

The logo consists of a series of colored dots (purple, blue, orange, yellow, green, pink, light blue) arranged in a pattern that suggests a stylized 'I' or a cluster of data points.

# InteropEHRate

## D6.10

### S-EHR mobile app - V2

#### ABSTRACT

This deliverable is the second version of the software for the prototype of the secure mobile app for citizens (referred to as the “S-EHR”), built following the design described in the D6.2 [D6.2] and D6.5 [D6.5] deliverables. The prototype includes the integration of other components the S-EHR app depends on, such as the first versions of the libraries for D2D protocol and R2D protocol. The S-EHR is to store on a smart device the health data about a citizen and produced by the citizen him/herself or by HCPs.

The following report is intended as a supporting documentation for the actual deliverable, which is the software itself. It includes the building and installation guides, as well as a user guide.

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<b>Task</b>	T6.4
<b>Dissemination Level</b>	Public
<b>Type of Deliverable</b>	Demonstrator
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DRAFT

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## LOGTABLE

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0.2	03-03-2021	Update existing section	Martin Marot	A7
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## ACRONYMS

Acronym	Term and definition
A7	Andaman7
EHR	Electronic Health Record
D2D	Device-to-Device
R2D	Remote-to-Device
S-EHR	Smart EHR
PHR	Personal Health Record
HCP	Health Care Professional
SW	Software

DRAFT

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# 1. INTRODUCTION

## 1.1.Scope of the document

This document is a SW accompany report that will help you to install and use the demonstration application. The demonstration application is available at this address: [https://drive.google.com/drive/folders/17QBvImSct1csMOWFI8FGO\\_1uoPbynbcP](https://drive.google.com/drive/folders/17QBvImSct1csMOWFI8FGO_1uoPbynbcP)

The installation guide is available at the section 3.1 of this document.

## 1.2.Intended audience

The document is intended to all people interested to have an overview of what was developed during the first year of the InteropEHRate project. This document focuses on the reference implementation of the S-EHR application made on Android.

## 1.3.Structure of the document

This current document is organized in the following sections:

- Overview: overview of the content of the current release of the S-EHR application.
- Installation guide: step by step explanation on how to retrieve the application in order to test it.
- User guide: step by step explanation on how to test all features available for the current version of the S-EHR application

## 1.4.Updates with respect to previous version

- update of the section “Installation guide”
- update of the section “User guide”

## 2. SW DESCRIPTION

SW TITLE	S-EHR App
SW VERSION	0.2.0
LICENCES AND PATENTS	N.A
PROGRAMMING LANGUAGES	Java SE 8.0 & kotlin 1.3
SUPPORTED PLATFORM(s)	Android 4.1 - Current version
SOURCE CODE	<a href="http://iehrgitlab.ds.unipi.gr/interopehrate/s-ehr-mobile-app/s-ehr-app">http://iehrgitlab.ds.unipi.gr/interopehrate/s-ehr-mobile-app/s-ehr-app</a>
EXECUTABLE	<a href="https://drive.google.com/open?id=1HRKmvllqfysu2UviLGhmvWPqVJQ1NZ6w">https://drive.google.com/open?id=1HRKmvllqfysu2UviLGhmvWPqVJQ1NZ6w</a>
SW TITLE	S-EHR App

Table 1 – SW DESCRIPTION



### 3. OVERVIEW

The current release (V2 of the S-EHR app, released at the end of March 2021) contains an example for the implementation of the libraries developed as part of the InteropEHRate framework, developed during the first and second year of the project, related to the use case of the three scenarios.

Those libraries are:

- Remote to device (R2D): The citizen retrieves a sample of an EHR (at this stage of the project, it is not the citizen's own EHR but a "fake" EHR serving as an example). This sample EHR is stored in the current database of the Android S-EHR application.
- Device to device (D2D): The personal health data of the EHR example retrieved with the R2D protocol will be shared to the HCP application (the reference implementation of the HCP app of the project) through a short range wireless connection, Bluetooth.
- Remote to device backup (R2D backup): The personal health data of the sample EHR can be stored and retrieved from an authorized cloud.

These libraries are integrated into an existing S-EHR application, the Android version of Andaman7. This constitutes the first version of the prototype of the citizen secure mobile app, serving as the reference implementation of the S-EHR app.

#### 3.1. Installation guide

Here are the instructions to download and install the S-EHR App. This guide needs to be executed directly from your android mobile. If you do it from a computer, you will have to perform an additional step:

- Go to this drive repository:  
[https://drive.google.com/drive/folders/17QBvImSct1csMOWFI8FGO\\_1uoPbynbcP](https://drive.google.com/drive/folders/17QBvImSct1csMOWFI8FGO_1uoPbynbcP)
- Download the apk file of the application "andaman7-iehr-release-3.7-iehr.52.apk". The apk file is the executable type file of the android application.
- Once the file is downloaded, open it to install the application.
- Launch the application.

If you are executing these steps from a computer, you'll need to transfer the file downloaded from your computer to the mobile device.

#### 3.2. User guide

This user guide will describe step by step the actions a user will have to perform in order to use the S-EHR app and test specifically the functionalities related to the three scenarios that have been implemented so far.

##### 3.2.1. Installation of the app

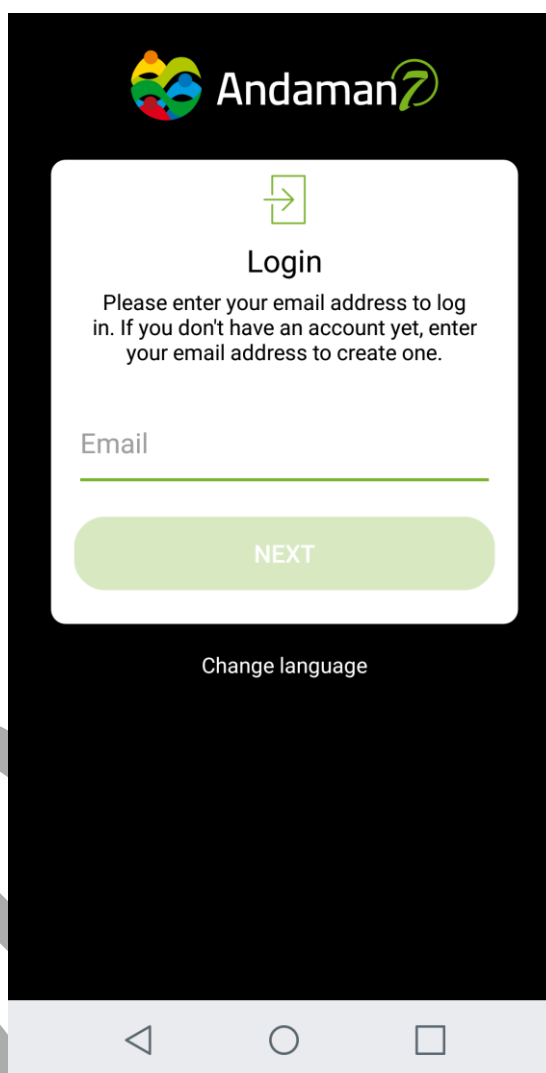
Firstly, install the S-EHR app on an Android device. To have access specifically to the V2 of the S-EHR mobile app, follow the instructions of the installation guide in section 3.2.

NB: To have access to the latest version of Andaman7, you can download the official app. To do so, open the Play Store from your mobile device and search for "Andaman7". Click on "install".

### 3.2.2. Registration to the app

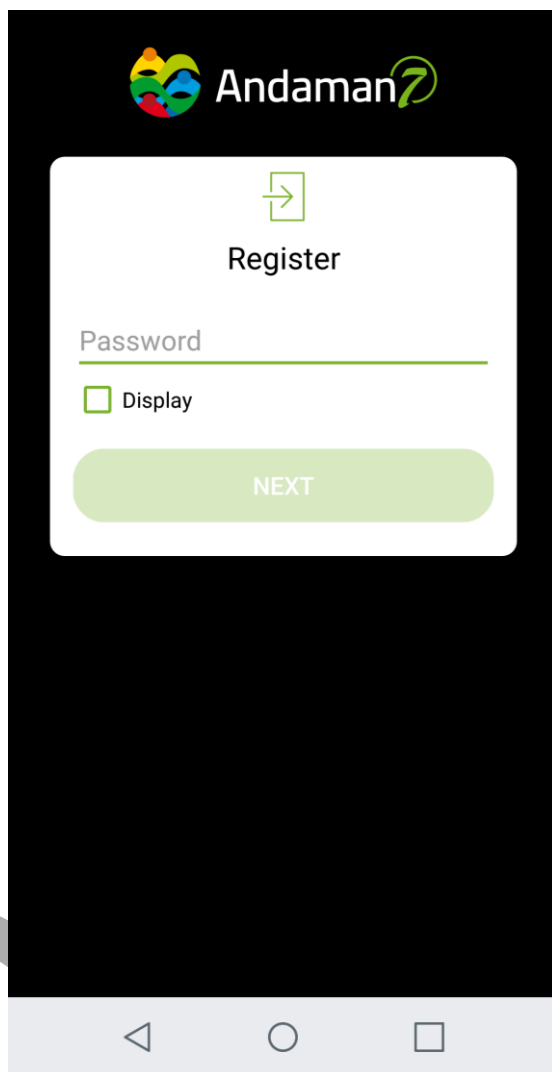
The first step to be able to use the application will be the registration step.

- First, enter a valid address mail in the email field of the login screen and click on “NEXT”.



*Figure 1 - sign up / login screen*


- If the email address doesn't correspond to an Andaman7 account yet, you will be invited to register to the app by creating an account with that address. To do so, you have to choose a personal password, at least 6 characters long. Click the “Display” checkbox if you want to verify it. Click on “NEXT” to validate your password and move to the next step.




*Figure 2 - password initialization screen*

- Select if you're a doctor or a patient.

NB: This option will only change a few details of the display but the app and its features are the same for every user. If you are a doctor, you can of course register as a doctor but fill in your own PHR like a patient.

 Andaman7



**Register**

Are you :

☐ **a health professional**

I will use this app to manage the medical records of my patients (in addition to mine and those of my family).

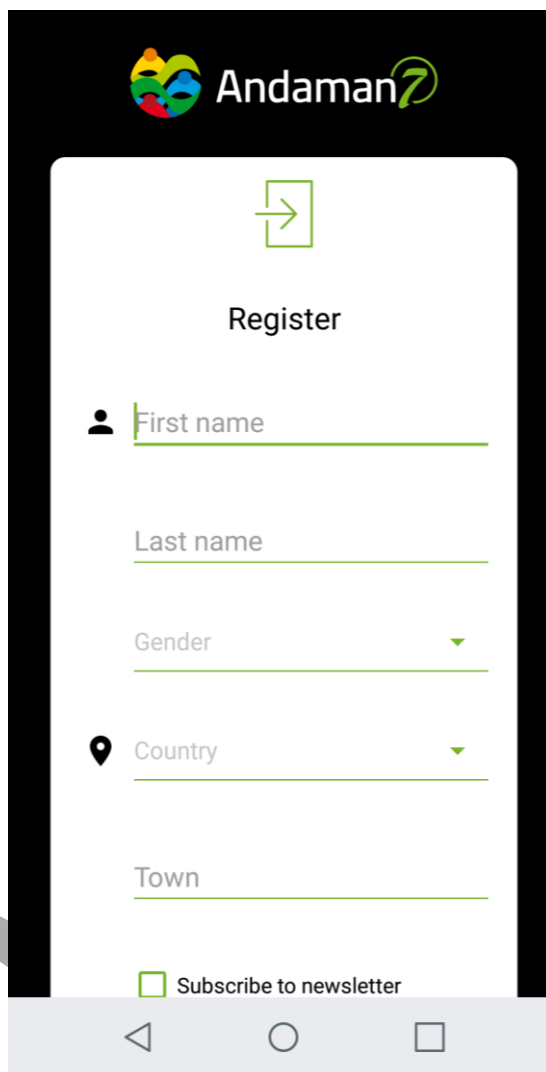
☒ **a patient**

I will use this app to manage my own medical records and possibly my family records.

**NEXT**

*Figure 3 - screen for selection of citizen type during registration*

- Fill in your personal information. First and last names are mandatory fields. Read the privacy policy and approve it by ticking the checkbox in order to be able to continue.

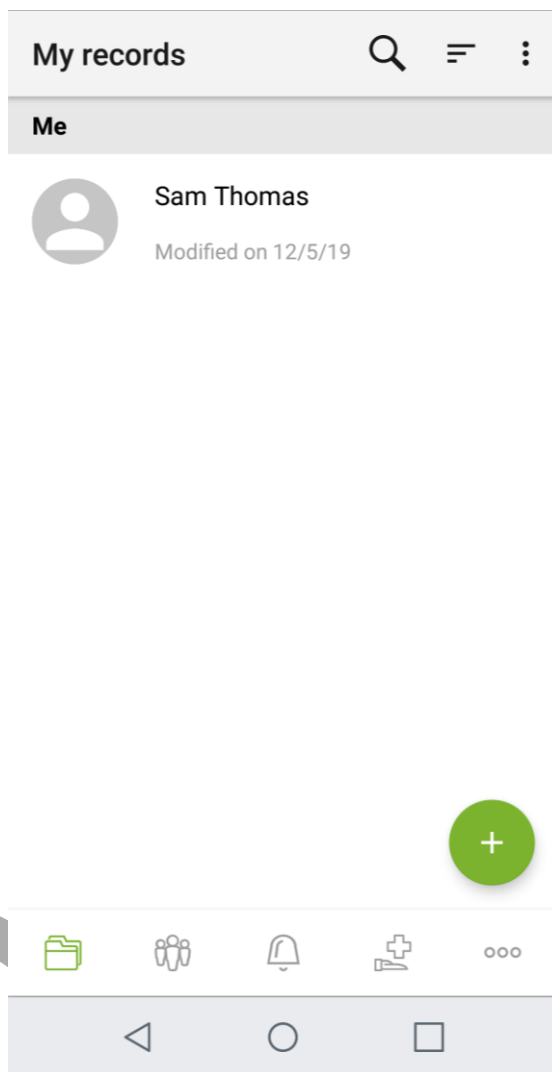
The image shows a mobile application interface for registration. At the top, there is a logo with four colorful circles (yellow, green, blue, red) and the text "Andaman7". Below the logo is a green square icon with a white right-pointing arrow. The title "Register" is centered. The form contains five input fields: "First name" (with a person icon), "Last name", "Gender" (with a dropdown arrow), "Country" (with a location pin icon and a dropdown arrow), and "Town". At the bottom of the form is a checkbox labeled "Subscribe to newsletter". The entire form is set against a white background with a black border. Below the form is a grey bar with three icons: a back arrow, a circle, and a square.

*Figure 4 – personal information registration screen*

- The registration is almost complete. For this demonstration version, your email is automatically validated, you just need to press the next button.

You're now connected to the application. Here is the first screen of the application. This screen lists all the records of your account. The only record in the list for now is your personal EHR, that was automatically created for you when you registered to the app.

NB: You can create new records for other people such as your patients or your children, for example, by clicking on the add button in the bottom right of the screen. But this is out of the scope of InteropEHRate.



*Figure 5 - list of records screen*

- Click on your name to access your PHR, you will arrive in the sections' screen. All the data types that you can record in the app are sorted by categories, in order to quickly find what you want. Start exploring the app, and maybe try to fill in a few information.

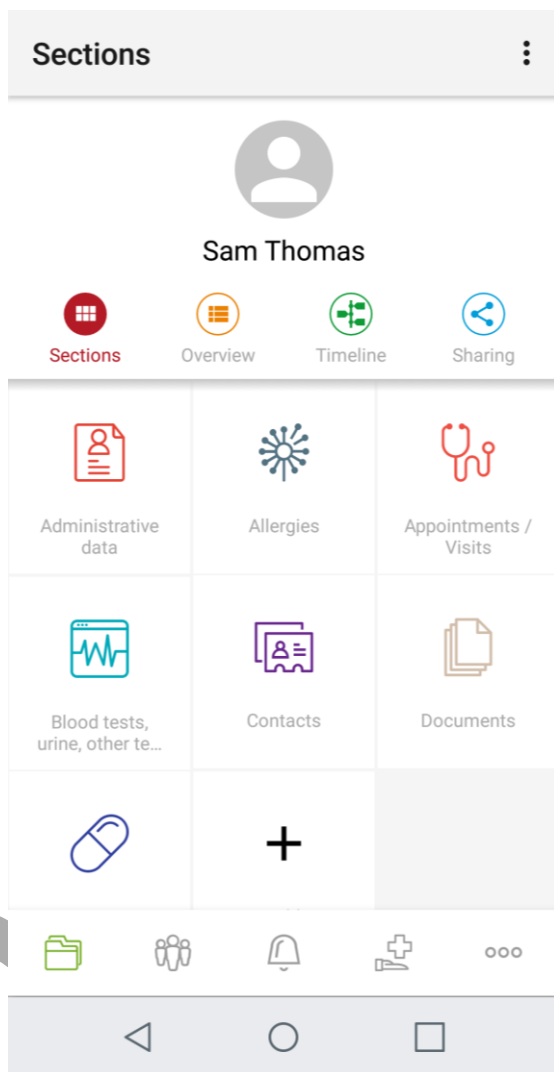


Figure 6 - sections screen

### 3.2.3. Scenario 1: Medical Visit

#### 3.2.3.1. Import a sample of an EHR (using the remote to device protocol features)

The following steps require an Internet connection. Make sure you are connected to the Internet before continuing.

- Go into the service screen (represented by a cross above a hand icon, in the bottom menu) and look into the self-service section after the service called “InteropEHRate Demo”. You can scroll down the screen or use the search feature at the top right of the screen (represented by the magnifying glass icon).

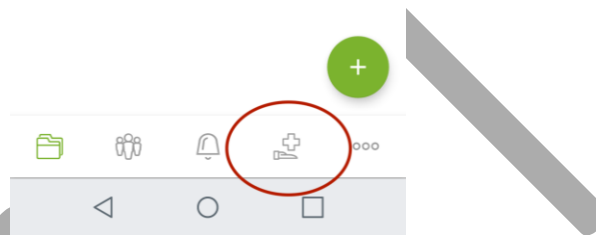
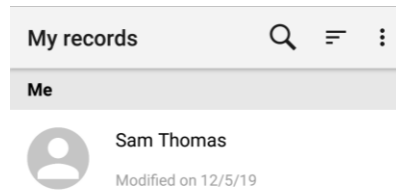


Figure 7 - "services" tab

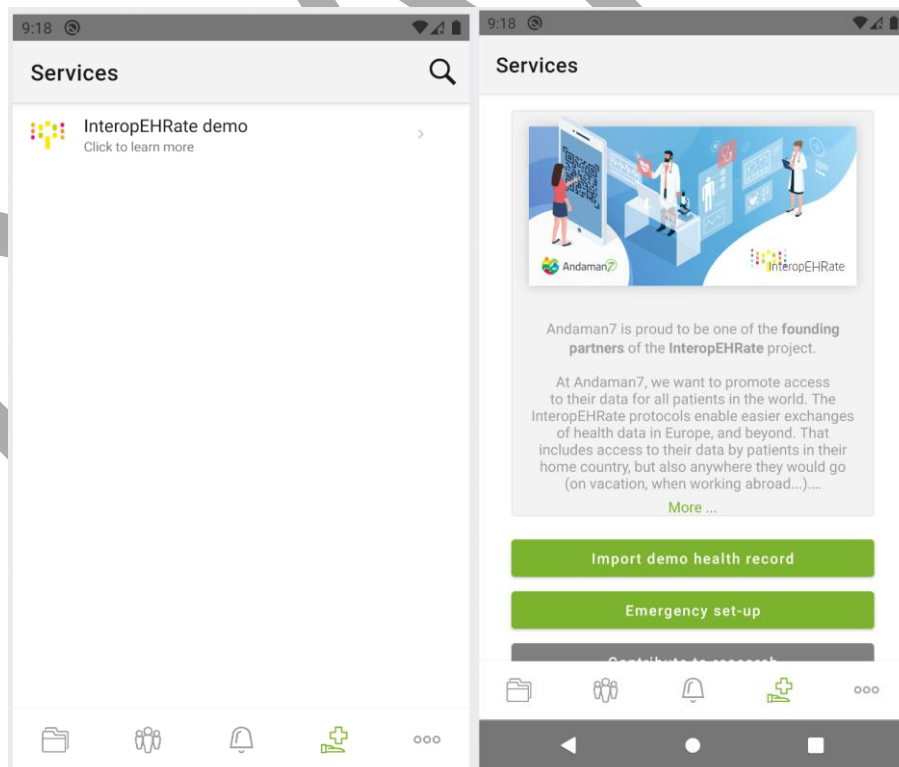


Figure 8&9 - "services" screen

- Click on the "InteropEHRate Demo" service. Then select the button "Import demo health record" to start the process.



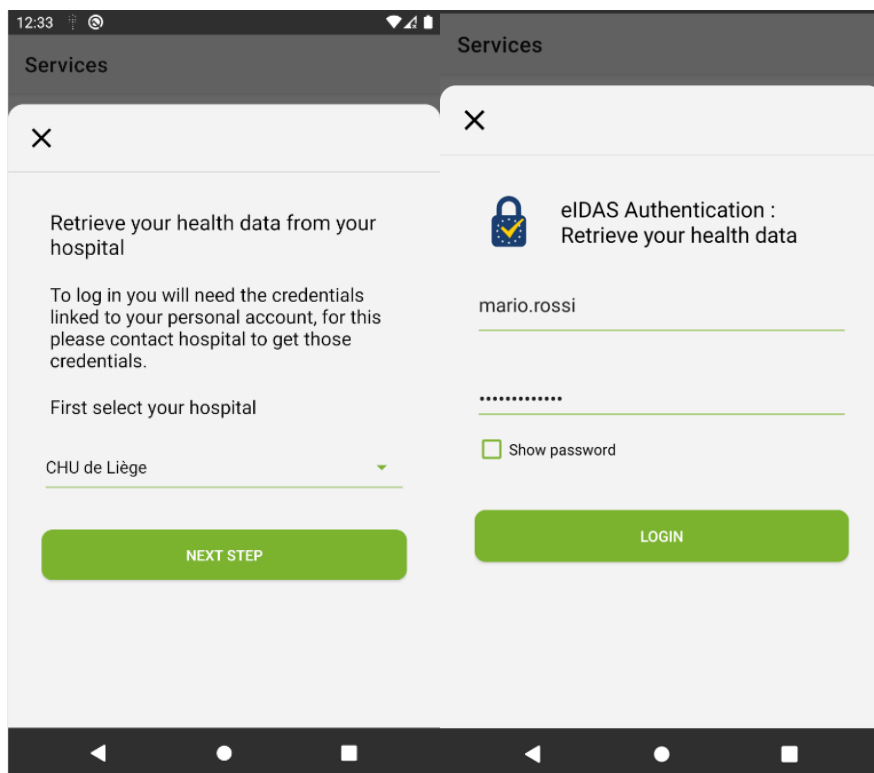


Figure 10 - "services" screen

- For first, select from which hospital you want to retrieve your health data. Then, after entering your credential and click on "Login", you will retrieve your health data. At this stage of development, the demo can only access a fake demo record, this is why the credentials are prefilled. At the end, the citizen will need to identify him/herself for real. But not to do it is still under discussion.

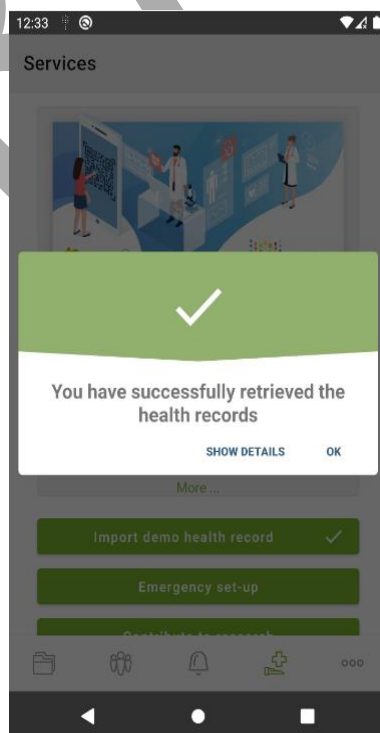
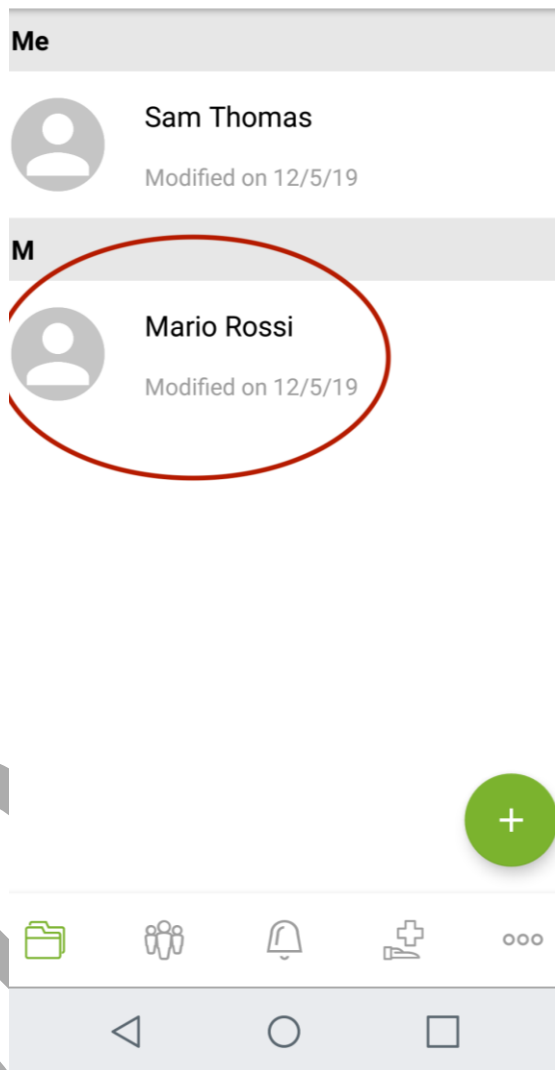


Figure 10 - confirmation of the demo record successful download

Now that the “InteropEHRate Demo” service is activated, a new record with the name of the demo patient, called “Mario Rossi”, has been added to your list of records. To access the list of records, click the folder icon in the left of the bottom menu.



*Figure 11 -InteropEHRate demo record*

This record of “Mario Rossi” contains data retrieved via the R2D protocol.



*Figure 12 - allergies section of InteropEHRate demo record*

- If you now go back to the services screen, you will see a green check mark next to the “InteropEHRate Demo” service, indicating that you are “registered” to the service (in this case, it means you have downloaded the sample EHR via the R2D protocol).



*Figure 13 - InteropEHRate demo service active*

Execute the same action to revert the whole process (the sample EHR will be removed from your application). This part (the import of sample EHR) being currently intended as a demo, since it is not the personal EHR of the user that is actually downloaded, the service can be activated/deactivated as many times as you want, without limitation.

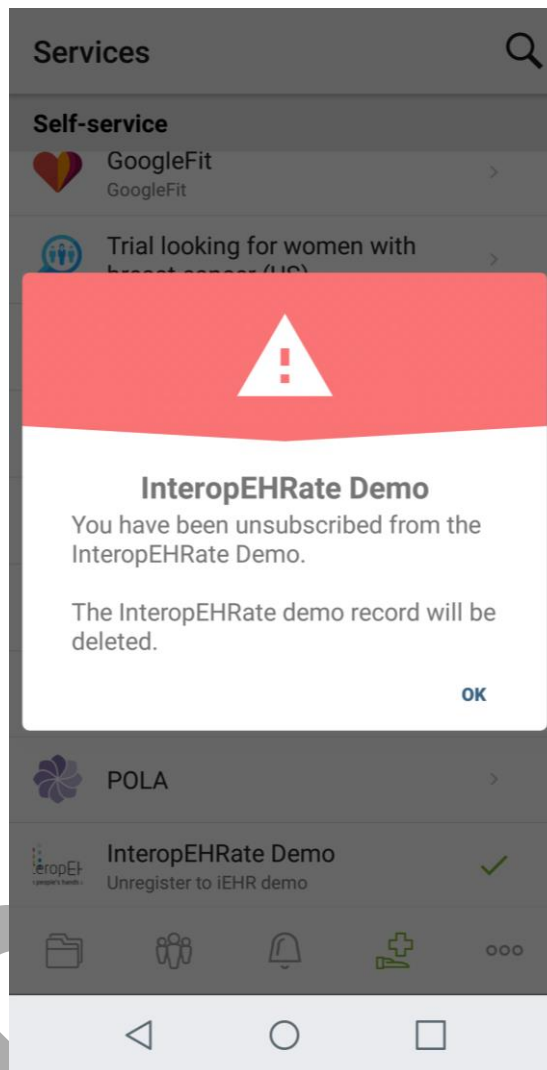


Figure 14 - InteropEHRate demo un-subscription

### 3.2.3.2. *Share data from the sample EHR to the HCP app (using the device to device protocol features)*

To be able to test the local sharing of data via the device to device protocol related features, you need to be registered to the “InteropEHRate Demo” service (see the instructions in the previous point). At this stage of the project, the local sharing feature is only available for the data stored in the demo record “Mario Rossi”.

You will also need to have a running HCP application. Refer to the deliverable D5.14 **[D5.14]** for information on how to install it.

- Go into the demo record “Mario Rossi”. In the right of the top menu, click on the “Sharing” icon.

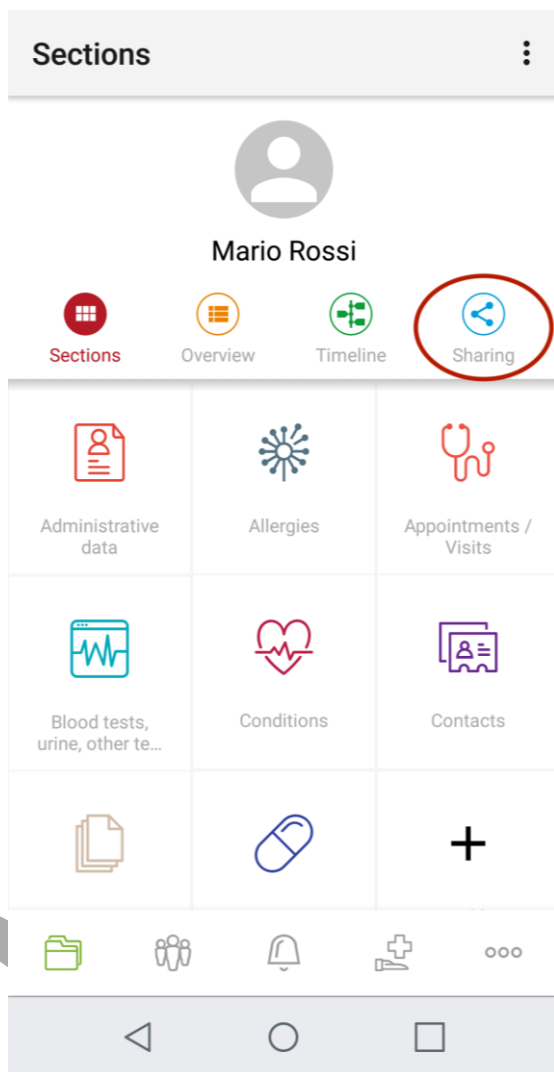


Figure 15 - sharing tab location

In this screen, you can see the information about the bluetooth connection status as well as the information about the sharing status.

- To start the sharing workflow, press the button “Start local sharing”. If your bluetooth is not enabled, the application will ask you to turn it on (click on “Allow”).

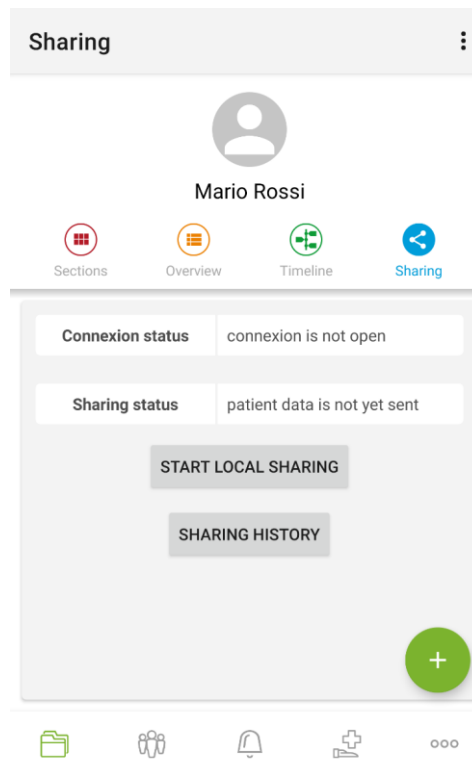
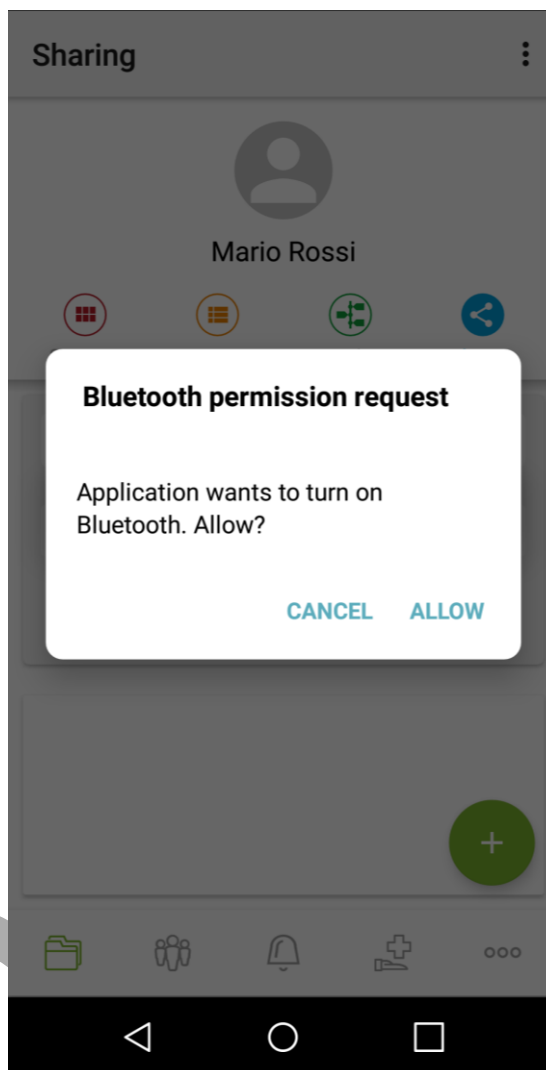


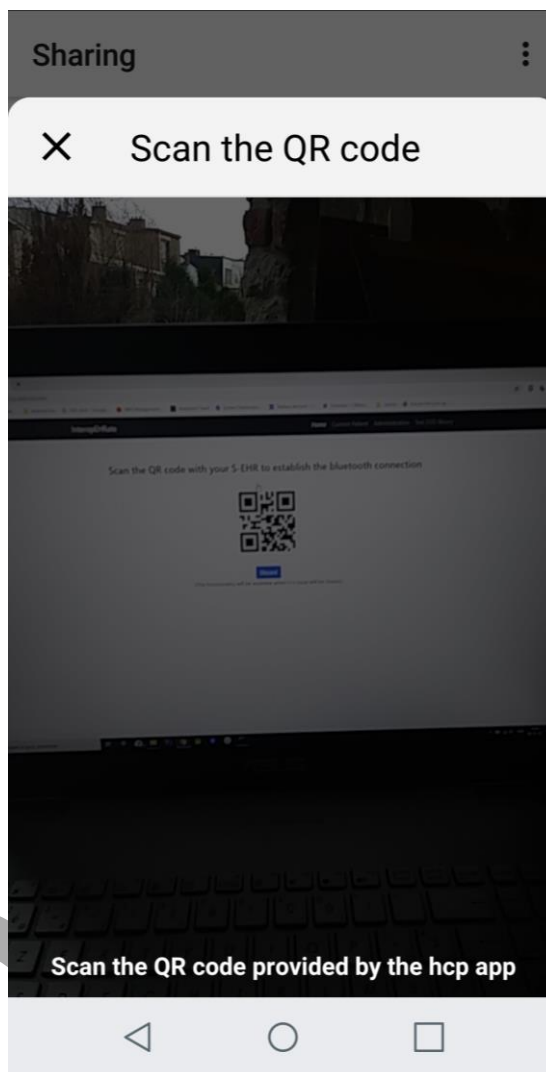
Figure 16 - D2D local sharing screen



*Figure 17 - bluetooth permission request*

- You should now see the QR code scanning screen. If it's the first time you open it, the application will ask your permission to access the device camera. This screen is used to start the connection with the HCP application. To start the connection, scan the QR code provided by the HCP application. The loading phase will end when the HCP application accepts the connection.





*Figure 18 - D2D local sharing scanner*

- Once the connection is accepted by the two parts (the citizen and the HCP), each one will see the personal information about the other one. On the mobile side, you will see the name of the HCP, his/her specialization and the hospital address. Double check that this information corresponds to the HCP in front of you and if so, click on "Continue".

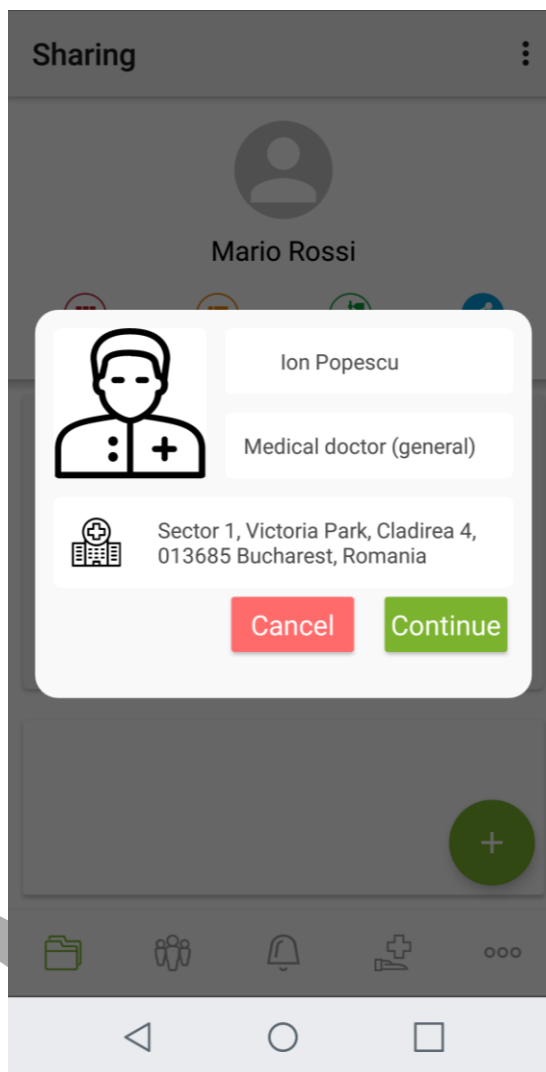


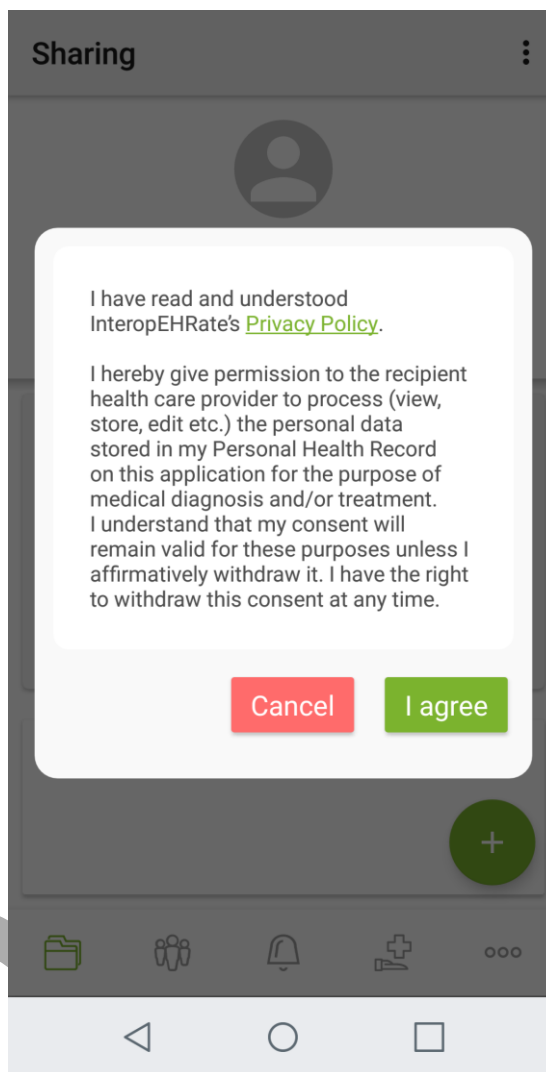
Figure 19 – D2D HCP information display

- Read the consent.

“I have read and understood InteropEHRate’s Privacy Policy.

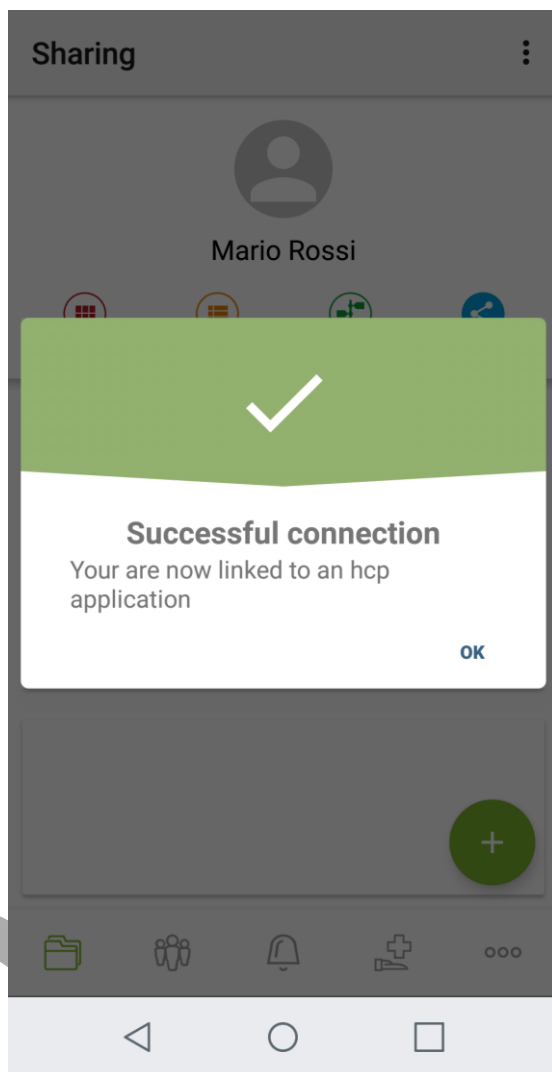
I hereby give permission to the recipient health care provider to process (view, store, edit etc.) the personal data stored in my Personal Health Record on this application for the purpose of medical diagnosis and/or treatment. I understand that my consent will remain valid for these purposes unless I affirmatively withdraw it. I have the right to withdraw this consent at any time.”.

If you accept the consent, click “I agree” to continue.



*Figure 20 - D2D informed consent*

Once you give your consent, the data of the InteropEHRate demo record of Mario Rossi will be shared to the HCP application. You can see that the connection status has changed and is now open.



*Figure 21 - D2D confirmation of bluetooth connection success*

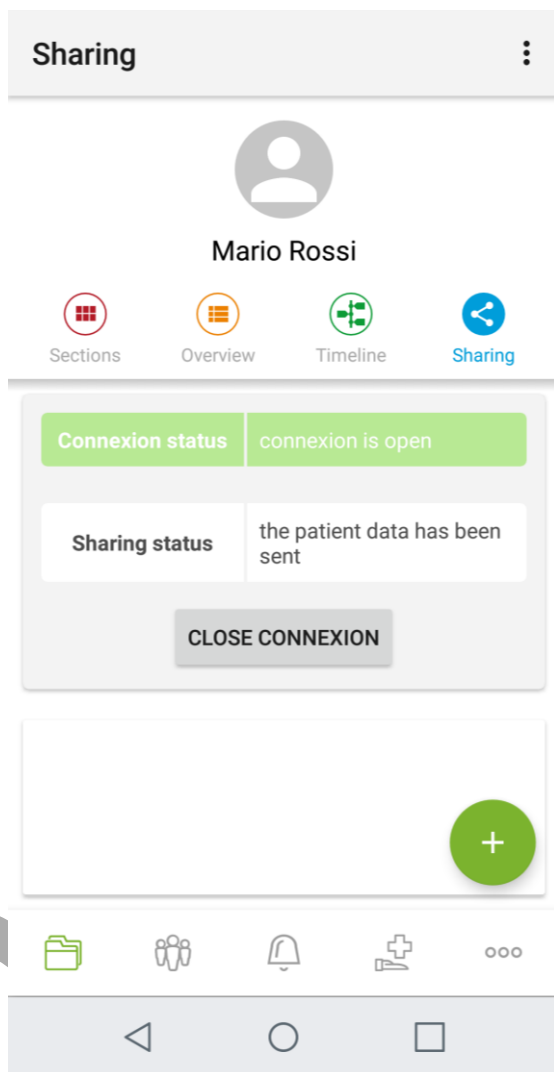


Figure 22 - D2D local sharing status

#### 3.1.1.1. Consult the log sharing information

The consultation of the log sharing for the citizen has been separated into two different User Interfaces:

- Logs sharing list screen: lists all the exchanges that a citizen has had via functionalities available in the InteropEHRate project. For now each row of the list summaries an exchange with:
  - the name of the party that received/sent data;
  - the type of exchange (sending/reception/both);
  - list of data types involved in exchange;
  - date of exchange.
- Log sharing detail: it groups together the same information as on the previous screen, with the addition of a more detailed view of the data used for the exchange.

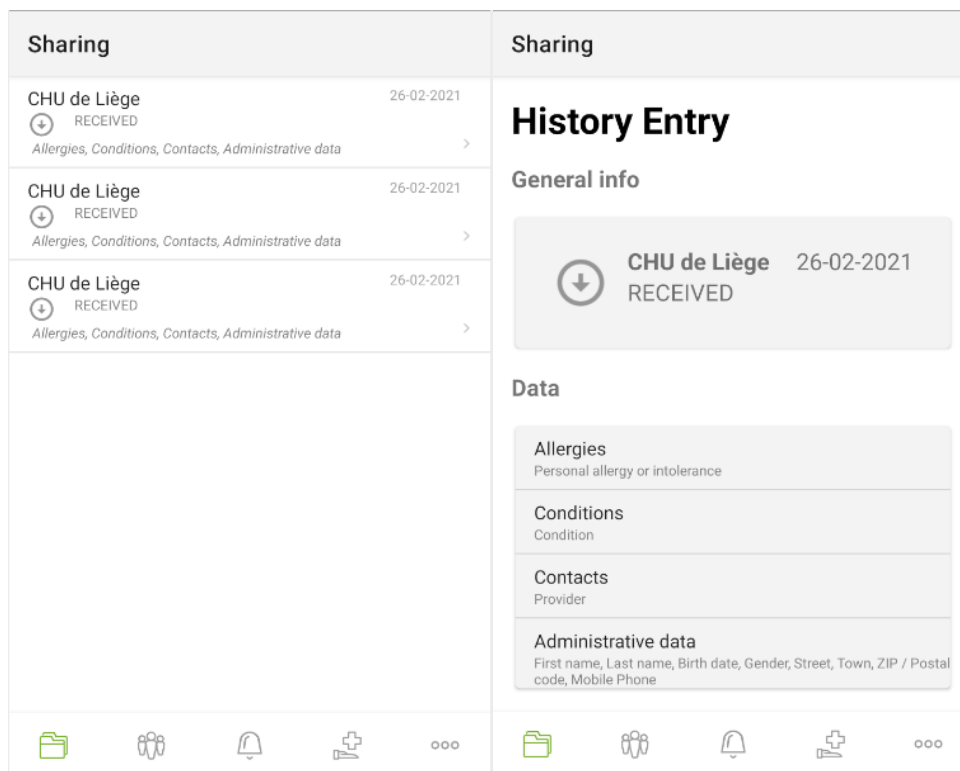


Figure 23 - sharing log consultation

### 3.1.2. Scenario 2: Emergency

The emergency scenario has been designed to allow an authorised partner to access the citizen's health data if the citizen is unable to provide access on his own.

To solve this, citizens can store their health data on a cloud platform (compatible with the InteropEHRate protocol) which allows the addition of two new functionalities:

- Back up the data on an external platform, so that it can be easily retrieved if the user has to change devices;
- Allow an authorised partner to access the citizen's health data in an emergency, even if the citizen is not capable of using the mobile application.

These functionalities are accessible by clicking on “Emergency set-up” in the InteropEHRate service screen.

#### 3.1.2.1. Registration to the InteropEHRate cloud service

If the citizen does not have an account, he or she can create one directly from the mobile application. For the pilot, only one cloud is available. But citizens will be able to choose on which cloud they wish to store their data. For this cloud, the password should contain numbers and letters. But afterwards, this restriction will depend on the cloud chosen.

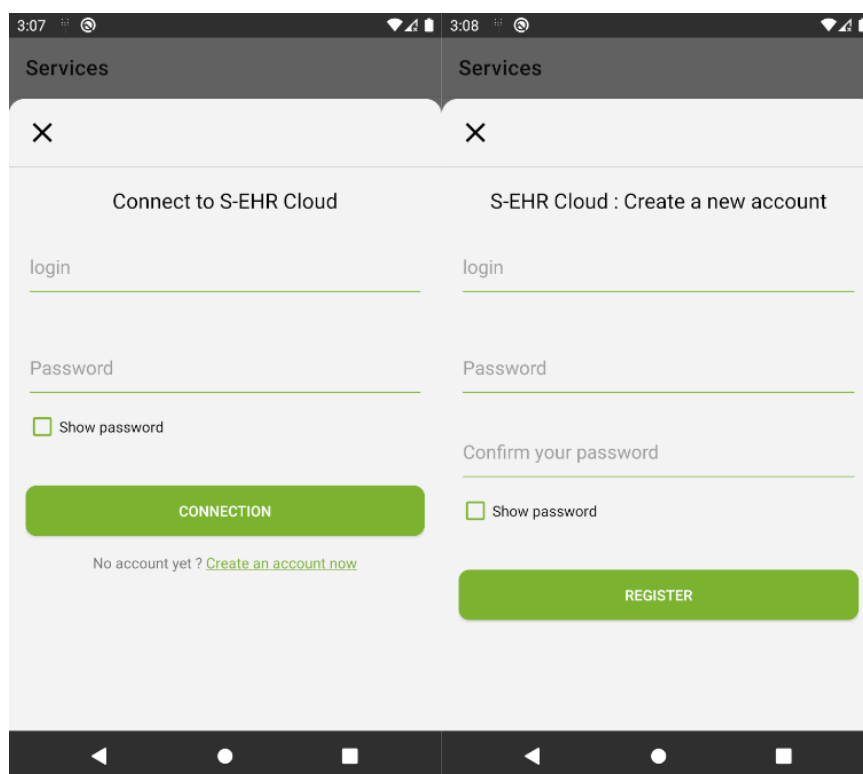


Figure 24 - R2D Backup account creation

#### 3.1.2.2. Login to the InteropEHRate cloud service

The citizen uses his/her credential to connect his/her S-EHR application with the cloud. Once the citizen is connected, all the data already stored on the cloud will be retrieved and saved on the S-EHR app. the S-EHR app will update automatically.

As long as the citizen is connected to the cloud, every change to the data will be reflected in the cloud. Thus, enabling the information stored in the cloud to be kept up to date. This functionality requires the use of the network, this update will only take place when the user is connected to the internet (each modification made outside the network will be processed the next time the user connects).

#### 3.1.2.3. Disconnect from the InteropEHRate cloud service

The citizen can disconnect from the cloud service at any time by returning to the InteropEHRate service page. Clicking on "Emergency set-up" brings him/her to a summary page of the service. By pressing the "Disconnect" button, the citizen disconnects from the service. This means that future updates of health data will no longer be passed on to the cloud, but data already present in the cloud will not be deleted.

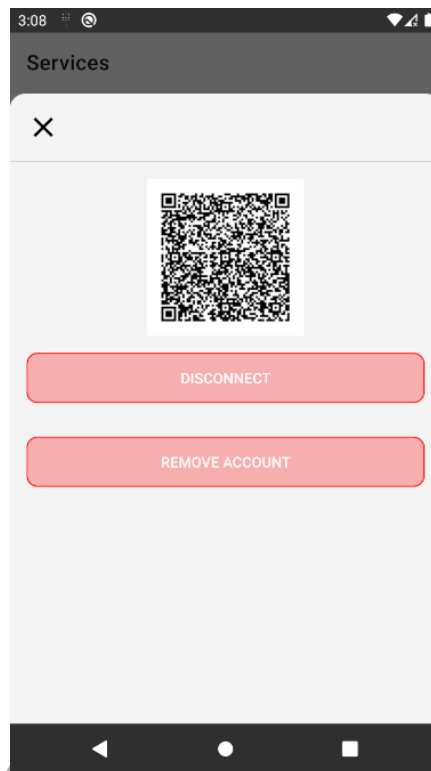


Figure 25 - R2D Backup detail screen

#### 3.1.2.4. Delete account from InteropEHRate cloud service

The button “Remove account” from the same interface provides the citizen the possibility to disconnect from the cloud, but also to totally clear the data on the cloud concerning his account, that means that the data and the account will be erased.

### 3.1.3. Scenario 3: Research

The research scenario has been designed to easily collect data of citizen matching study inclusion criteria. Only working for citizens that accept to be part of the research network.

Below are listed the steps for the research scenario (citizen side):

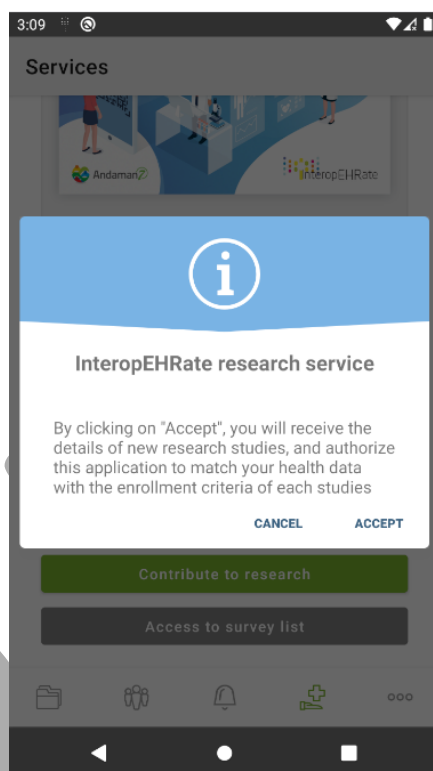
- The citizen accepts to be part of the research network;
- The S-EHR App receives a document that defines a study (inclusion/exclusion criteria, data to be collected, author of the study, ...);
- If the citizen matches the criteria, the citizen can choose to participate in the study or not;
- If the citizen accepts, his health data saved on his app will be collected and sent to a reference research center periodically.

At any time the citizen can choose to withdraw from a study, or withdraw from the research network.



### *3.1.3.1.Be part of the InteropEHRate open research network*

The citizen can register to the research by clicking on the button “Contribute to research” on the InteropEHRate demo service screen, once the citizen clicks on it, a dialog is displayed with the possibility to accept or refuse to be part of the research network. If the citizen accepts, and until he/she withdraws from the research, the S-EHR app will check periodically if there are new studies to be processed for the citizen. If it is the case, the S-EHR app will also check if the citizen’s health data matches with inclusion/exclusions criteria of each study.



*Figure 26 - research network option dialog*

### *3.1.3.2.Withdraw from the InteropEHRate open research network*

By clicking on the same button on the InteropEHRate demo service screen, the citizen will not be able to withdraw from the research network.

### *3.1.3.3.Consult the list of received invitations to research studies*

The citizen can show all the studies he/she participates/can participate by clicking on “Access to survey list”. For each study is displayed:

- Name of the study;
- Short description of the study;
- Starting date of the study.

By clicking on a study the citizen can participate, a dialog with more information about the study will be displayed, with two option:

- Cancel: to go back to the studies list screen.
- Accept: start registration process for this study.

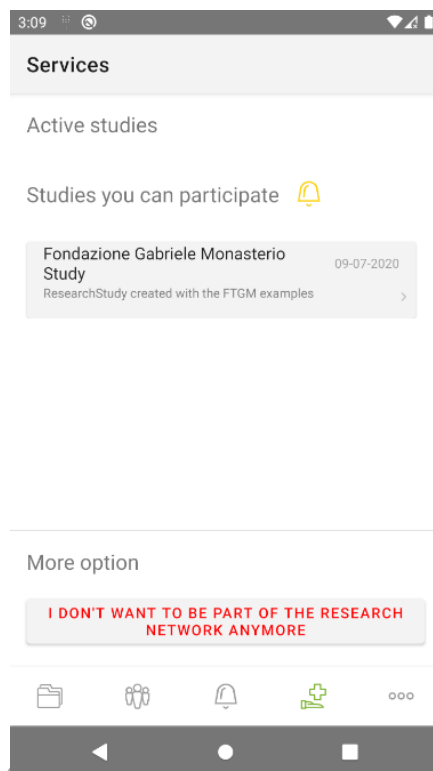


Figure 27 - Studies list

## REFERENCES

- [1] **[D6.2]** InteropEHRate Consortium, D6.2-Software requirements and architecture specification of a S-EHR - V2, 2020. [www.interopehrate.eu/resources/#dels](http://www.interopehrate.eu/resources/#dels)
- [2] **[D6.5]** InteropEHRate Consortium, D6.5-Design of a S-EHR mobile app - V2, 2020. [www.interopehrate.eu/resources/#dels](http://www.interopehrate.eu/resources/#dels)
- [3] **[D5.14]** InteropEHRate Consortium, D5.14-HCP Web app - V2, 2020. [www.interopehrate.eu/resources/#dels](http://www.interopehrate.eu/resources/#dels)

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