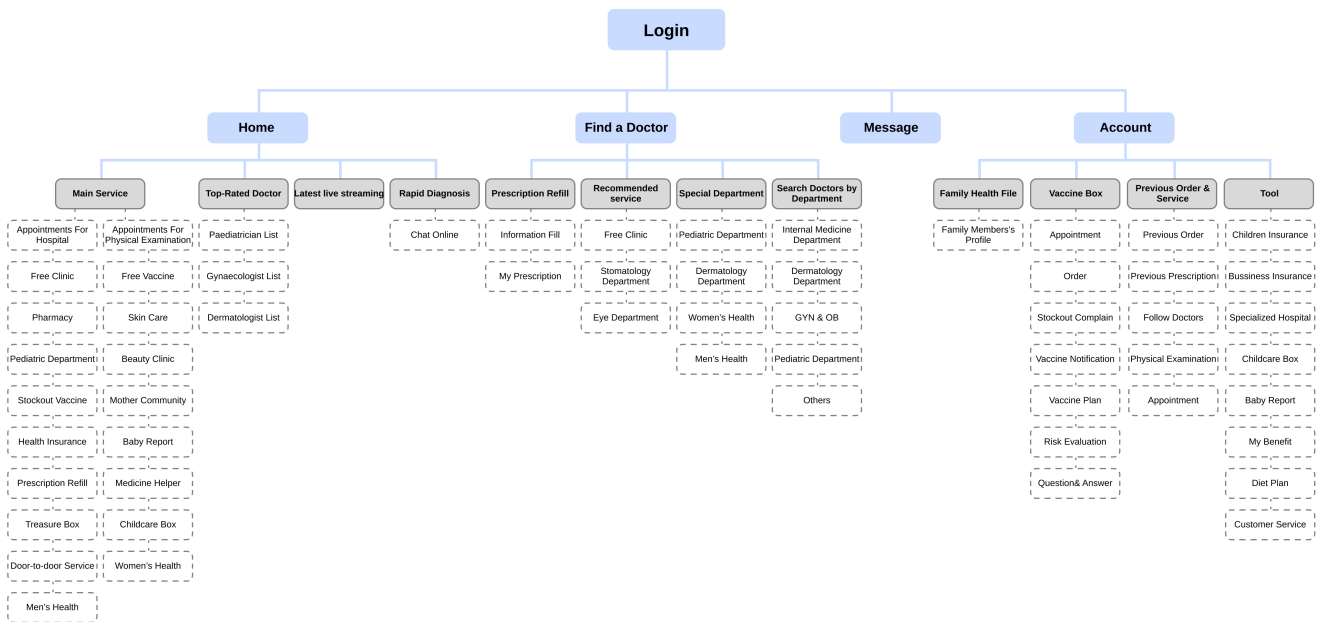


Figure 28 Functions & Service Of Alibaba Health App

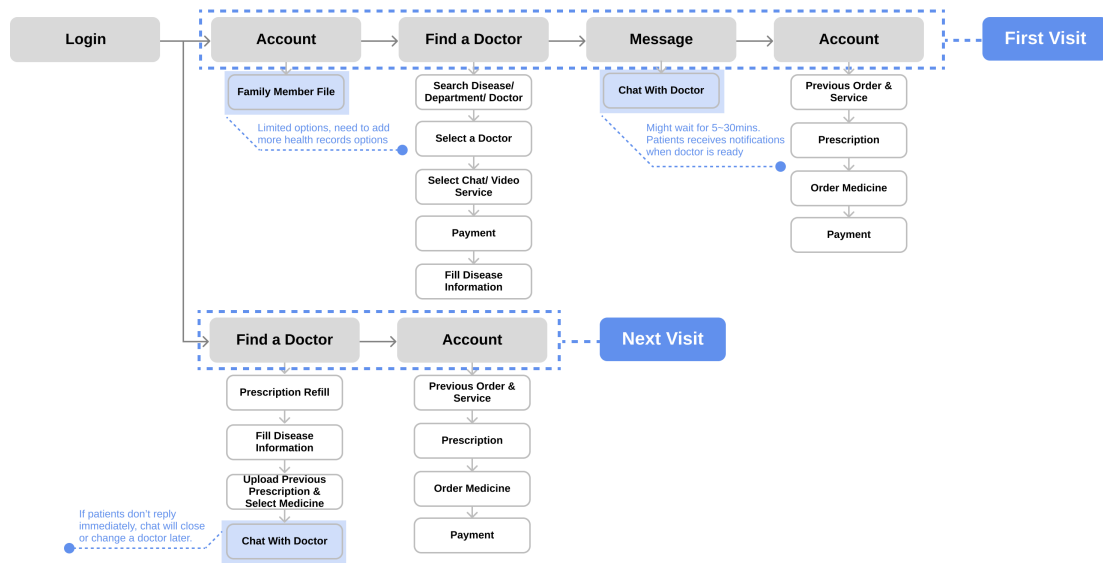


Figure 29 User Flow Of Chronic Patients On Alibaba Health App

Like other Telehealth platforms, Alibaba Health's registered doctors are mainly full-time from 2A and 3A-grade hospitals. While ensuring the quality of doctors, it also leads to another problem. Full-time doctors use the fragmented time to complete Telehealth diagnoses, and voice calls are more convenient. Therefore, video conversations are selling at twice the price of the call. It encourages patients to communicate with doctors by typing. However, older patients communicate less efficiently by typing.

According to the application structure, Alibaba Health has complex medical-related services, such as independent pharmacies, health lectures, baby care guides, and vaccine services. However, many users complain that there are too many homepage advertisements. Buttons in different sections

often lead to the same content. Users could find functions that lack maintenance but have not been removed when using the application. The interface, dense text, and complex functions make the application not easy to use and understand. The main advantages and issues are summarised in the following parts based on the customer review and chronic patients' user flow.

Advantages:

UI/UX

- Strong interaction
- Flexible function

Performance

- Self- diagnosis
- Search health information easily
- Encourage patients to comment
- Collect disease info by AI
- Low visit price and prescription refill price
- A large number of good doctors from 3A grade hospital
- Community service

Issues:

UI/UX

- Low contrast of color
- Using light and small sizes of the font
- Dense text
- Different buttons lead to the same interface
- Confusing interact flow

Performance

- Do not provide 24/7 service
- Too much advertisement
- Poor health record system
- Do not support insurance
- Unknown waiting time
- The rude attitude from assistant
- Unneeded permission
- Encourage image and call rather than video



Design Telehealth App for chronic patients

3.1 Define the problem

Medical consultation

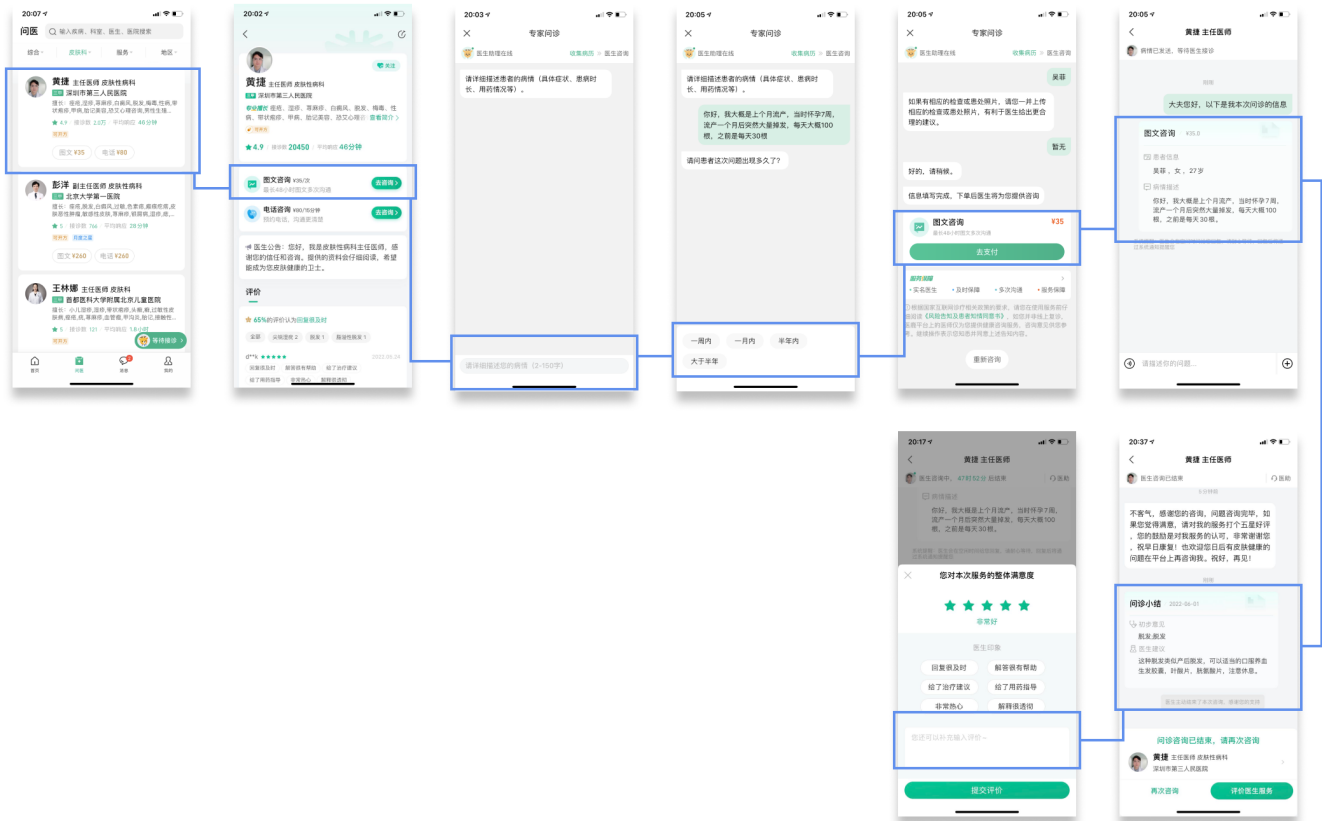


Figure 30 Current User Flow Of Medical Consultation

During the discussion with the doctor, the chat robot will collect basic patient information through a series of questions, which will then be compiled into a profile and delivered to the doctor. Basic disease information can be acquired simply via a questionnaire to improve efficiency. In the dialogue window, the doctor and patient communicate

primarily through text. When the patient cannot describe the symptoms clearly, adding the capability of sharing health data and uploading past prescription information can assist the doctor in identifying the issue appropriately. In this regard, adding non-textual interactions can improve patients' communication efficiency.

Prescription refill

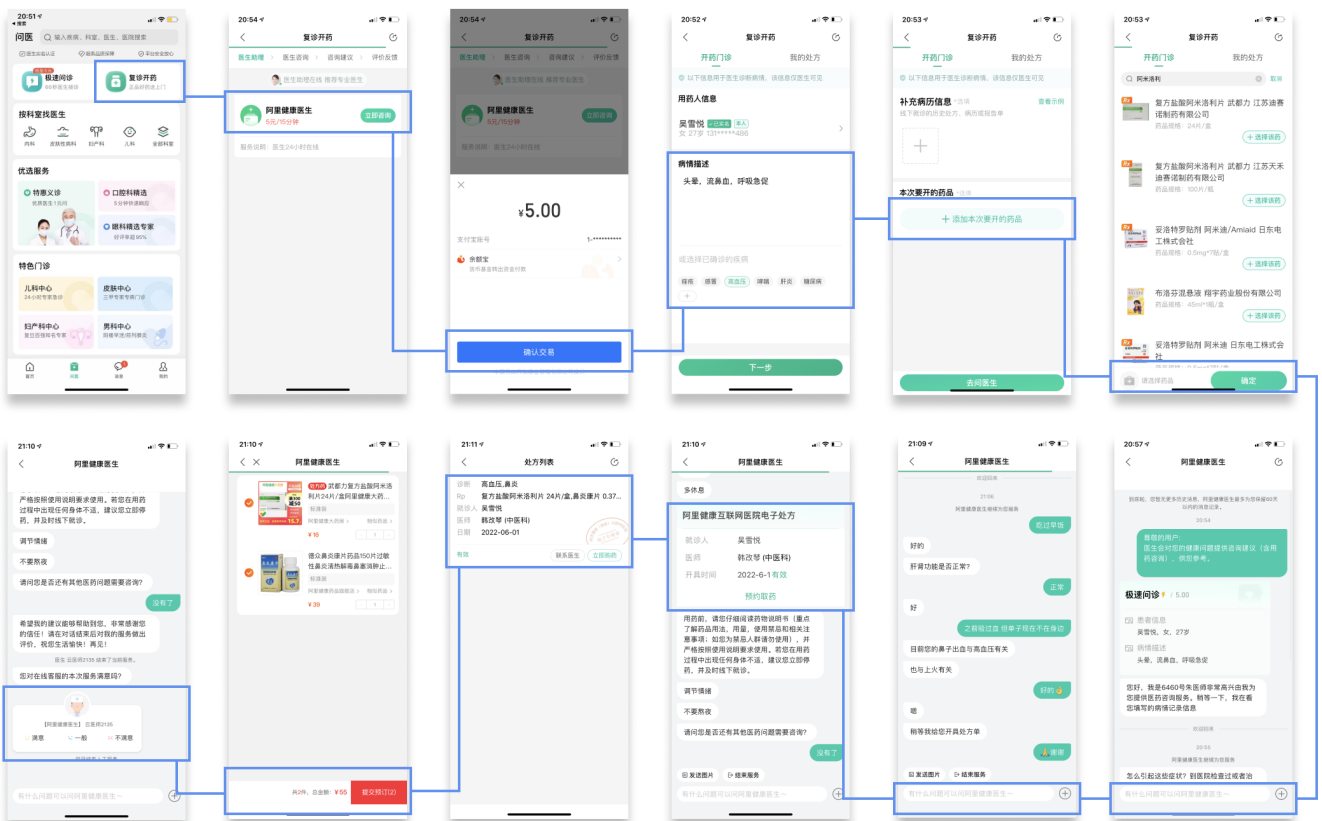


Figure 31 Current User Flow Of Prescription Refill

The system automatically assigns physician assistants to diagnose patients during the prescription refill. If the patient's information responds slowly, the system automatically switches assistants. The physician assistant does not comprehend the patient's situation, and the chat is brief, leading to a negative user experience. Patients will have the option of selecting the physician they previously consulted to issue a prescription or selecting a new physician. Moreover, physicians that patients trust will incentivise patients with chronic conditions to choose Telehealth for follow-up visits.

Personal account



Figure 32 Current User Flow Of Personal Account

On the personal account screen, the health profile of a family member includes basic information such as past disease history, allergies, and COVID-19 vaccines. Doctors can view a patient's health profile to determine the condition and should include chronic illness health data records so they can alter medications based on current information. In order to use health insurance on Telehealth, it is possible to connect the resident health insurance to the actual name in the health record.

3.2 Develop

Login experience

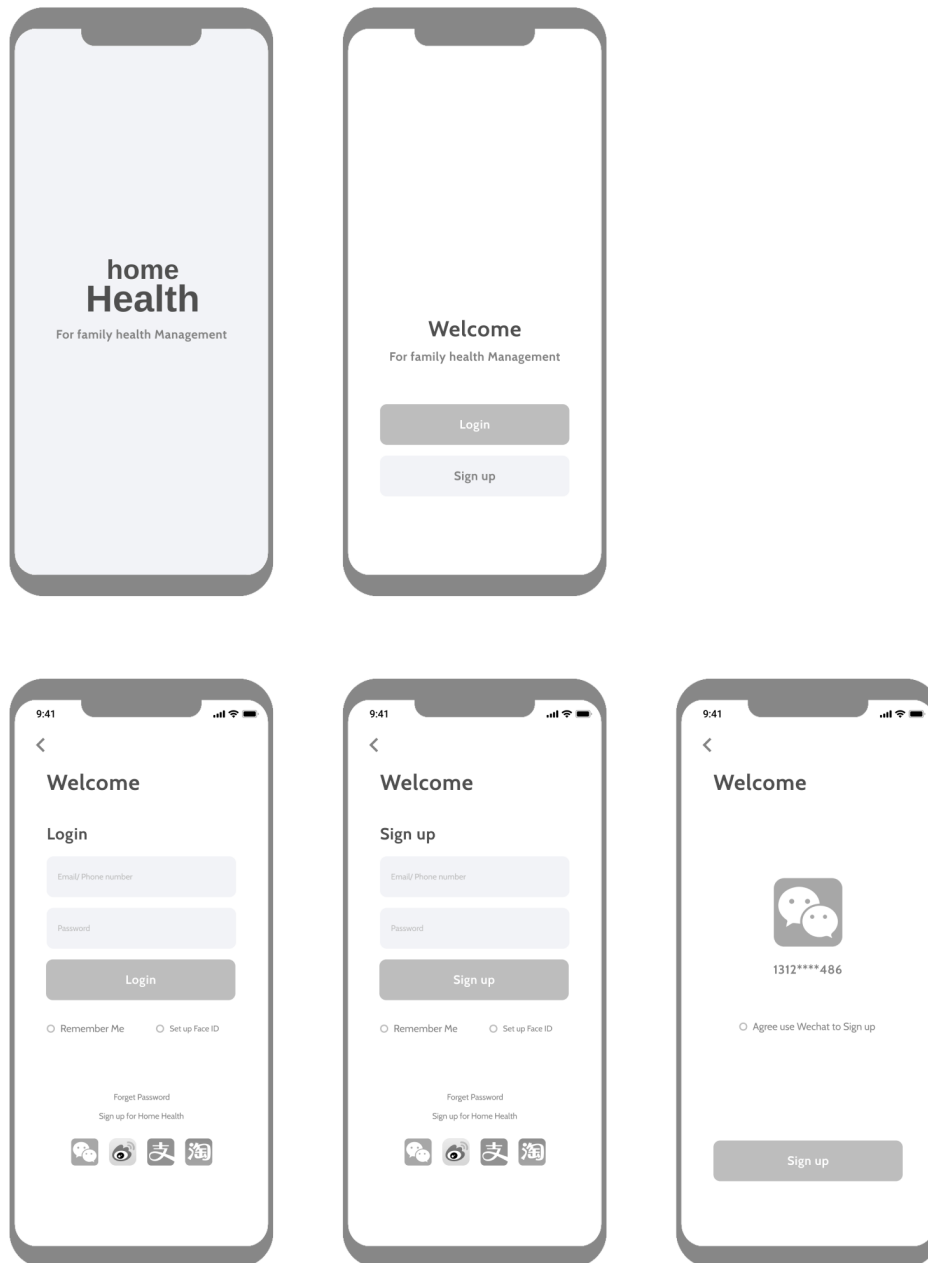


Figure 33 Login User Flow

In Login interface, by clicking remember me and face ID user can login without using password. They can also choose various social media account to sign in.

Health record experience

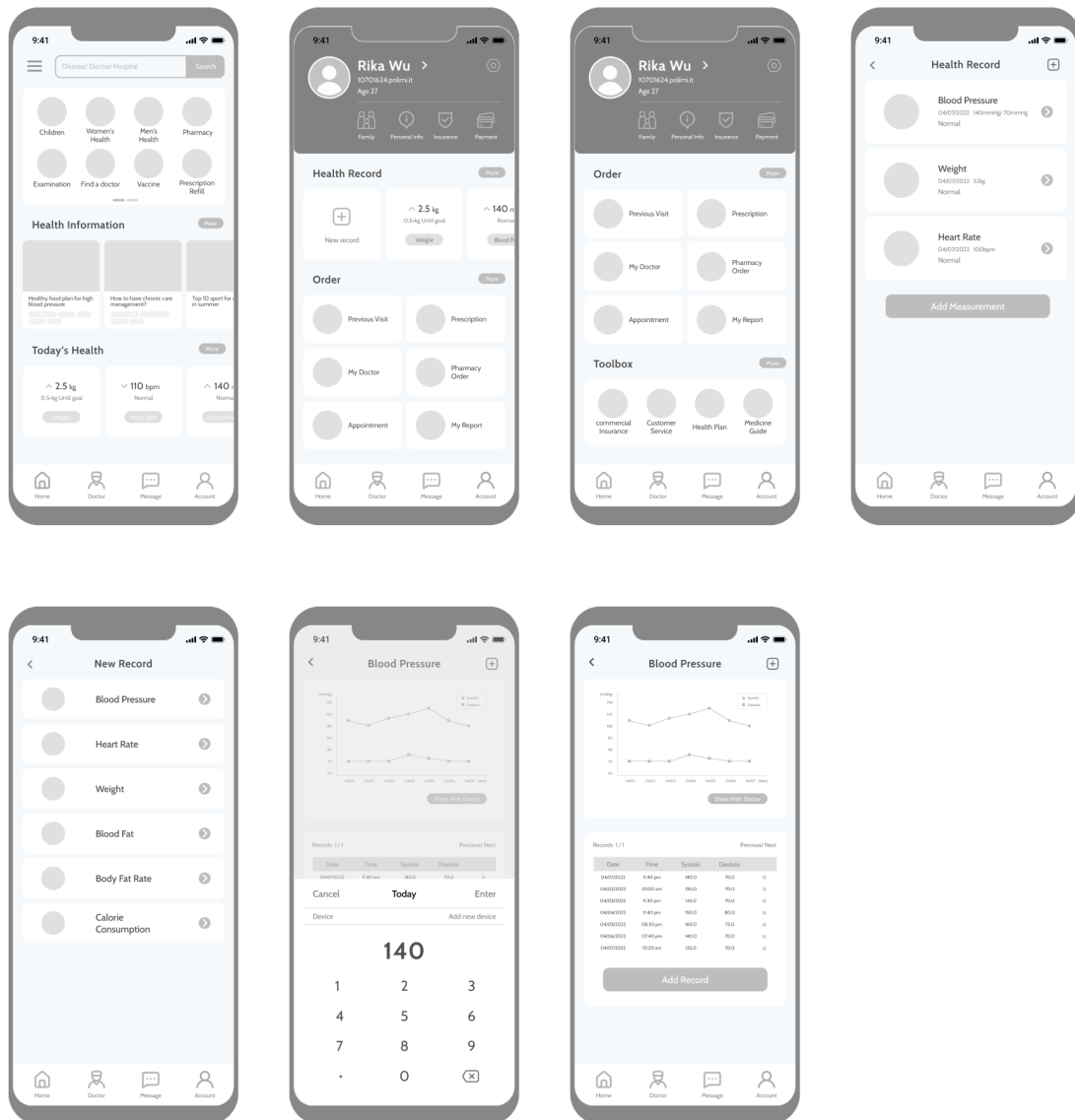


Figure 34 Health Record Management User Flow

Enjoy customized health record management for certain chronic disease. After adding measurement data, the app will visualize the records into graph for better understanding.

Insurance management experience

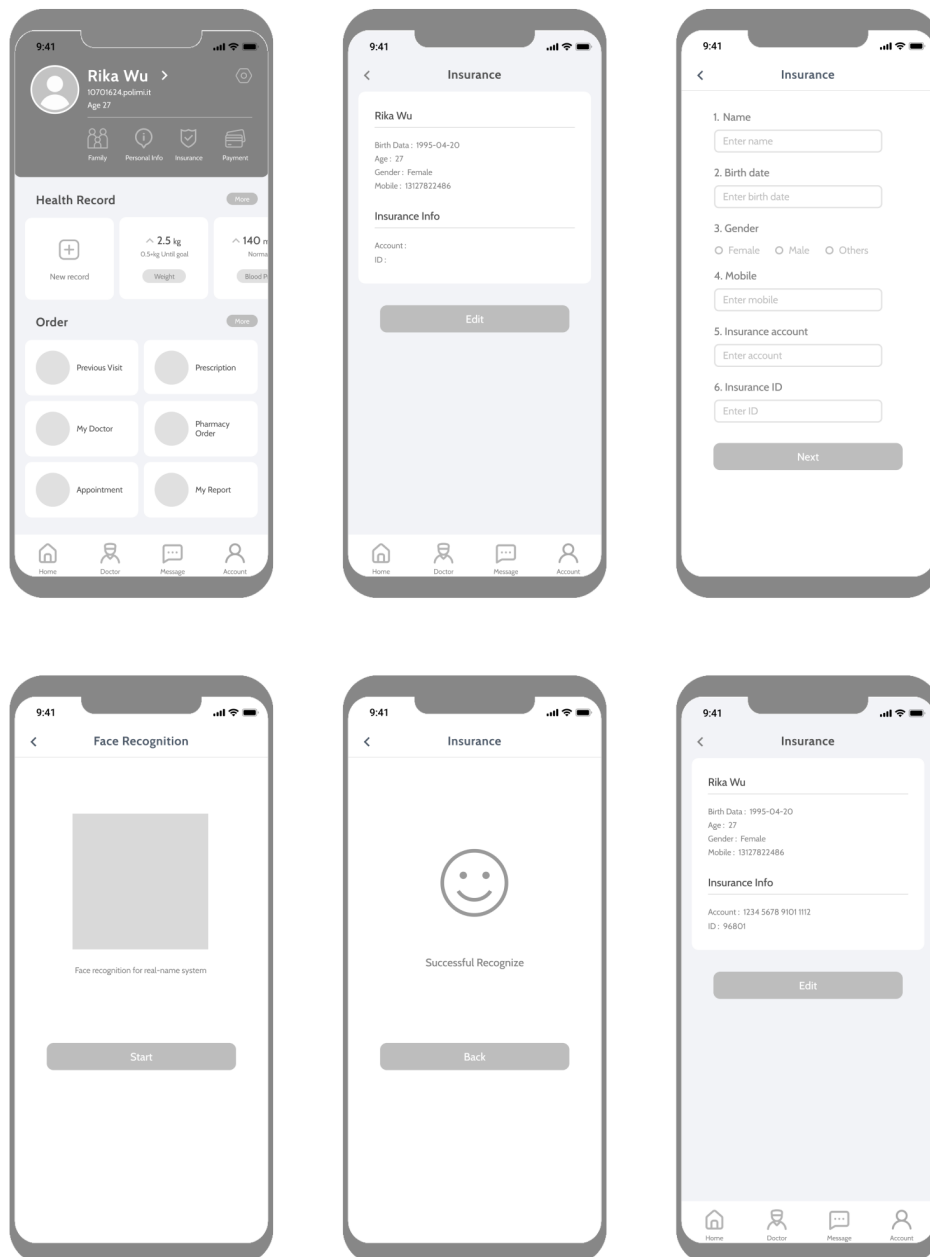


Figure 35 Insurance Management User Flow

Add Insurance information with real- name system. Make insurance card becomes the priority payment method.

Family member management experience

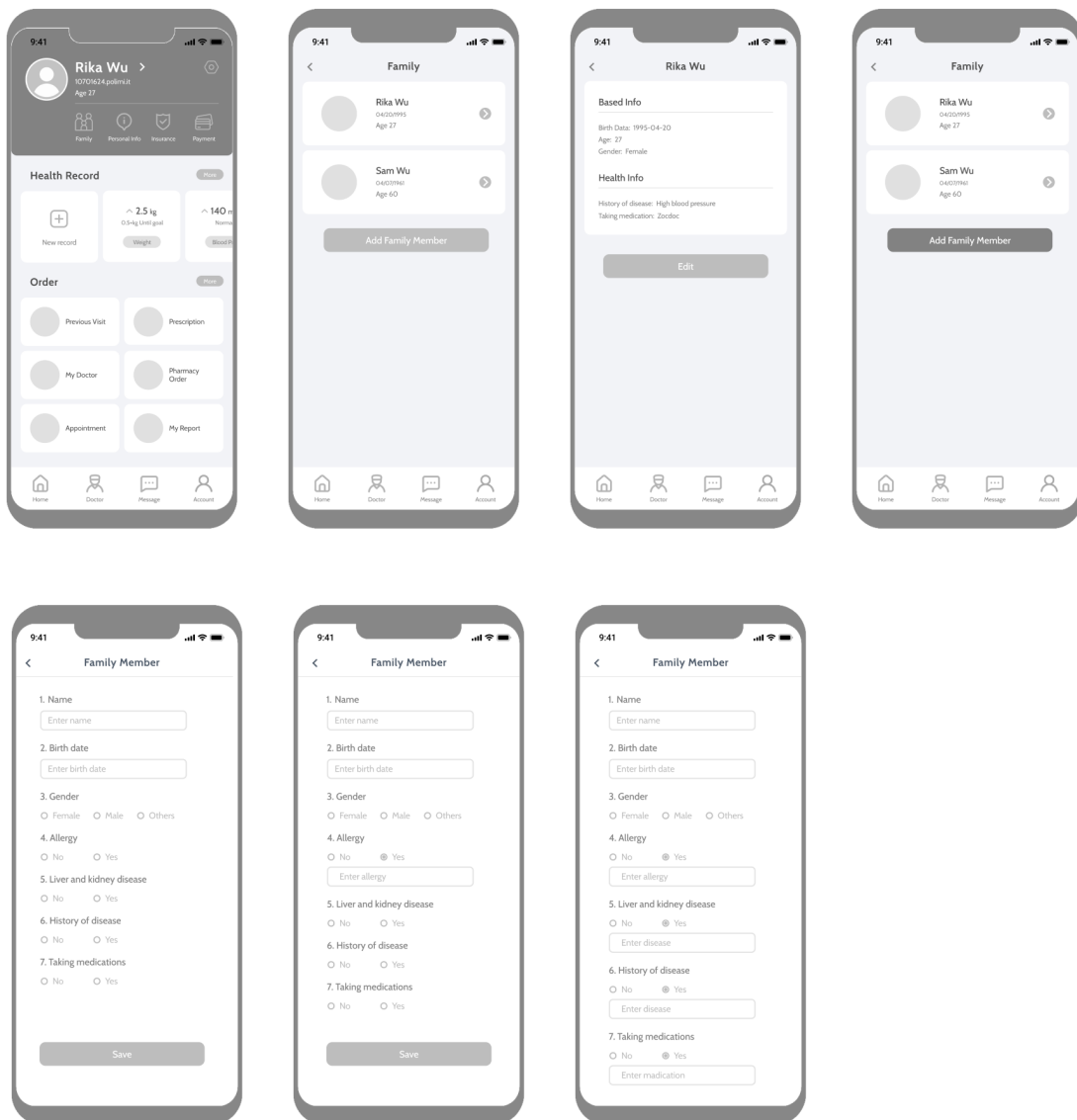


Figure 36 Family Member Management User Flow

Add family members' health information like allergy, history of disease and taking medication for doctor consultation.

Doctor consultation experience

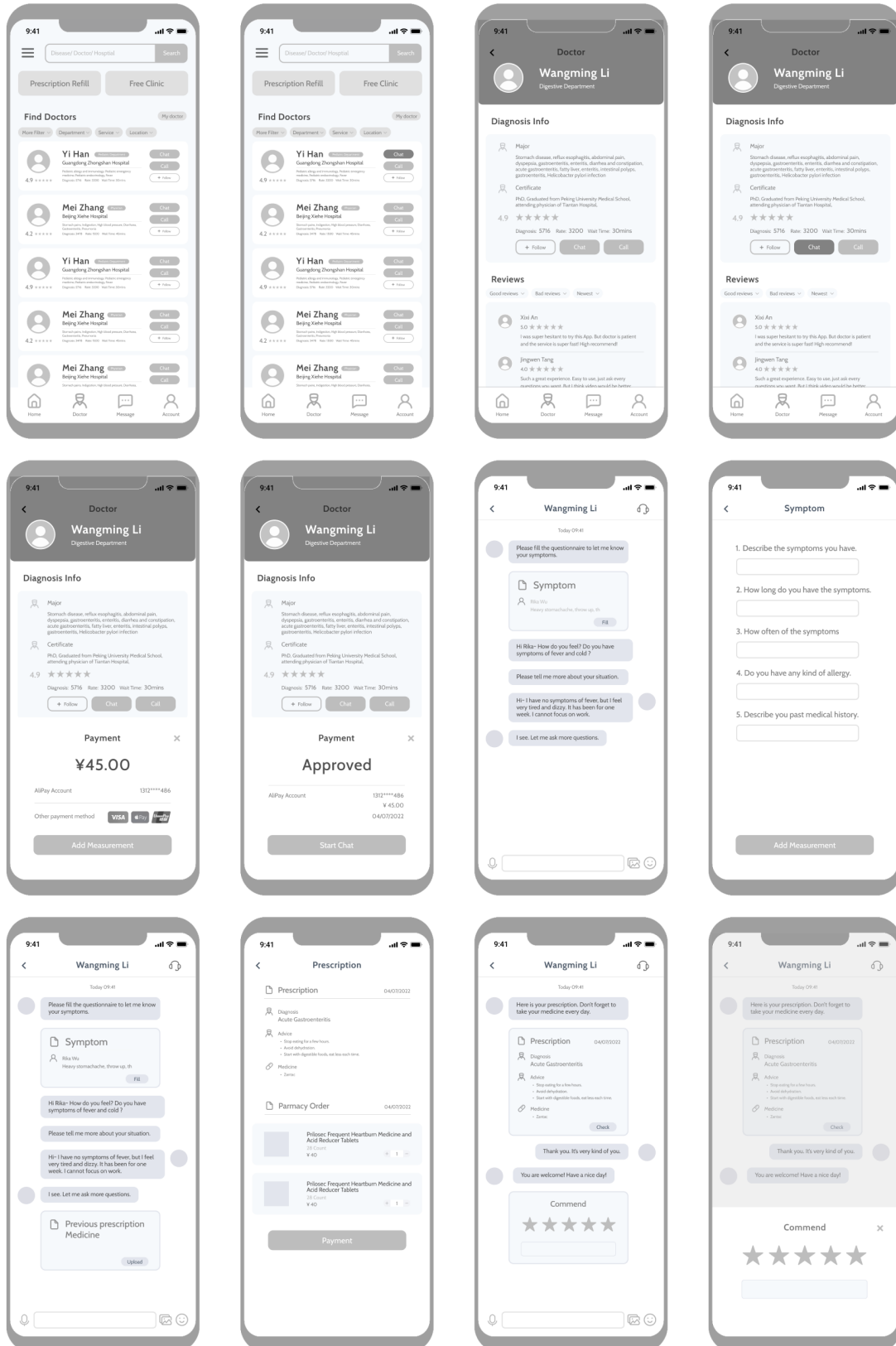


Figure 37 Doctor Consultation User Flow

In doctor consultation, users have a more convenient experience with a new flow. It supports more payment methods such as Alipay, Visa and Apple Pay. Users will fill out a questionnaire in the chatting interface for base information collection instead of talking with a chat robot. They can upload their previous prescription and medication more efficiently and share information they want with the doctor to have a better diagnosis experience.

Function & service

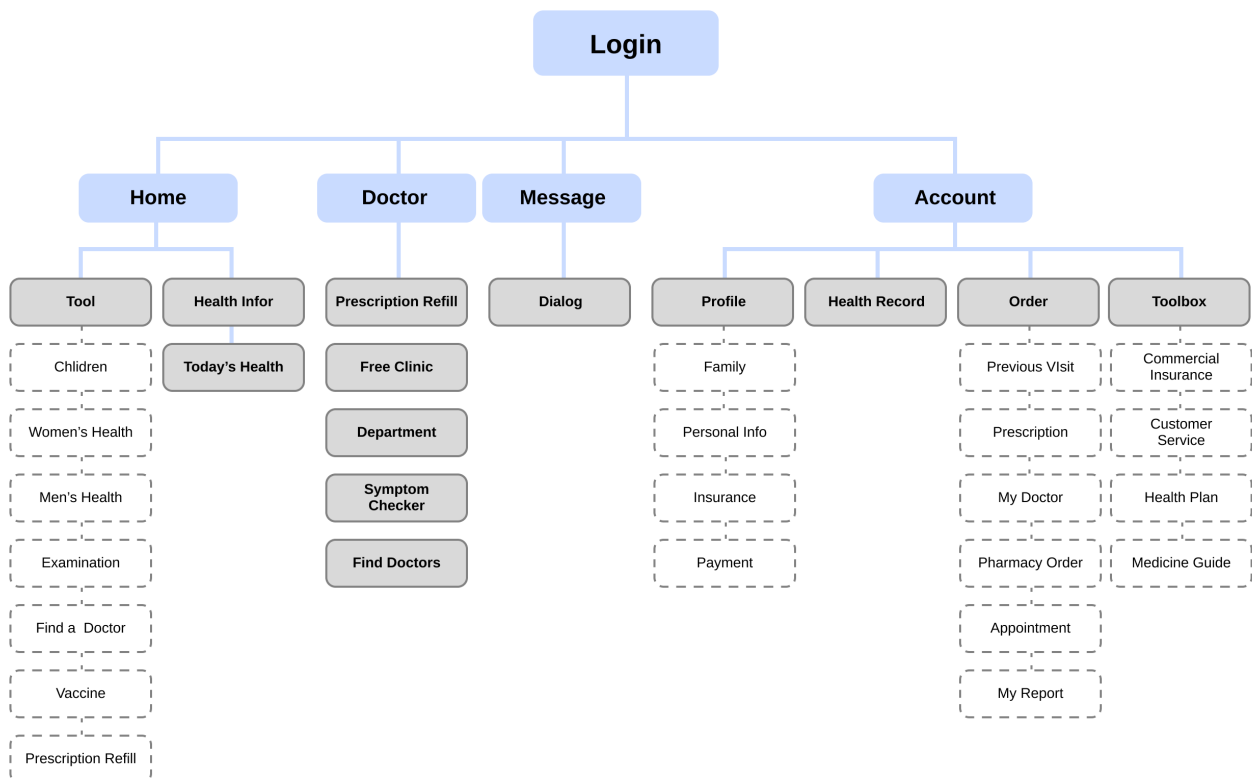


Figure 38 Function & Service

User flow

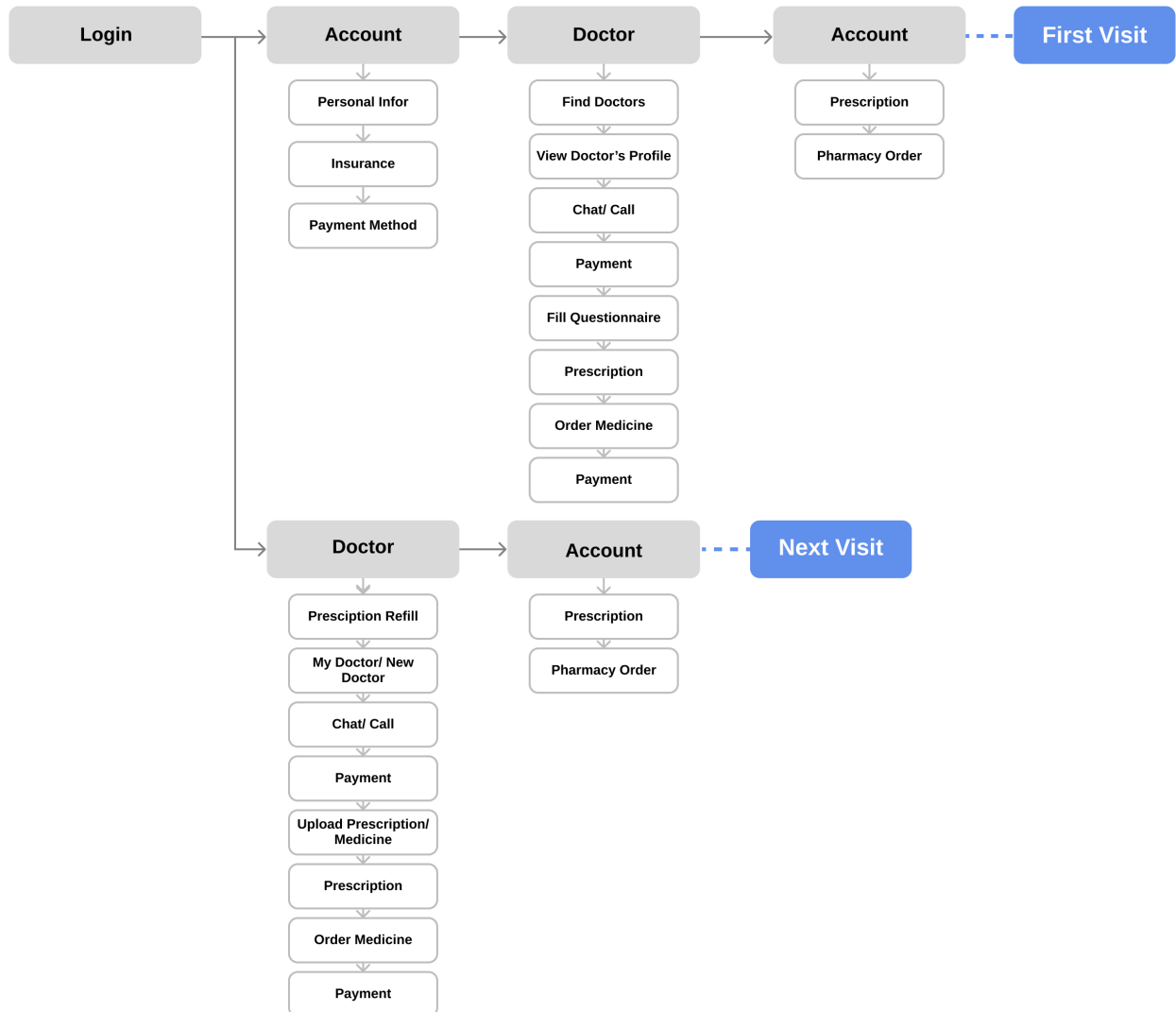
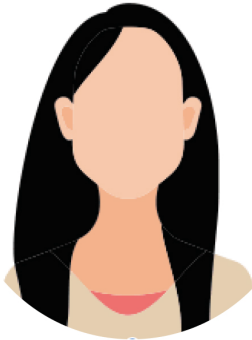


Figure 39 First & Next Visit User Flow

3.3 Persona & journey map



Lily Wang, 50

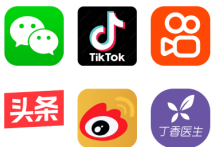
Demographics

Gender: Female
Nationality: Chinese
Location: Guangzhou
Employment: Store sales
Language: Mandarin,
Cantonese
Income: €670~980

Hobby

Cooking
Take a walk
Reading
Waching TV

Social media



“ I have high blood pressure and my husband has diabetes, and it is important for me to learn more about disease management. I would like to see a doctor online but I feel frustrated to use Telehealth.”

Motivations

- Interest in hypertension medical treatment
- Willing to attend health lecture
- Need Health advices such as recipe and sports plan
- Interest in Health monitoring devices
- Trying to use Telehealth for more disease advices
- Need notifications for schedule new apointments and take medicine

Frustrations

- Find it difficult to use Telehealth App
- Prefer to learn from video rather than article
- Regular return visit in 3A grade hospital costs long time and has limited interaction with doctors
- Feel worried about doctor’s skill on Telehealth

Goals

- Manage family members’ health
- Less time and financial cost on disease management

Features

- Income Level
- Mobility
- Digital sensitivity
- Health consumption



Mike Li, 28

Demographics

Gender: Male
Nationality: Chinese
Location: Shanghai
Employment: Programmer
Language: Mandarin, English
Income: €2000

Hobby

Video Game
Fitness
Reading
Hiking

Social media



“ For me, work is the most important thing. I always work overtime, too busy to go to the hospital. However, I have a family history of heart disease and really want to manage my weight to stay healthy.....”

Motivations

- Do not want to ask for a sick leave
- Hope to lose weight within a year
- Learn to read the physical examination report by myself
- Want to record my weight and blood pressure

Frustrations

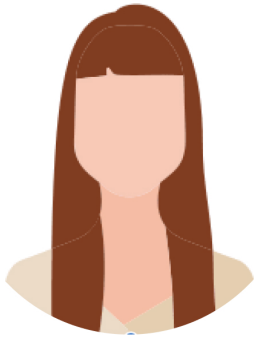
- I don't know how to use insurance on Telehealth
- I see different doctors on Telehealth each time, which lead to lack of trust
- I need a good application to record my health data and medical history
- My weight loss plan always fails
- Poor communication with the doctor
- I can't refill my prescription in community clinic

Goals

- Loss Weight and keep healthy
- Create an sports plan

Features

- Income Level
- Mobility
- Digital sensitivity
- Health consumption



May Fang, 35

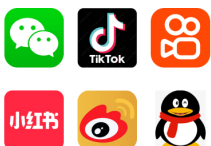
Demographics

Gender: Female
Nationality: Chinese
Location: Guangxi
Employment: Household
Language: Mandarin
Income: €900

Hobby

Cooking
Take a walk
Reading
Waching TV

Social media



“ Skin diseases have troubled me for many years. We don’t have a good specialized hospital in my city. Go to the hospital in Shanghai would be helpful but traveling expenses is too high.”

Motivations

- Heal the skin disease
- See an expert in famous specialized hospital
- Medication and health advice
- Interest in skin care information
- Long-term skin care management
- Save monry and time

Frustrations

- Lack of specialized hospital nearby
- Limited budget for treatment
- Prefer video call instead of chat and call
- Limited platforms and services support insurance
- Don’t want to go to other citys for treatment

Goals

- Save money
- Use insurance

Features

- Income Level
- Mobility
- Digital sensitivity
- Health consumption



Xiao Tang, 65

Demographics

Gender: Male
Nationality: Chinese
Location: Sichan
Employment: Retirement
Language: Mandarin
Income: €550

Hobby

Chess
Mahjong
Swimming
Watching TV

Social media



“ I am living alone in Sichuan now. I need to have my prescription refill each month. However, I am getting old, take a bus for one hour to go to the hospital is too tired for me.....”

Motivations

- Have prescription refill each month
- Manage multiple chronic diseases
- Go to the hospital as little as possible
- See doctors nearby

Frustrations

- Don't know how to use insurance on Telehealth
- Digital payment method is too different for me
- Need detailed explanations of the online service
- Need a guide to use Telehealth app
- Slow typing speed
- Presbyopia makes me feel tired of reading on screen
- Where to find the previous order
- Hope to find a doctor I know

Goals

- keep healthy
- See doctors more easier

Features

- Income Level
- Mobility
- Digital sensitivity
- Health consumption



Lily Wang

Age 50, store sales

"I have high blood pressure and need to learn more about disease management. I would like to see a doctor online but I feel frustrated to use Telehealth."

	Login	Profile	Appointment	Diagnosis	Payment
Doing	Enter password.	Complete medical history.	Read doctor's profile and comments. Choose a online doctor.	Describe the symptoms by voice call.	Pay for prescription. Oder medicine delivery and pay.
Thinking	Automatic login would be better.	I cannot describe my medical history well through profile.	Which doctor is the best?	I hope to see doctor's face.	Payment progress is too complex.
Feeling	Neural	Nervous	Happy	OK	Confused



Mike Li

Age 28, programmer

"I have a family history of heart disease and really want to manage my weight to stay healthy....."

	Login	Profile	Appointment	Diagnosis	Payment
Doing	Enter password.	Use montoring devices to upload data.	schedule a meeting after 30 mins with best reviews doctor.	Chat with doctor, send images.	Pay by Alipay and refill the prescription.
Thinking	That's easy.	Does it has notifications to remind me?	This doctor has the best reviews.	Not sure if I explain myself well.	How can I use insurance?
Feeling	OK	Neural	Happy	Confused	Sad



May Fang

Age 35, household

"Skin diseases have troubled me for many years. We don't have a good specialized hospital in my city. Go to the hospital in Shanghai would be helpful but traveling expenses is too high."

	Login	Profile	Appointment	Diagnosis	Payment
Doing	Sign in with social media account.	Take pictures to upload previous prescription.	Find a expert with high recommend from famous specialized hospital.	Send photos of my skin to doctor.	Pay with Alipay. Oder medicine delivery and pay.
Thinking	It's nice.	manage all the paper prescription and test result is annoying.	Ratings and scores are helpful.	Video meeting can well describe the symptoms.	Great to see a expect with low price.
Feeling	Ok	Confused	Happy	Nervous	OK



Xiao Tang

Age 65, retirement

" I am living alone in Sichuan now. I need to have my prescription refill each month. However, I am getting old, take a bus for one hour to go to the hospital is too tired for me....."

	Login	Profile	Appointment	Diagnosis	Payment
Doing	Login by phone number	Enter visa card number and birth date.	Choose a doctor randomly.	Make a call with doctor.	Make Order payment by Visa card.
Thinking	Hard to remember my password.	What are these functions for?	Who is the best doctor?	Bad connection. I can't hear the doctor well.	Where to see the update of delivery?
Feeling	Confused	Confused	Neural	Sad	Neural

3.4 Delivery





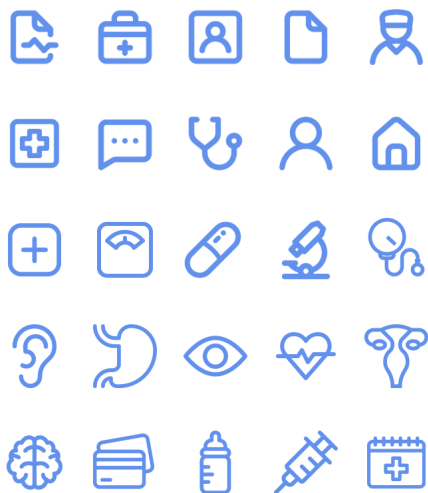
Logo

home
Health

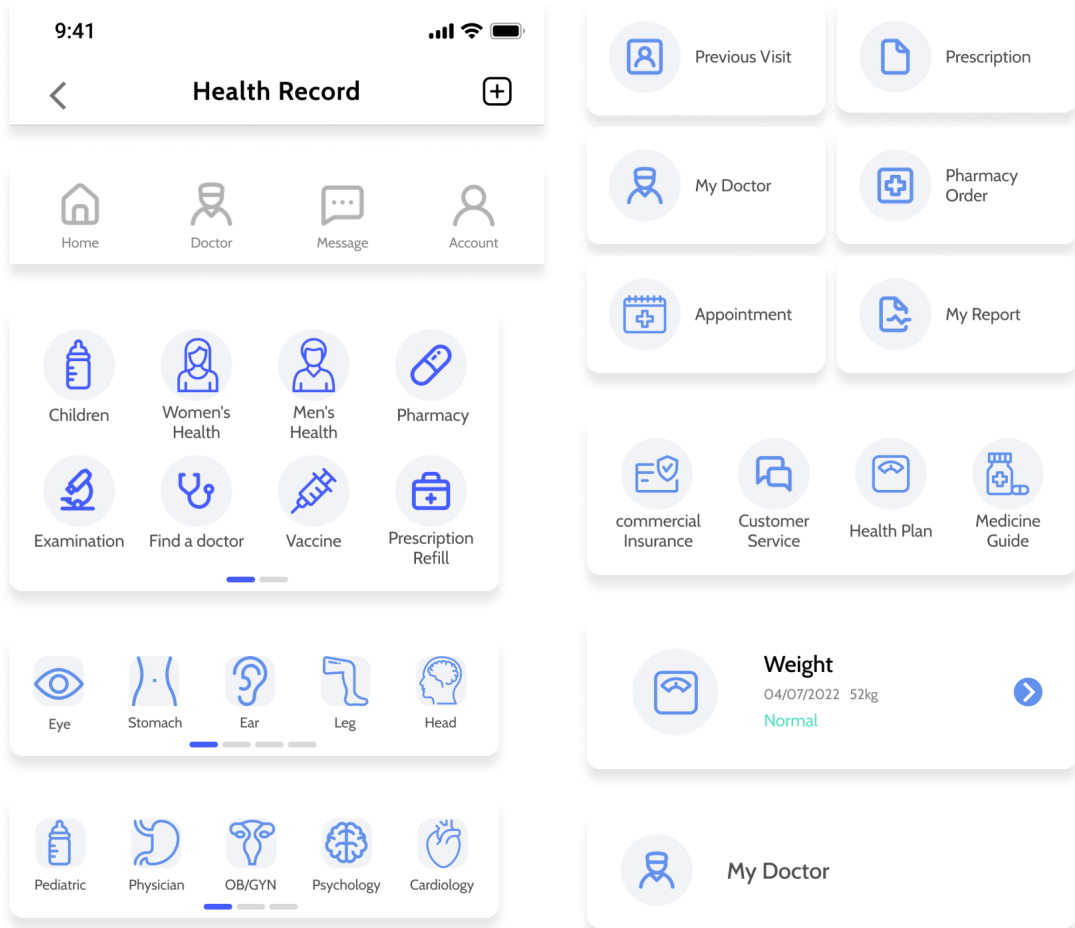


home
Health
For family health Management

Icon



Components



Login

Add Measurement

Prescription Refill

Search

+ Follow Chat ¥30 45mins Call ¥30 45mins

+ Follow Chat ¥30 Call ¥60

Good reviews ▾ Bad reviews ▾ Newest ▾

All Weight Pediatric Department

Color System

Primary color



Text color



Icon colour



Front

Heading 1 Cabin 24pt Bold

Heading 2 Cabin 18pt Bold

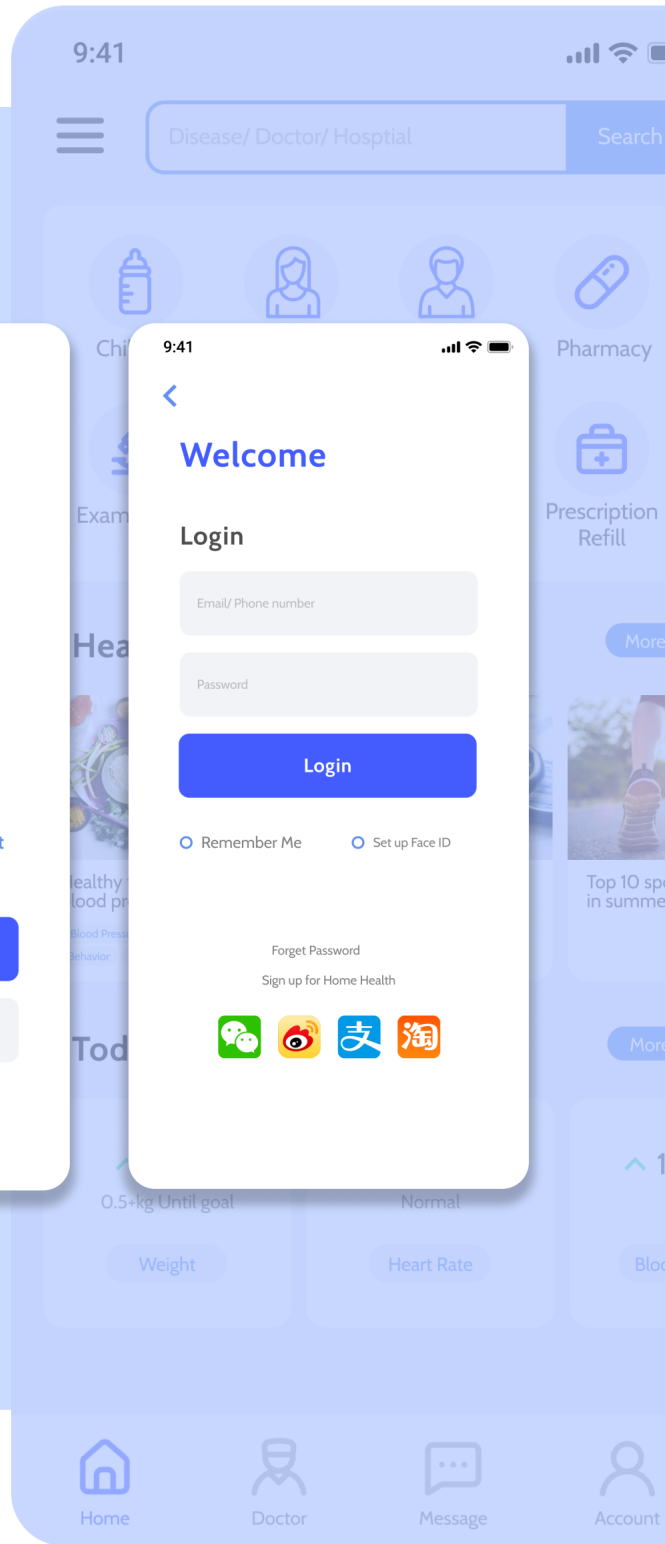
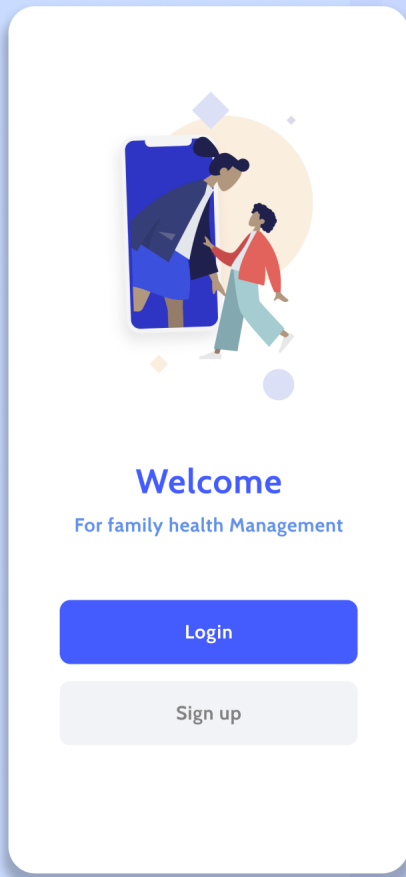
Heading 3 Cabin 16pt Medium

Body text Cabin 12pt Regular

Notes Cabin 10pt Regular

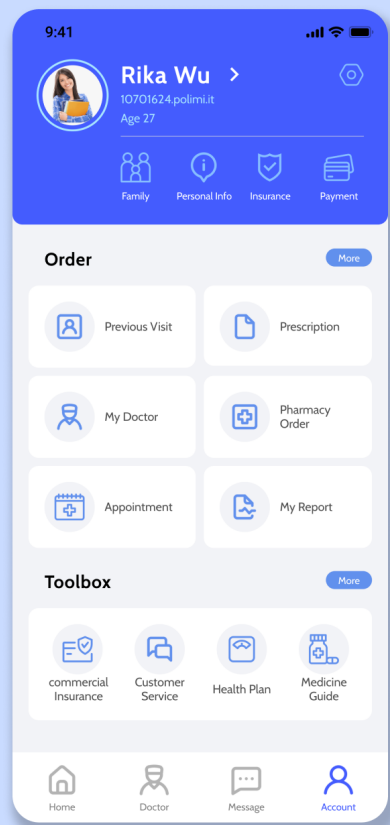
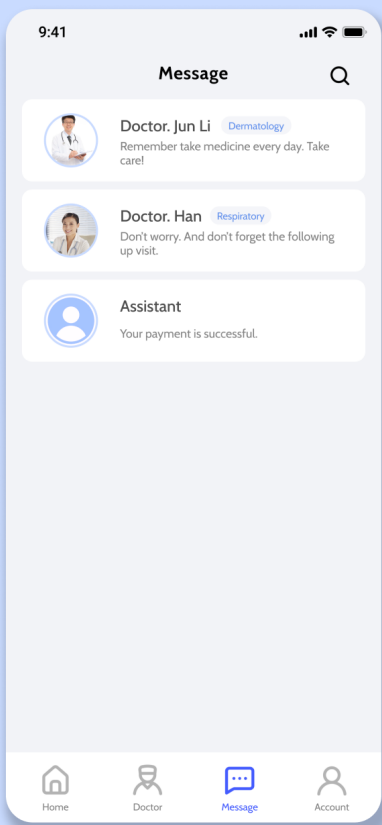
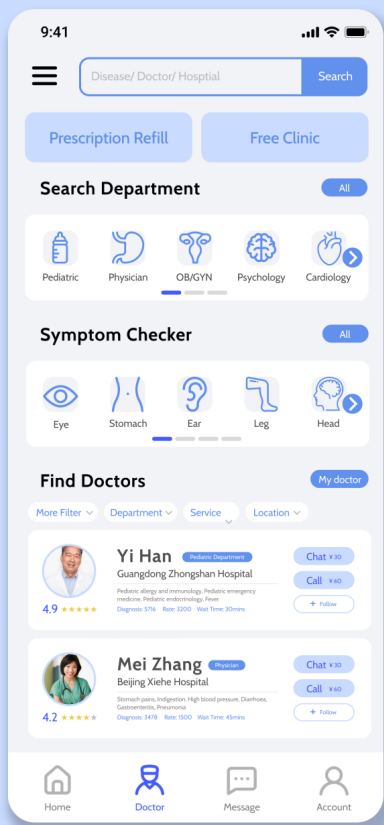
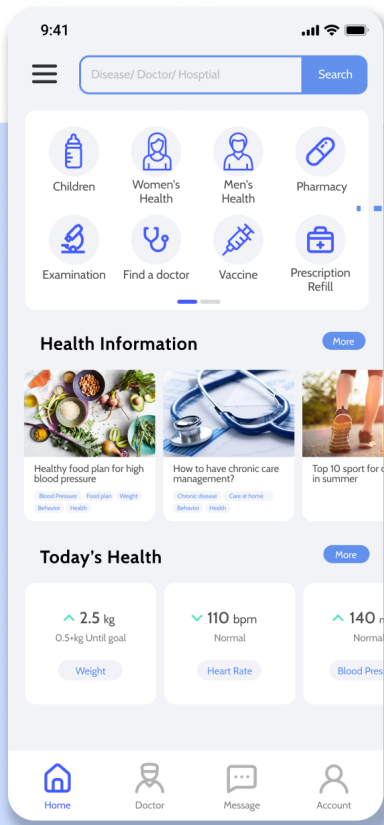
Login

The login interface is designed to be a concise layout page, and buttons with high degree of saturation color are set to guide users to complete registration and login. The login is faster and support many social media accounts register here.



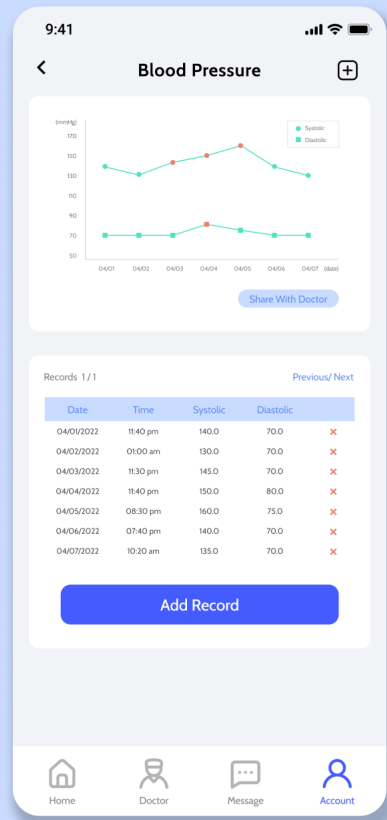
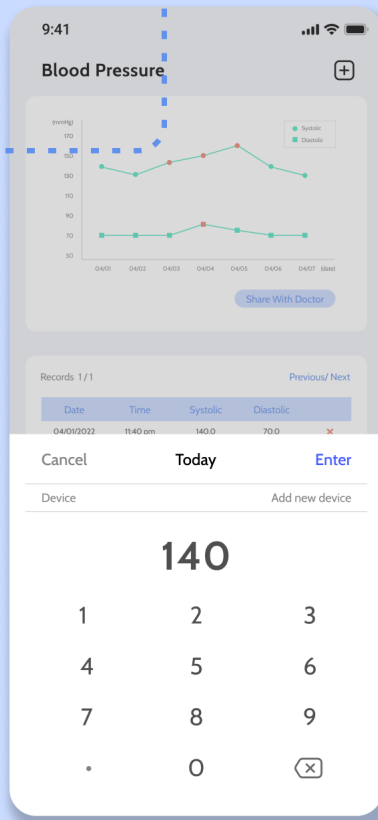
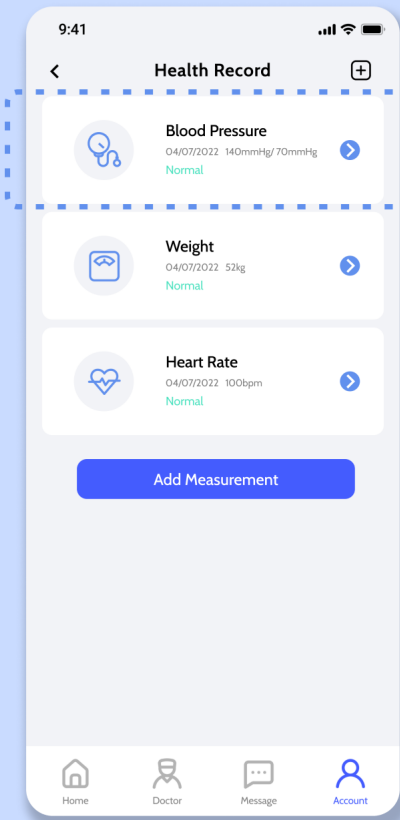
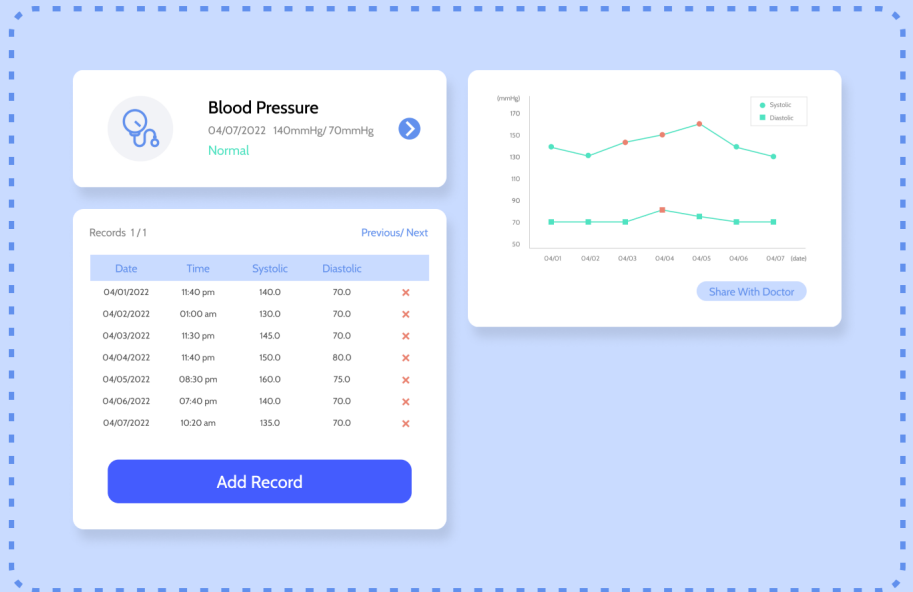
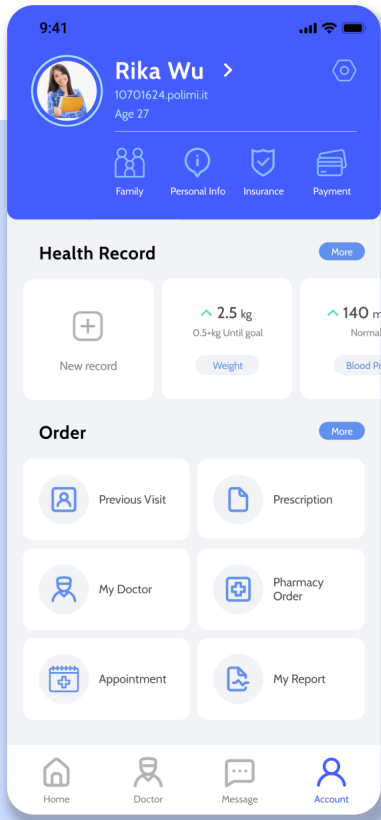
Homepage

The main functions of Telehealth are Home, Doctor, Message and Account. The app's main functions are also simplified into health management, consultation and follow-up. Important functions are set at the top of Home, making people see at a glance.



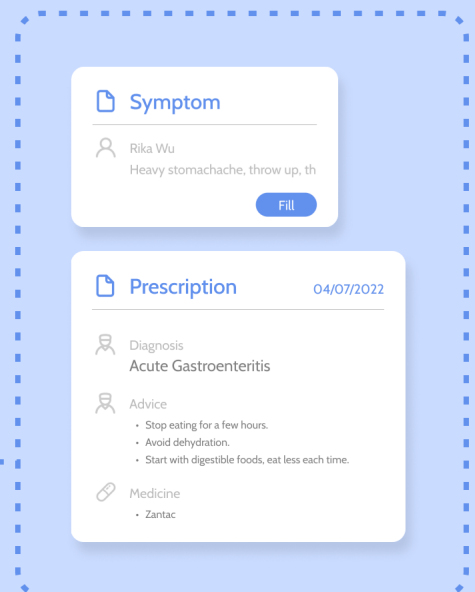
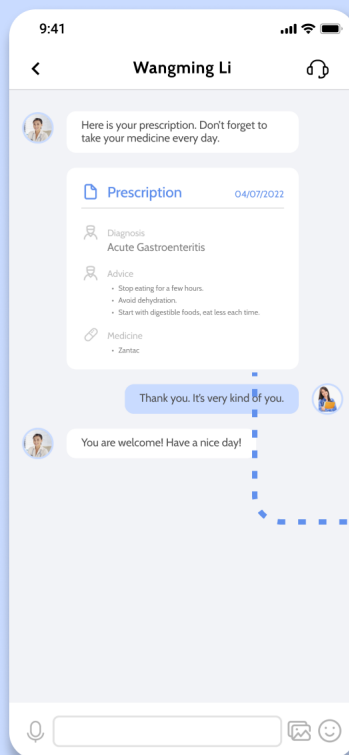
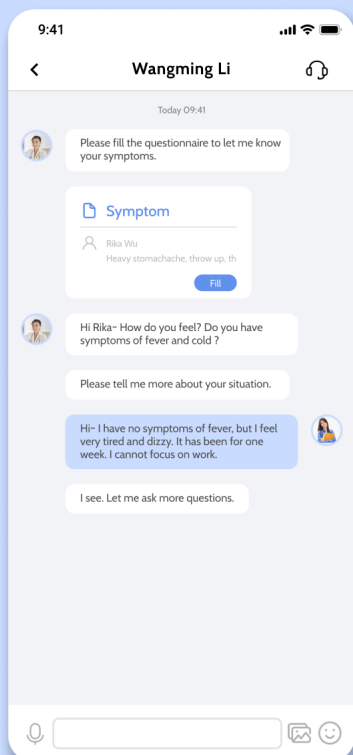
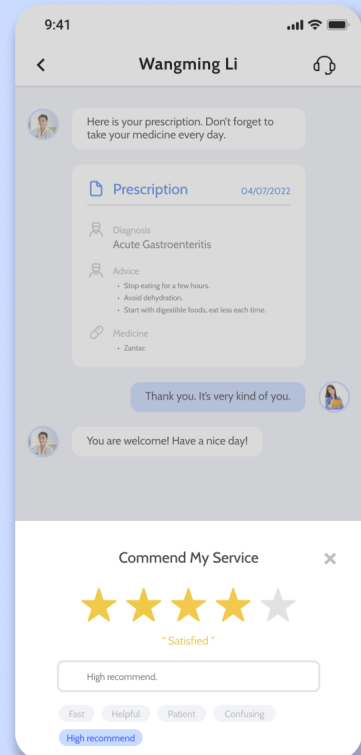
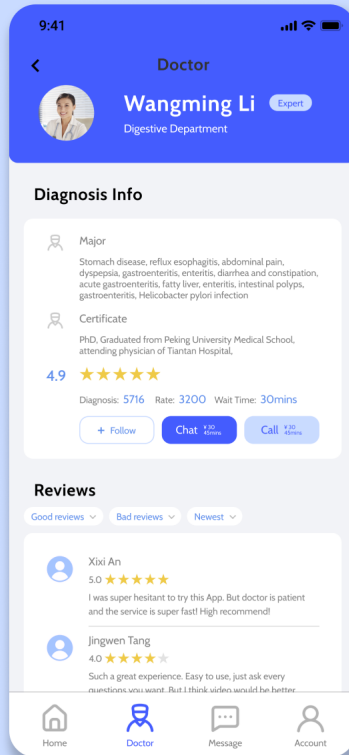
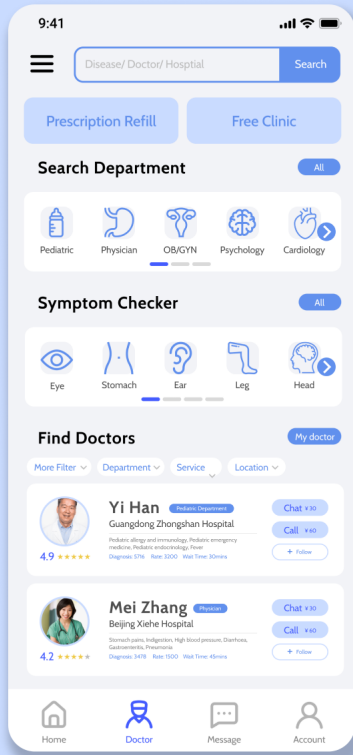
Health Record

Users can create personalized measurement data on the Account page through the "new record" button to complete health management. The interface automatically generates charts based on the health monitoring device linked with the user or manually added data. And the green color represents normal data, and the red color represents abnormal data.



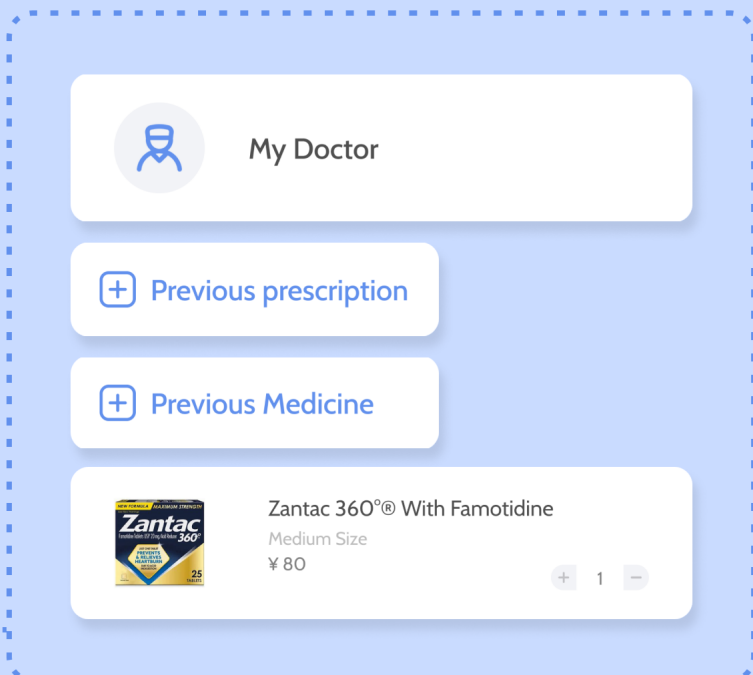
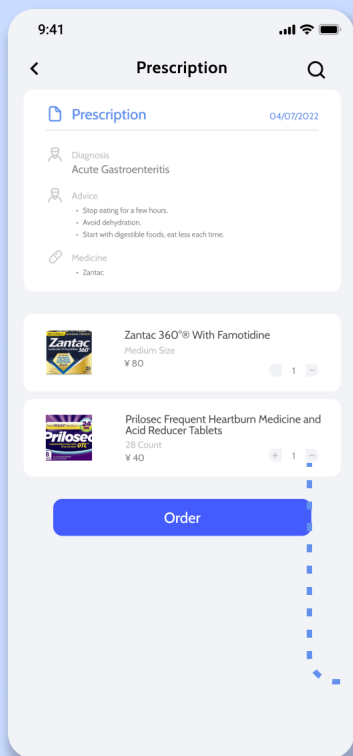
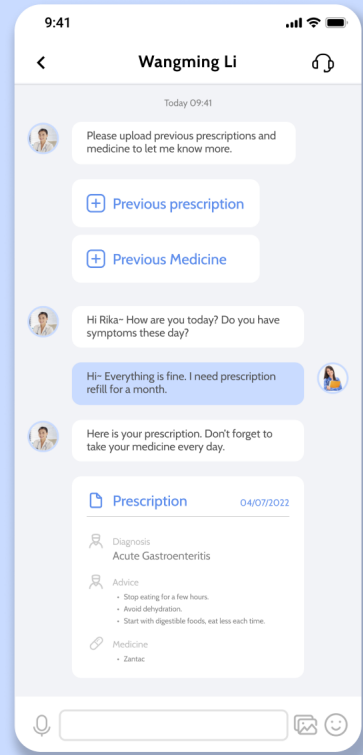
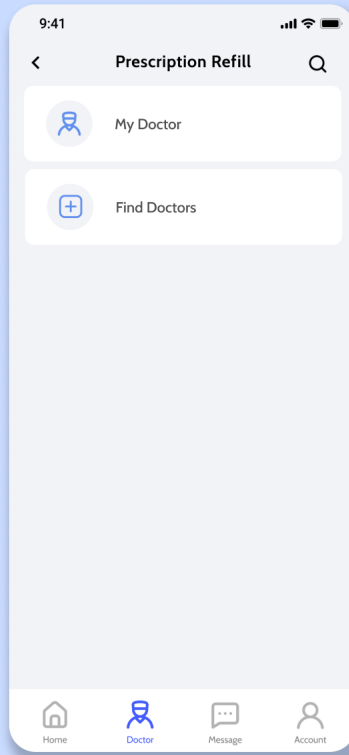
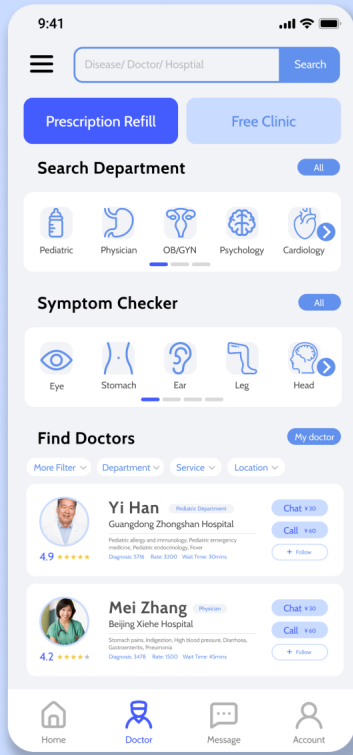
Medical Consultation

The button of Chat is designed to be darker to guide users to choose. Patients can describe their symptoms and disease history, allergy information in a symptom questionnaire. After diagnosis, a prescription file will be shown including the name of the disease, doctor's advice and medications.



Prescription Refill

Enter into prescription refill, users can choose the doctors they known or a new doctor. Users can upload the previous prescription and medication in the dialogue window. After the diagnosis, the user can click to enter the prescription interface to order prescription drugs and deliver them.



3.5 Improvement

User health record management

Compared to the previous Telehealth app, the new design prioritizes the user's Health Record maintenance under the personal account. Users can monitor health data on the Telehealth platform by manually entering or binding health monitoring devices. It s not only improves the health management function of the Telehealth platform but also builds the user's usage habits efficiently. Users can construct personalized health records depending on their health issues, and their daily health records will generate visual charts automatically. Through the sharing function, the charts make it easy for users to monitor their health and assist physicians in precisely assessing their problems. The medical insurance capability has been added to the personal account interface to make it easier for patients to register their insurance information and link their identification.

Functional interface simplification

The App reduces the functional sections and buttons on the homepage to focus on diagnosis, follow-up, health data management, and health information, based on the most popular Telehealth features among Chinese users. The new

design streamlines repeated material, eliminates adverts, and lists promotion sections that may hinder user comprehension. Color is used to highlight and differentiate between common and crucial typographic functions. The new interface contains larger fonts, contrasting colors, and more distinct and unified sections, making it easier for users of all ages.

Prescription refill experience

The new design emphasizes the prescription refill feature with prominent buttons for patients with multiple visits. Patients might choose their prior physician or a new prescriber.

Choosing a previous physician can assist consumers in gaining confidence in the physician, the platform, and user behaviors.

The doctor's appearance is also more conducive to monitoring the patient's health status. In the interface of the dialogue with the doctor, the patient can upload past prescriptions and medications in the app or take images to submit prescription information, allowing the doctor to comprehend the problem and diagnosis readily.

Conclusion

Future Chinese patients with chronic diseases will utilize Telehealth for health management at a rising rate. Through Telehealth, people in regions with limited medical resources will access higher quality medical resources at a cheaper cost. Telehealth, on the other hand, may diagnose common diseases and significantly lower the medical burden of 3A hospitals in large cities while improving the medical service experience for patients. From the historical evolution of Telehealth in China, it is evident that the comprehensive deployment of electronic medical records and medical insurance would be the future trend of Telehealth in China. The automated management of personal medical records can facilitate the sharing of diagnostic patient information between various medical institutions and Telehealth platforms, hence enhancing the diagnostic precision of Telehealth.

Electronic medical records can liberate patients from paper records, reduce the loss of paper files, and improve the progression of disease management. It will be a significant problem in the future to successfully communicate patient records while preserving patient information. In recent decades, it has been fashionable for young people to monitor their health using technologies such as smart wristbands and

Apple watches. As health awareness has expanded, the acceptance of health monitoring gadgets has grown. Currently, Telehealth platforms offer only rudimentary health monitoring device bundling and emphasize medical consultation services. The future trend in Telehealth health management development will be to collect data, evaluate it, and present consumers with individualized recommendations. Even though China's national policy favours the use of Telehealth by citizens with medical insurance, there are still difficulties with the authentication of personal information. More patients will utilize Telehealth in the future due to the rising digitization of health insurance and the availability of insurance payments on most Telehealth platforms. As awareness of chronic diseases increases, offline healthcare providers will create more partnerships with Telehealth platforms to offer patients more convenient, high-quality, and economical healthcare services.

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