SAFE LIVE

SPECIFICATIONS

V.1

SUMMARY

A. GLOBAL OVERVIEW

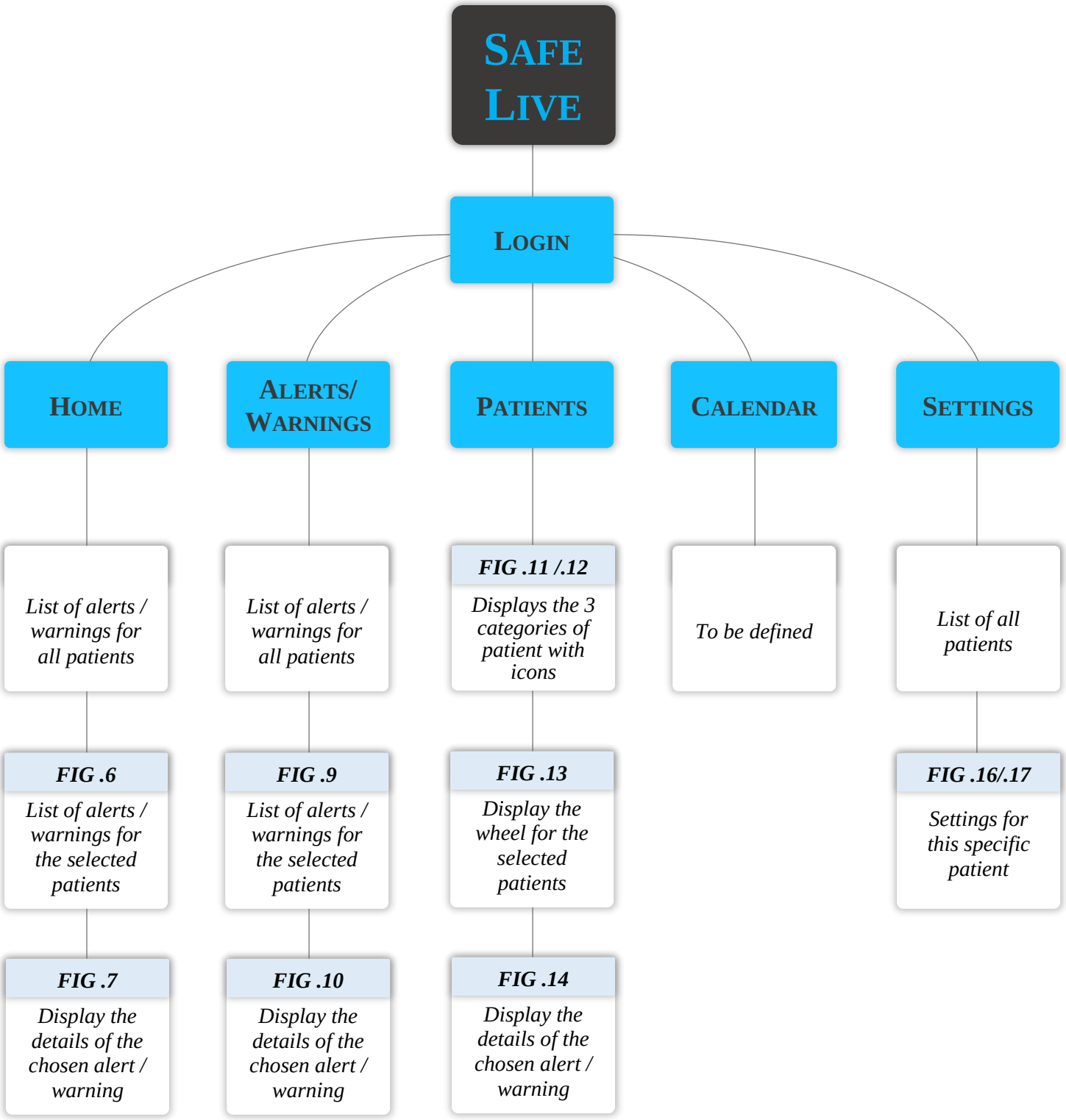


FIGURE 1: *GLOBAL OVERVIEW OF THE APP STRUCTURE*

GLOSSARY

- **Sensor:** physical sensor providing information on the Resident's status.
- **Resident:** person living assisted in a nursing home, under the responsibility of one or several nurses.
- **Location:** provides information on the resident's location as well as his current status according to the sensor readings. Enables staff to determine path till resident, in case his outside the premises.

DATABASE STRUCTURE

A patient can be associated to several nurses, therefore the recording of a nurse in the database contains only a pointer to a patient's ID.

The patient ID is unique, as the nurse's id.

Nurse table:
PsEudo random generated value <ID>
STRING <First Name>
STRING <Last Name>
Photo
Nursing Home
Address of Nursing home
Role
Number of patients (integer)
Array including ids of patients PAtientsIDs
Patient table
ID card (table): ID (long float), photo, first name, last name, address (room number), nursing home
SENSCNTXTDATA (table): <Sensor, Values>
Anomalies (table): <AnomalyType, Values, Timestamp>

CREATE TABLE SensCntxtData (id INTEGER PRIMARY KEY AUTOINCREMENT, timestamp DATETIME DEFAULT (DATETIME('now','localtime')), name TEXT, value TEXT);

Please consider the table as the table associated with one sensor. For each of the sensors you will have data as the one already provided in the sample file on the drive. Please find herein another sample of sensor data:

6|2016-01-13 10:53:20|com.Timestamp=46918279299639
innerTimestampDisplay=2016-01-13 10:53:20
type=1
values=[-2.220622
2.2780828
8.069656]

Example of Query for GENERATING the Home screen:

SQL QUERY: FOR NURSEID, FIND IN PATIENTSIDS, LIST OF ALERTS (QUERY ON SPECIFIC ALERTS, COUNT NUMBER OF ALERTS)

B. GENERAL INTERACTIONS

APP LAUNCH AND FIRST SCREEN DISPLAYED

FIGURE 2: *GLOBAL OVERVIEW OF THE APP STRUCTURE*

As illustrated in Fig.2, the user will launch the app by clicking on the Safe Live's icon.
After entering his credentials ("*Email*" and "*Password*") he will directly be sent to the home screen.

NAVIGATION THROUGHOUT THE APPLICATION'S STRUCTURE

At all time the user will have the possibility to display the menu. As illustrated with Fig.3, the menu icon will be the default icon as specified in the google material design. Once the user has clicked this icon, a slider menu appears. This menu will be the only mean to access the different parts of the application (As illustrated in Fig.1).

If the device on which the application is running, doesn't have physical buttons dedicated for the navigation, the default android footer (as pictured below with Fig.4) will be used.

C. USABILITY

TUTORIAL

Video or step by step app presentation

ICONS

Below are listed every icons used at this stage:

History of alerts

Sound alerts

Heart rate

Heart rate alerts

Activity

Use SafeLiveApp existing logo

Location (map)

Respiratory risks (not in pilot version)

Oximetry (not in pilot version)

Temperature (not in pilot version)

Blood Glucose (not in pilot version)

Blood pressure (not in pilot version)

Sleep (not in the pilot first pahse)

COLOR AND FONT

No color has been strictly defined. This will be left to the designer appreciations.
Here are listed all colors currently used in the mockups and wireframes:

#03A9F4 #0288D1 #FAFAFA #68DFA1 #F9C02D #D43E52

Regarding the font, in all mockups, “Roboto” has been used. This font can be freely downloaded on the google material design guideline. However the designer is free to use any font he may think will be a great fit for this application.

CURRENT SCREENS

In this document some screens and wireframes will be presented.
All screens will be listed in a separate document.

USABILITY

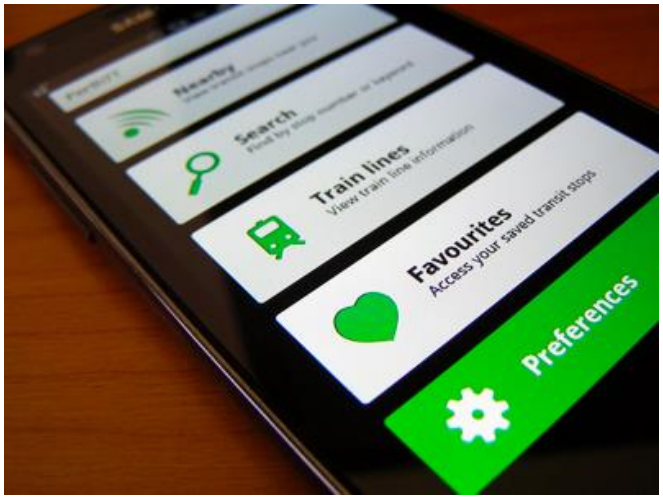
This application is intended for nurses, affiliated healthcare personnel, with a simplified version intended for patients/ regular people.
Therefore a high focus should be putted on usability. This will take the following form:

- When actions are required by the user, the area of selection should be large enough;
- The size of the text elements should be easily readable;
- The font chosen should be easily readable;
- Ensure that the lightness contrast between foreground and background colors is high;
- Ensure to use white spaces in order to improve the overall comprehension;

D. STRUCTURE DETAILED

1. SPLASHSCREEN

This screen will be redesigned. No changes from the functionality point of view. It needs to allow a fast access to all the main screens/functionalities provided by the application. Some potential examples of such a screen are listed below (only to serve as a broad guide and not to be taken necessarily as such):



At the same time, this screen needs to offer a one-glance overall view of the most important data/information, either alerts or warnings (overall status of the patients).

Structure like in the first image, using the same content as in the menu, with the preceding icons used for Home, Alerts, Patients and Settings. TO start with use classical material design icons, followed by menu item and short explanation, on the form:

Icon, MenuItemName
MenuItem Description

2. LOGIN

This screen will be redesigned. No changes from the functionality point of view. The current screen can be seen at page XX. However at a later stage, the following functionalities will be added:

- Create an account;
- Retrieve a password;
- Add status (Nurse/Patients).

3. MENU

The menu is divided into 4 sub-menu items which are the following:

- Home;
- Alerts;
- Patients;
- Calendar; (not in pilot version)
- Settings.

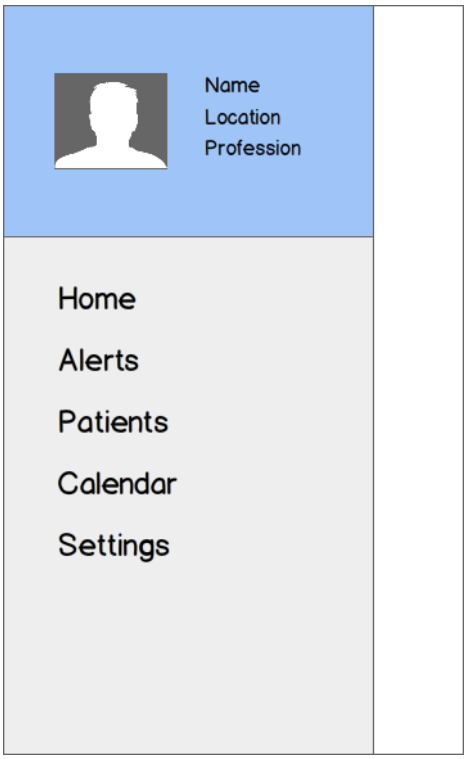


FIG 3

The menu should respect the style as defined by the material design trends.

3. HOME

The home screen is seen as a dashboard.

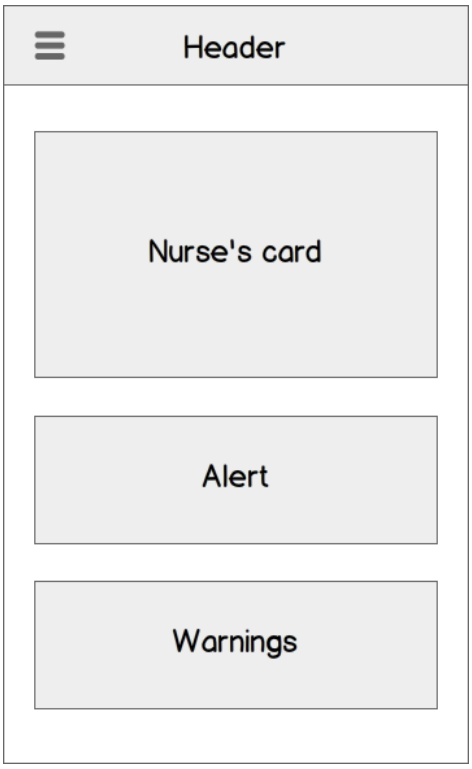


FIG 4

This figure illustrates the default view of the "Home" screen. Once logged-in, the user is directly sent to this screen. The nurse card includes the following information:

- Photo
- Name
- Location (e.g. nursing home)
- Profession

The default state for the "Alert" card is the name of the card, followed by the current number of active alerts; a row of pictograms will appear right below, showing the type of alert (heart, respiratory, etc.), only visible in this type a view. When tapped, the card expands and displays the alerts for all the residents the nurse is attending to, See Fig 4.

The default state for the "Warning" card is the name of the card, followed by the current number of warnings. When tapped, the card expands and displays all active warnings for all the residents assigned to the nurse. See Fig 4.

FIG 5

Once the user selects one of the two expendable cards ("Alerts" and/or "Warnings"), the card expands.

The content of the card will respect the following:

- On the left side, a picture of the patient
- On the right side, those information must be present:
    - 1st row - name of the patient,
    - 2nd row - type of alert / warning
    - 3rd row - timestamp

Alert and warning can be dismissed by sliding them toward the right side.

When user clicks on an alert or warning, a new screen appears that will provides detailed information on this event.

a. HOME – LIST OF ALL ALERT / WARNING

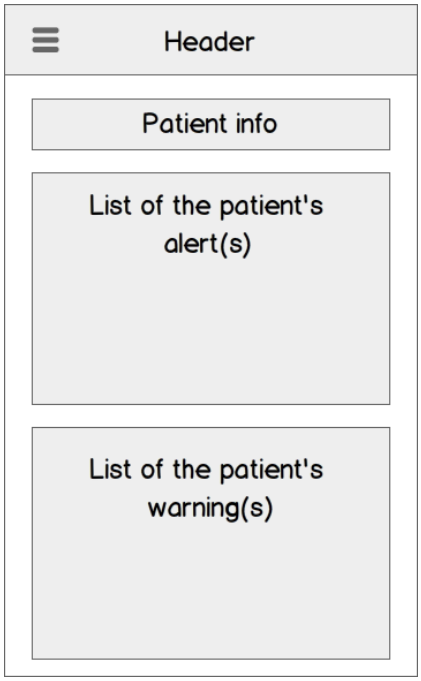


FIG 6

A list of all the alerts / warnings **for the selected patient** should be displayed.

Those alerts and warnings will be clearly divided into to two categories. Each category will present the data in a chronological order (from the most recent to the oldest).

By selecting one of the listed alert/warning, the user will be sent to a new screen where this element will be more detailed.

b. HOME – DETAILED ALERT / WARNING

FIG 7

This screen will focus one a specific patient's alert that has been previously selected by the nurse.

- **The first element** should be the picture of the patient, his name and his location within the building.
- **The second element** is the alert itself. Depending on the type of alert (and therefore the sensor) this element will change. Please refer to the Annex for an exhaustive list of those sensors.
- **The third element** is a history of alert for this patient.

4. ALERTS / WARNINGS – LIST FOR ALL PATIENTS

FIG 8

Once the user selects one of the two expendable cards ("Alerts" and/or "Warnings"), the card expands.

The content of the card will respect the following:

- On the left side, a picture of the patient
- On the right side, those information must be present:
    - 1st row - name of the patient,
    - 2nd row - type of alert / warning
    - 3rd row - timestamp

Alert and warning can be dismissed by sliding them toward the right side.

When user clicks on an alert or warning, a new screen appears that will provides detailed information on this event.

a. ALERTS / WARNINGS – LIST FOR THE SELECTED PATIENT

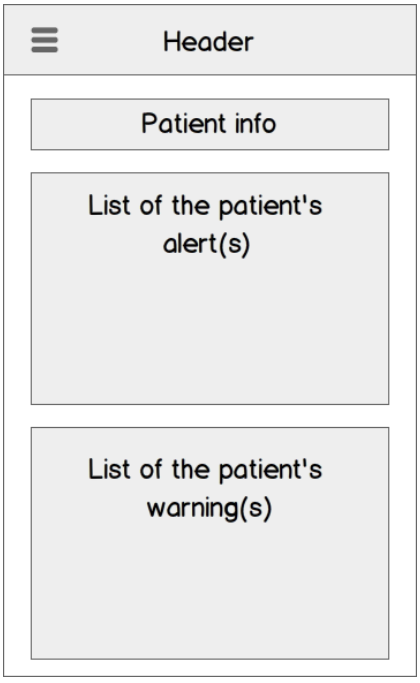


FIG 9

A list of all the alerts / warnings **for the selected patient** should be displayed.

Those alerts and warnings will be clearly divided into to two categories. Each category will present the data in a chronological order (from the most recent to the oldest).

By selecting one of the listed alert/warning, the user will be sent to a new screen where this element will be more detailed.

b. ALERTS / WARNINGS – DETAILED VIEW OF THE EVENT

FIG 10

This screen will focus one a specific patient's alert that has been previously selected by the nurse.

- **The first element** should be the picture of the patient, his name and his location within the building.
- **The second element** is the alert itself. Depending on the type of alert (and therefore the sensor) this element will change. Please refer to the Annext for an exhaustive list of those sensors.
- **The third element** is a history of alert for this patient.

5. PATIENTS

This screen displays all the patients that are assigned to the user. 3 categories are present:

- High risk residents;
- Regular resident;
- Remote /assisted persons;

This categories are mutually exclusive, one patient can only belong to one of them.
Every patient must be listed under one of this three categories.

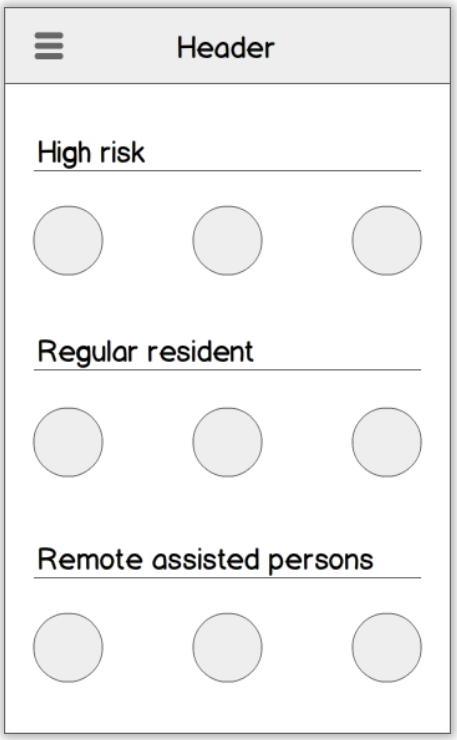


FIG 11

This figure illustrates the list of patients.
The first element to be displayed is the name of the patient.
The second element is the patient's picture, rounded and circled by a color circle. The color of the circle will vary depending on the patient's status. Those colors are:

- **Green:** The patient is fine
- **Yellow:** the patient has a warning
- **Red:** the patient has an alert

The final elements are icons for alerts and warnings, and their number of occurrence. Alert's icons and / or warning's icons only appear if the patient had an alert / warning.

This elements will be presented in the next figures.

FIG 12

This figure illustrates the type of information requested in Fig.XX. As represented, the name of the patient with alerts and warnings should displayed.

Alert icons and warnings, preceded by the number of time those events have been counted ,must be present.

a. PATIENTS - WHEEL

When the user clicks on a patient's picture, a new screen appears.
This screen should present the following information:

- Name of the patient
- Picture of the patient
- Location of the patient within the building (i.e.: "*Wing B – Room 26*")
- The wheel (will be detailed in the next section)

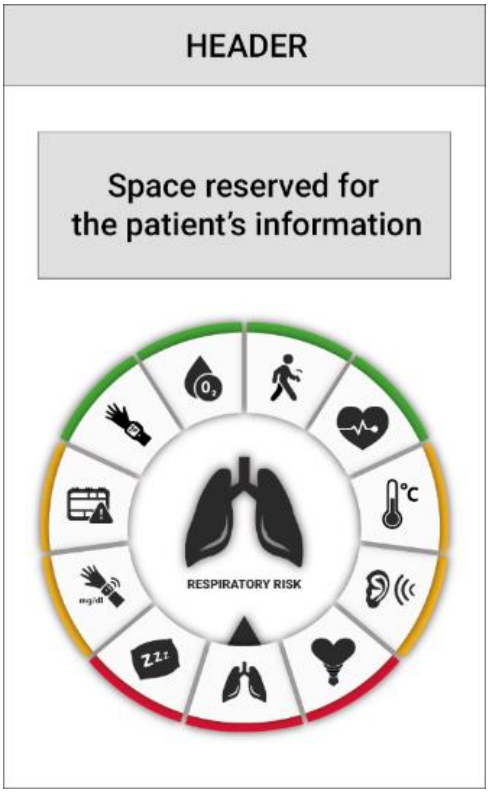


FIG 13

This figure illustrates the type of information requested for this screen. As represented, a space will be dedicated for the patient's information.

Right after, a visual illustration of all sensor
The wheel is seen as means of representing on which category the event belongs. Every category will have a color (green, yellow or red) that will depend on the patient status for that particular category. The patient's picture should appear in the middle circle.

Important: so far the wheel has been saw as the best way of displaying at glance the entire resident's information. The designer will have the choice to either retake and fine tune

b. PATIENTS – DETAILS FOR THE SELECTED SENSOR

FIG 14

This screen will focus one a specific patient's alert that has been previously selected by the nurse.

The first element should be the picture of the patient, his name and his location within the building.

The second element is the alert itself. Depending on the type of alert (and therefore the sensor) this element will change. Please refer to the Annex of this document for an exhaustive list of those sensors.

The third element is a history of alert for this patient.

6. CALENDAR

This feature has to be discussed and approved before being elaborated.

7. SETTINGS – PATIENT SELECTION

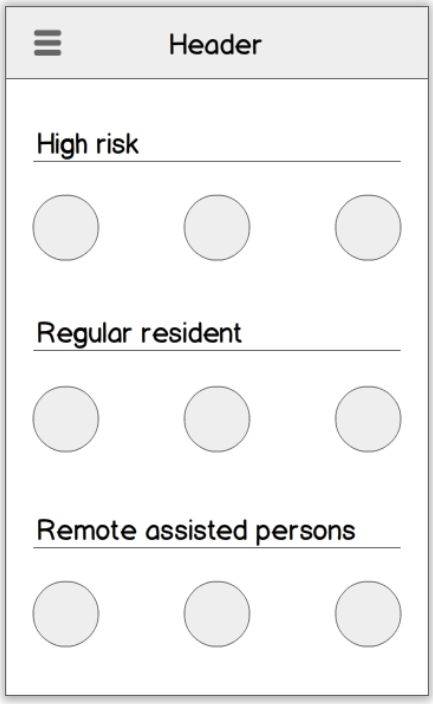


FIG 15

Settings are set per resident. Therefore the first screen to appear when the user clicks on "settings" is a list of all his assigned residents.

Unlike the list of patients displayed with Fig.XX, icons for alerts and warnings will be removed.

When the user has selected one resident, the screen for settings the resident's parameters appears.

a. SETTINGS – PARAMETERS

Once the user has selected one patient, a new screen appears where he can set 4 type of parameters. Those parameters are grouped into 4 main categories, which are the following:

- Regular behavior
- Set alert
- Set warnings
- Contacts

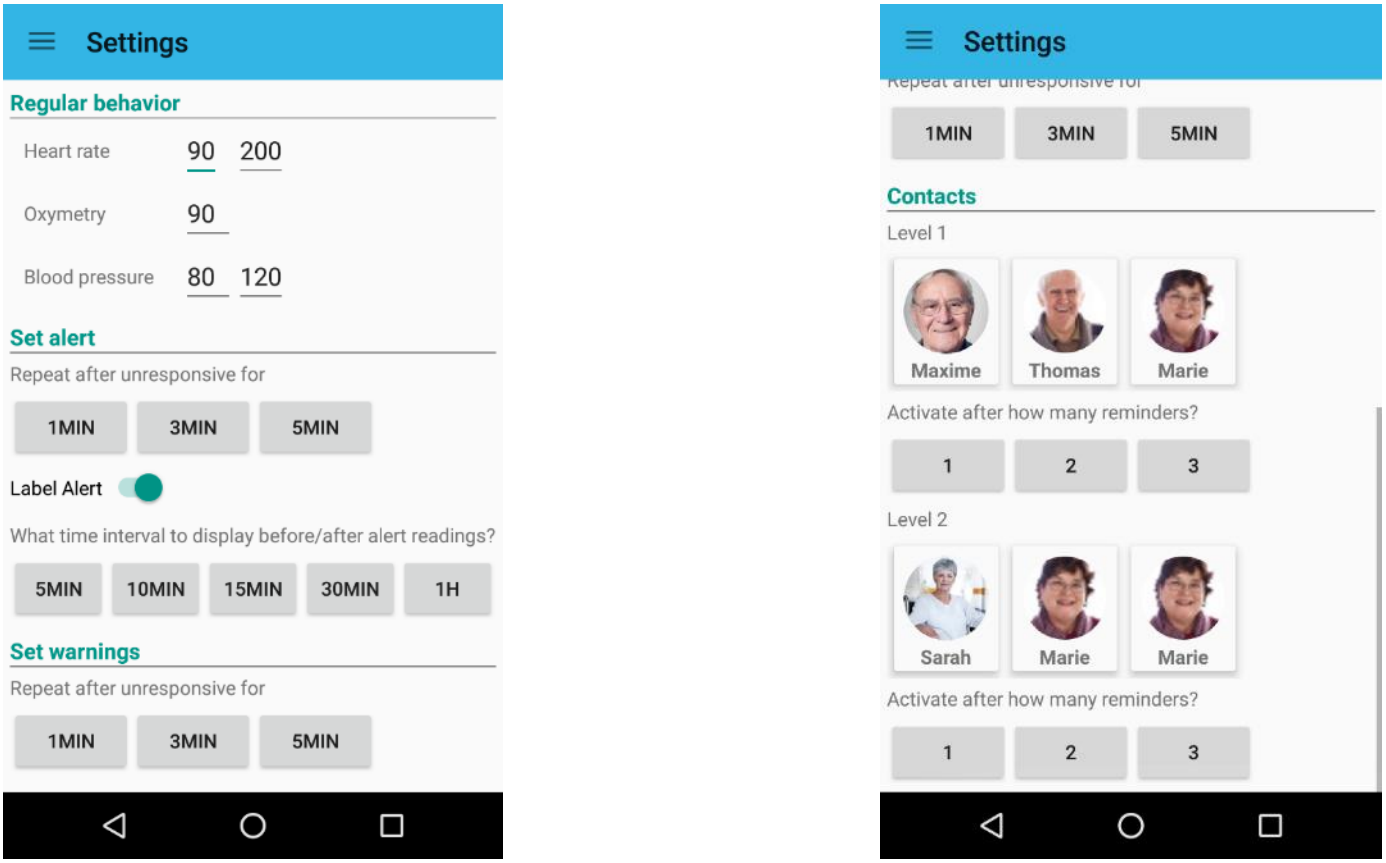


FIGURE 16 - 17: *PARAMETERS*

E. SENSORS

8. Heart rate overview screen

Accessible only when clicking on the icon from the Circle menu and per patient

#Alerts screen becomes Heart rate overview screen

Add patient's circled picture on the top right corner, relatively small but still visible.

Header: Menu history (see Tablet history) (If time allows Menu appearing top with: Last alert | Today |Last week |Last month)

Two graphs (in the style of the audio signal), followed by a list of patient's alerts and warnings . When clicking on an alert/warning this is zoomed into instead of the last alert on the second graph, label changes from "Last alert" to "Alert at <timestamp>" and the alert is showcased in the graph.

List alerts/ warnings

- **Graph 1:** Current status of heart rate, displays in a signal like manner (see audio screen) the following streams:
  - Heart rate sensor data on one stream, no numeric labels on the stream
  - 2 gray horizontal lines (max and min thresholds) for the values
  - A green vertical line static with the current time moment, labeled Now (with additionally the current time, if possible).
  - Green stream like signal labeled "Normal profile"
  - If anomaly=true (create local variable), showcase anomaly on the timeline (take the red zooming graphical element from the audio) and make it appear on a specific place on the signal and move till disappears in the left hand side as time passes by
  -
    - on the Ox axis add timeline with a display of hour every 5 minutes but with ticks every one minute, choose time interval as to fit screen. Ideally the numbers on the timeline should move with the signal dynamically.
    - If this is not possible on Ox axis, just specify time labels as -15 min, -10min, -5 min as ticks and Now for the green vertical line current moment.

Graph 2: Last alert: Zoom on the last alert

Heart rate sensor data on one stream, with numeric labels every one minute, use signal like no linear like graph line

- display on Ox axis, exact time (7h15 to 7h20), ticks every one minute, labels every 5 minutes and on the start and end date of the alert. Display 5 minutes before and 5 after
- two red vertical lines on the start and end date of the alert

(If time allows, display on red the alert signal portion, yellow if before or after were warnings)

9. Activity screen

Three types of information to be showcased:

1) **Instant activity, taken as in the sample data below, WALKING is showcased as INSTANT ACTIVITY**

"3969,""2016-01-13 10:53:29"",com.class,""timestamp=1452678809586"
display=2016-01-13 10:53:29
type=instant-activity
"values=[type=WALKING]"""

-Possible values: sedentary, unknown, walking, running, jumping

If INSTANT_ACTIVITY

- = SEDENTARY, print on screen SEDENTARY (with an associated material design pictorgram)
- = WALKING, print on screen WALKING (with an associated material design pictogram walking)
- = RUNNING, JUMPING print on screen EXERCISING (with an associated material design pictogram exercising)
- = UNKOWN, print on screen the question : Is everything ok? With Yes no options, followed by a query box, Are you EXERCISING, WALKING, TRAVELING, HAVING FUN? (butons that can be clicked)

2) **Provide menu like with history of acitivity: LAST HOUR | TODAY | THIS WEEK |LAST MONTH**

For each of them print a graph with percentage of the possible activities (can reuse the circle represenation already available or similar to the S-health app (bar like graph)

3) **Number of steps per moment of the day, do consider the following database representation:**

"3169,""2016-01-13 10:53:27"",com.class,""timestamp=1452678807736"
display=2016-01-13 10:53:27
type=activity:pedometer
values=[Steps=26
AfternoonSteps=0
EveningSteps=0
MidnightSteps=0
MorningSteps=26
NightSteps=0
"NoonSteps=0]"""

10. Sound/ environmental noise screen

Reuse existing sound representation. Sound reading is done from the device directly, the module is available on the interface provided code and showcase also available and implemented. The sound is NOT stored in the database, we perform online analysis on the device.

The elements need to to be reused.

11. Alert location screen

Pin-Point current location on map
Showcase map of the surroundings with path to nursing home.

Use mockup available at https://drive.google.com/drive/folders/0B6g6fMt4AYlLaTJnRngxVXdxYzA

Remove calories from the mockup.

Values to be showcased as taken from database, see sample below:

"4081,""2016-01-13 10:53:30"",com.class,""timestamp=1452678809845"
display=2016-01-13 10:53:29
type=location
values=[Activity:in vehicle: 85% on foot: 8% unknown: 8% walking: 8%
Lat:49.6533149
Long:6.2314056
Alt:425.8375441712618
Speed:0.37045178
"Address: , 10 Schleiwegaass, 1670 Senningerberg, Luxembourg]"""

12. Sleep screen , Temperature screen(not in pilot)

Current value of temperature

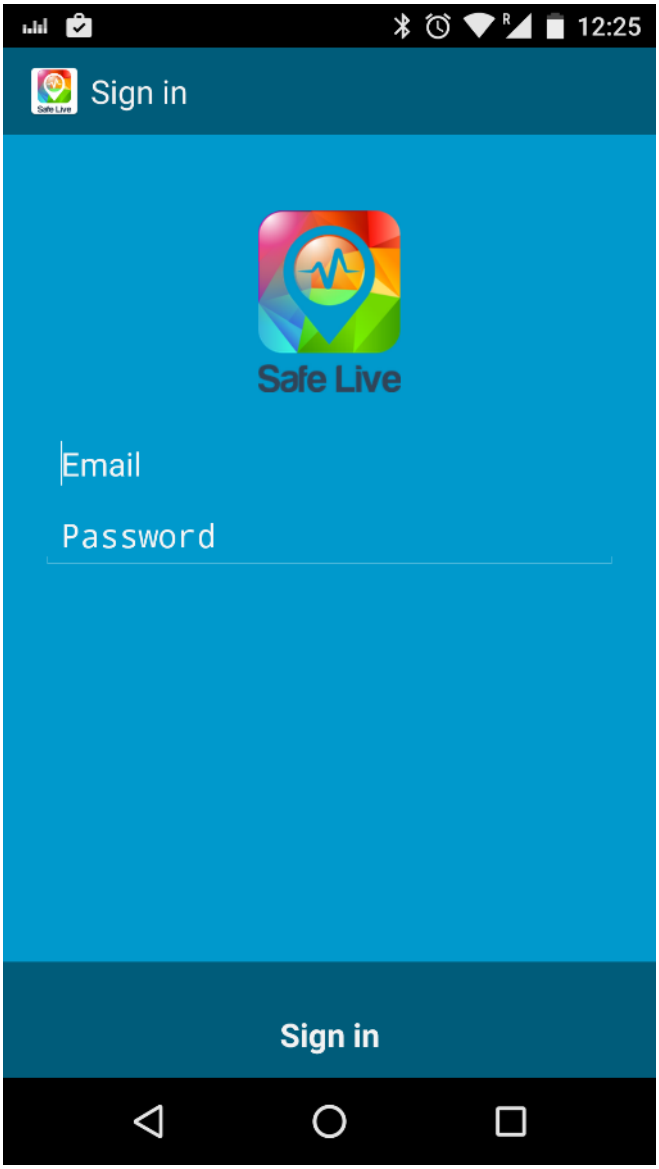
Remark:

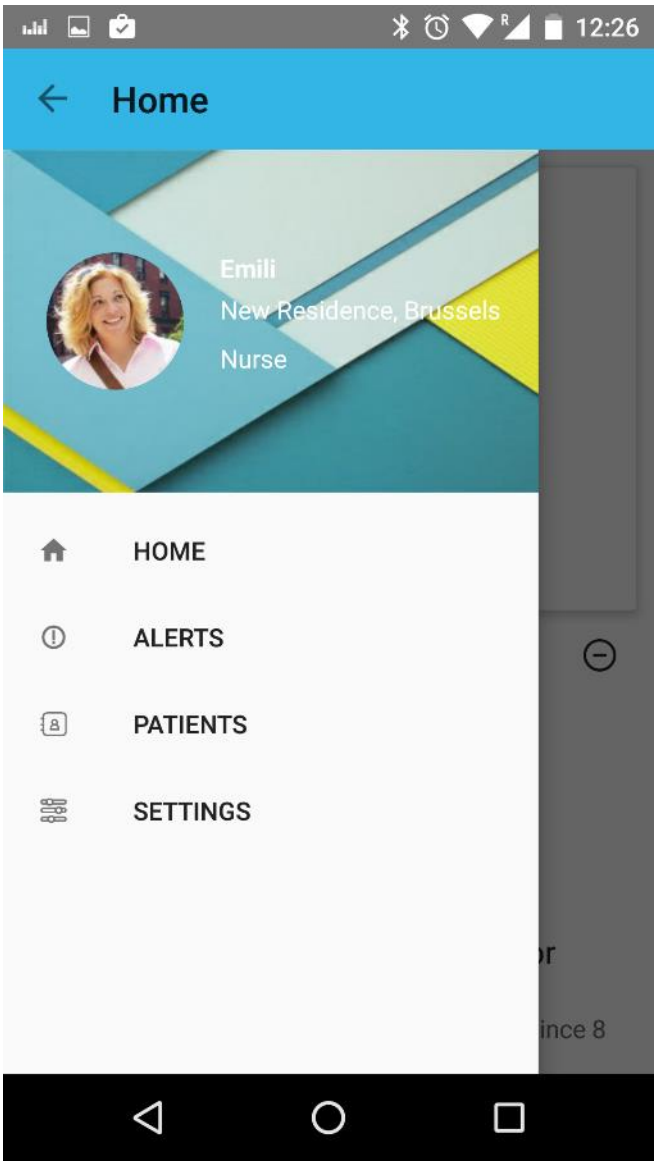
There is more than one nurse attending a single resident. This makes that once one of the nurses takes care of one of the residents the ‘backup’/other attending nurse(s) should be notified that the case is being taken care of.

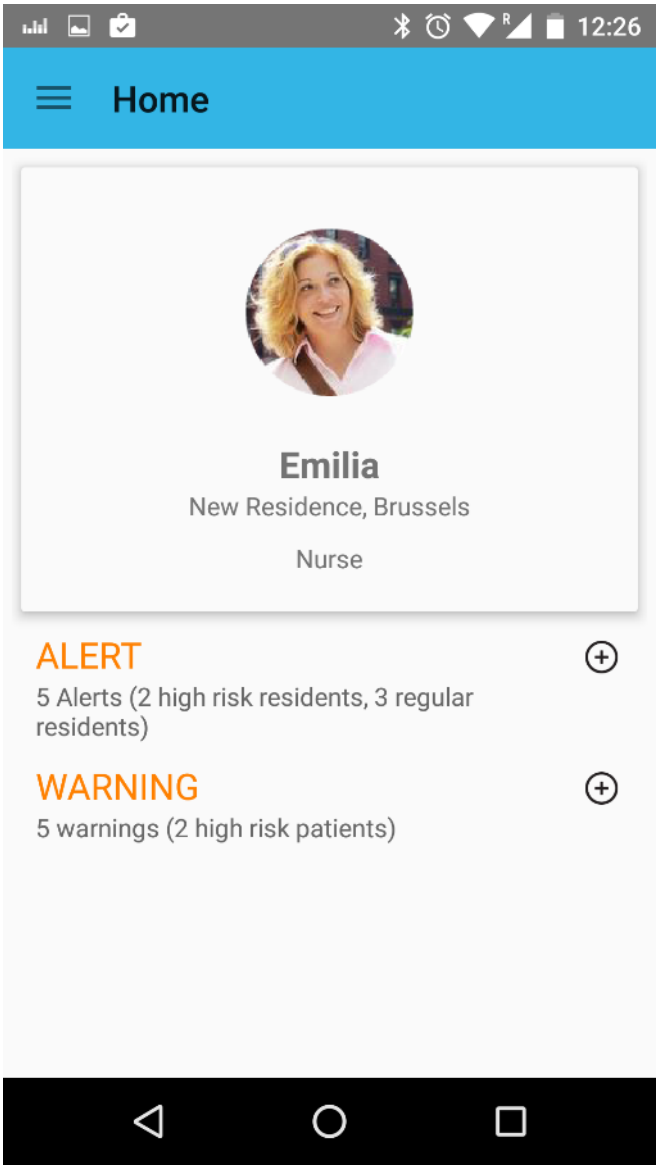
- Tunstall mtrax

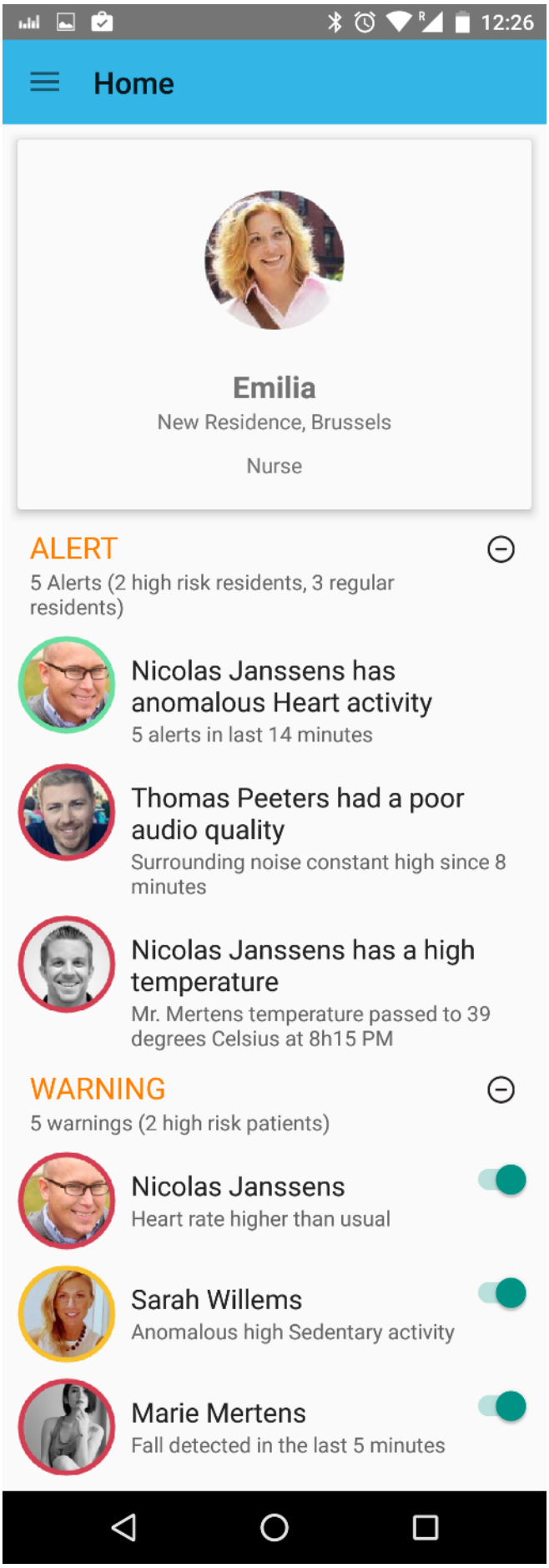
  http://www.tunstall.co.uk/Uploads/Documents/AHM%20system%20leaflet%20(Web).pdf

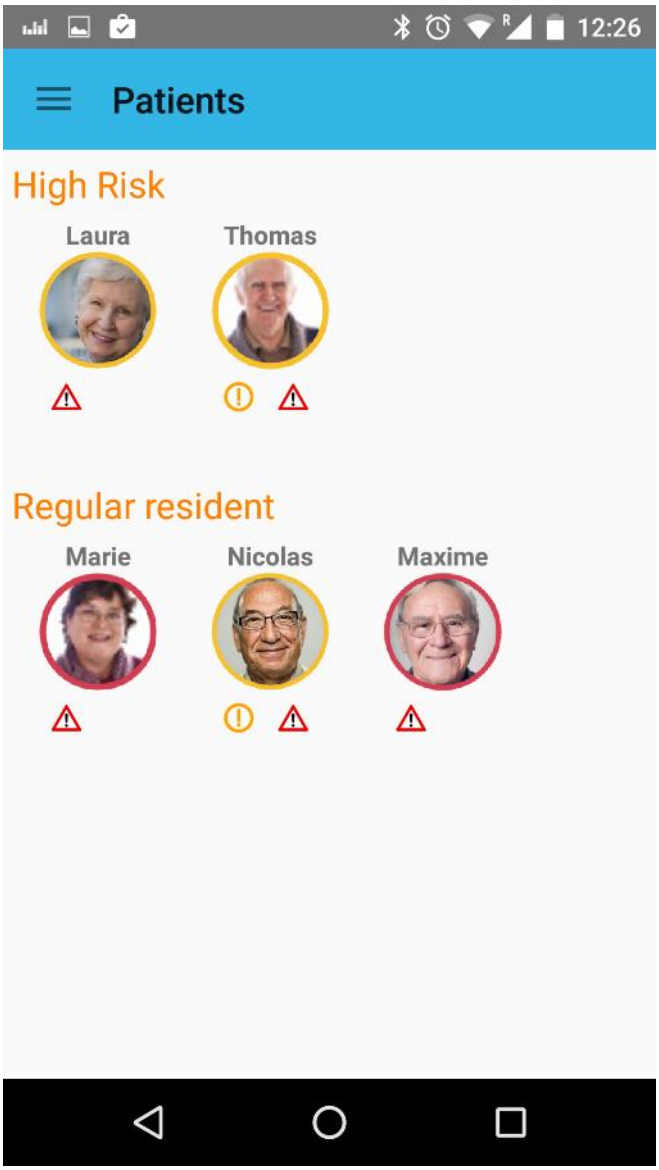
F. ANNEX - CURRENT SCREENS

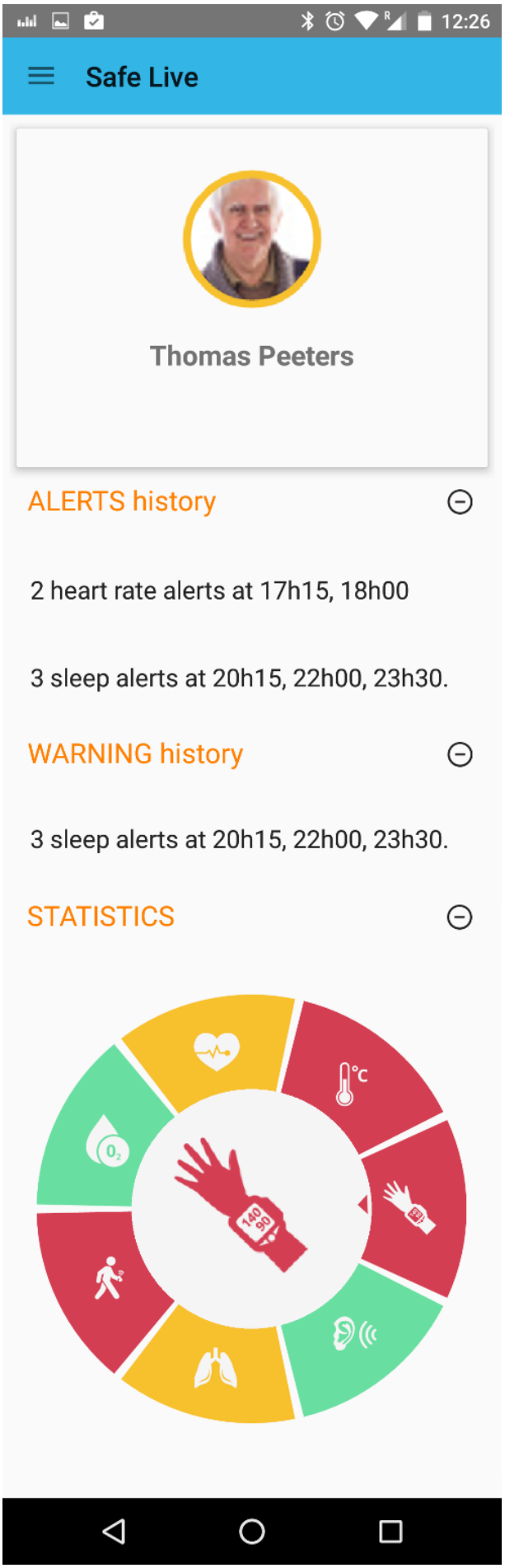


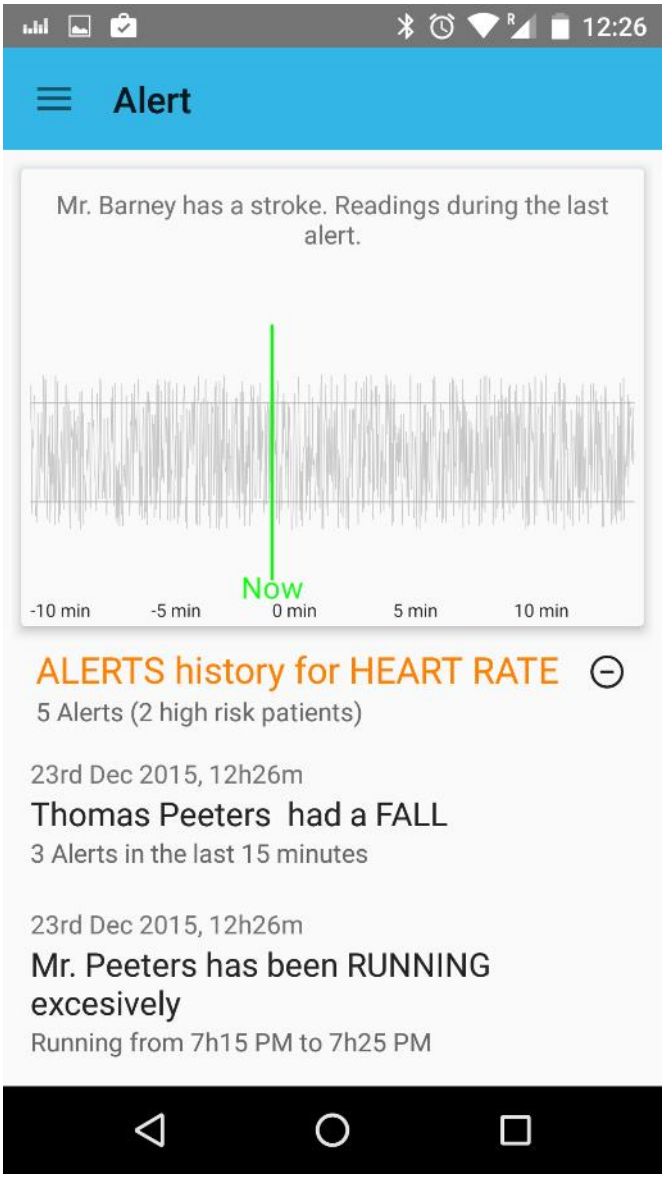


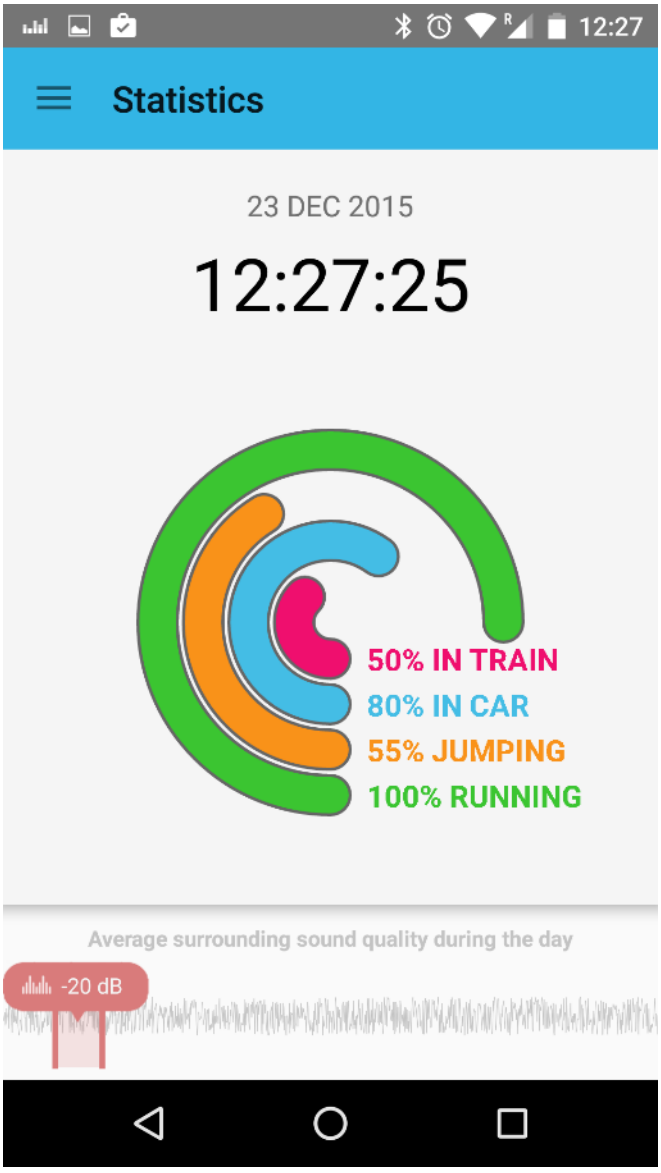

12:26
Home
Emilia
New Residence, Brussels
Nurse
ALERT
5 Alerts (2 high risk residents, 3 regular residents)
WARNING
5 warnings (2 high risk patients)

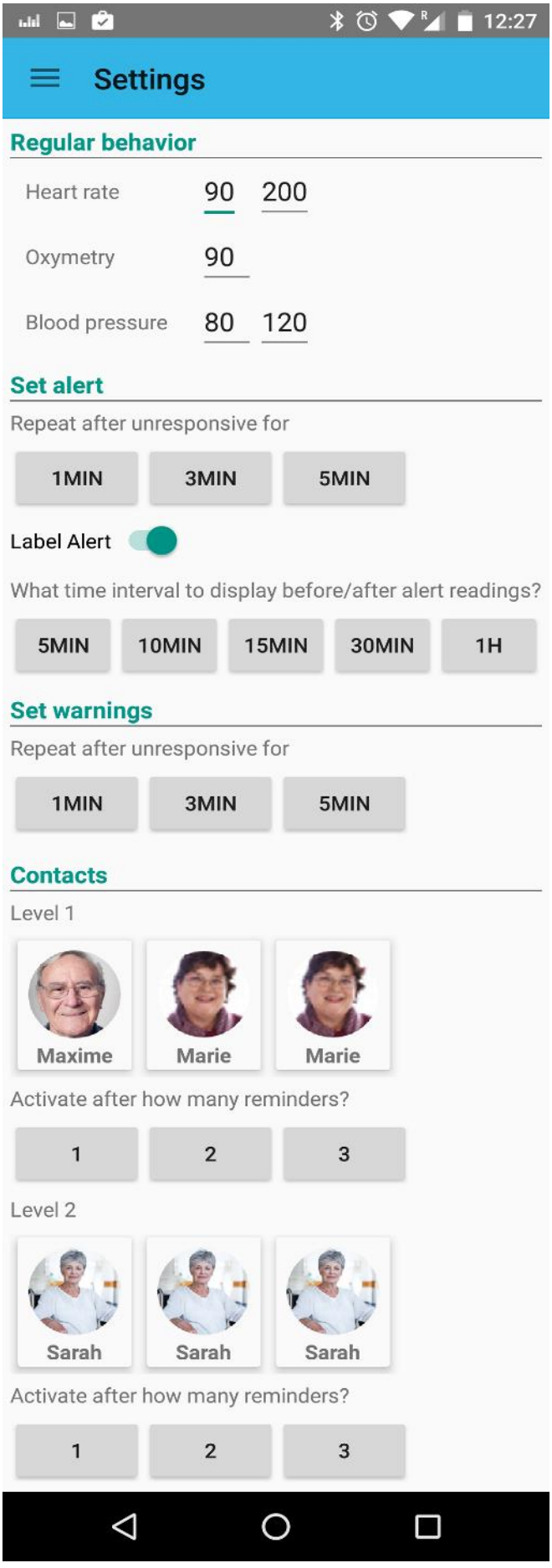

12:26
Home
Emilia
New Residence, Brussels
Nurse
ALERT
5 Alerts (2 high risk residents, 3 regular residents)
Nicolas Janssens has anomalous Heart activity
5 alerts in last 14 minutes
Thomas Peeters had a poor audio quality
Surrounding noise constant high since 8 minutes
Nicolas Janssens has a high temperature
Mr. Mertens temperature passed to 39 degrees Celsius at 8h15 PM
WARNING
5 warnings (2 high risk patients)
Nicolas Janssens
Heart rate higher than usual
Sarah Willems
Anomalous high Sedentary activity
Marie Mertens
Fall detected in the last 5 minutes


12:26
Patients
High Risk
Laura
Thomas
Regular resident
Marie
Nicolas
Maxime


12:26
Safe Live
Thomas Peeters
ALERTS history
2 heart rate alerts at 17h15, 18h00
3 sleep alerts at 20h15, 22h00, 23h30.
WARNING history
3 sleep alerts at 20h15, 22h00, 23h30.
STATISTICS


12:26
Alert
Mr. Barney has a stroke. Readings during the last alert.
Now
-10 min
-5 min
0 min
5 min
10 min
ALERTS history for HEART RATE
5 Alerts (2 high risk patients)
23rd Dec 2015, 12h26m
Thomas Peeters had a FALL
3 Alerts in the last 15 minutes
23rd Dec 2015, 12h26m
Mr. Peeters has been RUNNING excesively
Running from 7h15 PM to 7h25 PM


12:27
Statistics
23 DEC 2015
12:27:25
50% IN TRAIN
80% IN CAR
55% JUMPING
100% RUNNING
Average surrounding sound quality during the day
-20 dB


12:27
Settings
Regular behavior
Heart rate
90
200
Oxymetry
90
Blood pressure
80
120
Set alert
Repeat after unresponsive for
1MIN
3MIN
5MIN
Label Alert
What time interval to display before/after alert readings?
5MIN
10MIN
15MIN
30MIN
1H
Set warnings
Repeat after unresponsive for
1MIN
3MIN
5MIN
Contacts
Level 1
Maxime
Marie
Marie
Activate after how many reminders?
1
2
3
Level 2
Sarah
Sarah
Sarah
Activate after how many reminders?
1
2
3