

cloud nine

smart environment for an
efficient medical practice



Ruby Boyle

Project 2 | Design & Prototype, Fall 2022

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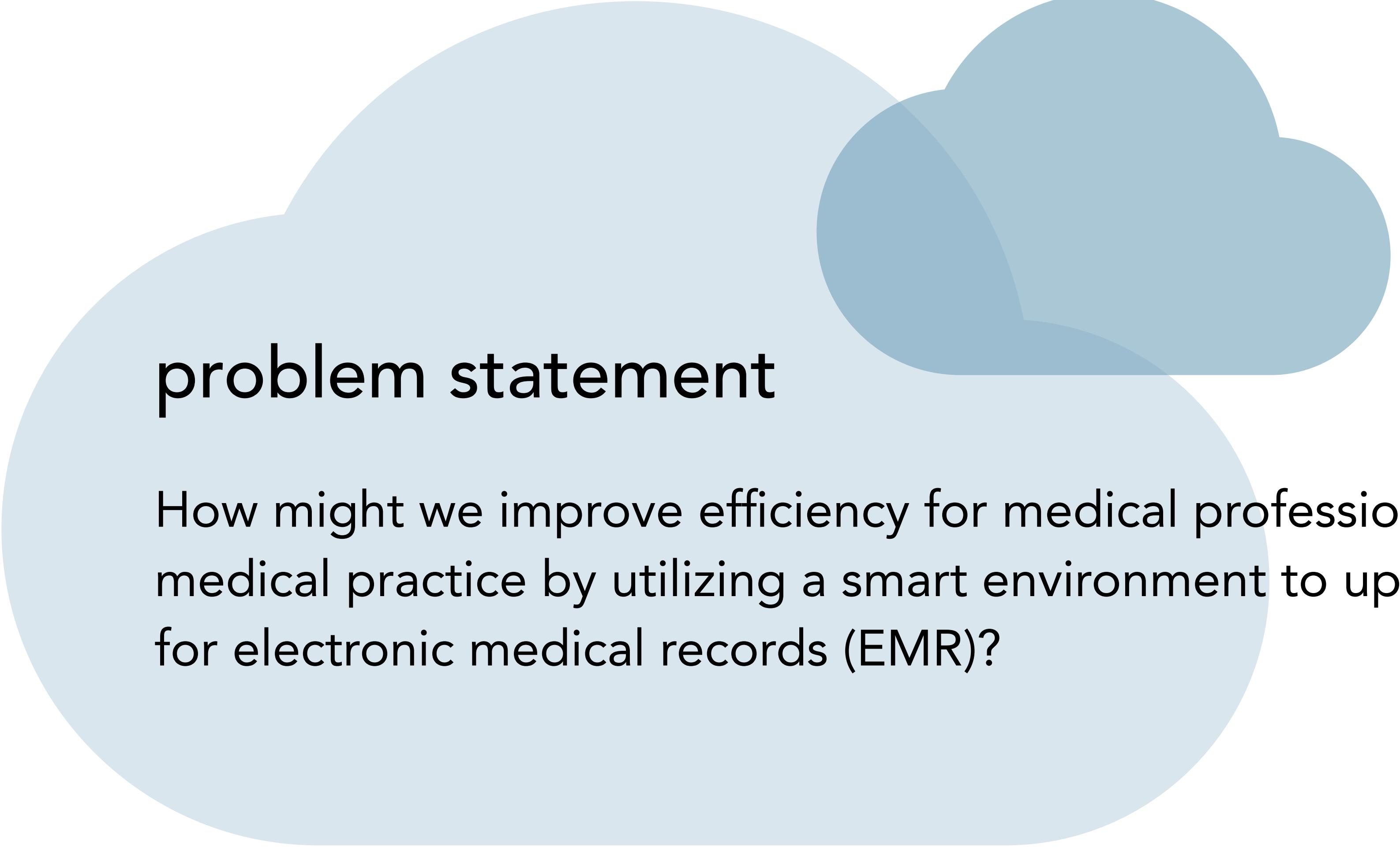
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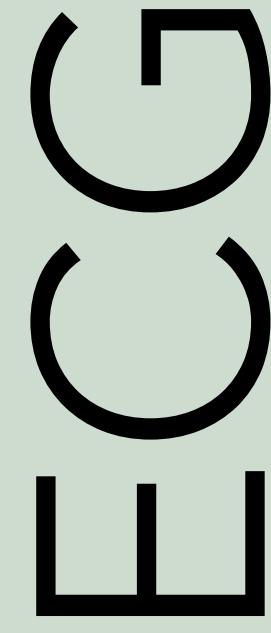
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problem statement

How might we improve efficiency for medical professionals in a medical practice by utilizing a smart environment to upload data for electronic medical records (EMR)?



Electrocardiogram monitoring measures heart activity. The IoT of this device as a wearable can detect abnormalities by acquired wireless data.

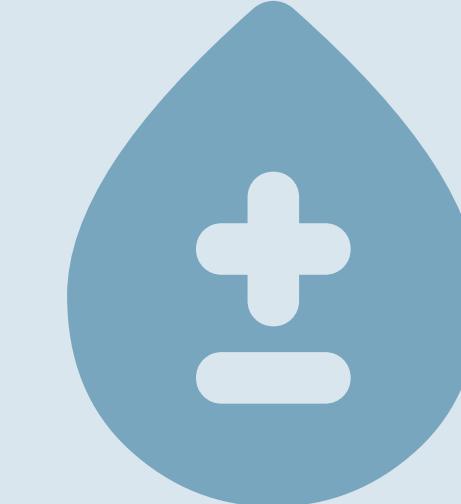
A non invasive glucometer in the form of a glove with a camera a laser sensors to monitor patients blood glucose level.



glucose

top four IoT healthcare metrics

blood pressure



Blood Pressure is measured for every diagnostic. There are now wearable devices that can monitor vitals and send them directly to the cloud.



temperature

Body temperature monitoring is another source of the diagnostic process. An example of this device be a 3D printed monitor on the ear that tracks core body temperatures.

user empathy map

pains

- lots of room for human error with manual recording process
- takes a lot of time
- poses a data security risk

gains

- improves efficiency and accuracy of EMR charting
- better communication and data access for the patient

think & feel

may feel frustrated
may feel empathetic
may feel concerned
may feel empowered

hear

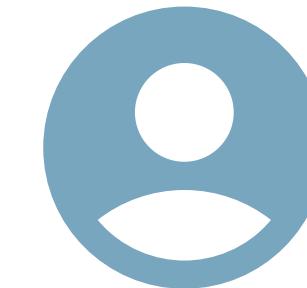
the concerns of patients
verbal communication that isn't documented
colleagues complains on software

say & do

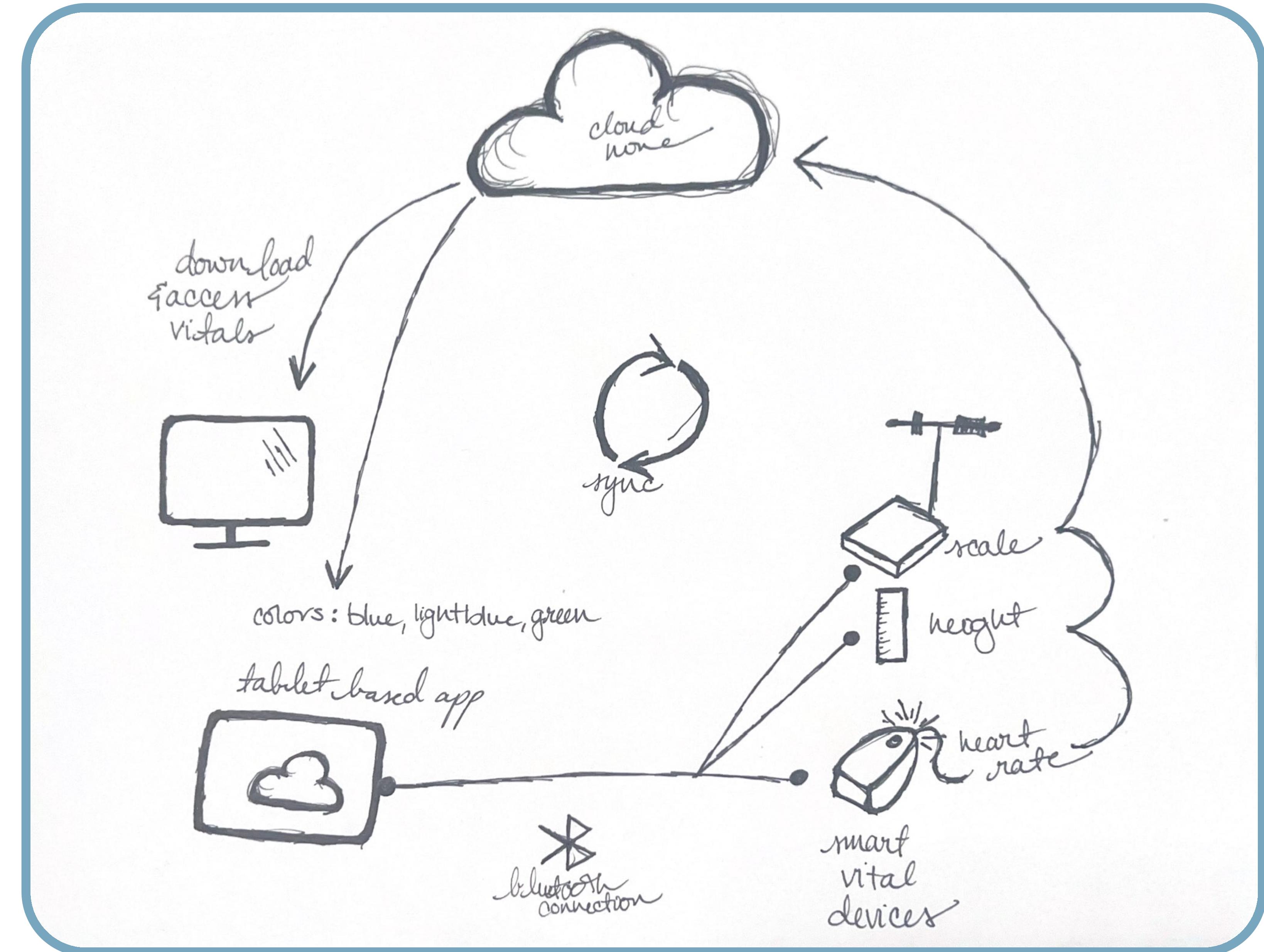
be empathetic towards a patient
say vitals out-loud to be recorded
type vitals in to a charting software
may have to use multiple software systems

see

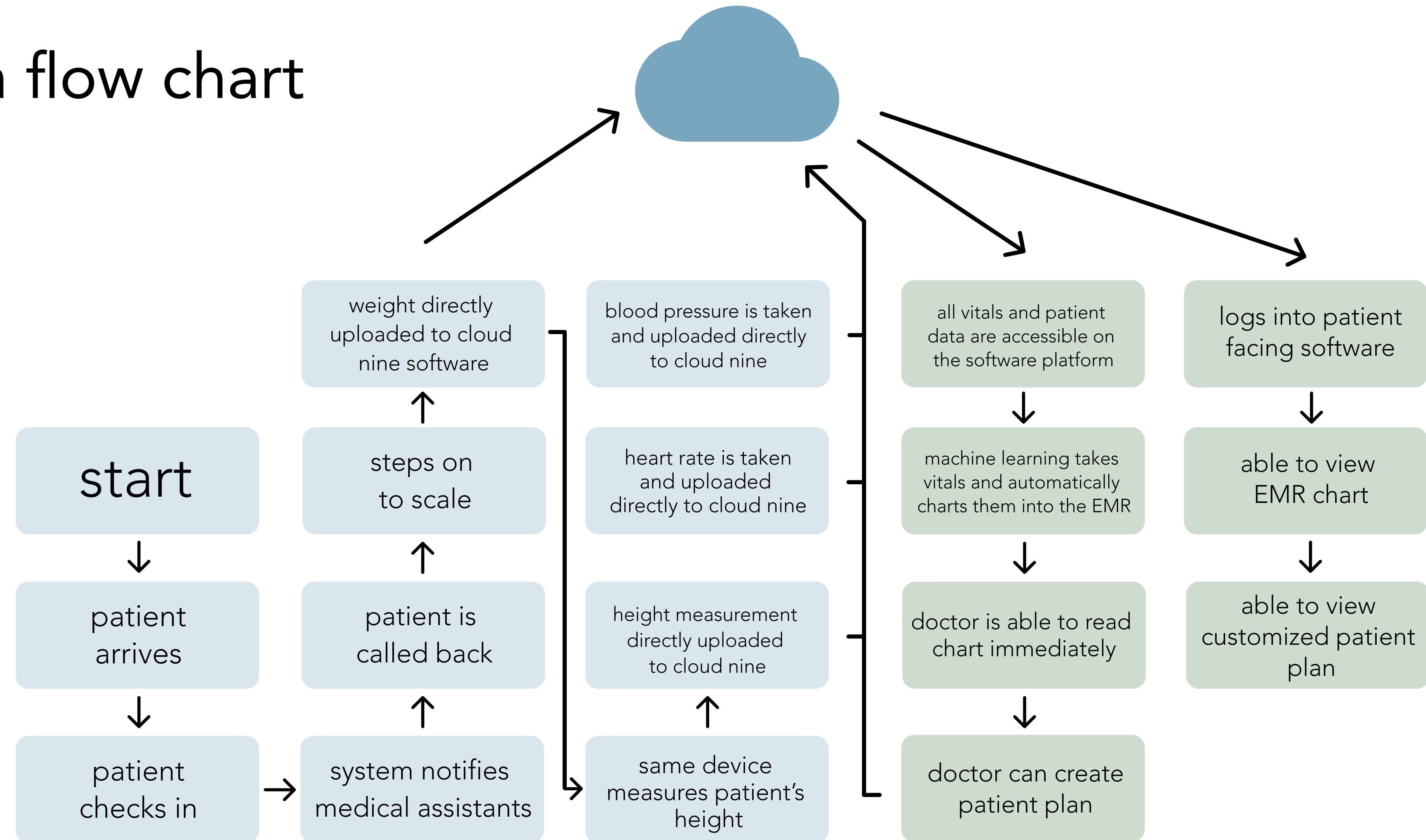
patients in pain
other medical personnel they work with
a confusing UI of a charting software



smart environment sketches



system flow chart



smart environment visualization

uploaded straight from
device to cloud nine



patient vitals taken
and stored directly
from device



synchronizes with all
software at practice

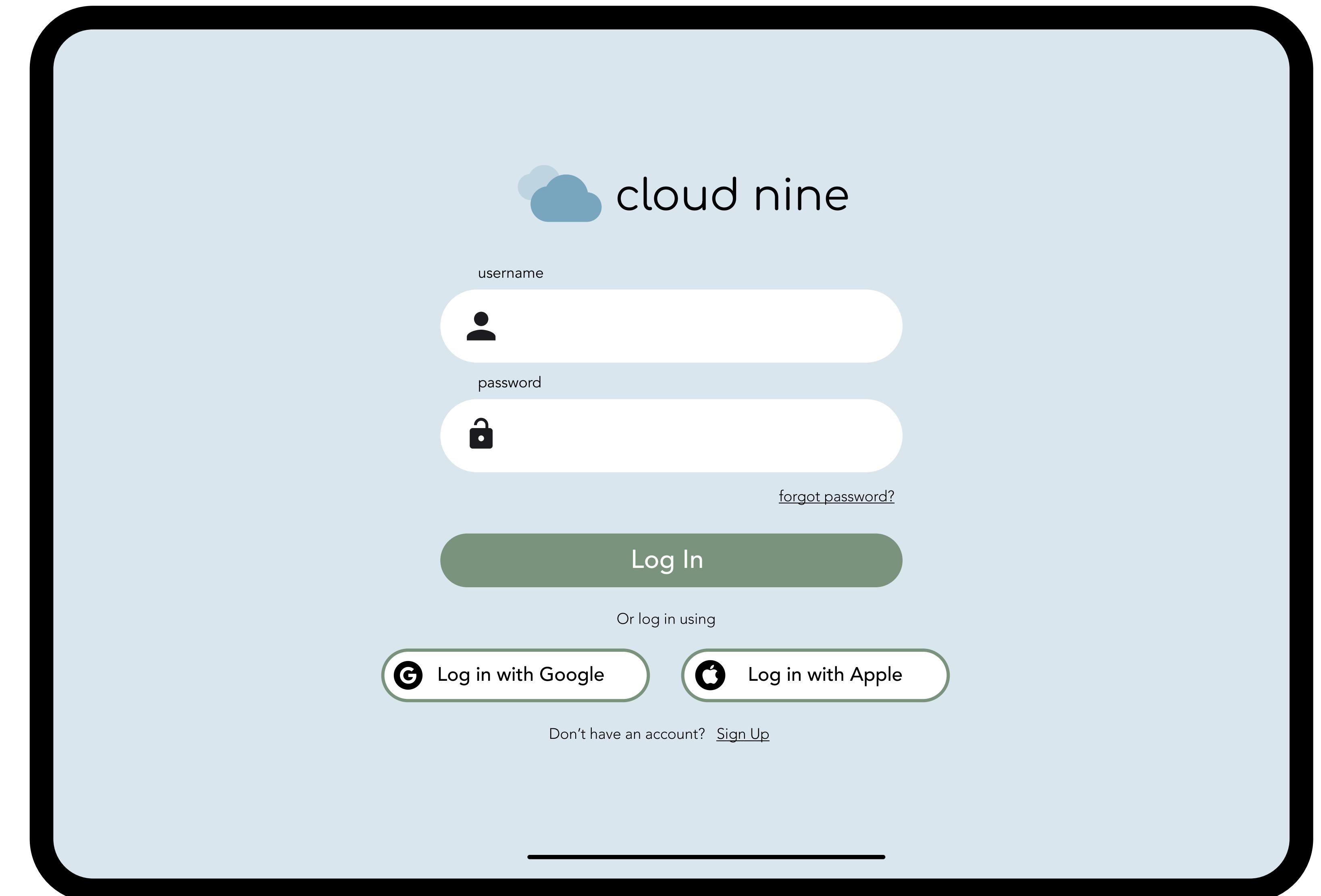


accessed by doctor
and medical assistants
on any device



cloud nine app prototype

[view prototype](#)



ui screen patient chart

colors

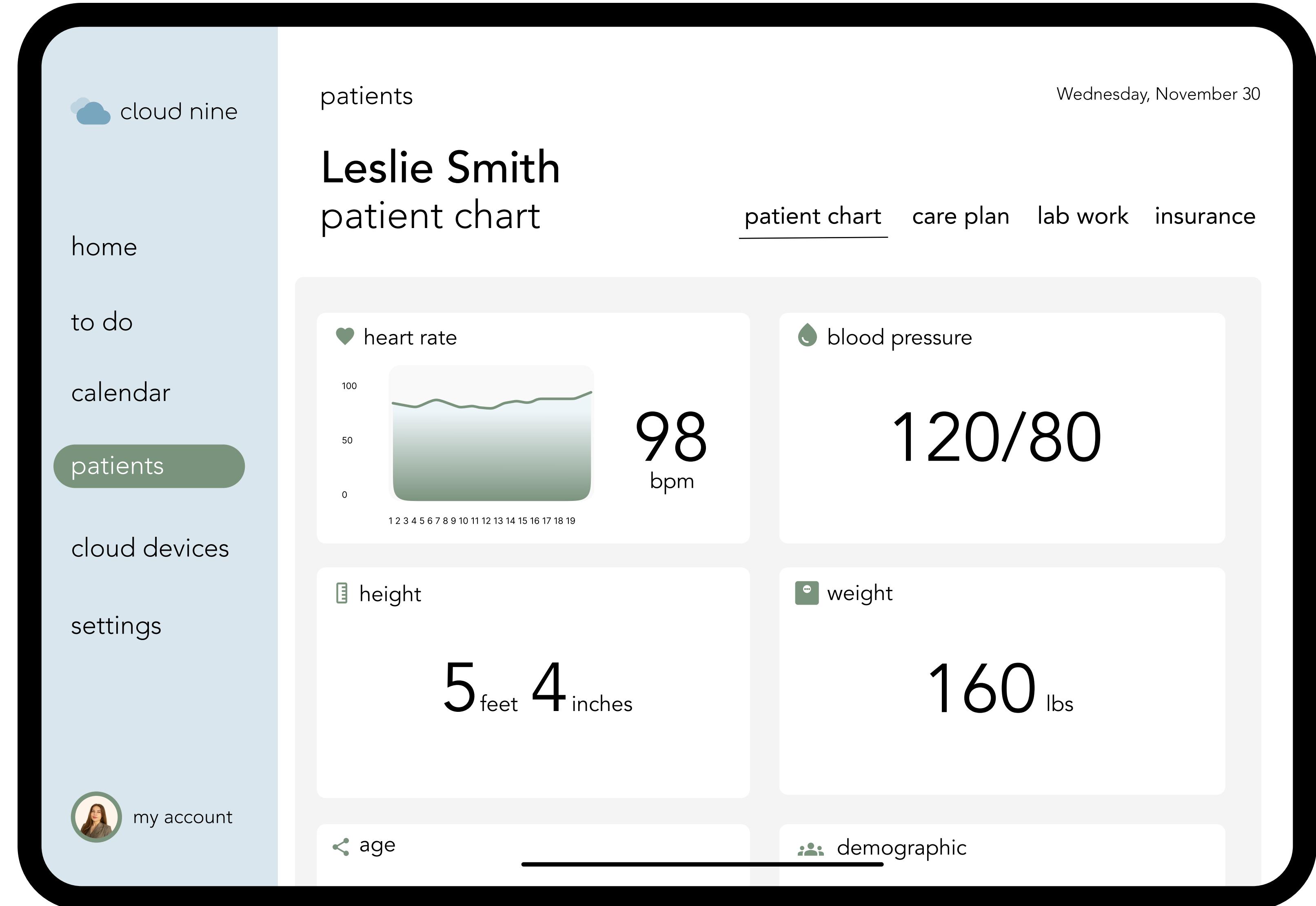


fonts

Anvenir
Comfortaa

icons

 Google
Material Icons



A screenshot of a mobile application interface for a patient chart. The top navigation bar includes a logo for "cloud nine", the date "Wednesday, November 30", and tabs for "patient chart" (which is underlined), "care plan", "lab work", and "insurance". The main content area displays a patient profile for "Leslie Smith" and various health metrics.

The left sidebar menu includes links for "home", "to do", "calendar", "patients" (which is highlighted with a green rounded rectangle), "cloud devices", and "settings". At the bottom of the sidebar is a "my account" section featuring a circular profile picture of a woman.

The right content area shows the following data cards:

- heart rate**: A line graph showing a fluctuating line over time, with the value **98 bpm** displayed.
- blood pressure**: The value **120/80** displayed.
- height**: The value **5 feet 4 inches** displayed.
- weight**: The value **160 lbs** displayed.
- age**: A progress bar indicating age, with the "demographic" tab selected.



ui screen

medical personnel dashboard

colors



fonts

Anvenir
Comfortaa

icons



Google
Material Icons



The image shows a mobile-style user interface for a medical personnel dashboard. At the top left is a cloud icon followed by the text "cloud nine". On the right, it says "Wednesday, November 30". The main content area has a light blue background. At the top center, it says "home" and "welcome, ruby". Below this is a "to do" section with three items: "send prior authorizations", "approve next weeks schedule", and "buy more cloud devices", each with a small circular icon. A "view all" button is at the bottom right of this section. To the left of the "to do" section are menu items: "home" (highlighted in a green rounded rectangle), "to do", "calendar", "patients", "cloud devices", and "settings". At the bottom left is a "my account" section with a profile picture of a woman. To the right of the "to do" section is a "calendar" section with three items: "morning emails" (7am - 8am), "allergy shot appt" (8am - 8:30am), and "skin test appt" (9am - 10am). A "view calendar" button is at the bottom right. Below the "calendar" section is a "cloud devices" section with a "devices online" heading. It lists "electrocardiography (10)" with a heart icon and "scale (5)" with a scale icon. A "manage all devices" button is at the bottom right.

cloud nine

Wednesday, November 30

home
welcome, ruby

to do

- send prior authorizations
- approve next weeks schedule
- buy more cloud devices

view all

home

to do

calendar

patients

cloud devices

settings

my account

patients

- Leslie Smith [view chart](#)
- Mike Williams [view chart](#)
- Jose Santana [view chart](#)

view all charts

calendar

- morning emails 7am - 8am
- allergy shot appt 8am - 8:30am
- skin test appt 9am - 10am

view calendar

cloud devices

devices online

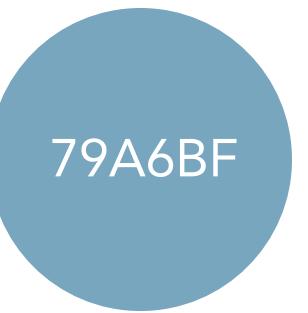
- electrocardiography (10)
- scale (5)

manage all devices

ui screen

successfully added
smart device

colors



fonts

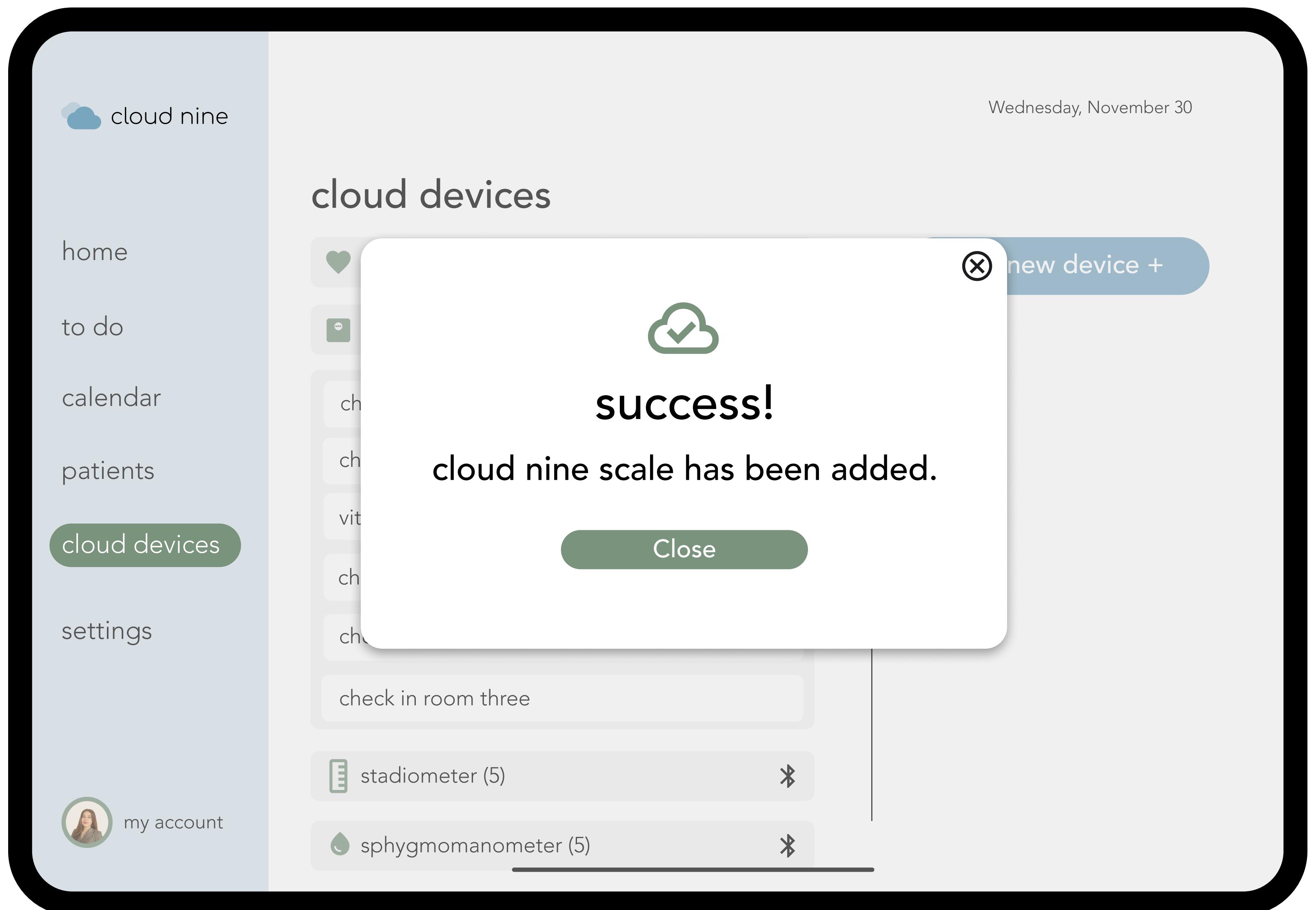
Anvenir

Comfortaa

icons



Google
Material Icons



bibliography

Guwalani, U. (2022, August 1). Security and privacy issues with IOT healthcare devices. ImpactQA. Retrieved December 8, 2022, from <https://www.impactqa.com/blog/security-and-privacy-issues-with-iot-healthcare-devices/>

Min Woo Woo, Jong Whi Lee, Kee Hyun Park, Woo Woo, M., Jong Whi Lee, Kee Hyun Park, Abstract Healthcare applications in IoT systems have been receiving increasing attention because they help facilitate remote monitoring of patients. In this paper, & Park, K. H. (2017, April 12). A reliable IOT system for personal healthcare devices. Future Generation Computer Systems. Retrieved December 8, 2022, from <https://www.sciencedirect.com/science/article/pii/S0167739X17305423>

Pradhan, B., Bhattacharyya, S., & Pal, K. (2021, March 19). IOT-based applications in healthcare devices. Journal of Healthcare Engineering. Retrieved December 8, 2022, from <https://www.hindawi.com/journals/jhe/2021/6632599/>