

## 2021 VCD Thesis Showcase

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Instructor / Mike Strobert, Adam Smith



HealthWay is the brand-new generation of Personal Health Record System, which uses the IoT healthcare device to keep long-term health data records. The user can view the data via the HealthWay mobile app. For users with chronic diseases, Healthway helps track key biochemical indicators.

Once the data became abnormal, the system can inform the patient in time. In addition, HealthWay allows the user communicate with the doctor online, and help users make an online appointment the first time after data and physical abnormalities occur.



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- Part 2 **Highlight Features**
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Part 1

# Project Introduction

# Health care is one of the common topic that almost everyone face.

## Background

## The Problem

## The Solution

The fundamental purpose of health care is to enhance the quality of life by enhancing health. With the development of medical technology, the commercial health care system will provide humans with better medical service.

Once the data became abnormal, the system can inform the patient in time. In addition, HealthWay allows the user communicate with the doctor online, and help users make an online appointment the first time after data and physical abnormalities occur.



Background

The Problem

The Solution

# Difficult to collect health information

The patients (especial for patients with chronic diseases) feel trouble to collect detailed health information and understand their body health well, which will cause information lag for them and their doctor to understand their health conditions well.



# Design a personal health record system, and using IoT medical devices to collect health data.

Healthway is designed to use medical data to help users manage their health without compromising their privacy too much, and to

help health care providers make health care more personalized and targeted.

Background

The Problem

The Solution



Part 2

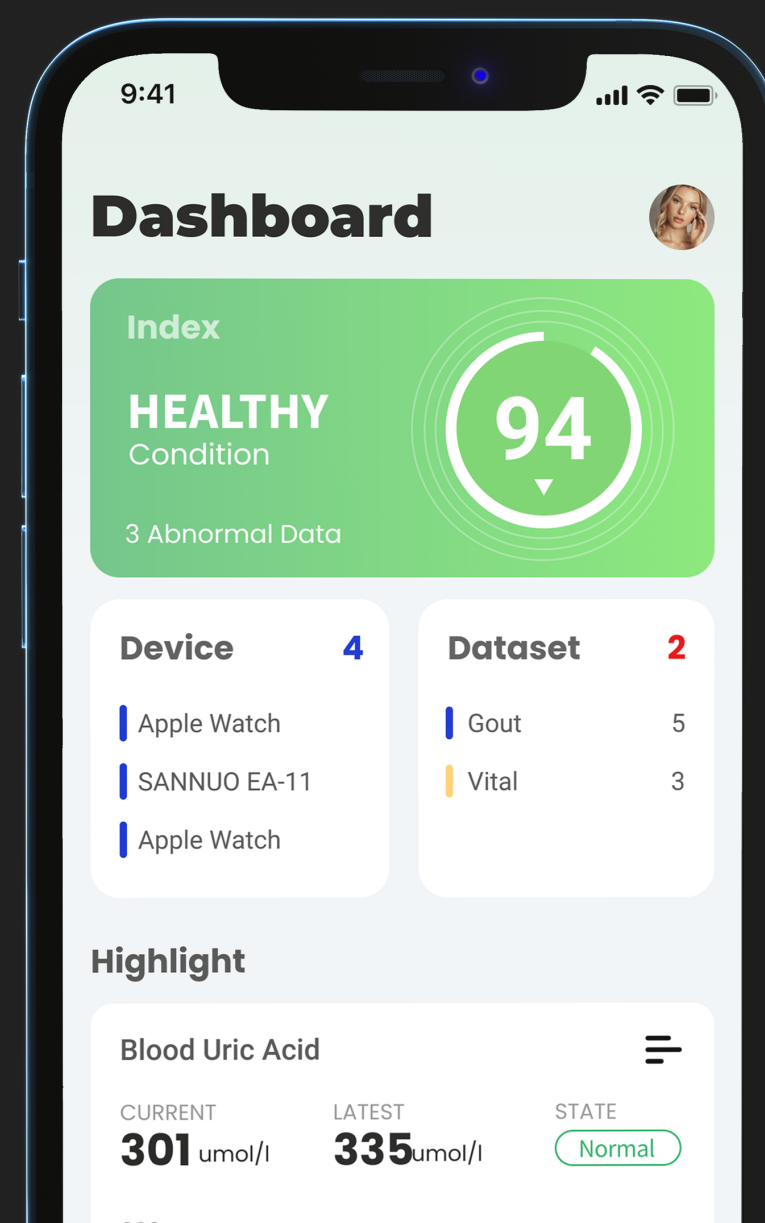
# Highlight Features



# Healthway's Four Highlight Features

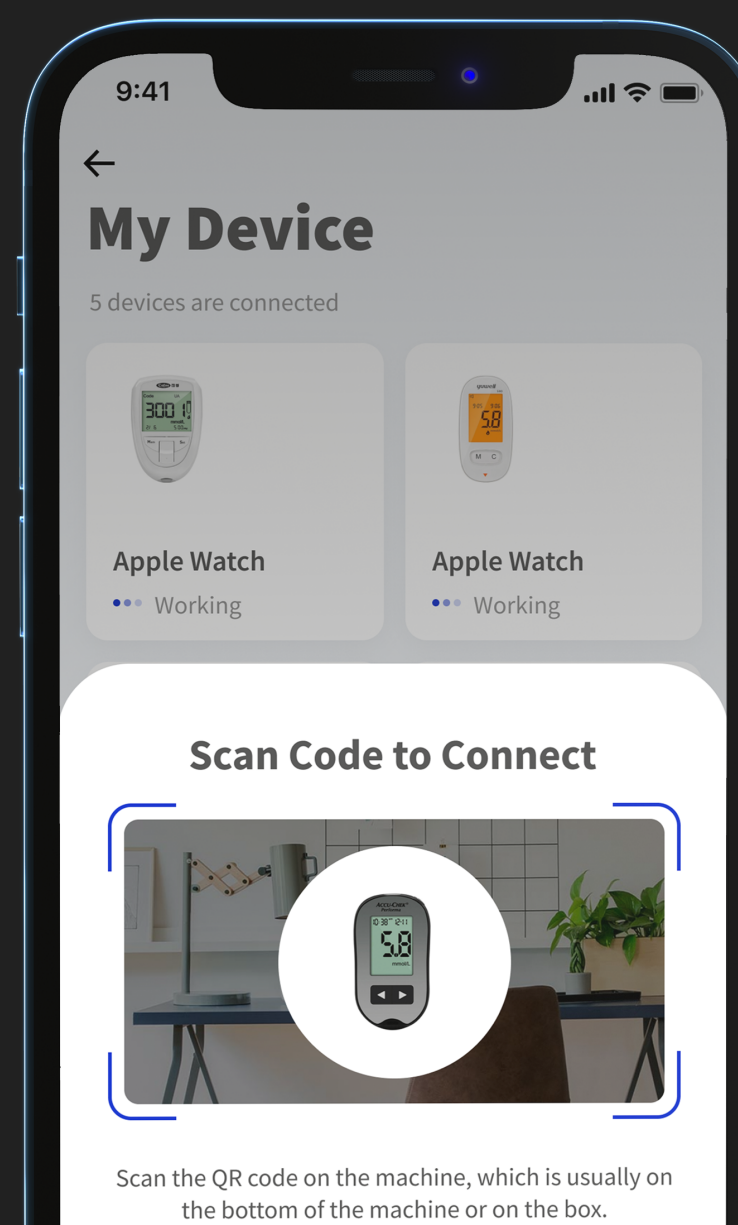
1

All the health data that users care about are shown here



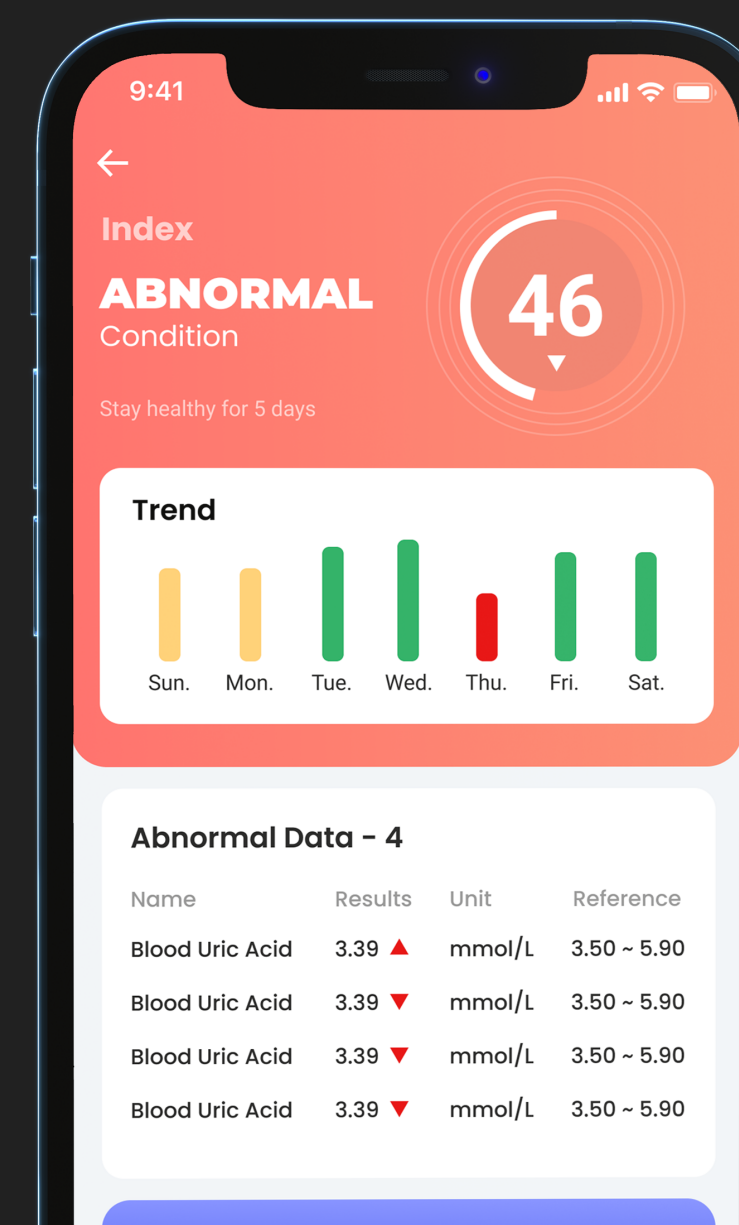
2

Intelligent connectivity using home IoT medical devices



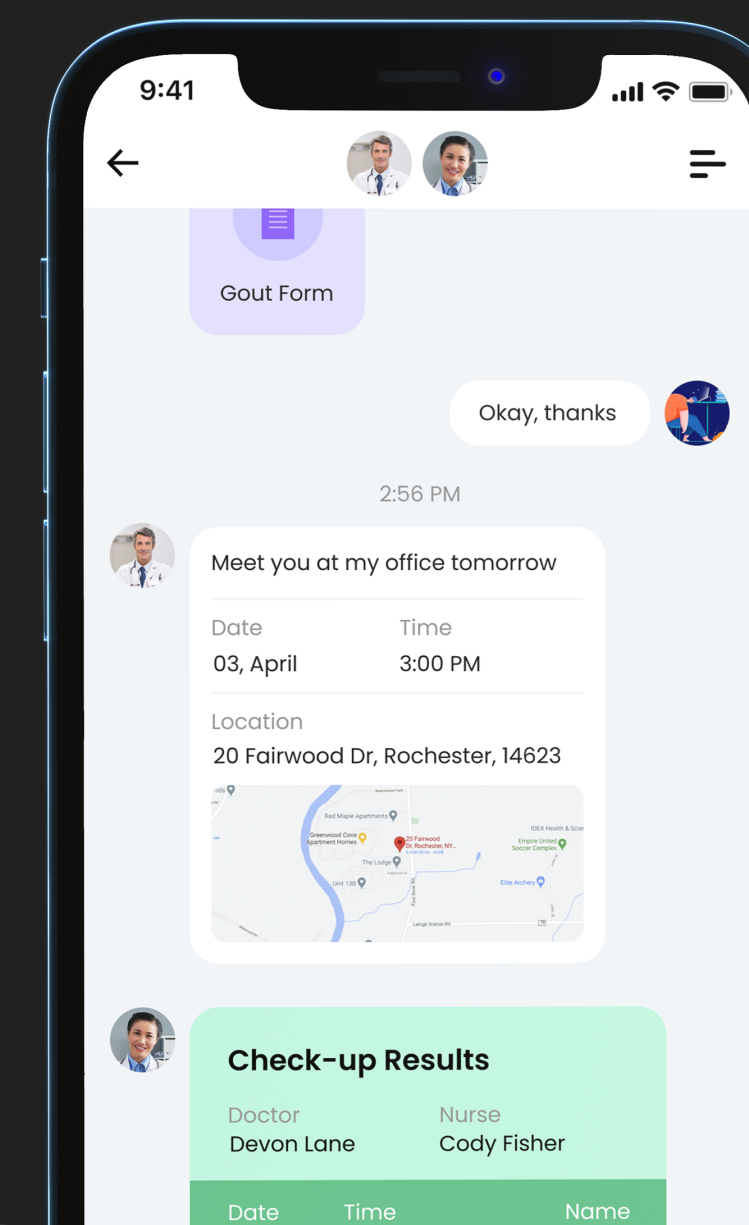
3

Achieve timely feedback for abnormal data



4

O2O medical service and data synchronization





## Part 3

# Process Deck

1. Insight & Opportunity

2. User Research

3. Competitive Analysis

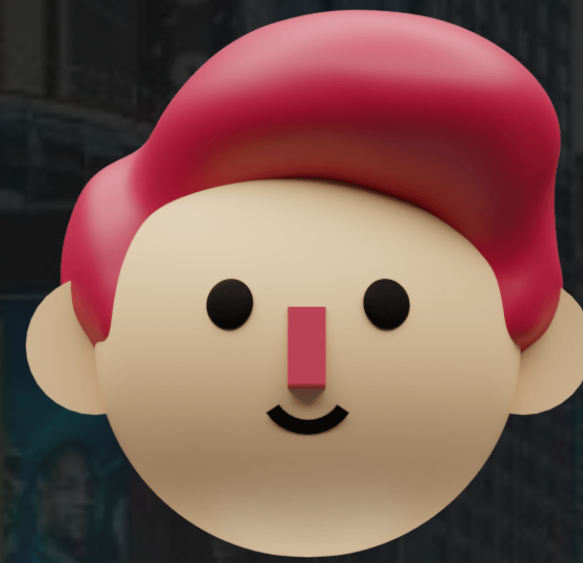
4. Ideation

5. Design Works



■ Build empathy with your users

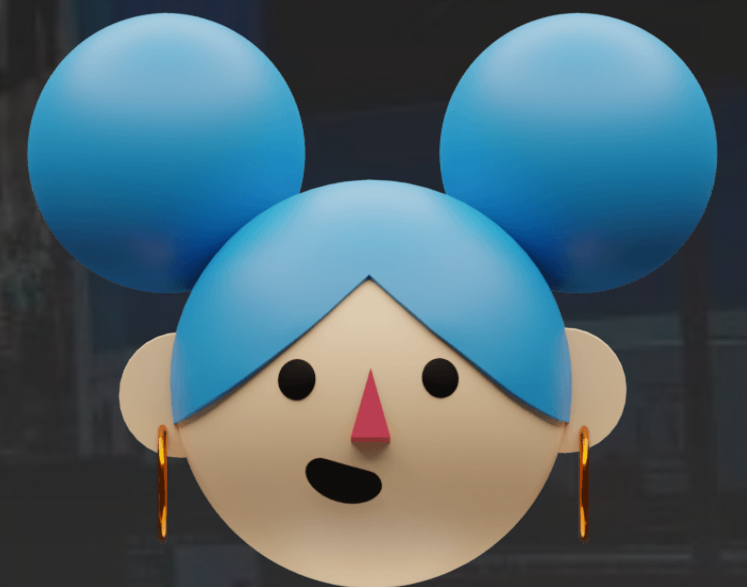
“ Nearly **99.9%** respondents said health was very **important** to them



In daily life, I **pay much attention on my body health**. I learned a lot of information from website, the truth and reliability of it is questionable.

“ The **Internet platform** is one of the most important ways for most users to obtain health information

It is difficult to find a doctor with a high degree of expertise when in need. Information sources rely on internet, **especially fragmented**.





# PHR System will developing in the next decade

Internet Medical Services

2000

Appearance: Internet-based Medical Application

2010

2014

Appearance: Internet-based Medical Application

2016

2020

Great development of Internet medical treatment

2030

AI in Healthcare

Neural networks are beginning to be applied in the field of AI medicine

AI medical image-assisted diagnosis was applied in COVID-19

EHR System (for hospital)

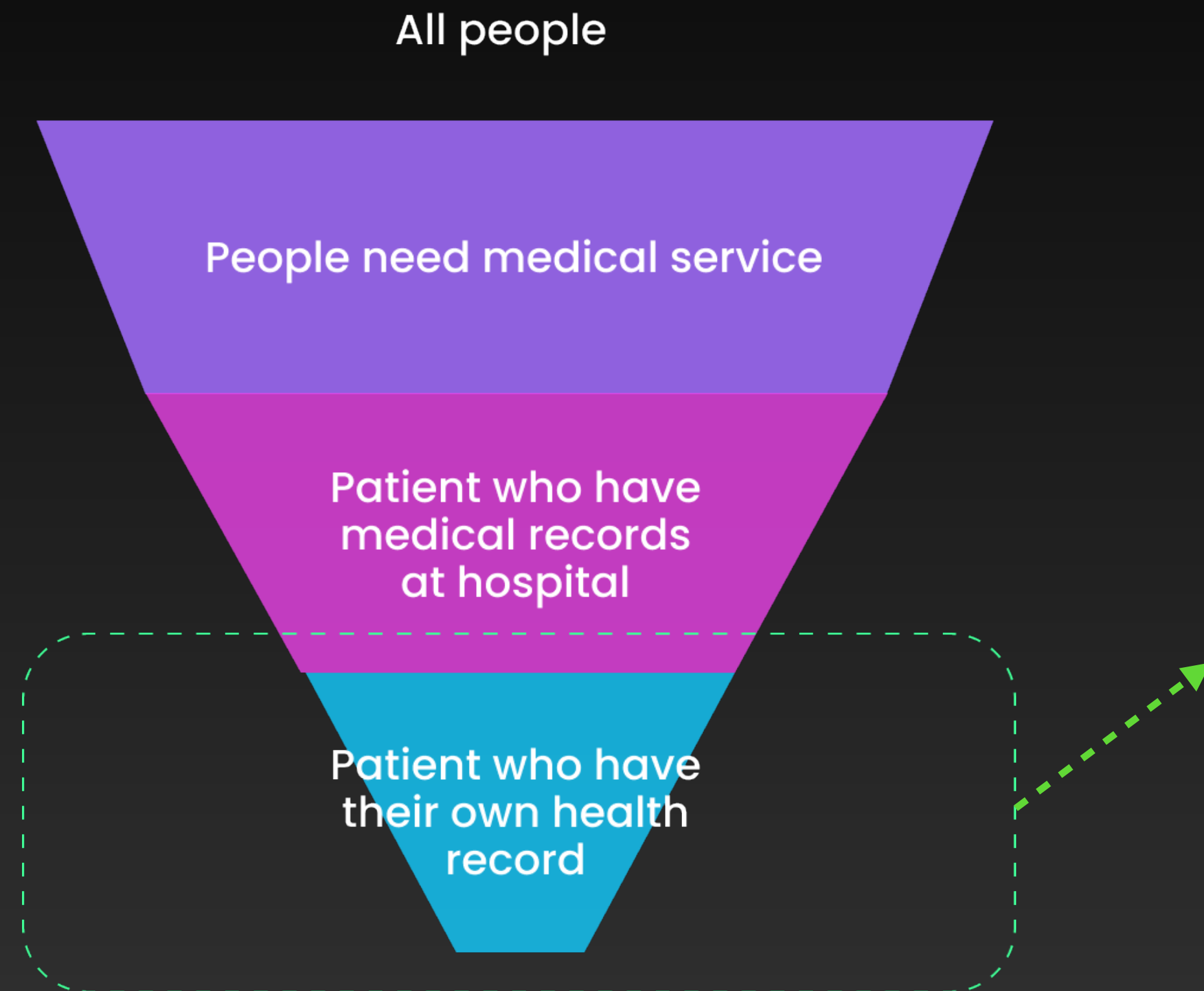
EHR System Large-scale application

PHR System (for patients)

Developing after 2020



## ■ Preliminary conclusions



With the increasing demand for health data and records from individual users, **there is a good market opportunity for the application of PHR systems at the product level.**

## Part 3

# Process Deck

1. Insight & Opportunity

2. User Research

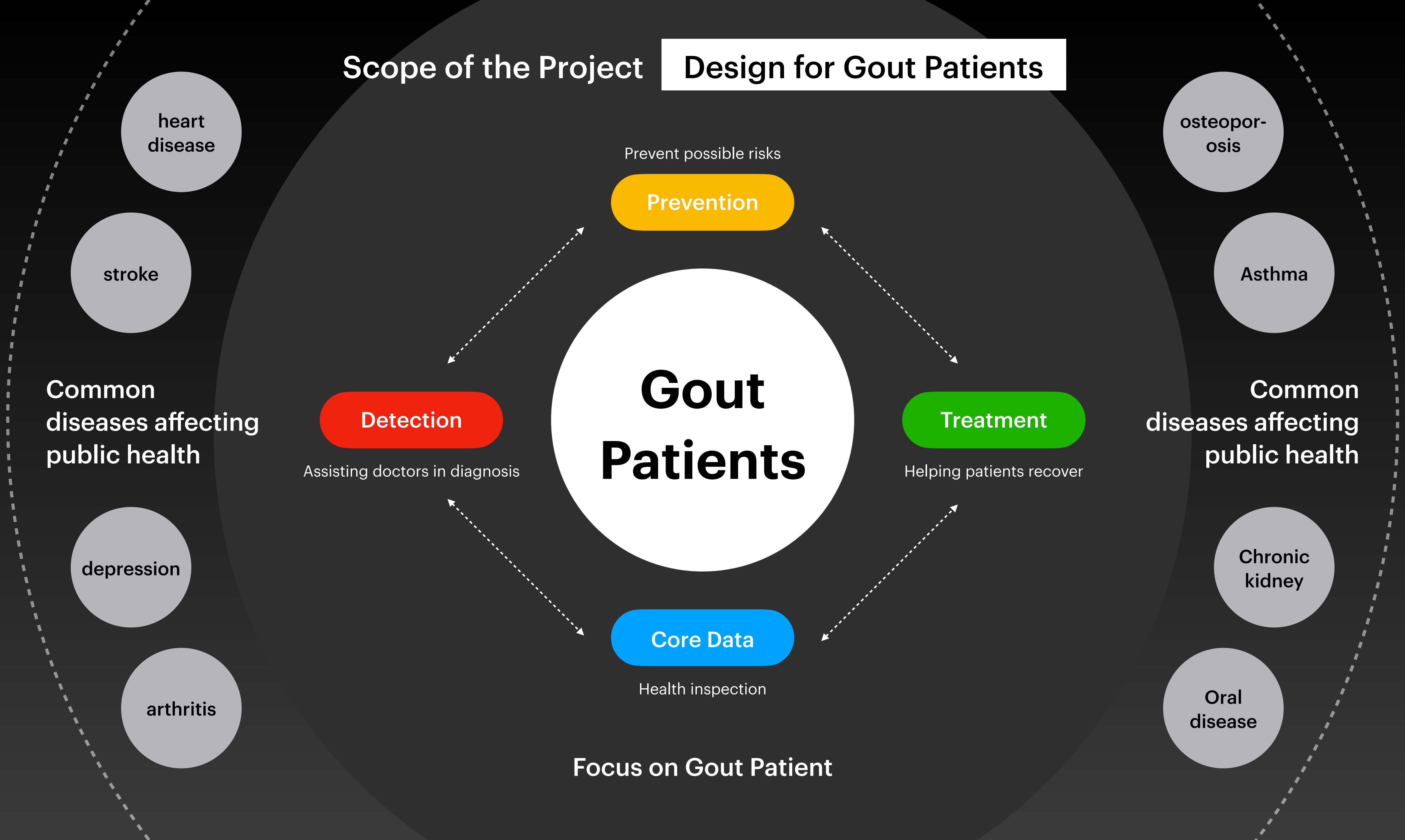
3. Competitive Analysis

4. Ideation

5. Design Works

Scope of the Project

Design for Gout Patients





# The Data

That Gout Patient  
Need to Collect

| Indicators       | Normal Range   |
|------------------|----------------|
| Uric acid        | 149-420 umol/l |
| Serum Creatinine | 53-106 μmol/L  |
| Blood Urea       | 2.9~7.5 mmol/L |
| Cystatin C       | 0.51-1.09 mg/L |
| Urine PH         | 6.5~7.0        |

Data that need to included in the design part

## ■ User Persona

### Conclusion

# Gout affects the patient's diet

“ I don't know when the gout will come on, but every time I want to drink or eat meat, **I have to control my diet.**”

### User's Needs

1. Periodically check the relevant data indicators
2. check the changes of the relevant indicators

### Pain Points

1. Work is busy, but going to the hospital for testing is particularly time-consuming. Sometimes I don't get tested until a long time later
2. Paper test sheets are easy to be lost, and timely feedback on the recovery of the disease cannot be obtained.
3. Data between different hospitals are not interchangeable, and the experience of changing hospitals is not good

Wade Warren

37

Staff of Internet  
Enterprise



## Expert Interview



**Doctor An**  
Peking University  
Epidemiological statistics

**“Detailed health data can improve the accuracy and efficiency of disease diagnose.”**

- Health records can significantly improve the accuracy and efficiency of diagnosis
- Scientific research institutions can provide enough research data and samples
- The collection method relies on the establishment of records in hospitals, but there is no data exchange between hospitals, so some doctors still apply to handwritten medical records

## Expert Interview

### Part 1

#### Questions to Ask

1. What is the importance of patient health data archives for diagnosis and treatment of patient diseases?
2. What is the importance of patient health data archives for medical research institutions and researchers?
3. What are the current data collection methods of research institutions and hospitals?
4. What are the obstacles to data collection and analysis?
5. Is the prospect of PHR system's application and landing in China optimistic?

### Part 2

#### Insights

##### Accuracy and Efficiency

Health records can significantly improve the accuracy and efficiency of diagnosis

##### Research data and samples

Scientific research institutions can provide enough research data and samples

##### Establishment of records in hospitals

The collection method relies on the establishment of records in hospitals, but there is no data exchange between hospitals, so some doctors still apply to handwritten medical records

### Part 3

#### Comments

##### Data transfer

Data can be shared between patients and doctors

##### Usability

Taking into account the use habits of users of all ages

##### Low learning cost

No learning cost, ready to use

## Conclusions: 4 Goals That Healthway Need to Fulfill

1



### Personal health record system

Set up IoT system and cloud based data storage mechanism. By connecting the IoT detection device to the mobile device, the information is collected and synchronized to the personal database.

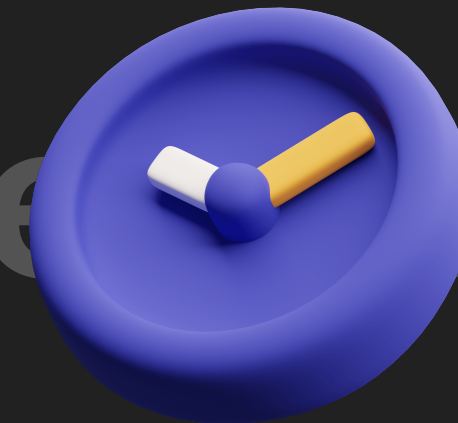
2



### Intelligent connectivity using home IoT medical devices

The application of IoT technology can make data collection more convenient. Traditional medical records, which rely on manual input and records, are inefficient.

3



### Achieve timely feedback for abnormal data

Set up IoT system and cloud based data storage mechanism. By connecting the IoT detection device to the mobile device, the information is collected and synchronized to the personal database.

4



### O2O medical service and data synchronization

Ensure that medical services can be expanded from online to offline, and achieve seamless connection of medical services. It is necessary to ensure that the user files and data in the PHR system can be fully interchanged to provide efficient services.

## Part 3

# Process Deck

1. Insight & Opportunity

2. User Research

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4. Ideation

5. Design Works

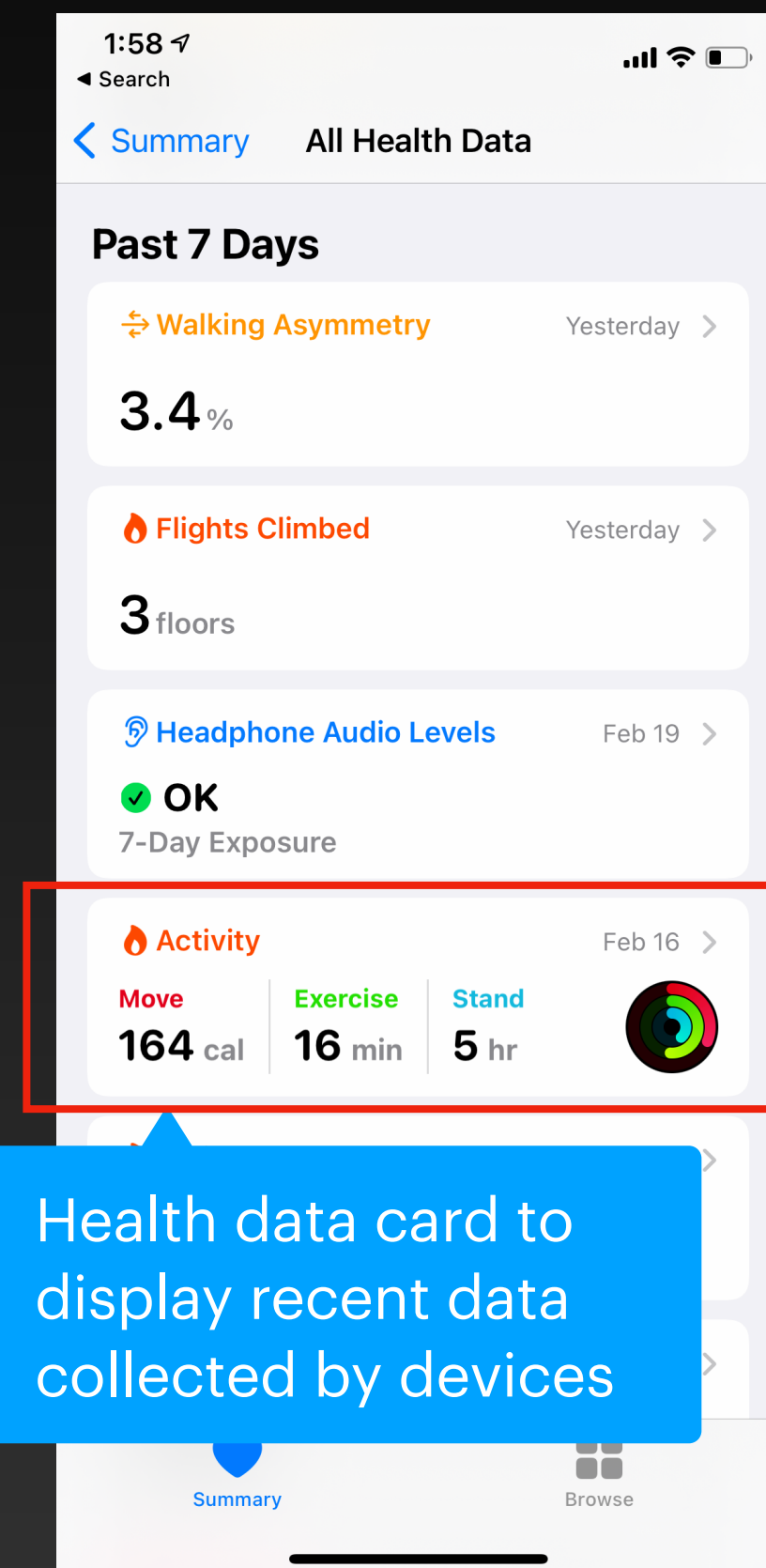


# iOS Health App

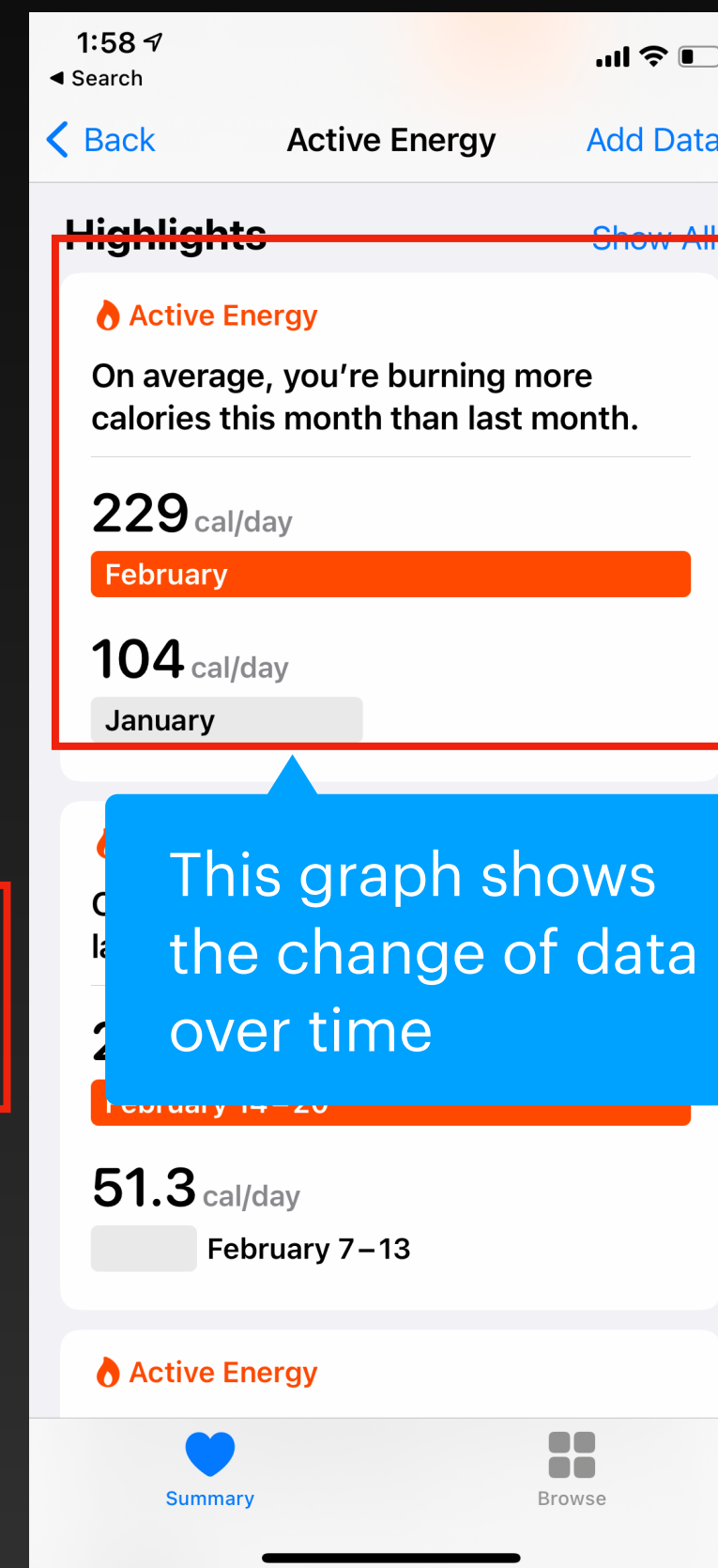
The Health app integrates data from your iPhone, watch and third-party apps you already use, so you can check all your progress in one convenient place.

It also provides the ability to import hospital diagnostic reports to help Health act as a mobile user Health database.

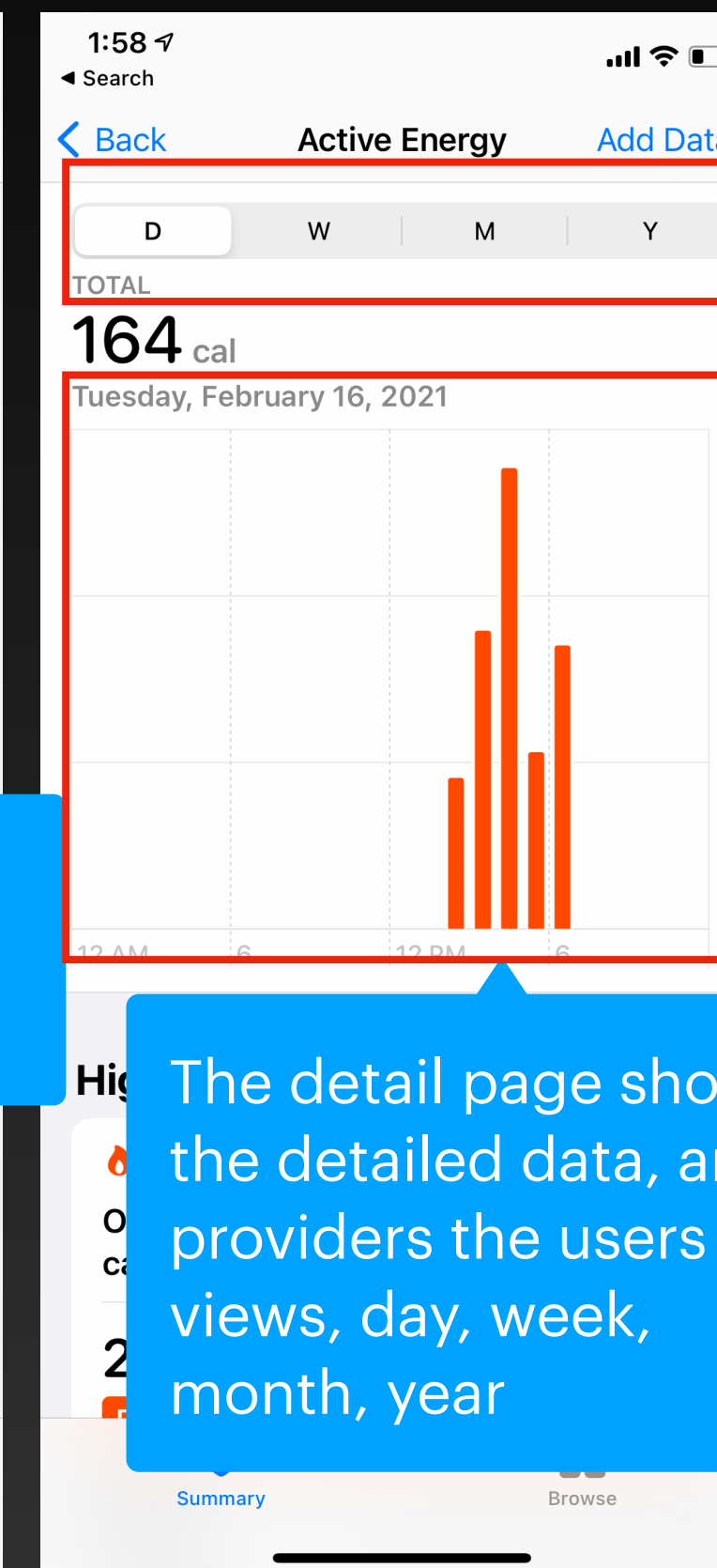
Data List



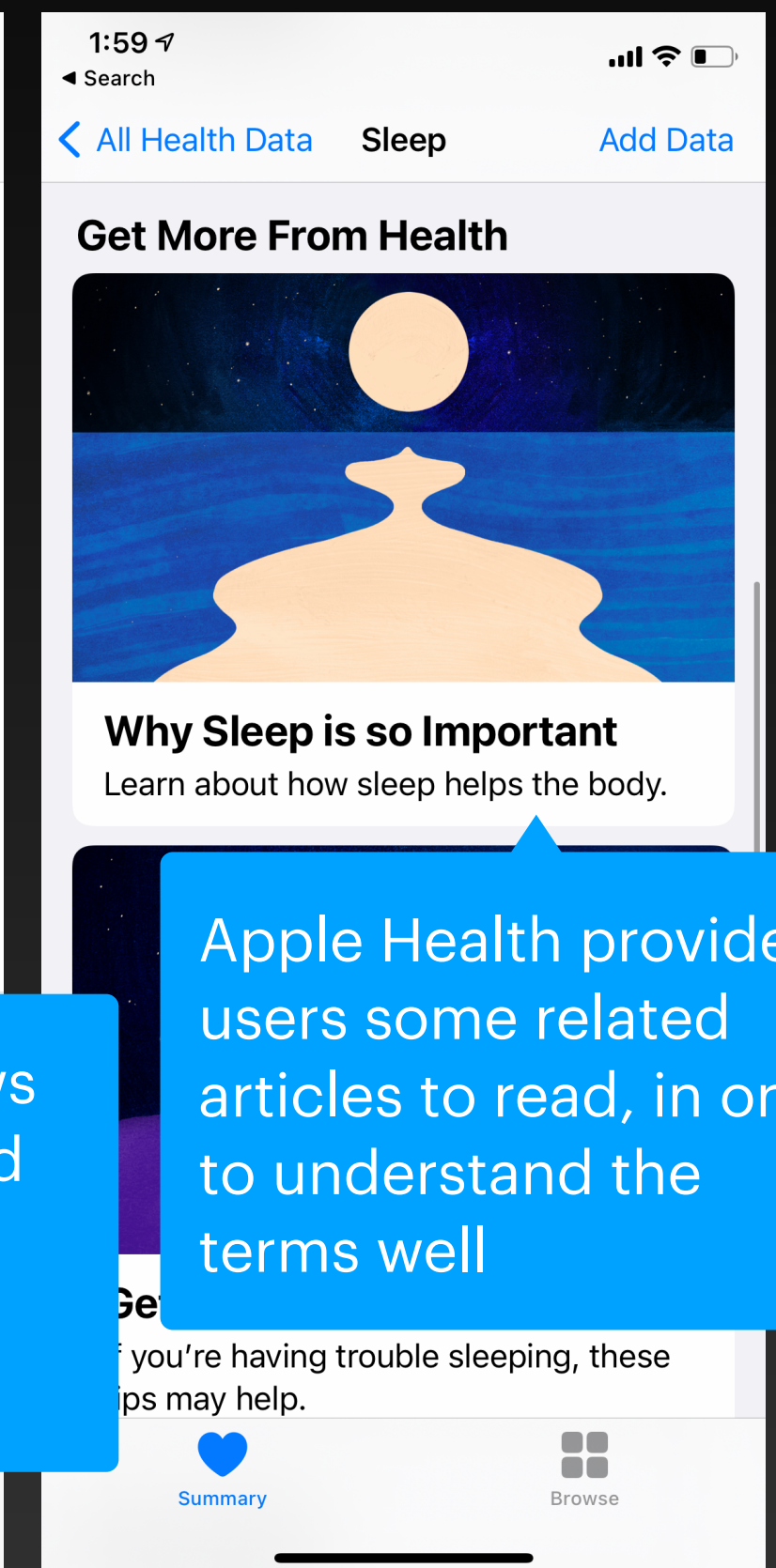
Detailed Data Page - 1



Detailed Data Page - 2



Detailed Data Page - 3



# Dingxiang Doctor

Dingxiang Doctor is a well-known Internet medical service platform in China, providing users with medical encyclopedia and distribution of medical information.

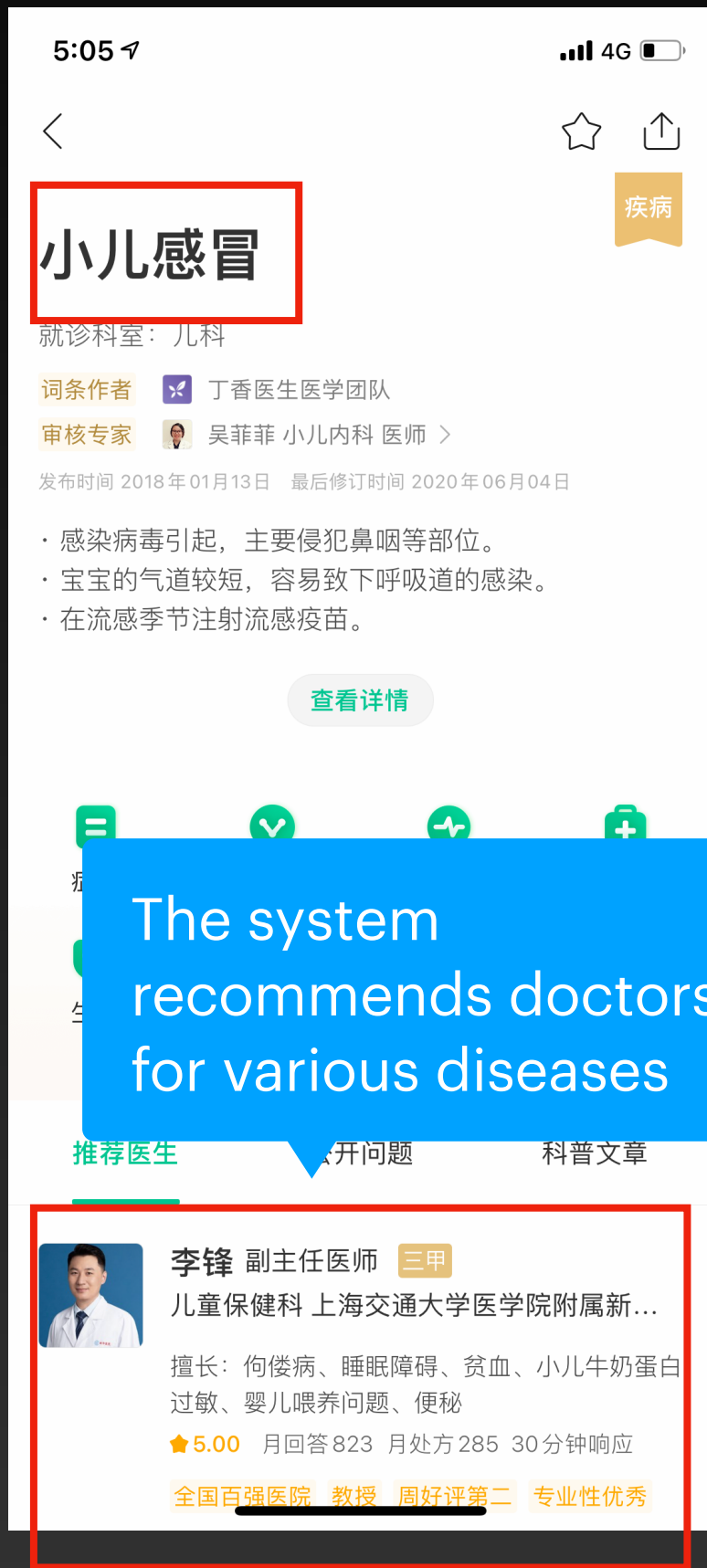
At the same time, access to offline medical resources, users can consult doctors online, doctors can also inquire about the patient's clinical symptoms to make pre-diagnosis.

Data List

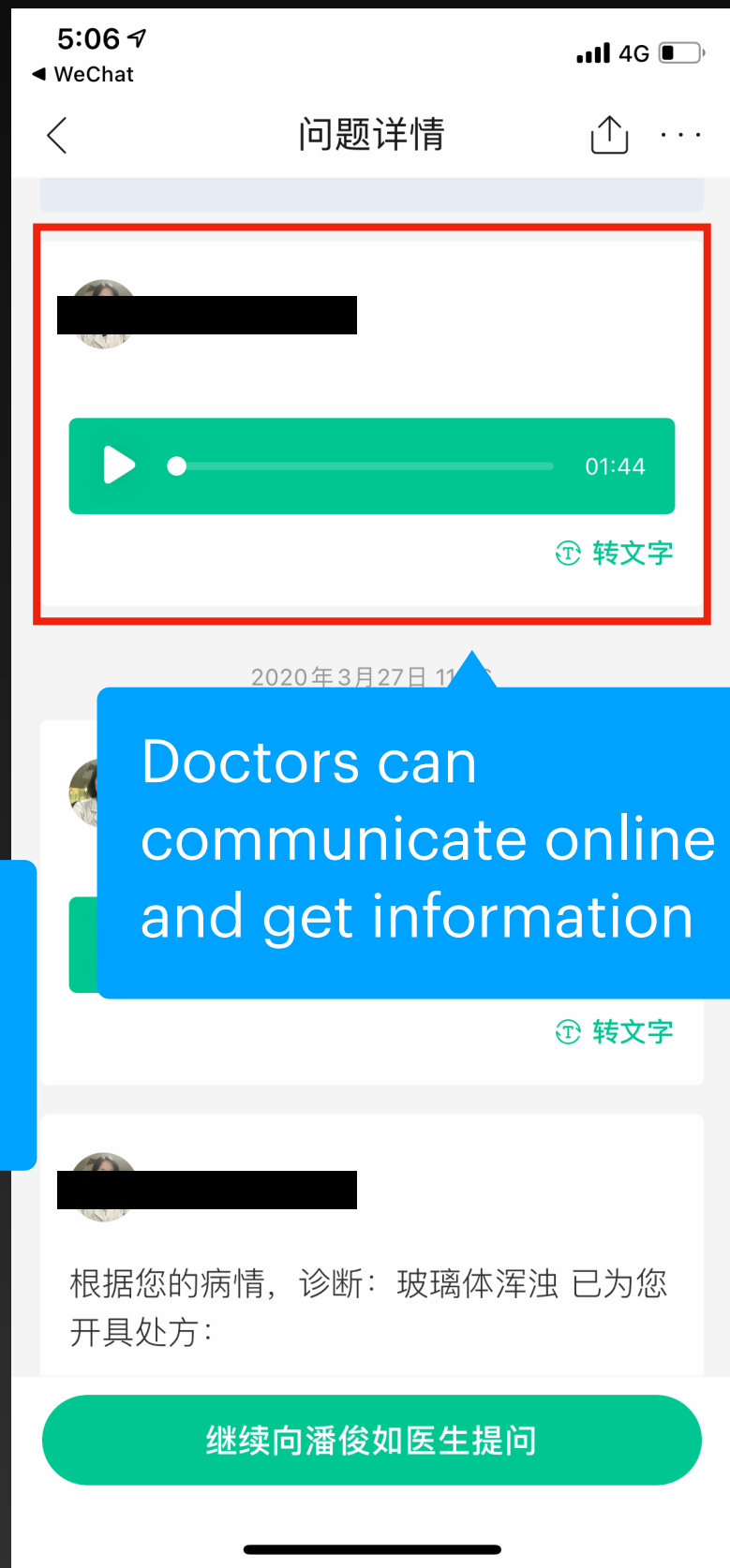


Classification presents the encyclopedia of various diseases

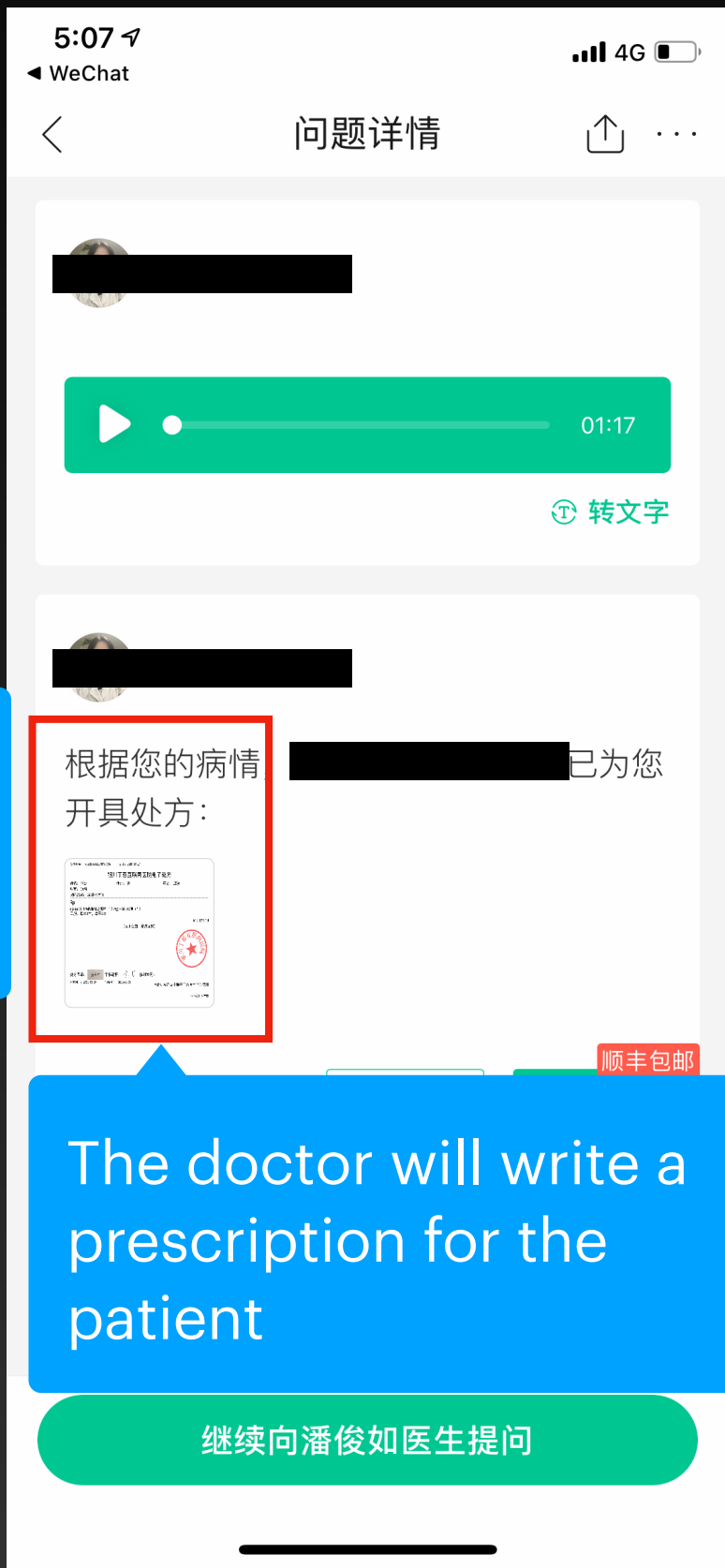
Detailed Data Page - 1



Detailed Data Page - 2



Detailed Data Page - 3



## Quick Competitive Analysis

|                  | IoT Connection | Data Dashboard | Medical Consulting | Online Appointment |
|------------------|----------------|----------------|--------------------|--------------------|
| Apple Health     | ✓              | ✓              | ✗                  | ✗                  |
| Dingxiang Doctor | ✗              | ✗              | ✓                  | ✗                  |
| Beijing 114      | ✗              | ✗              | ✗                  | ✓                  |
| HealthWay        | ✓              | ✓              | ✓                  | ✓                  |

Realize integrated innovation to improve the interactive path of Internet medical products

## Part 3

# Process Deck

1. Insight & Opportunity

2. User Research

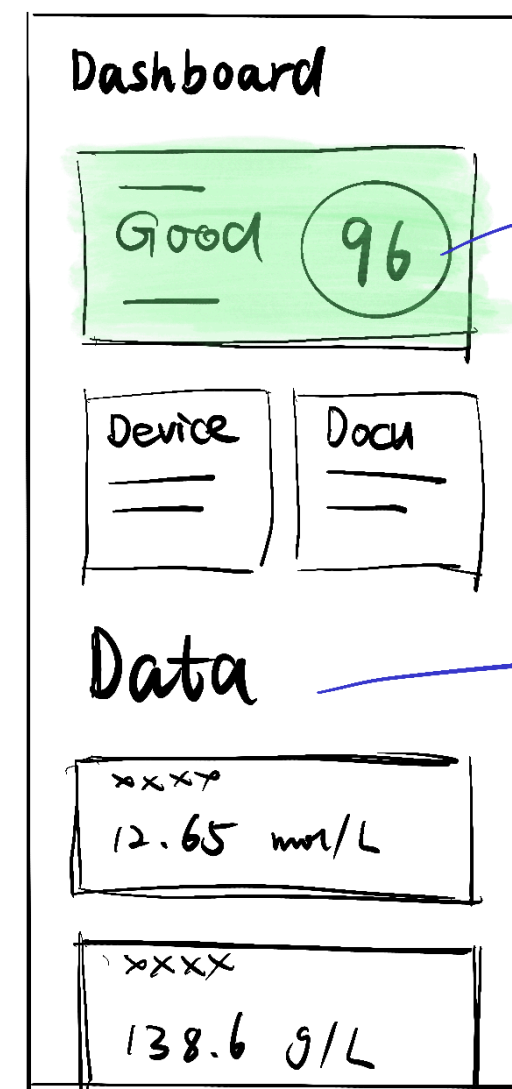
3. Competitive Analysis

4. Ideation

5. Design Works



## Dashboard



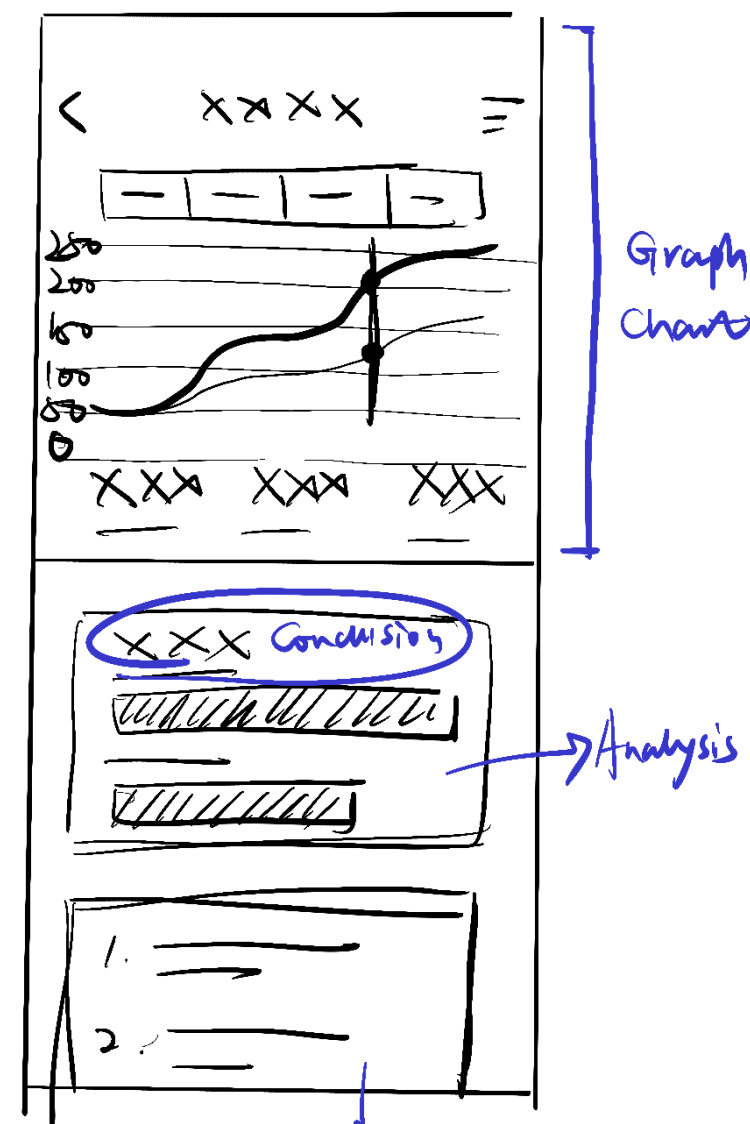
Health Index

Bad 56 Ordinary 78

The number will change in real time.

Dataset based on the disease

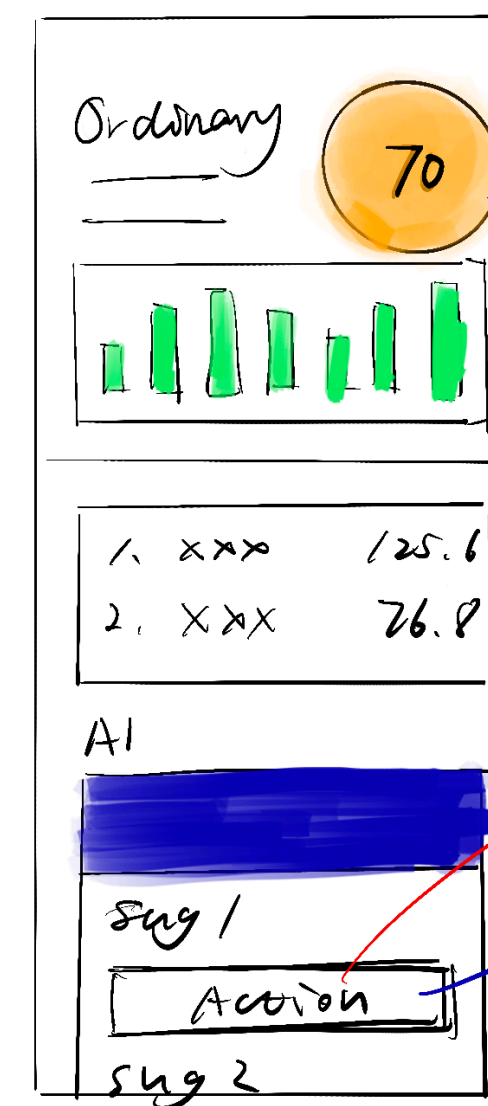
Patients can view relative data in the home page directly.



All information related to the data will be listed below!

## Health Index Page

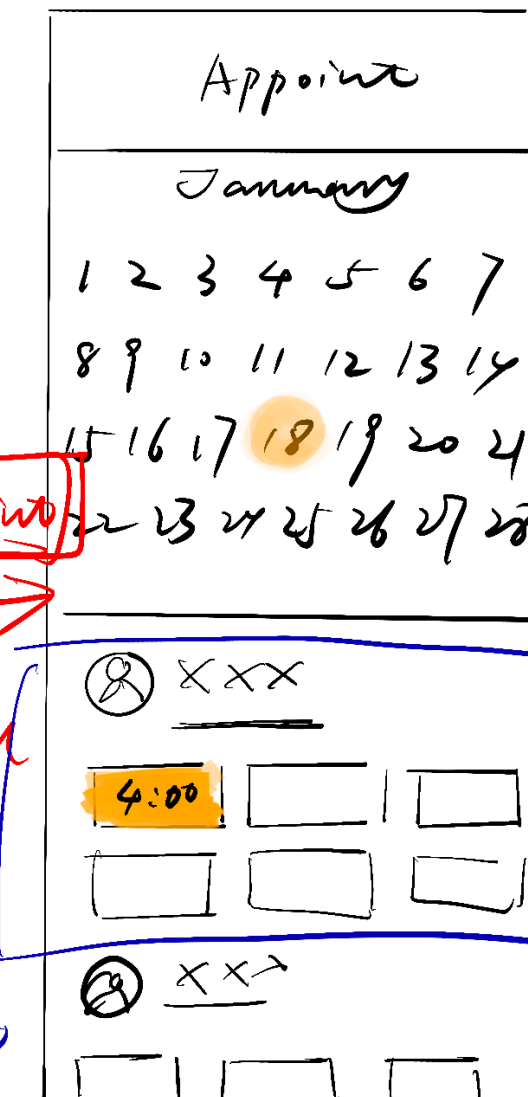
Health Index Page



User can't appoint the user for further check-up or hospital

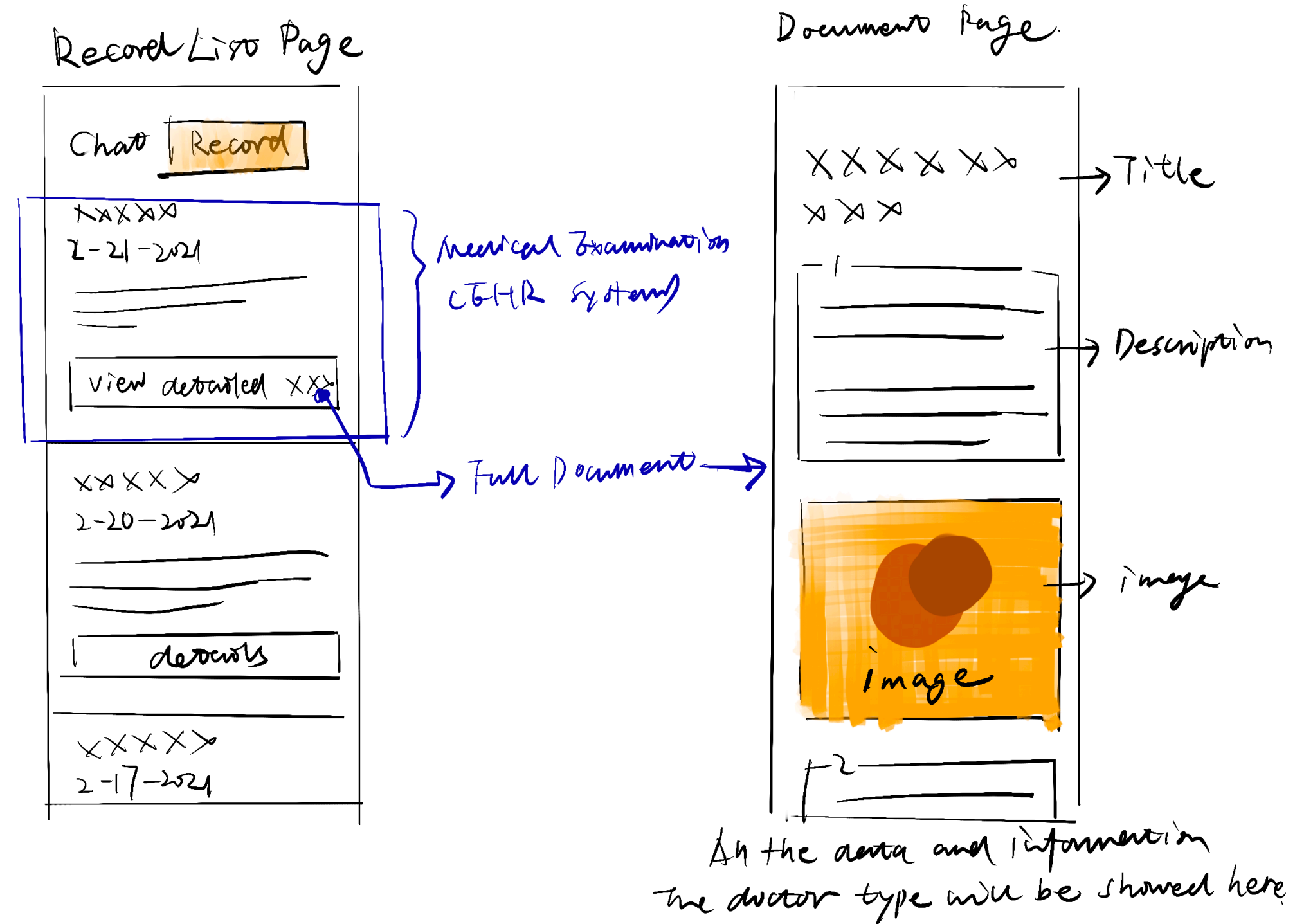
According the Health Index, the system will suggest AI the users to take Action

Action Page.

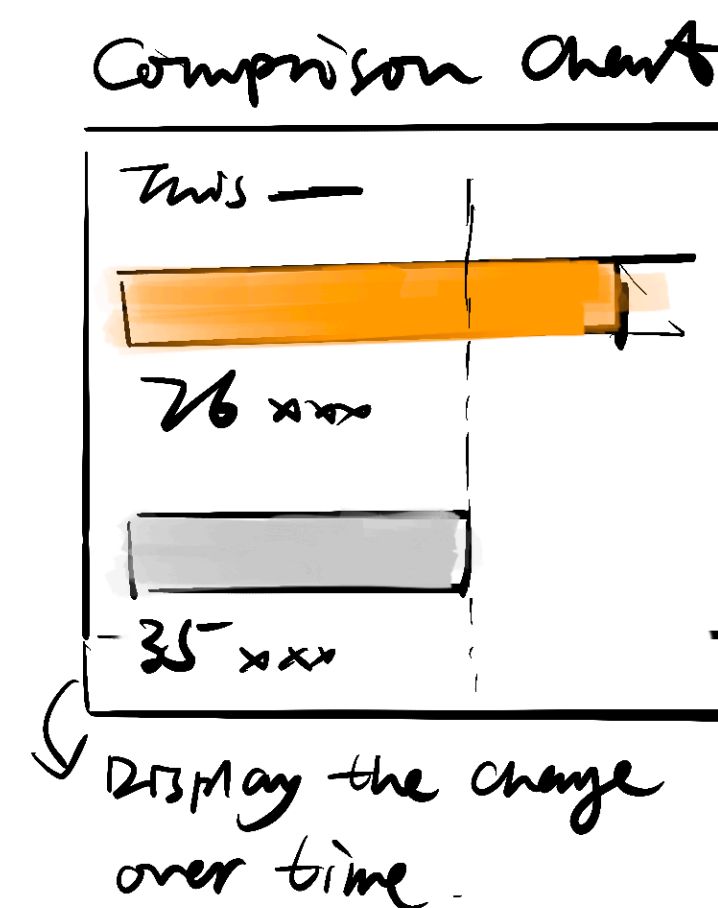
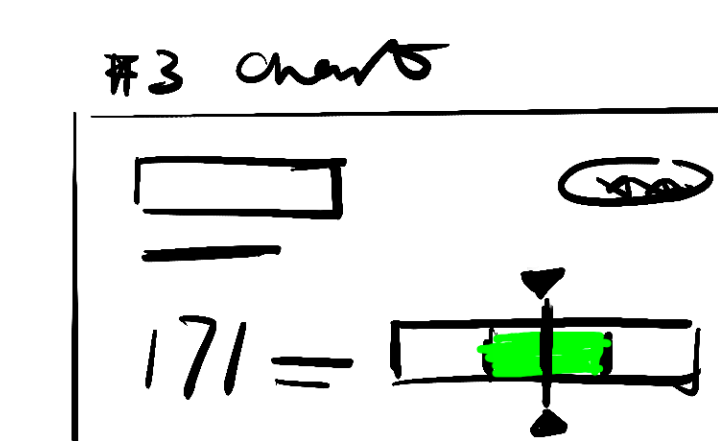
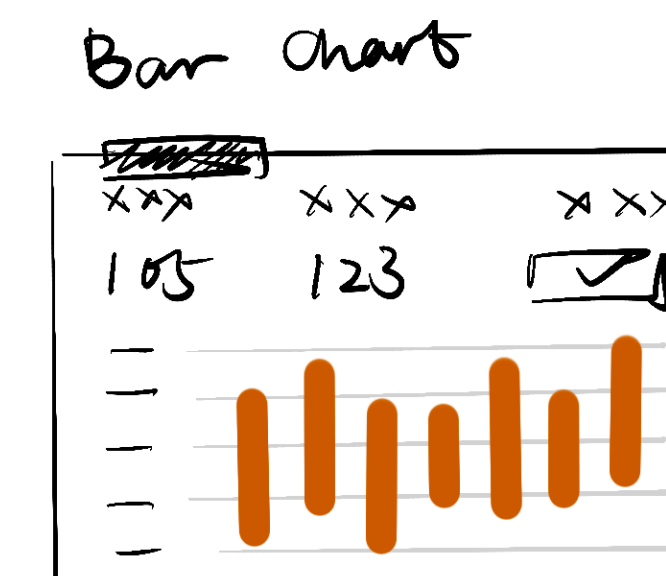
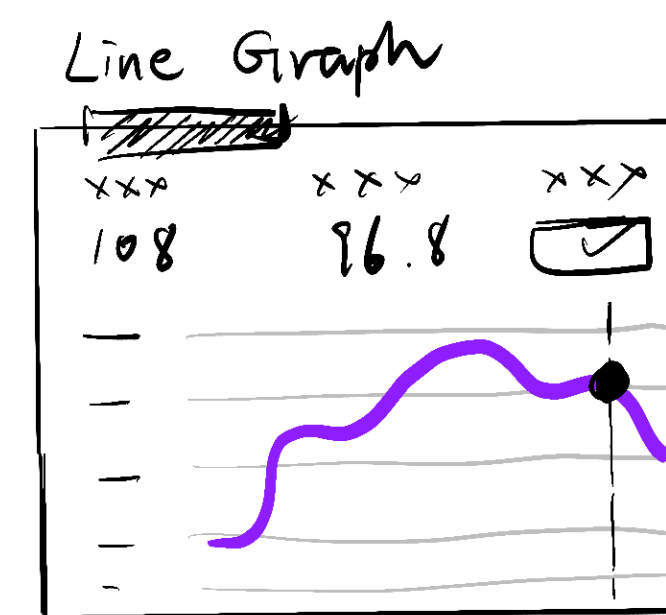


Doctor Cancel to view the available time

# Health Record Page



## Data Chart





## Part 3

# Process Deck

1. Insight & Opportunity

2. User Research

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5. Design Works

## Scenario

### *One*

#### **Connect** IoT devices and view the data

The user can connect their IoT devices to collect the data, then all of the data can be synced to their mobile phone. The user can browse the changes of the data over time.

### *Two*

#### **Receive** timely health reminders

When the data became abnormal, the system will analyze it, then reminds users the abnormal data and give them suggestion made by AI.

### *Three*

#### **Contact** online, enjoy medical services offline

The user can share the data with their doctors, the doctor can monitor the change of data anytime. With the help of the HealthWay, doctor can connect with the patients as soon as possible.



## Scenario 1 — Connect IoT devices and view the data

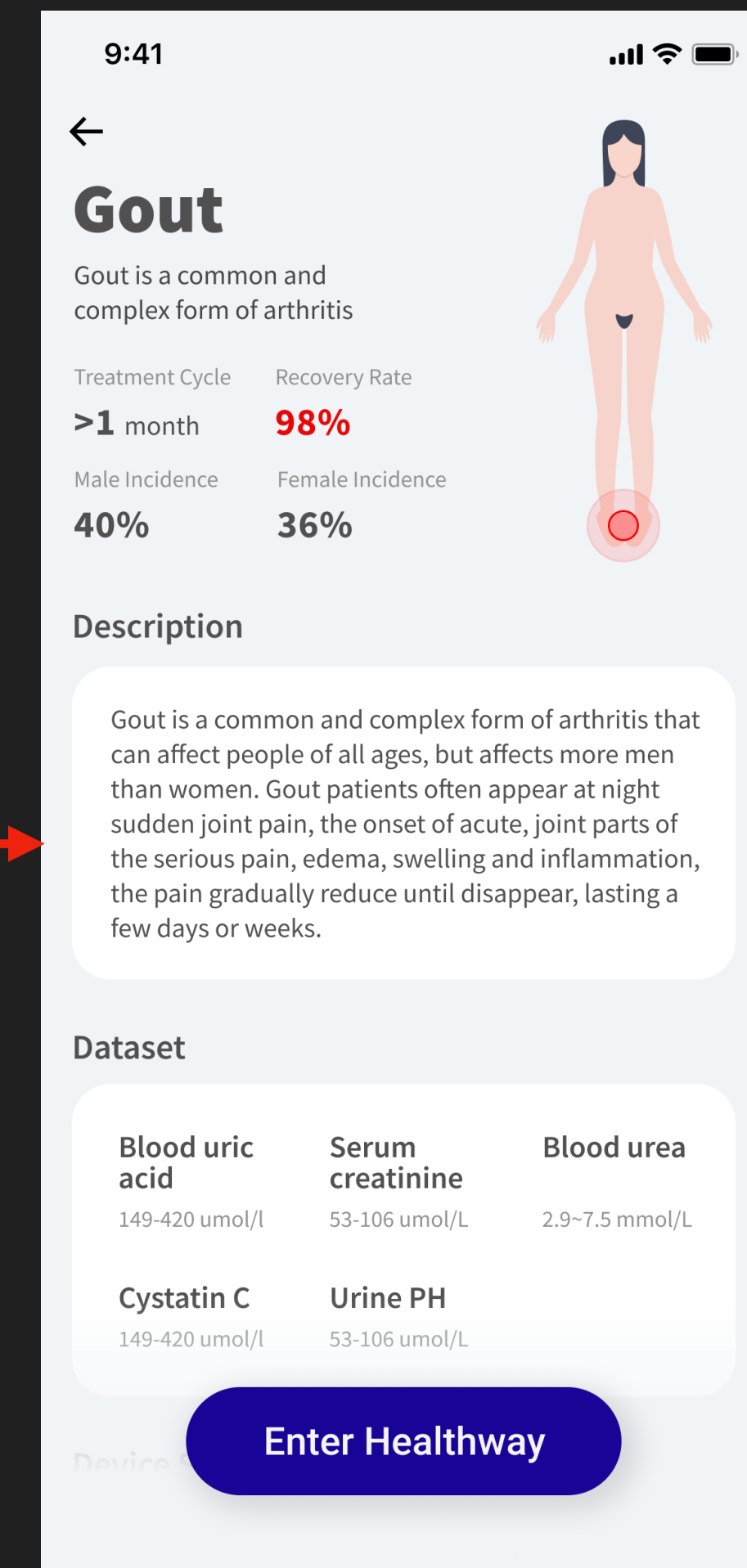
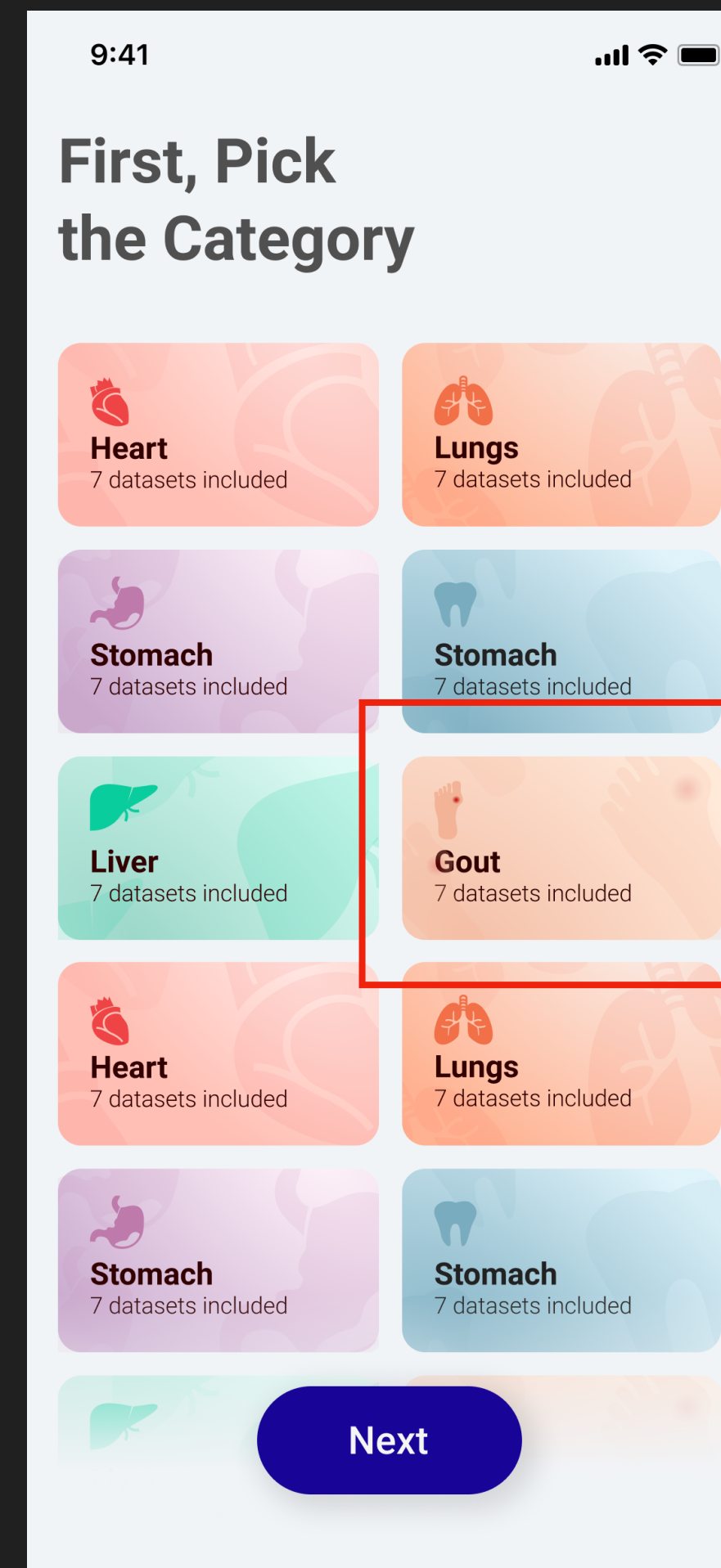
Scenario 2

Scenario 3

### Step One

First, **set up** your account and **choose the dataset** you need (or the doctor tell you) !

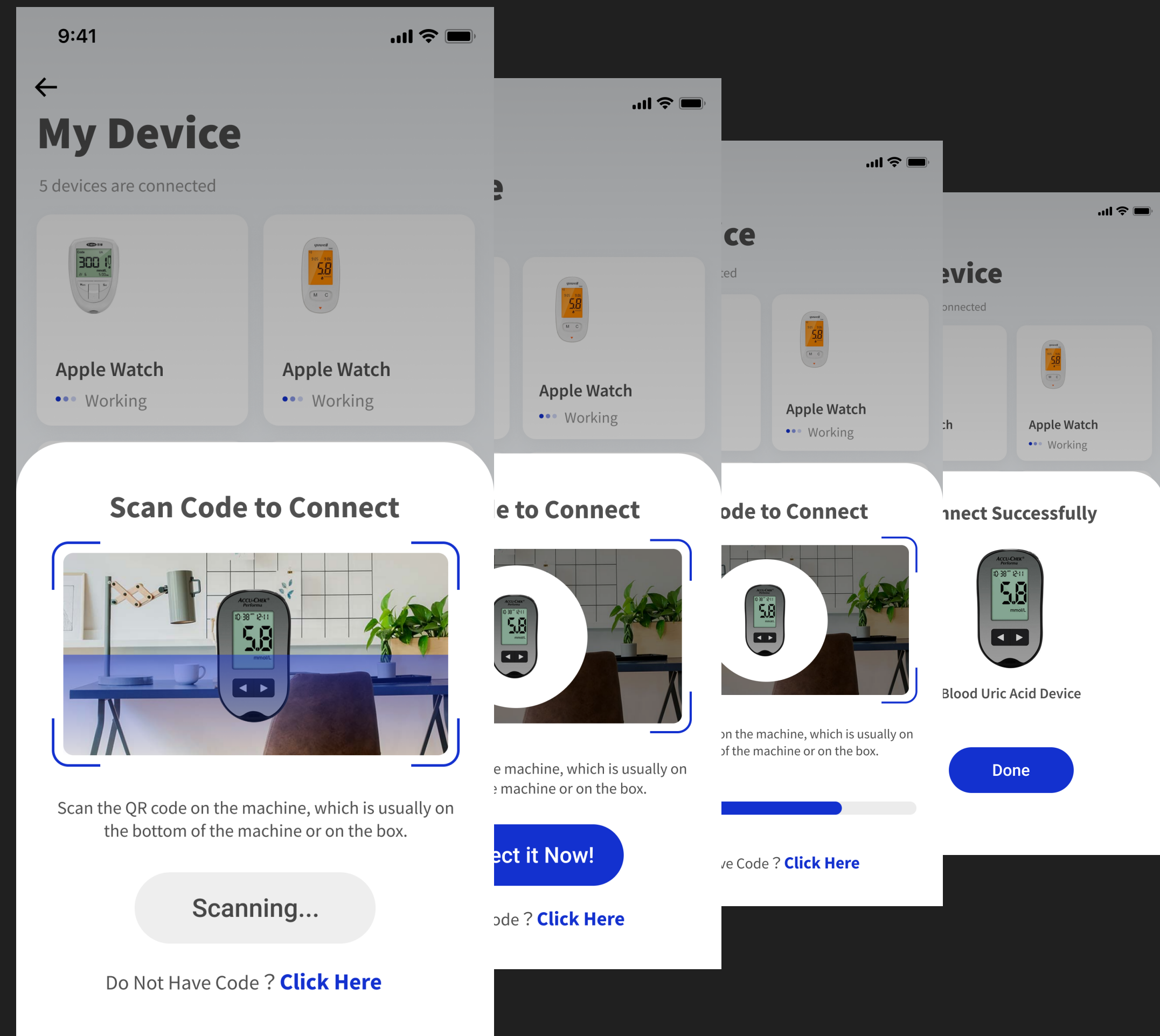
01





## Step Two

**CONNECT** IoT device to user's account



## Scenario 1 — Connect IoT devices and view the data

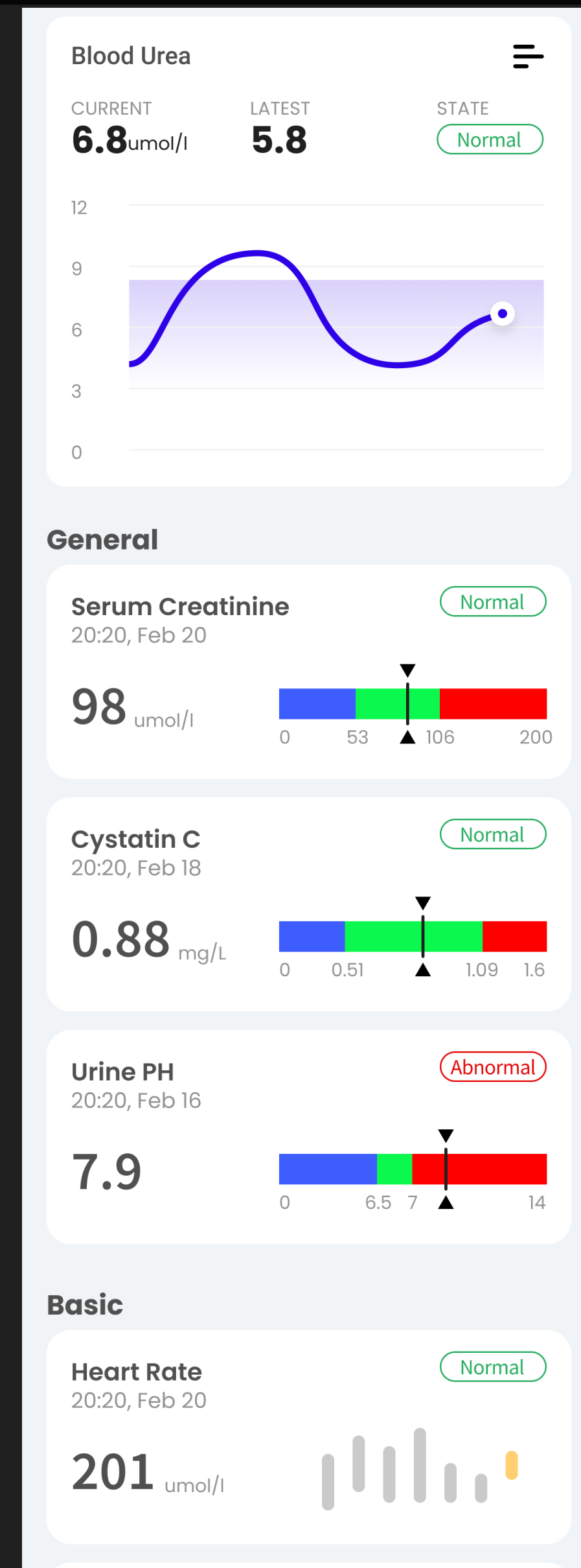
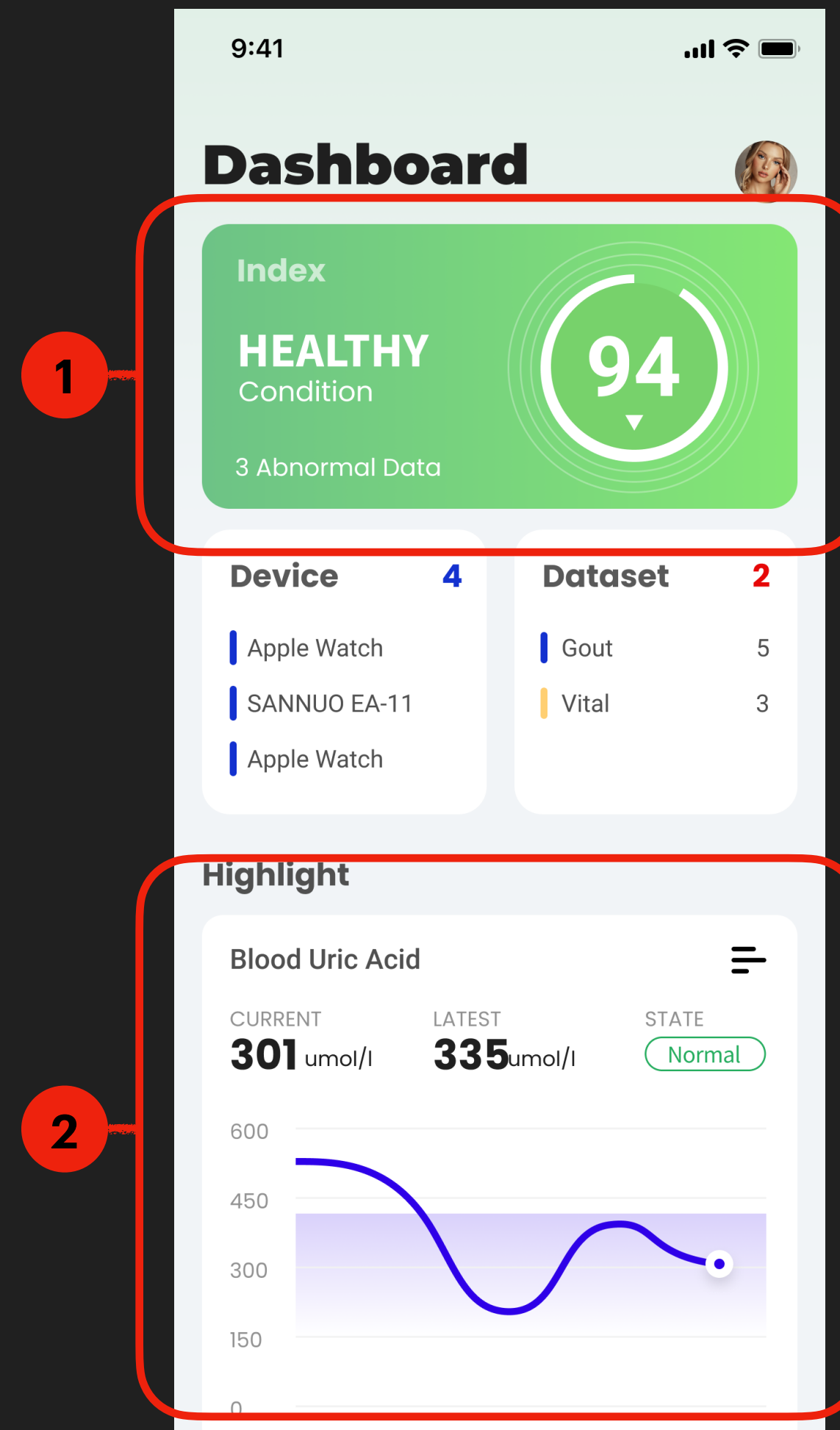
Scenario 2

Scenario 3

### Step Three

Access and **view the data**(based on the dataset the user set) from the dashboard

- 1 On the home page, this card will show today's health index
- 2 All the specific data will be displayed below, click the card to jump to the detailed page



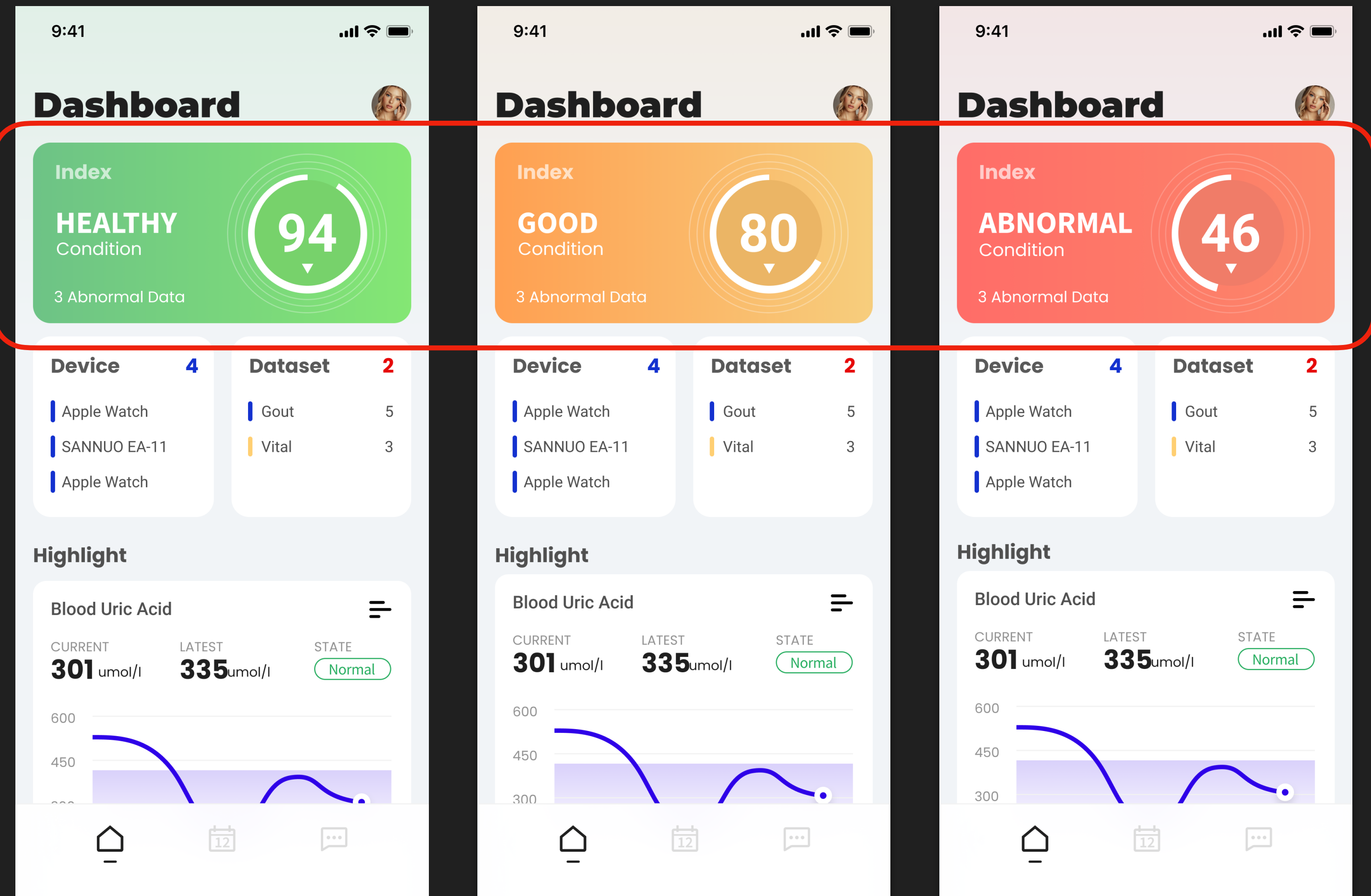
03

# Scenario 1 — Connect IoT devices and view the data

Scenario 2

Scenario 3

Three  
different  
states

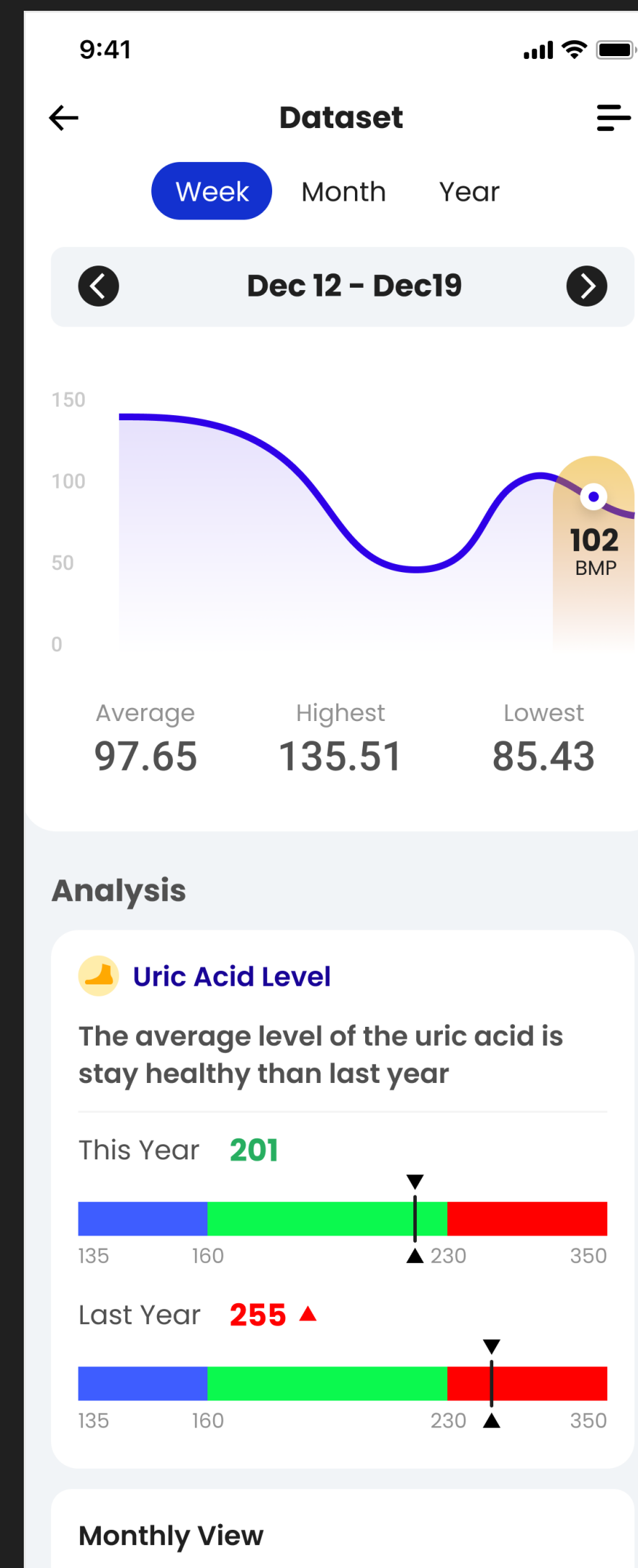




## Step Four

Jump to the detailed data page to learn more **related information**

04



February Great

January Normal

Show All Monthly History →

AI Suggestion

This is Homee, I can help you manage your body health

About Uric Acid Level

Uric acid is a waste product found in blood. It's created when the body breaks down chemicals called purines. Most uric acid dissolves in the blood, passes through the kidneys and leaves the body in urine.

Food and drinks high in purines also increase the level of uric acid.

Resource

10 internet of things (IoT) healthcare examples

Dr. HealAlerts  
Sep 16, 2021

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The user can connect their IoT devices to collect the data, then all of the data can be synced to their mobile phone. The user can browse the changes of the data over time.

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#### **Receive** timely health feedback

When the data became abnormal, the system will analyze it, then reminds users the abnormal data and give them suggestion made by AI.

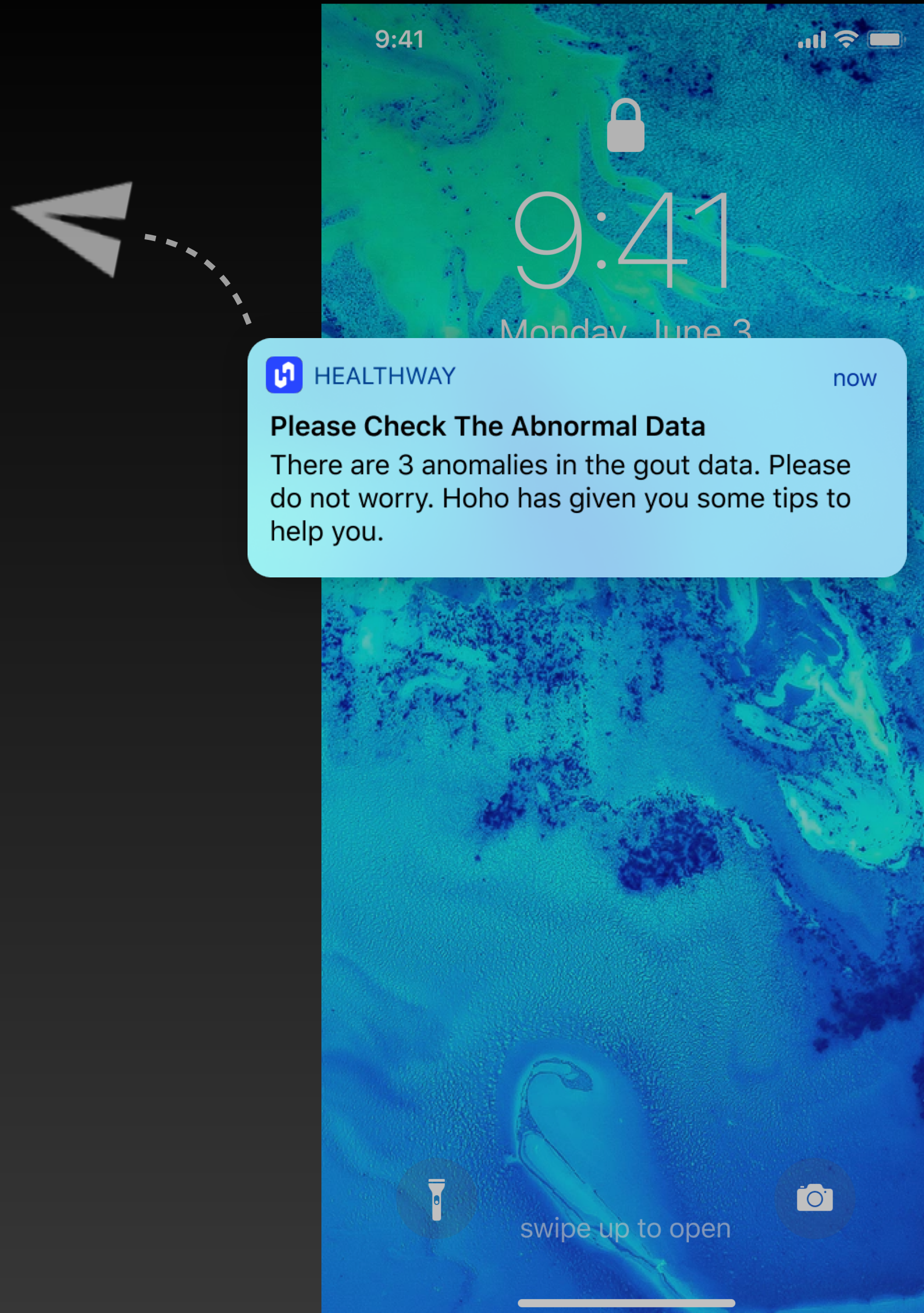
### *Three*

#### **Contact** online, enjoy medical services offline

The user can share the data with their doctors, the doctor can monitor the change of data anytime. With the help of the HealthWay, doctor can connect with the patients as soon as possible.







**The Blood Uric Acid levels are elevated and beyond the healthy range.**

**210.5** → **320.8** Out of range

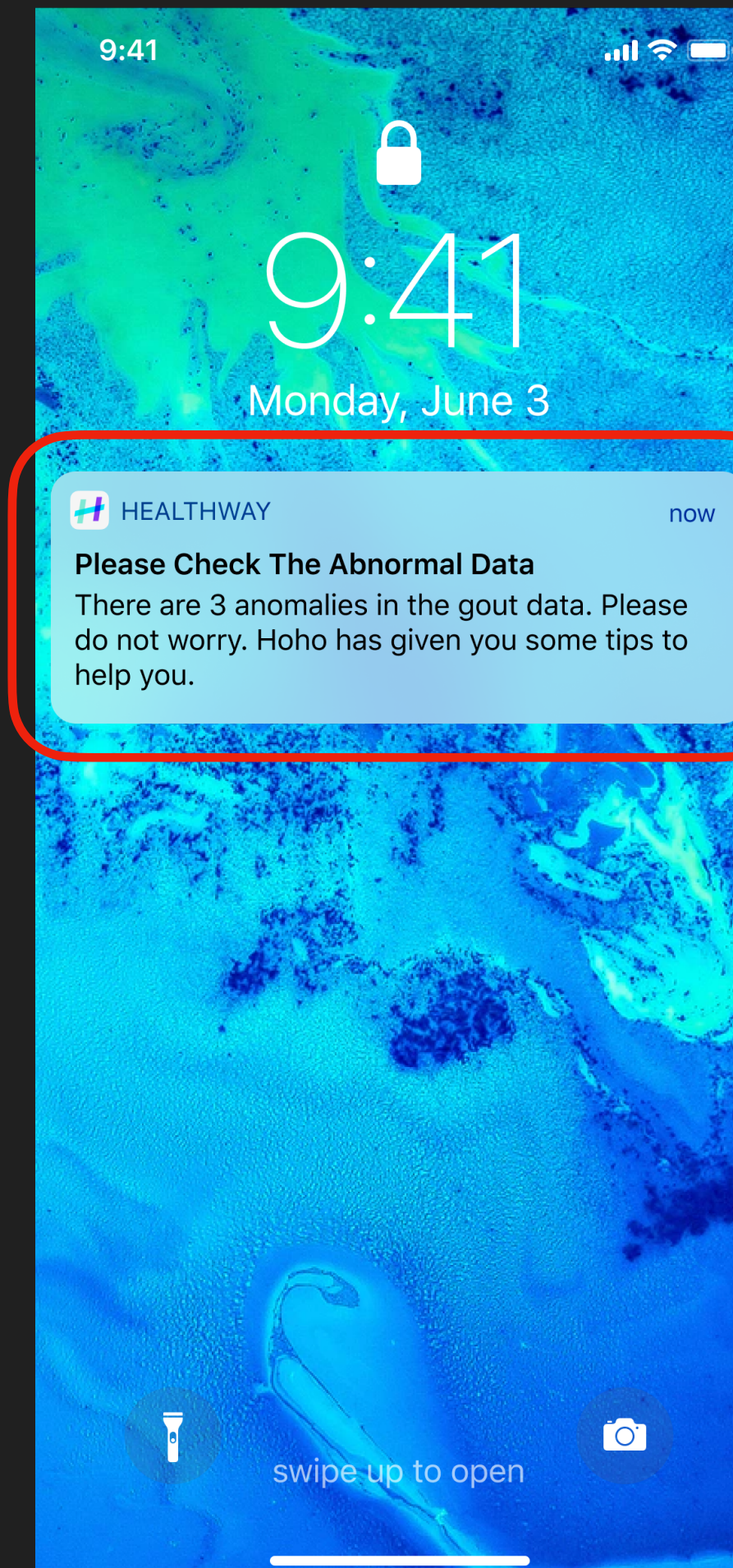


## Step One

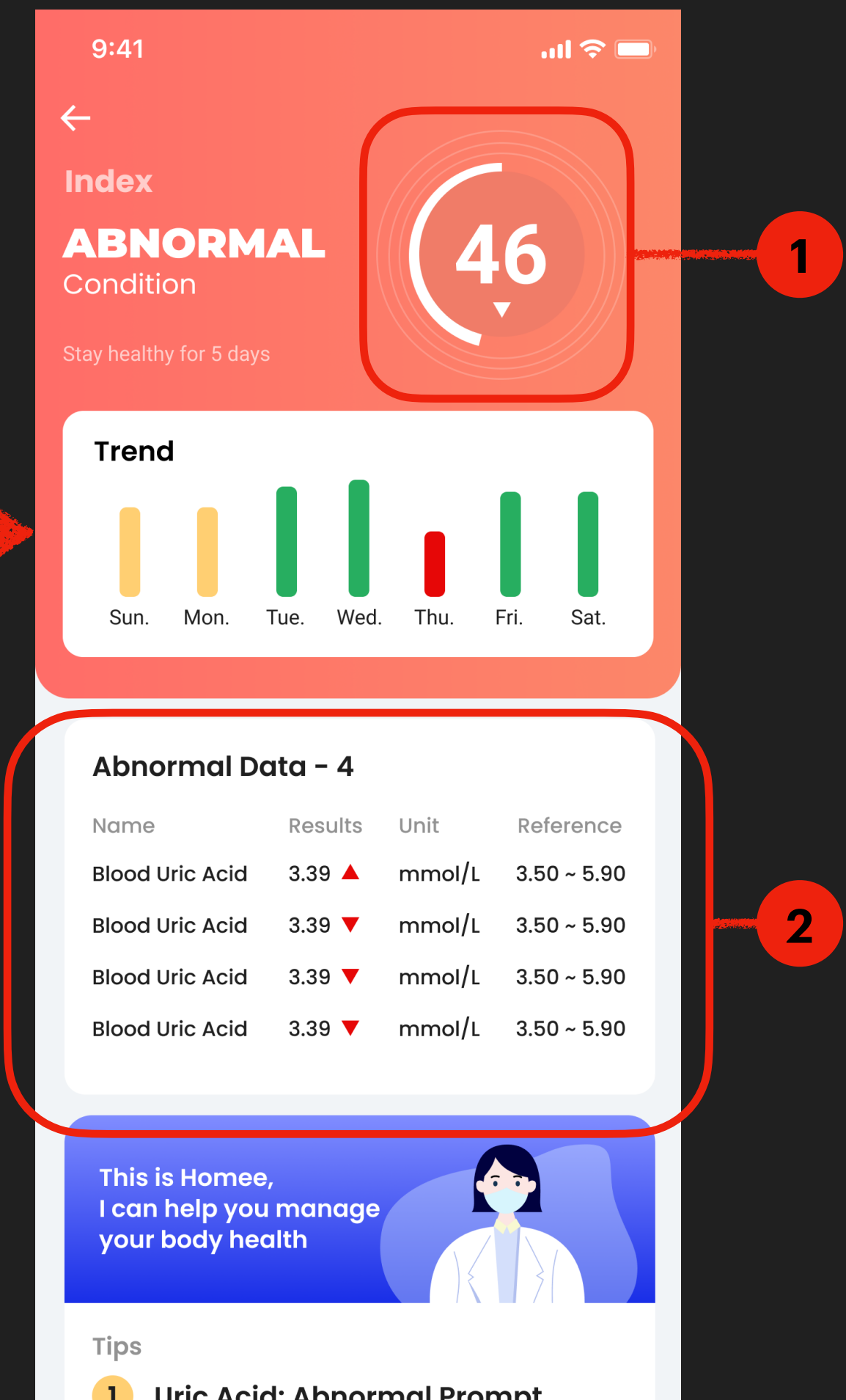
System will remind the user to be attention on the abnormal data through the system's notification center.

- 1 The score shows today's health index
- 2 In the abnormal data card, user can view the overview of those data

Lock Screen/Notification



Lock Screen/Notification

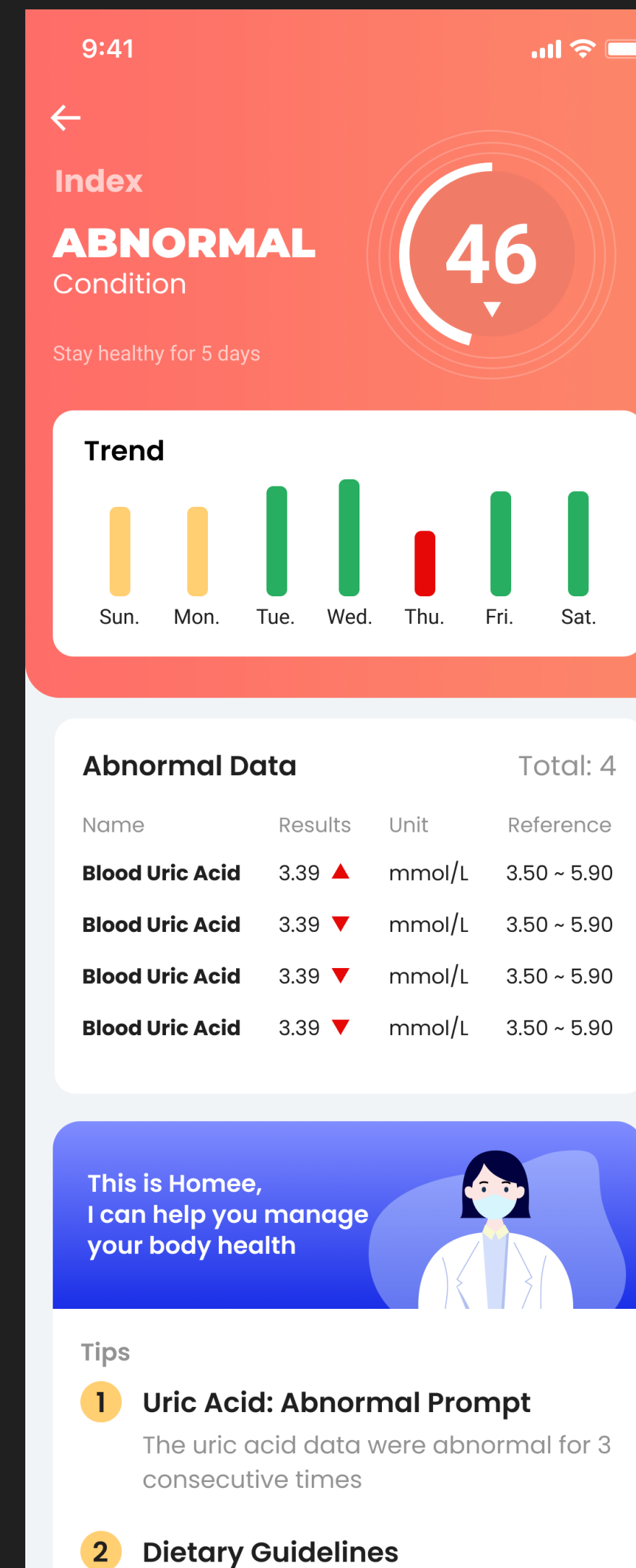


## Step Two

# Check the Health Index, and view related health information and data

- 1 The Homee—the AI assistant, will give the user health suggestions, click the appoint button to start O2O service

## Lock Screen/Notification



## Action

- 1 **Appoint for further Check-up**  
**Appoint**
- 2 **Measure uric acid levels every morning and evening**  
**Set Reminders**

## History

- Last Month** Average  
**Looks Good!** 92  
2 days of abnormal data
- January** Average  
**Looks Good!** 96  
2 days of abnormal data
- December** Average  
**Looks Good!** 90  
2 days of abnormal data
- [Show All Monthly History](#) →
- [Show All Data](#) →
- [Data Sources & Access](#) →

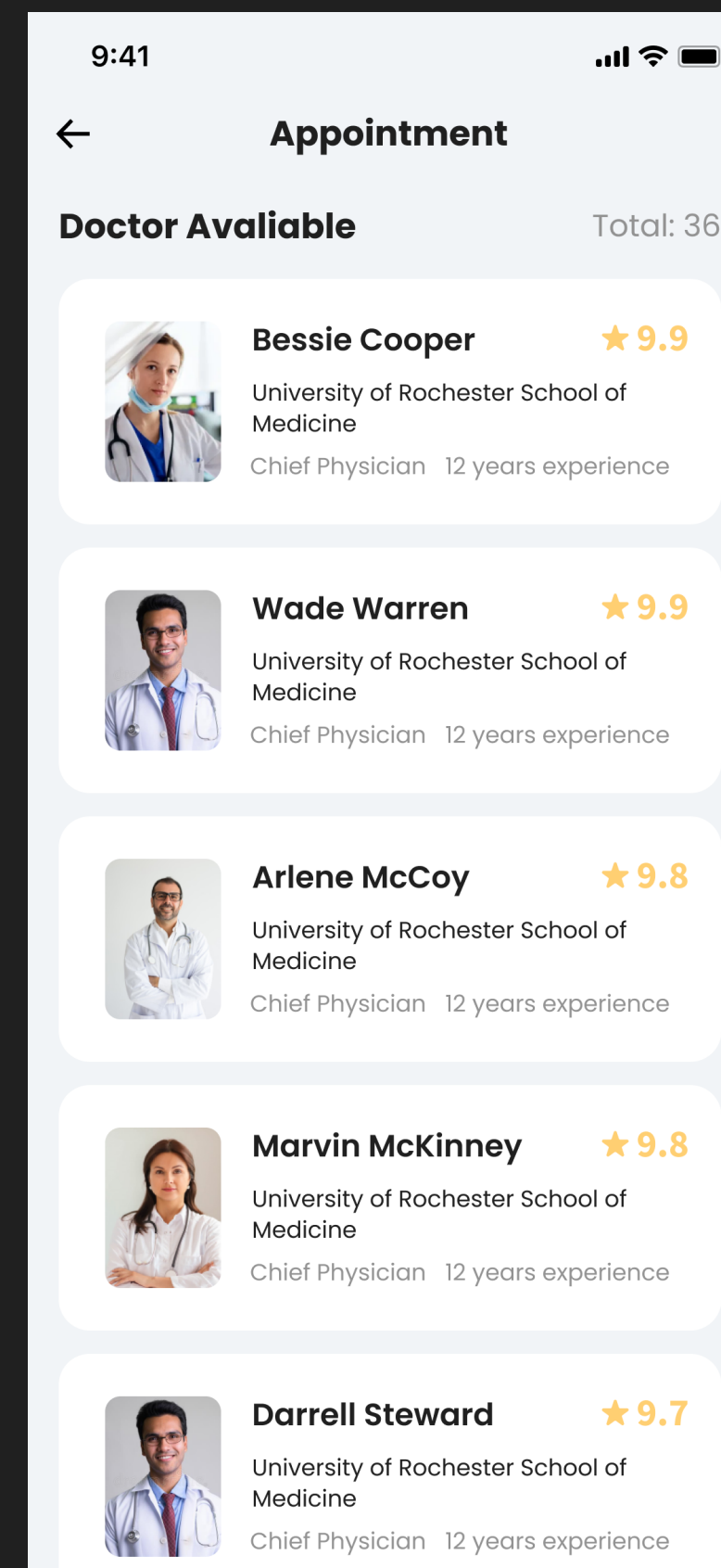


## Step Three

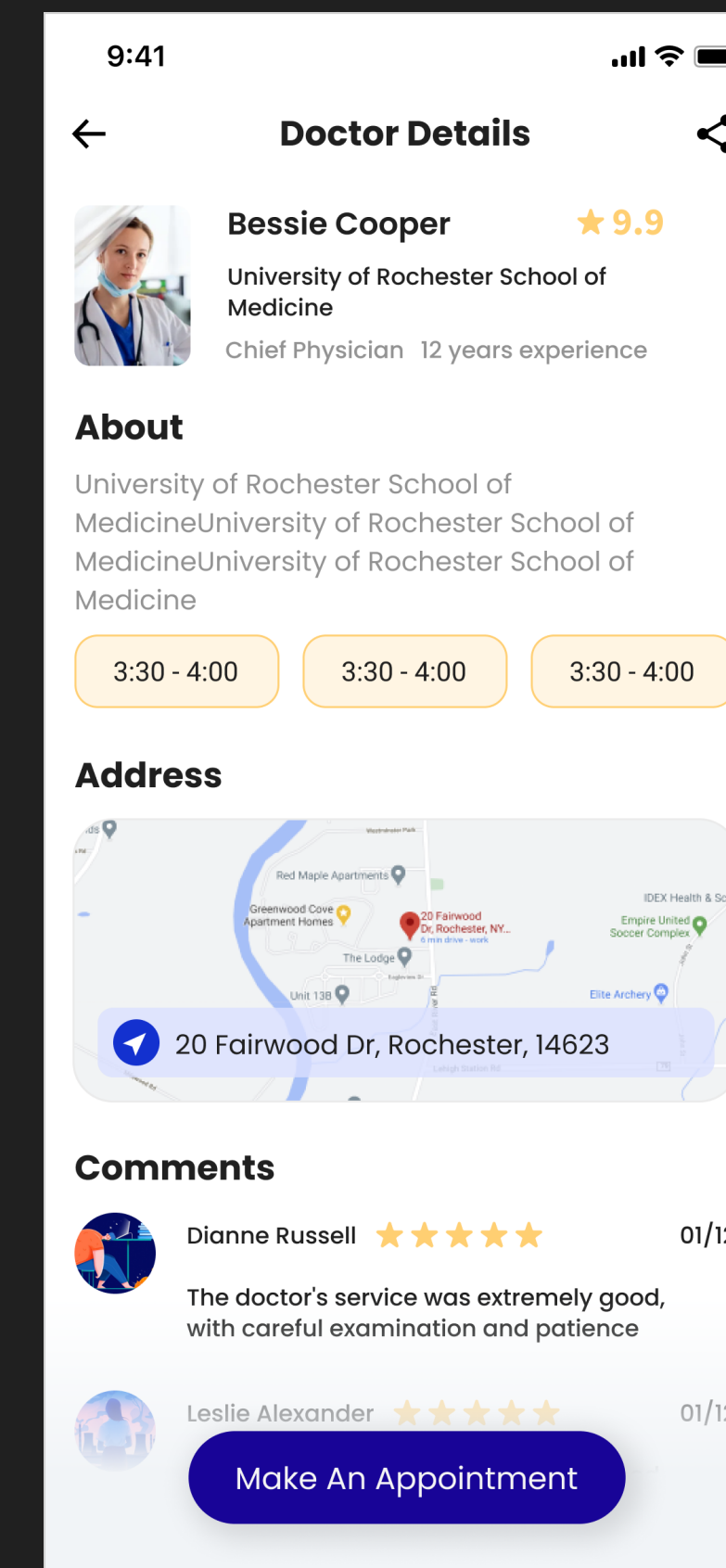
**Healthcare service O2O:**  
Follow the suggestion from  
**Homee** — The Digital AI Assistant,  
and make an appointment

03

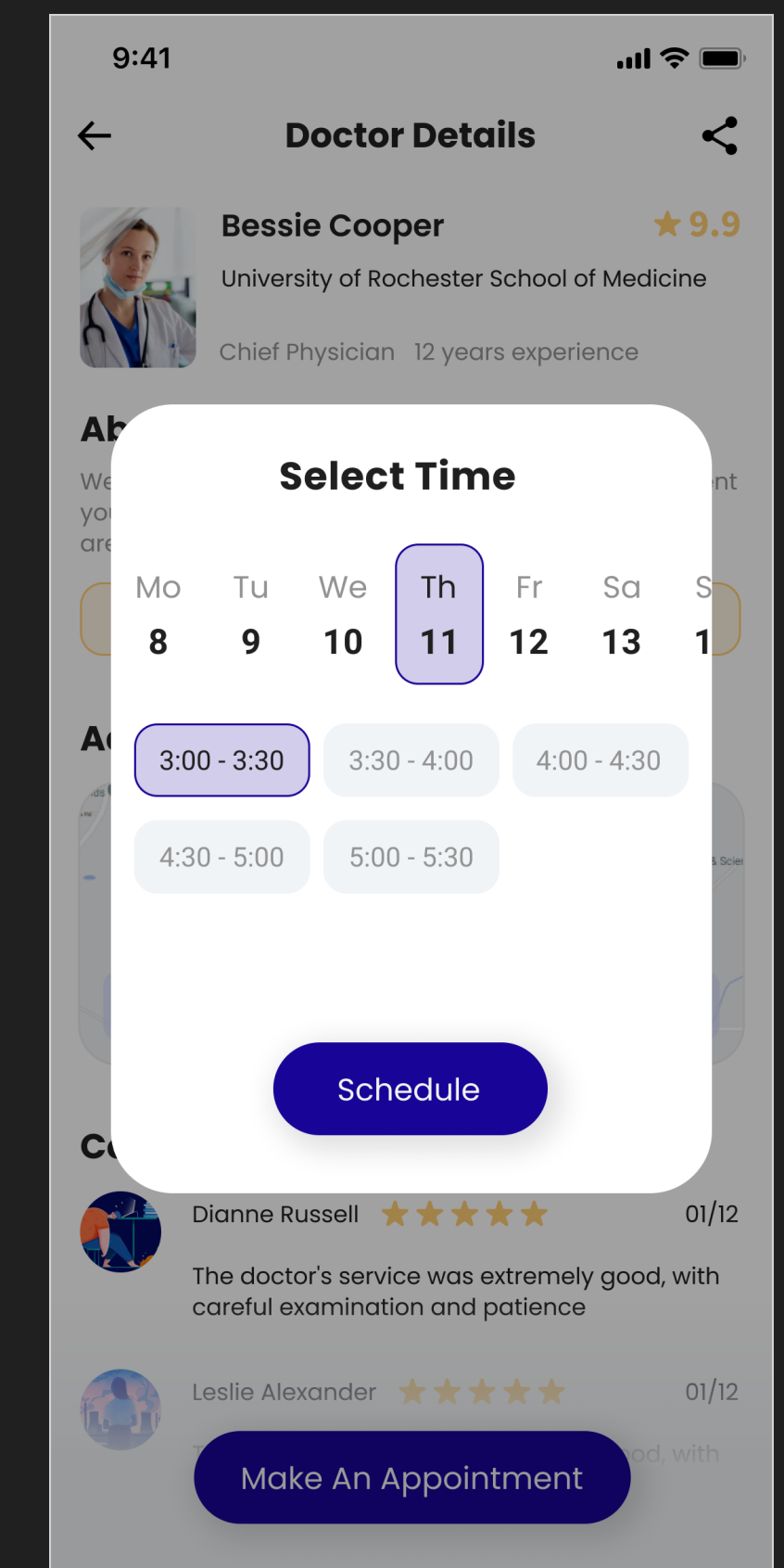
Lock Screen/Notification



Lock Screen/Notification



Lock Screen/Notification



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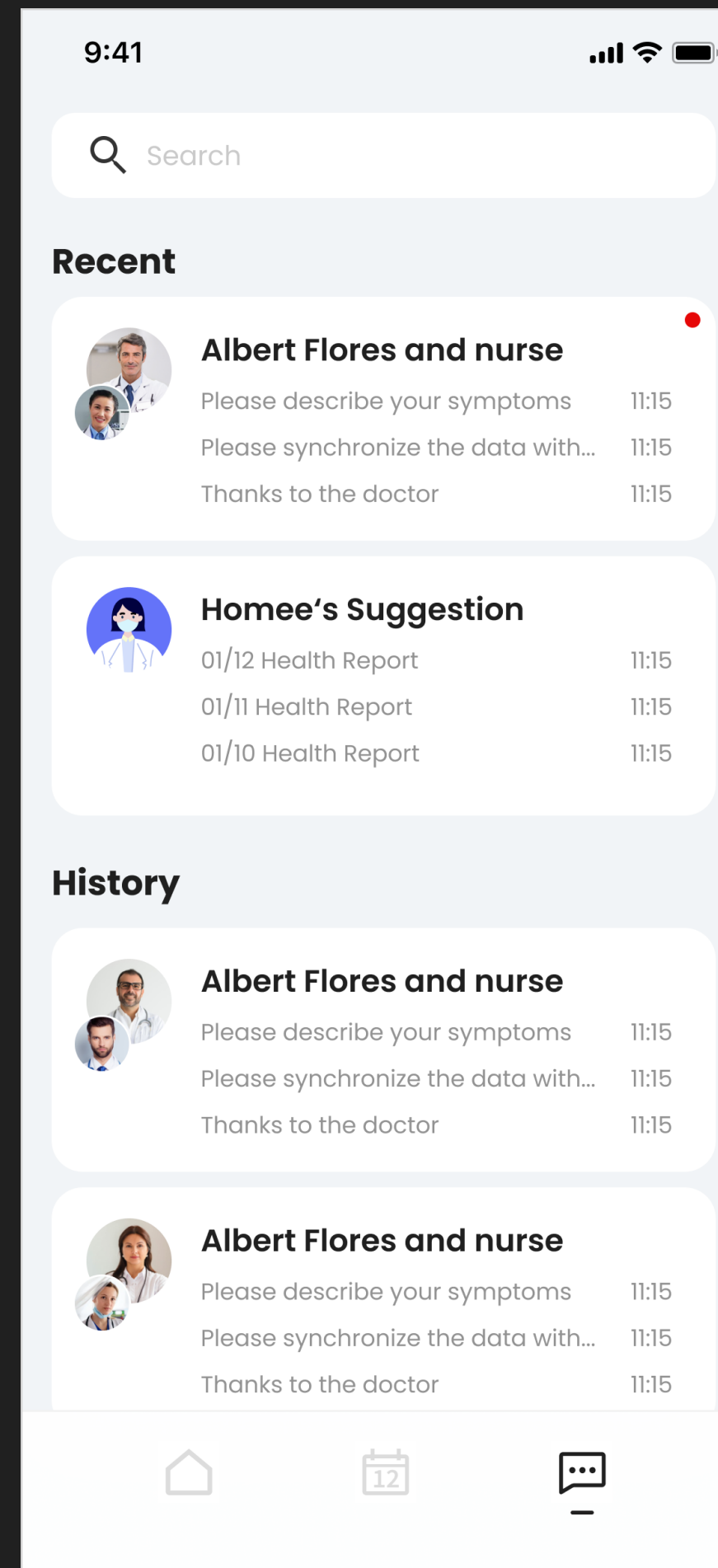


## Step One

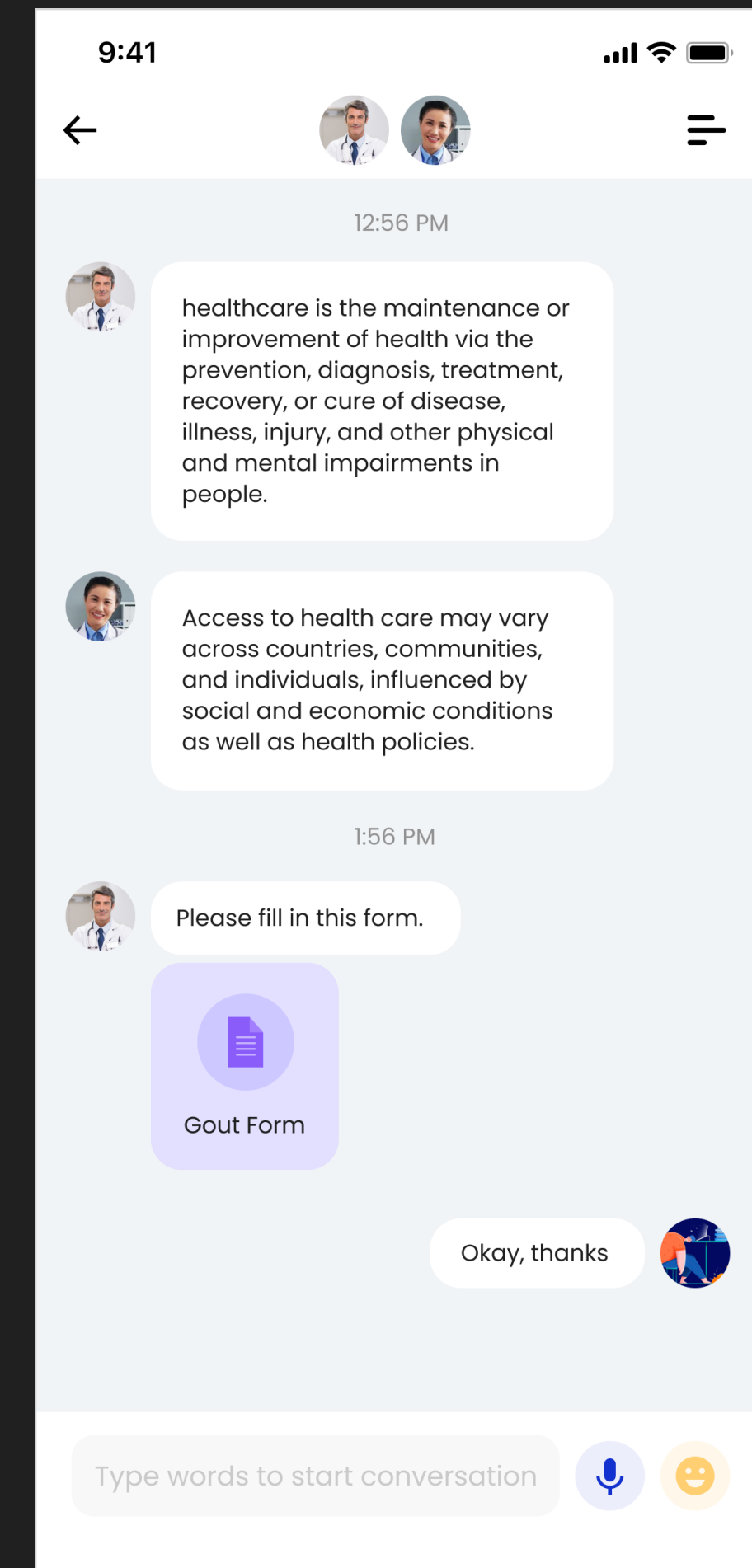
Carry out preliminary communication on the Internet using Healthway

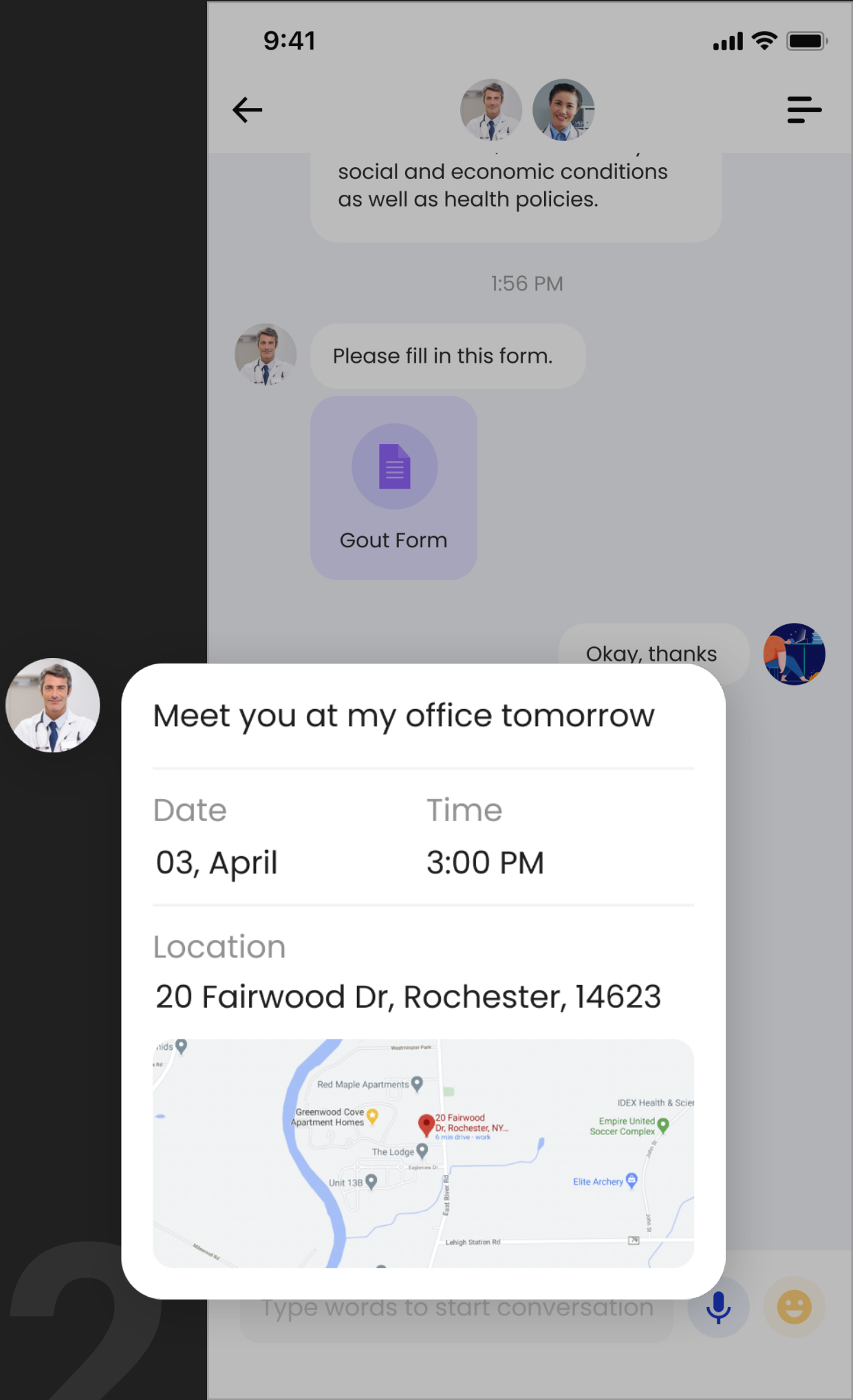
01

## Lock Screen/Notification



## Lock Screen/Notification





Step Two

Meet the doctor at the hospital for further check-up

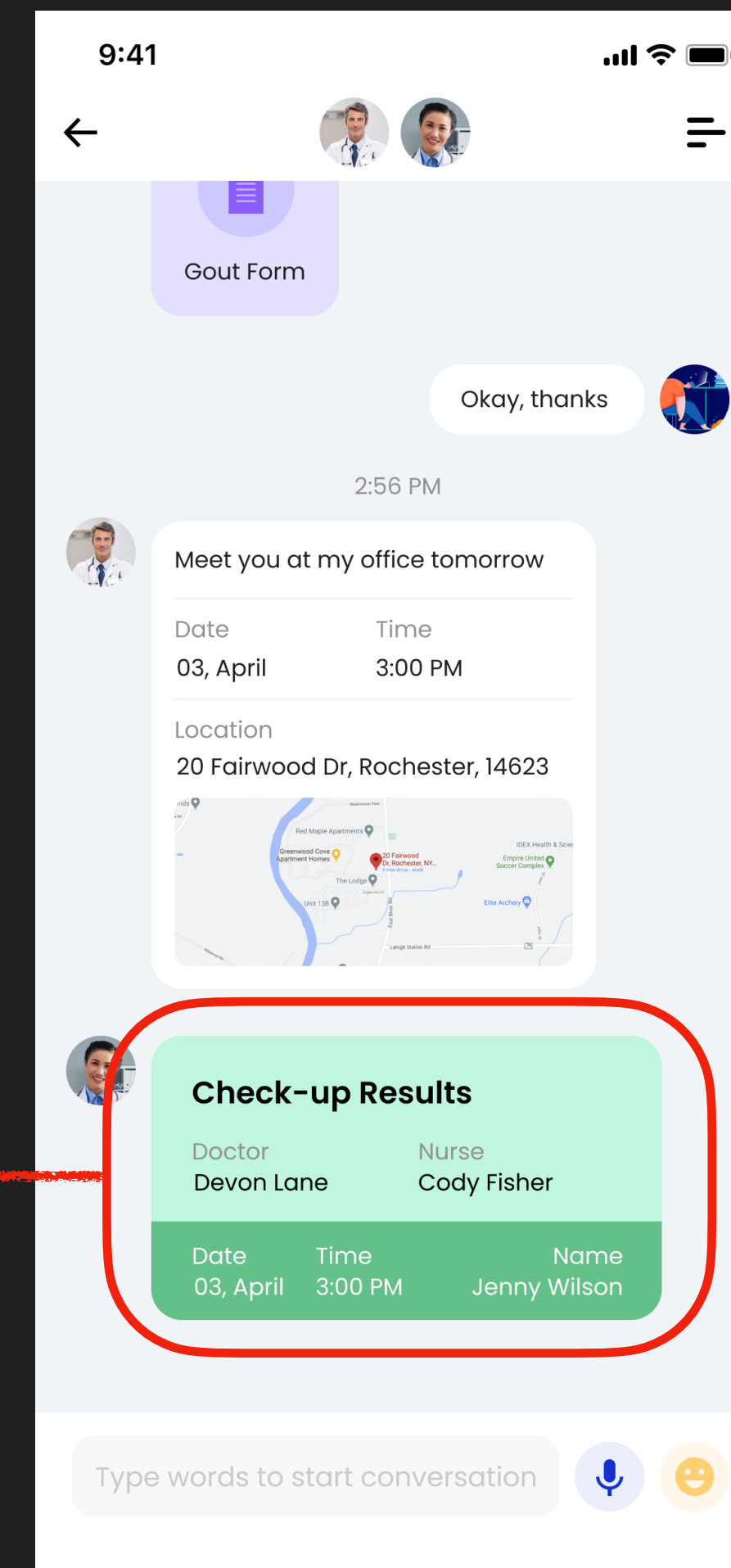


## Step Three

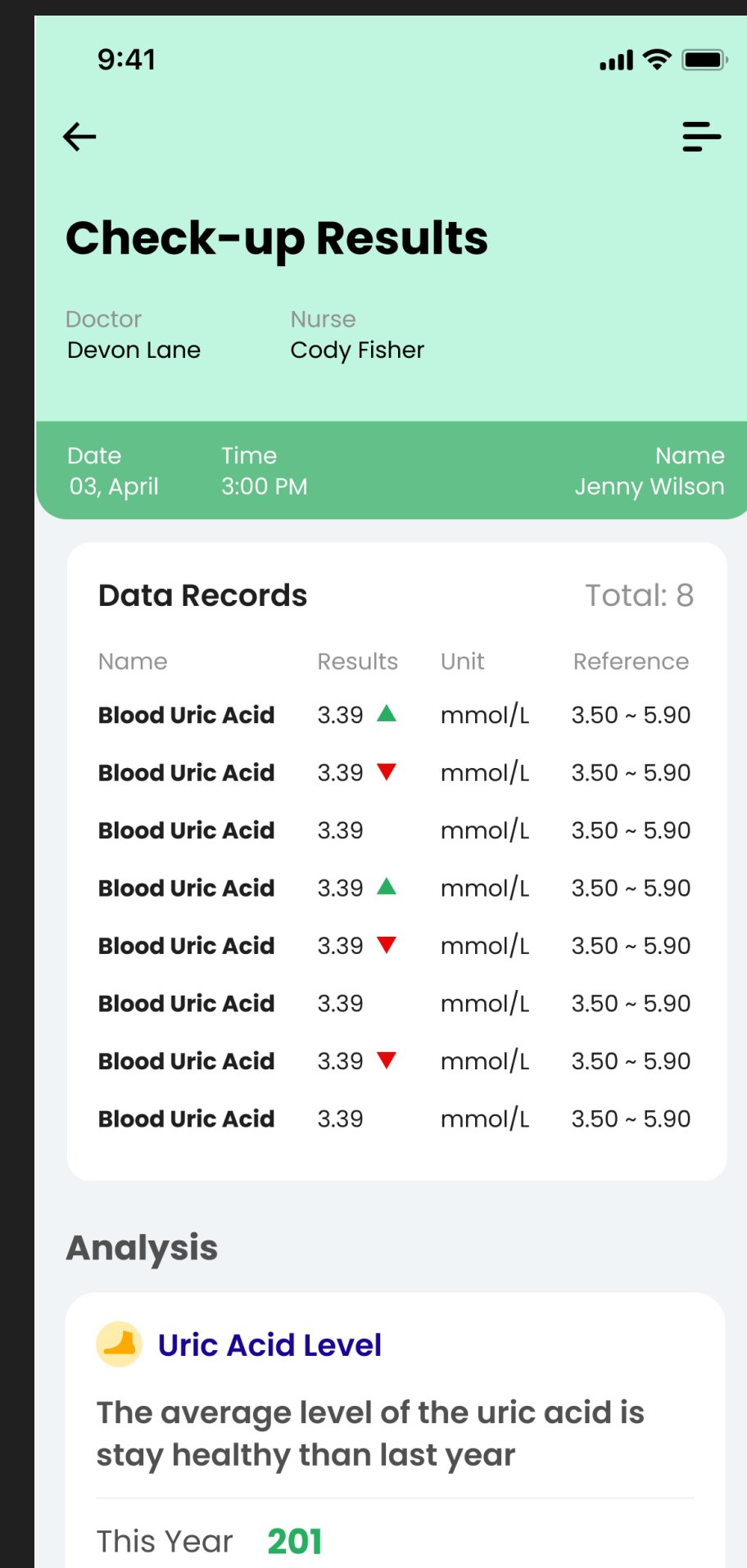
All the results will be displayed in your mobile phone in HealthWay app.

- 1 After the check-up at hospital, the doctor and the nurse can sync the results directly via the Healthway.

Lock Screen/Notification



Lock Screen/Notification



## Part 4

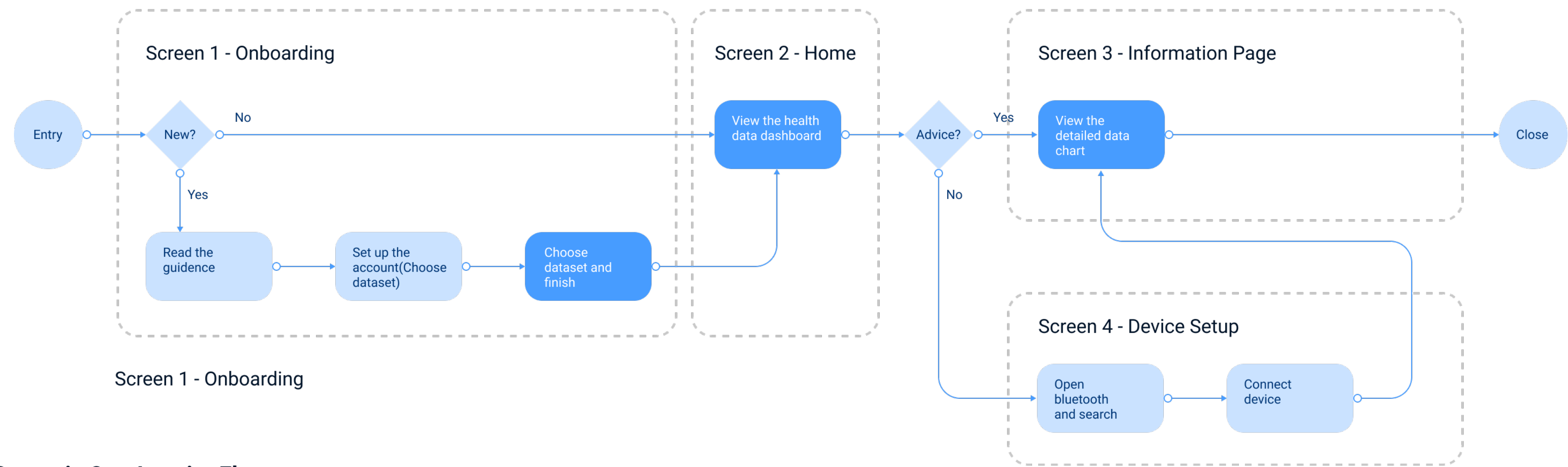
# Appendix

Main User Flow / Interaction Document / Branding / Data Visualization

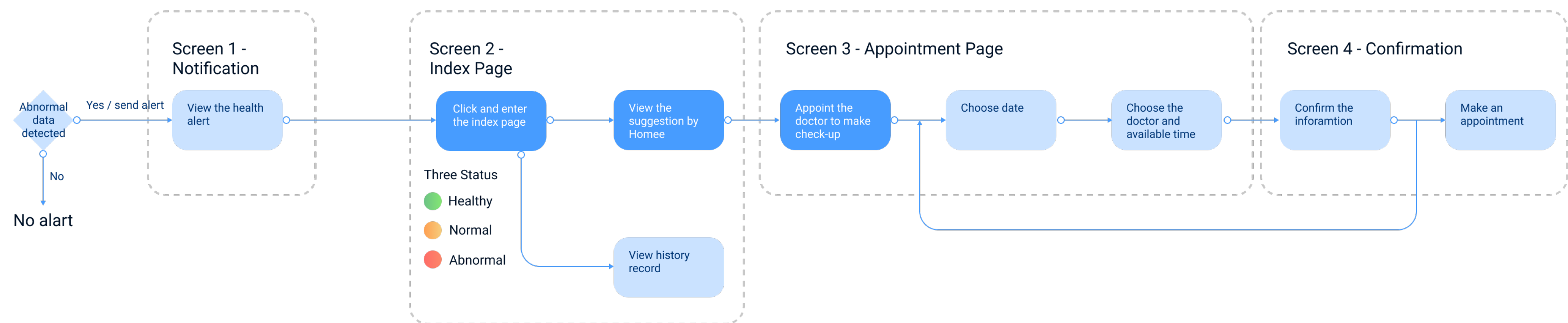


# Main User Flows

## Scenario 1 -- Connect IoT devices and view the data

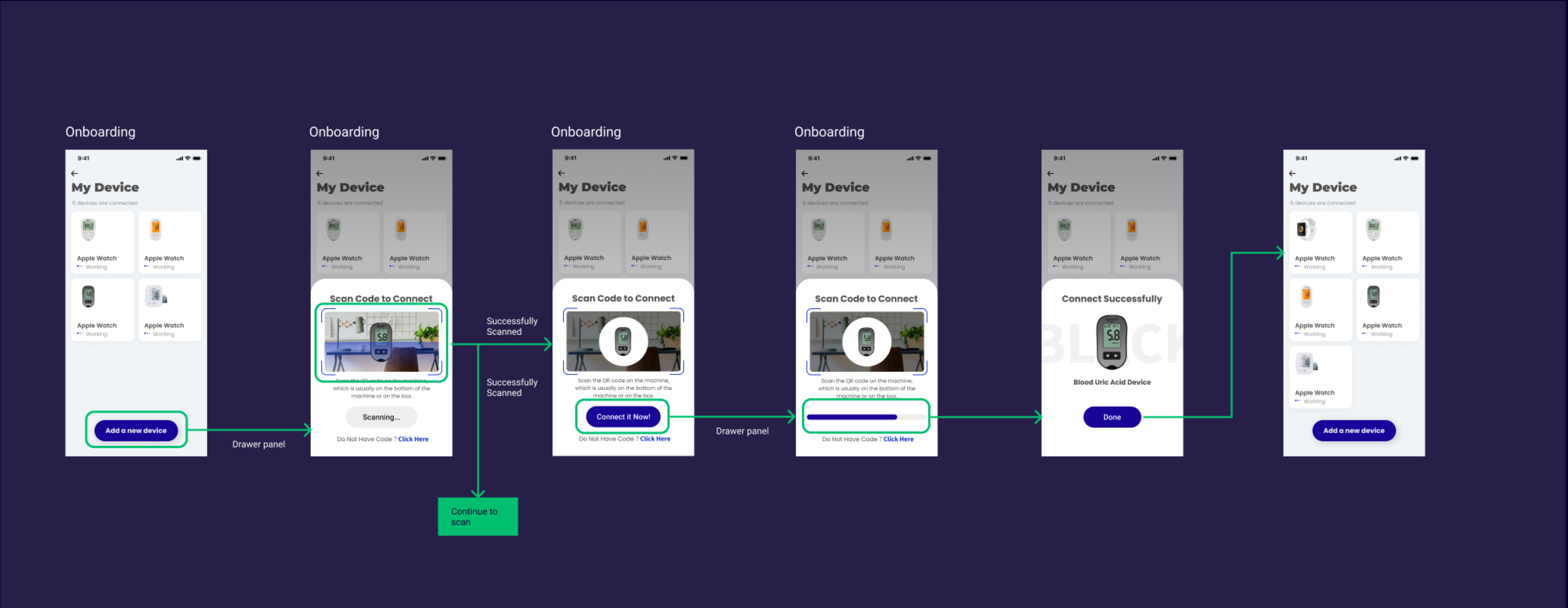


## Scenario 2 -- Appoint Flow



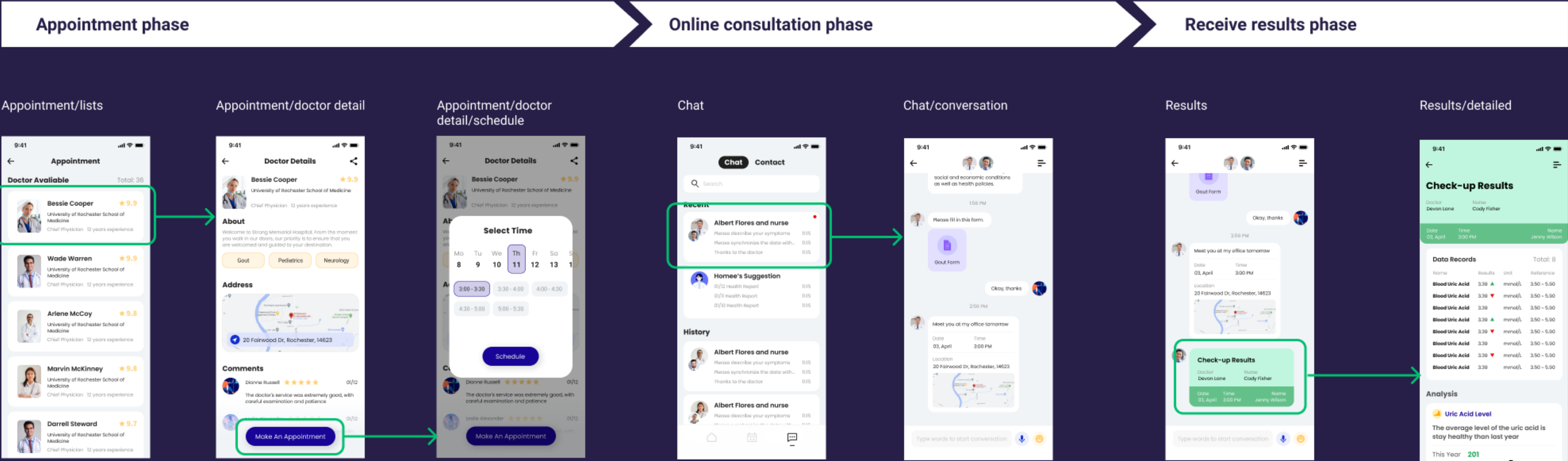
# Interaction Document 1

## IoT Device Set up



# Interaction Document 2

## Appoint and contact



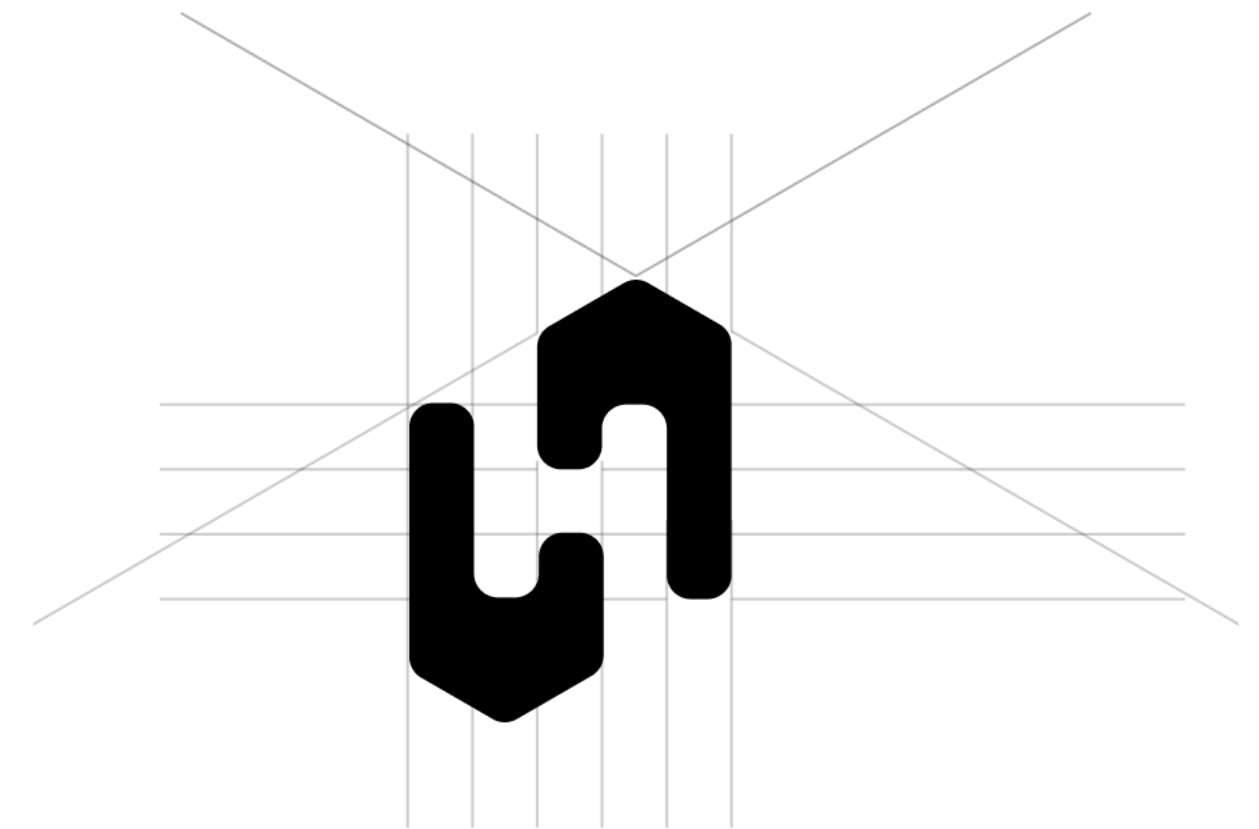


# Branding



# Healthway.

Keep abreast of your health anytime and anywhere.



## Variation



GREEN

BLUE

YELLOW

#6CFFE1

#2846FF

#FFCF72

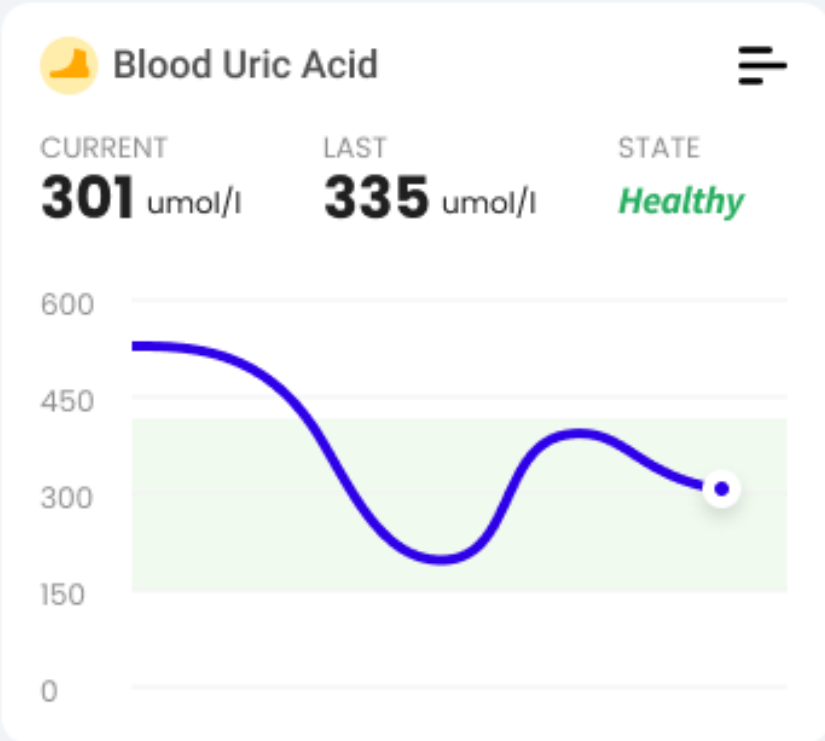
## Meaning

The inspiration of the Logo is derived from the design strategy, which is allowing the users to manage their own health at home. The Logo is consists of two simplified house. The negative space in the canvas composes the shape of the letter "H". The overall shape line is simple and clear, the color matching is bright.

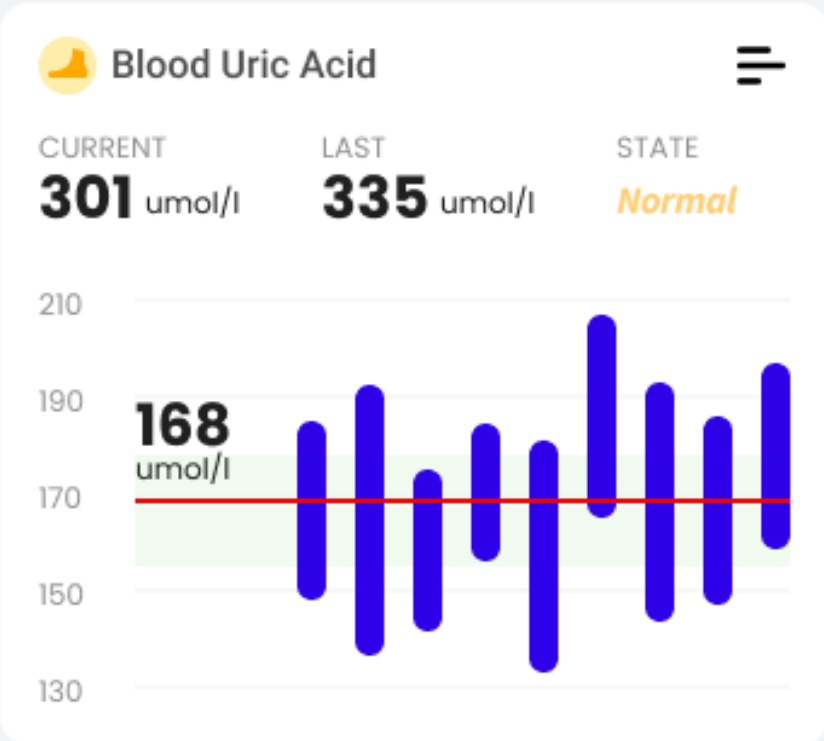
# Data Visualization

## Overview

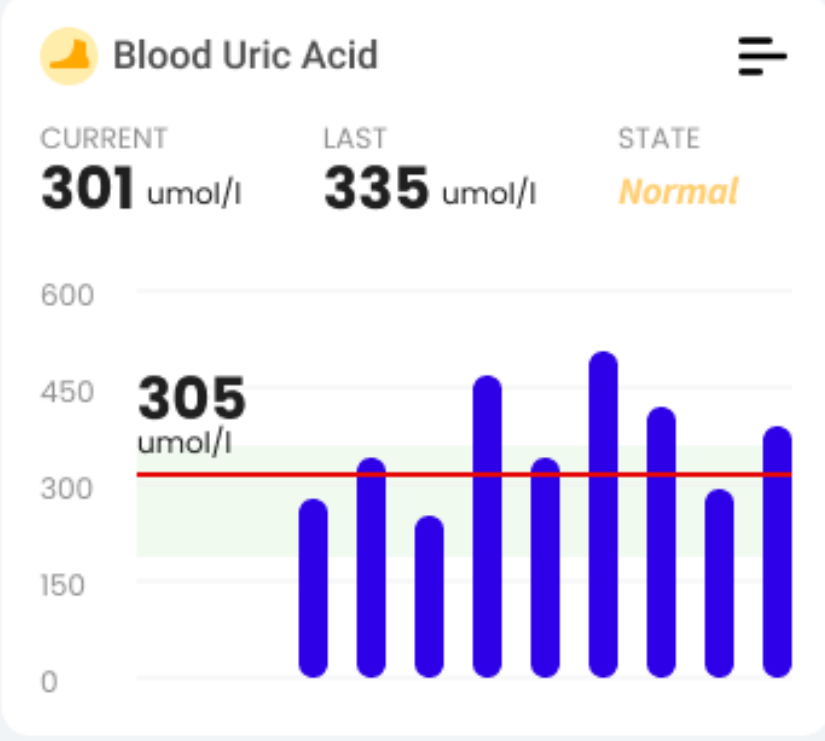
### Line graph



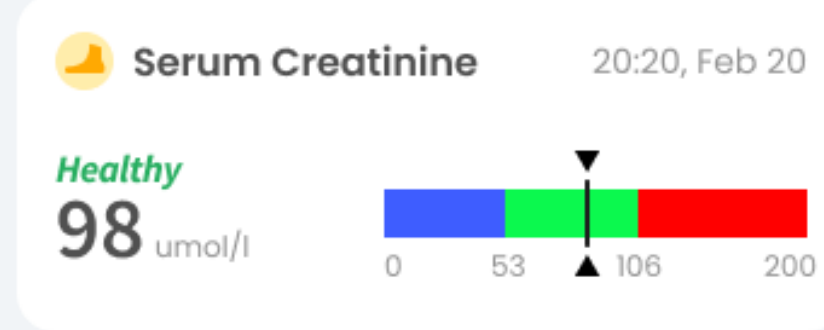
### Bar graph - 2



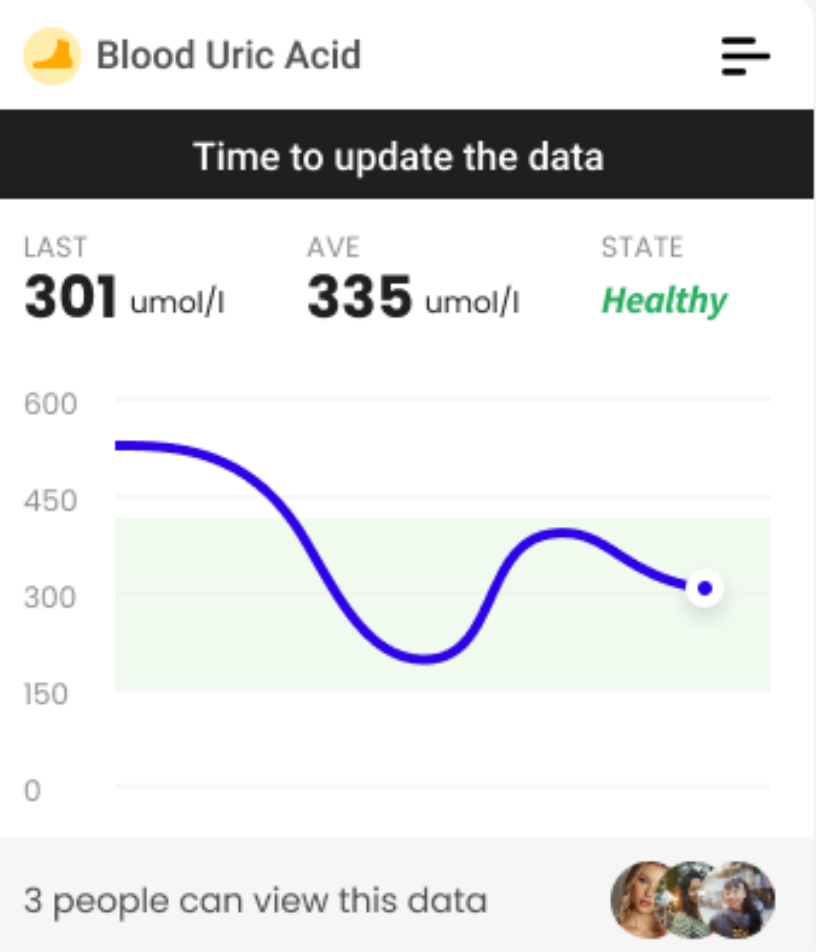
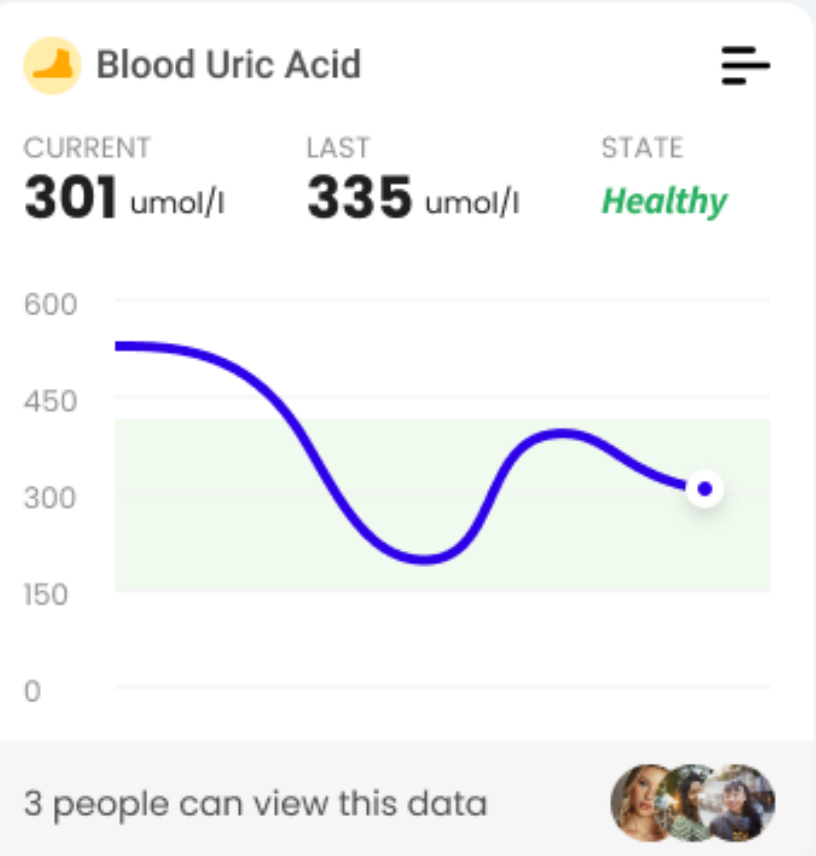
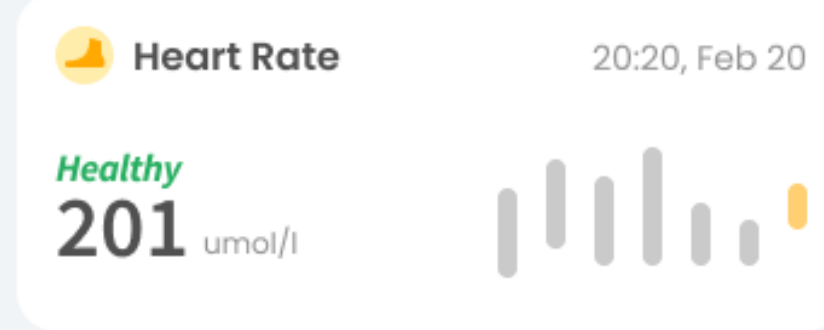
### Bar graph



### Bullet graph

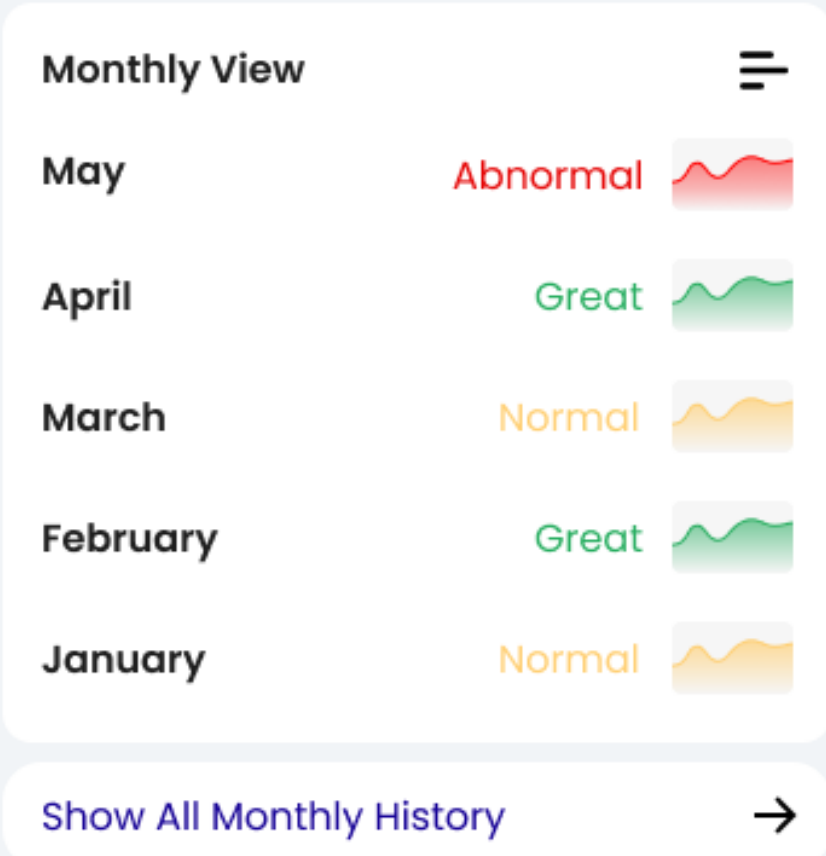


### Small bar graph

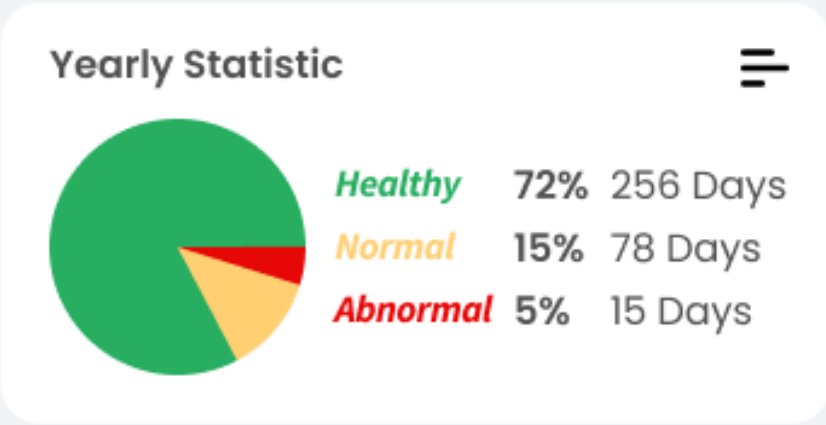


## Analysis

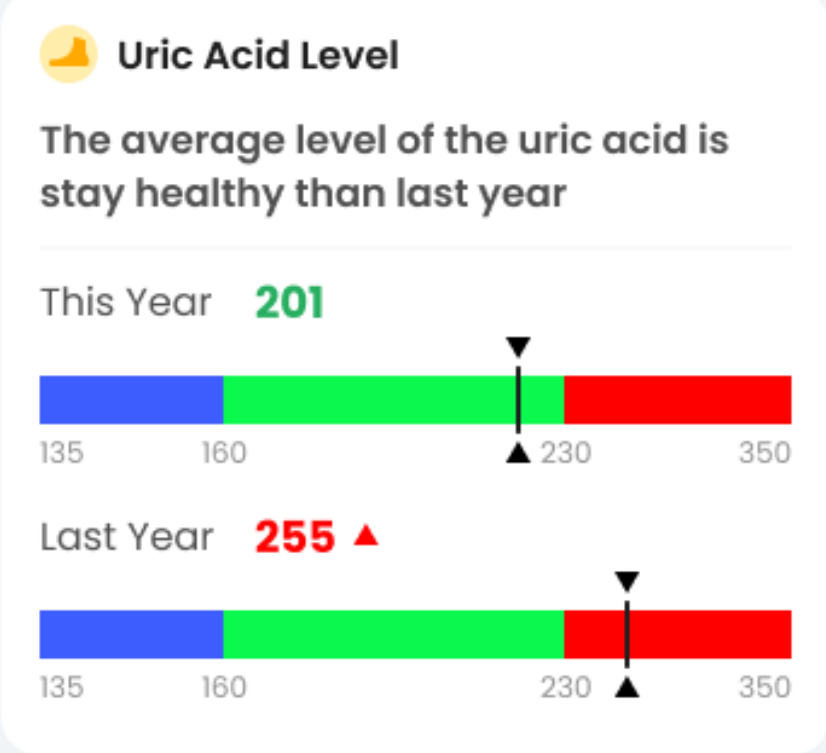
### Monthly view



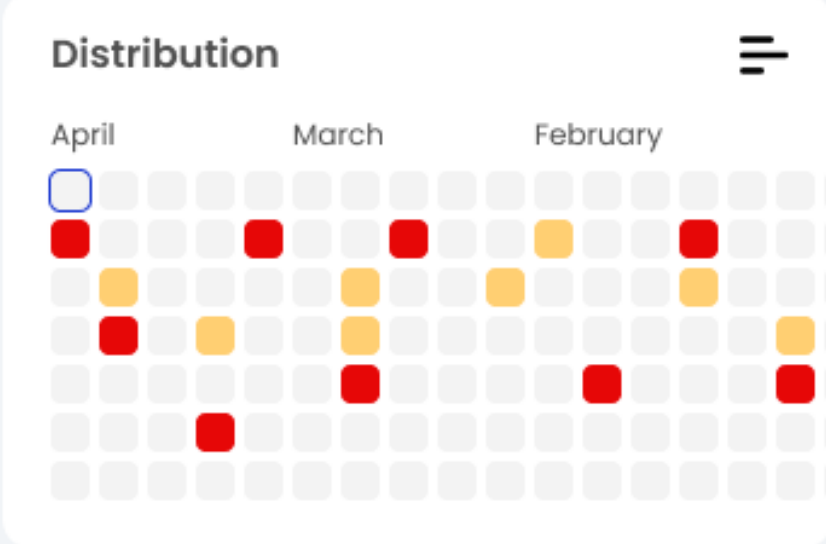
### Yearly Statistic



### Comparison graph



### Distribution graph



# Thanks for Watching

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