



Guidebook

AioCare – mobile spirometry



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AioCare (aiocare.com)



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Requirements

iPhone 5s or newer, the system
iOS (9.0 or newer), system
Android (5.0 or newer).



Table of Contents

New account	4
setting up a new account	6
main panel	9
connecting the device to the phone	10
Patient's card	20
setting up a patient's card	22
main panel	31
Conducting an examination	34
spirometric measurement	36
spirometric measurement instruction	42
errors during measurement	48
examination summary	52
patient's card – details	57
COPD diagnosis	62
step 1 – Survey	67
step 2 – Spirometry No 1	69
step 3 – Drug administration	73
step 4 – Waiting time	76
step 5 – Spirometry No 2	78
COPD summary	82
Reports	90
examination report preview and print	93
measurement report preview and print	97



New account

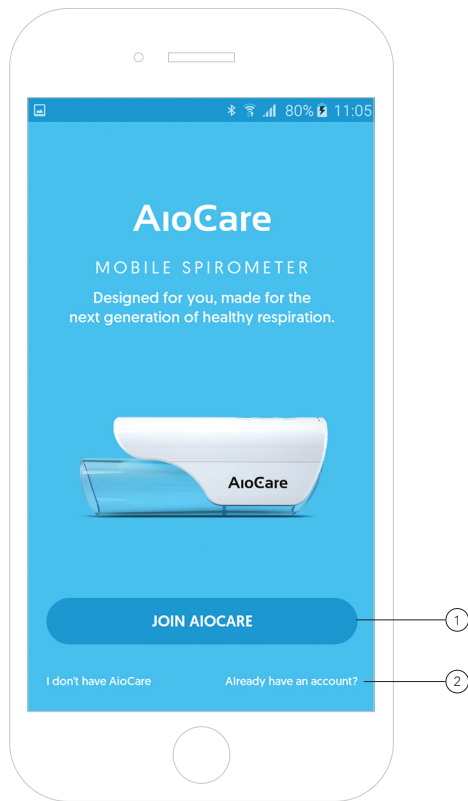


AioCare - Designed for you,
made for the next generation
of healthy respiration.

A new account for the doctor

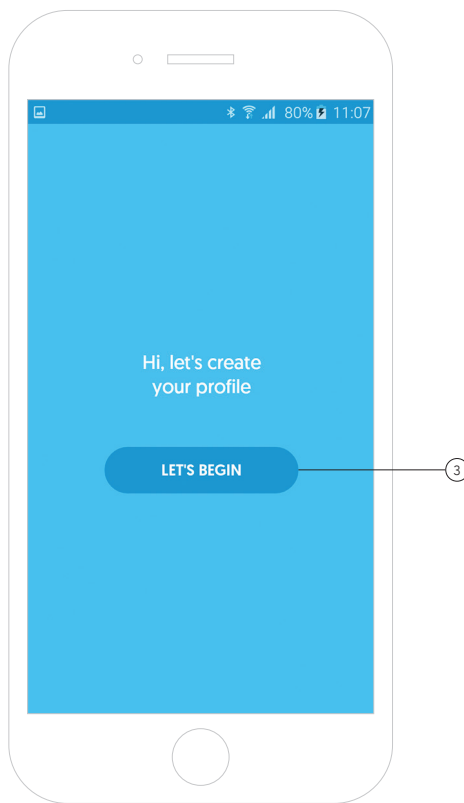
To create a new medical account, click **"Join AioCare"**.^①

Once you have an account, just click **"Have an account already?"** And enter your email and password.^②



A new account for the doctor

After clicking the **"Let's begin"** button, the application will take the user to the wizard, which should be filled step by step. ③

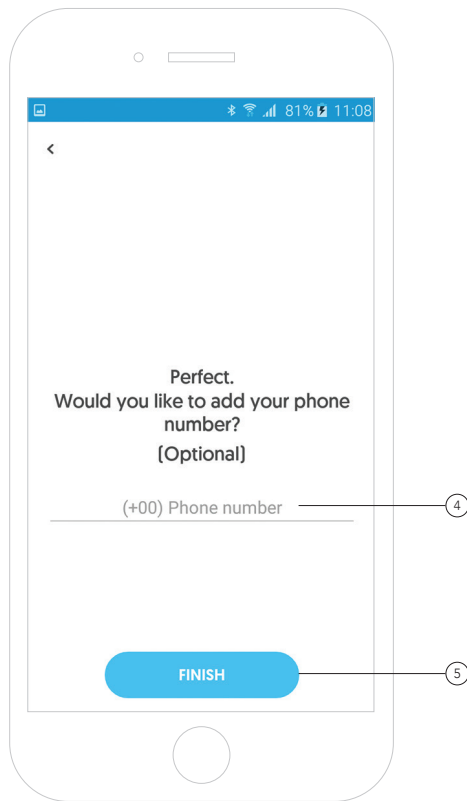


A new account for the doctor

In the last step, the application will ask you for a phone number. This step is not mandatory. ⁽⁴⁾

Provided telephone number will be used for possible contact in case of technical problems with the AioCare application and device.

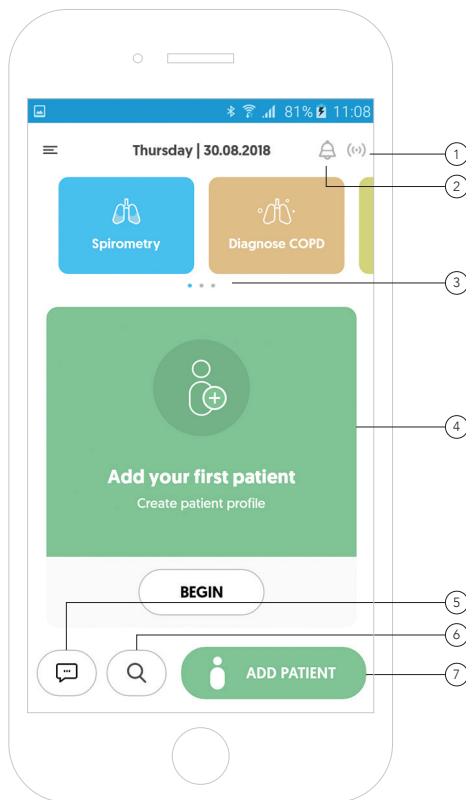
After filling out the data, click **"Finish"**. ⁽⁵⁾

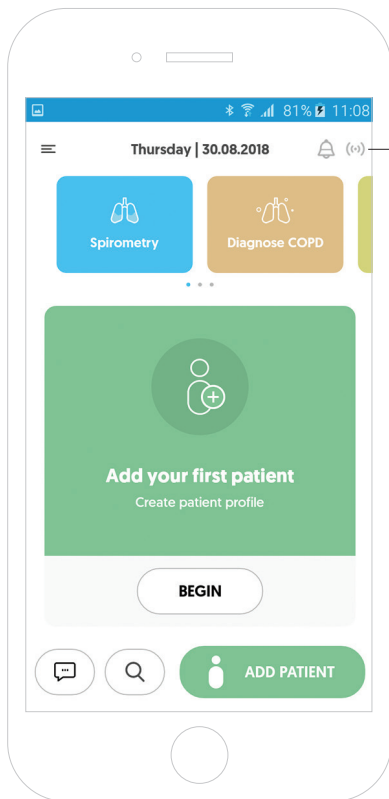


Main panel of AioCare PRO app

On the mail panel of app there are sections:

- Connecting device to the phone ①
- Notification center ②
- Examination selection ③
- Selection of patient's cards ④
- Chat with patient ⑤
- Searching for patients' cards ⑥
- Adding a new patient's card ⑦



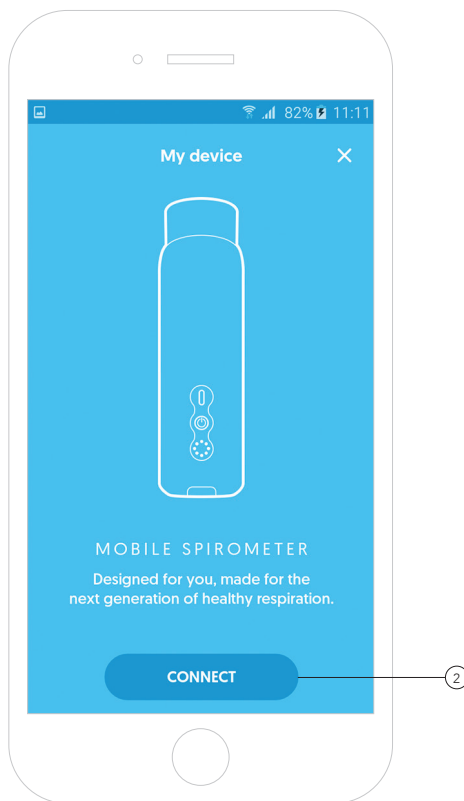


Connecting the phone to the AioCare device

Click connection icon. ①

Connecting the phone to the AioCare device

To connect the phone to the AioCare device, click the **"Connect"** button. ②



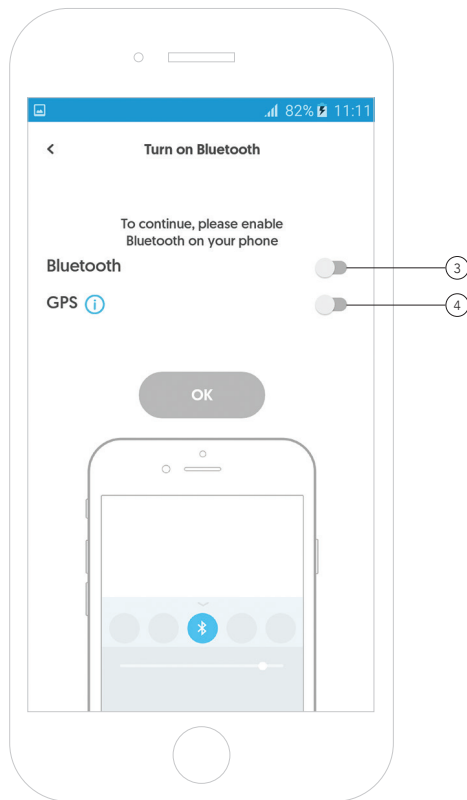
Connecting the phone to the AioCare device

To connect the phone with the device, you must have the Bluetooth module turned on in your phone.

If the phone Bluetooth is disabled, move the slider. The Bluetooth module on the phone will turn on automatically. ③

To increase the probability of connecting the phone to the AioCare device, we recommend turning on the GPS module. ④

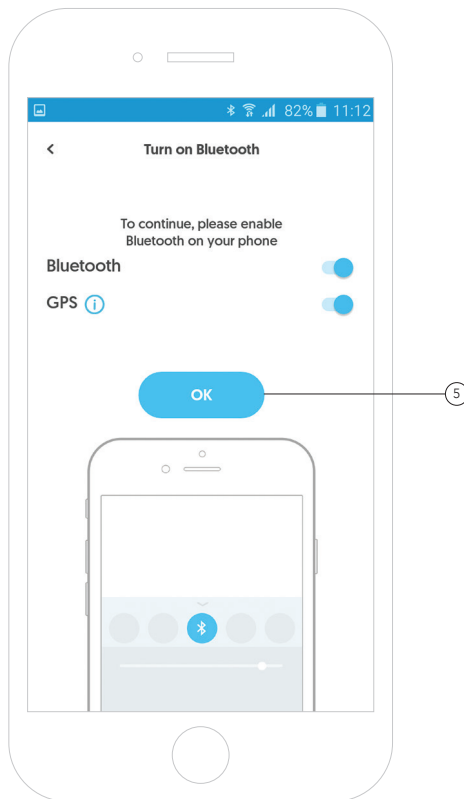
After moving the slider, the application will display a system window on which it will be possible to enable the GPS module. After turning the module on, return to the AioCare PRO application.



Connecting the phone to the AioCare device

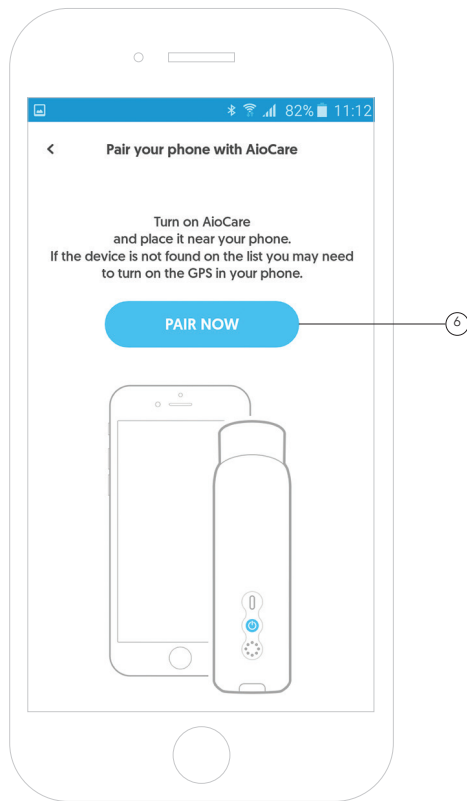
After switching on the Bluetooth module in the phone, the application will allow you to go to the next step of connecting your phone to the device. ⑤

The GPS module is not required to connect to the AioCare device, but in order to increase the probability of proper connection of the AioCare device to the mobile device, we recommend turning the GPS module on.



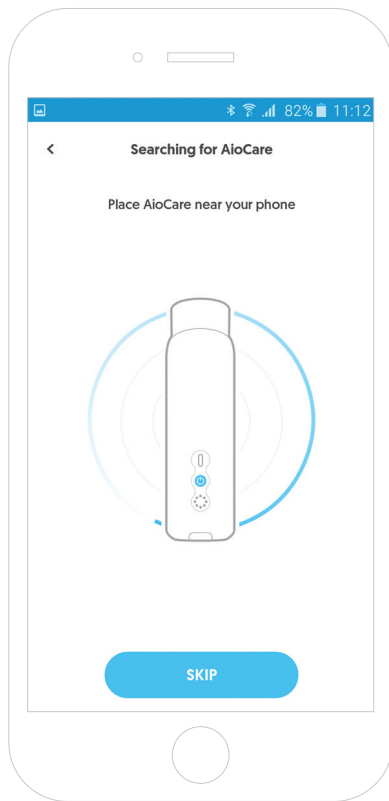
Connecting the phone to the AioCare device

In the next step, turn on the AioCare device and place it near your phone, then click on the **"Pair Now"** button. ⑥



Connecting the phone to the AioCare device

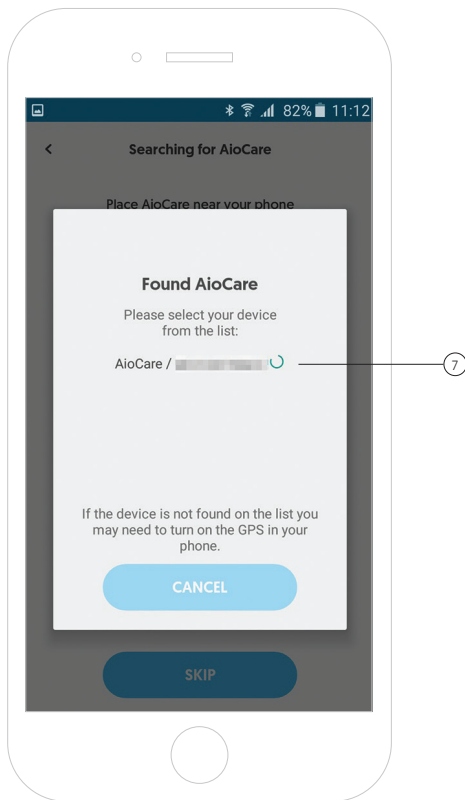
The application will start searching for the device.



Connecting the phone to the AioCare device

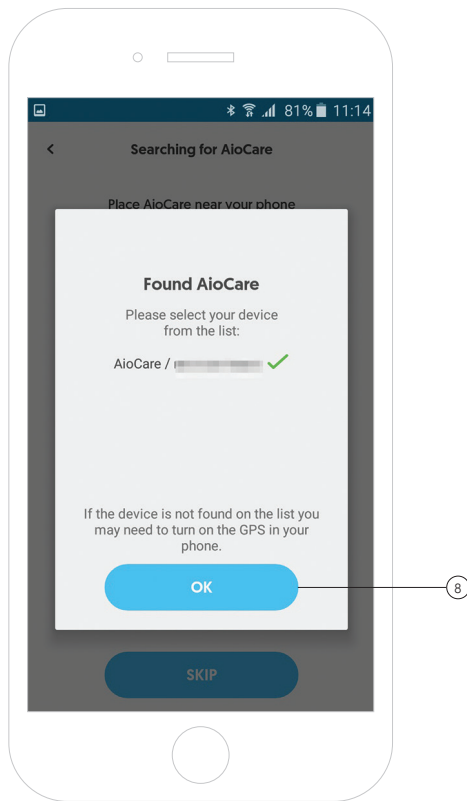
When the application finds a device by displaying on devices list, confirm by clicking the serial number according to the number on the spirometer that you want to pair. ⑦

If the device does not appear on the devices list, we recommend turning the GPS module on in the mobile device.



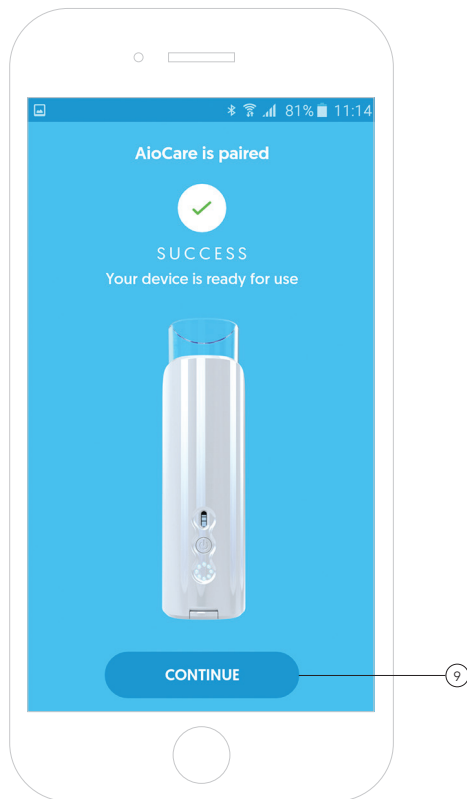
Connecting the phone to the AioCare device

After confirming the phone connection to the device, click **"Ok"**. (8)



Connecting the phone to the AioCare device

When the application connects to the device, connection confirmation will be displayed on a screen. To go to the main application screen, click **"Continue"**. ⑨





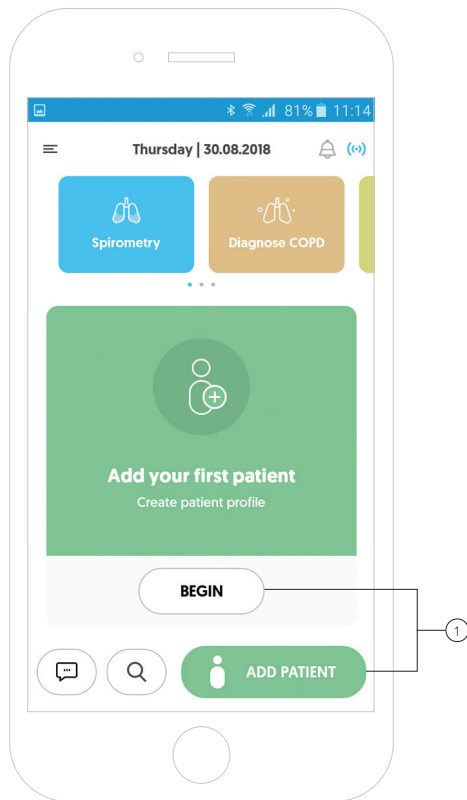
Patient's card



Adding patient's card

To perform the examination in the application, you must first create a patient's profile and card.

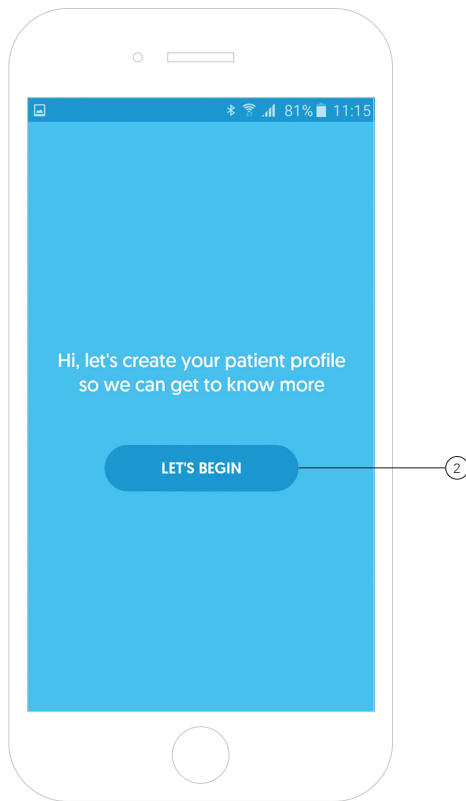
This can be done by clicking the **"Begin"** button in the patient's card section or by clicking the **"Add Patient"** button. ①



Adding patient's card

To create a new patient's profile, click on the **"Let's begin"** button. ②

The wizard will guide you through the entire process of adding a patient step by step.



Adding patient's card

In the first step, the application will ask you for patient's name, surname and e-mail address. ^③

After filling in the data, click **"Next"**. ^④

Completing the email field is not mandatory.

Alright, tell us more about your patient.
What is full name and mail?

First name

Last name

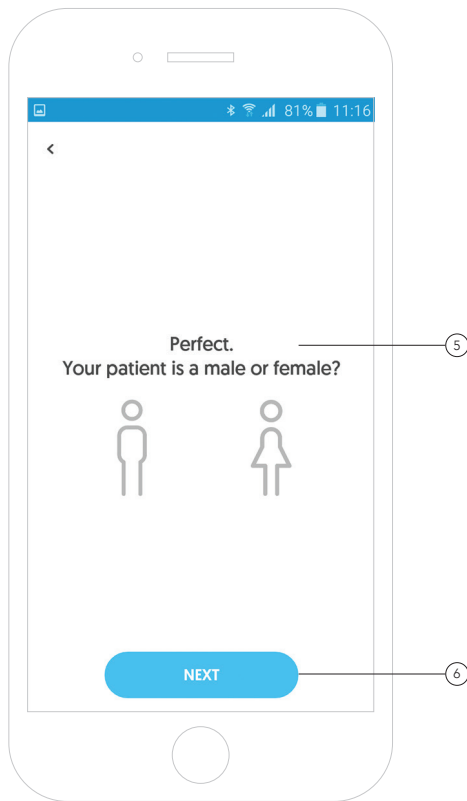
Email

NEXT

Adding patient's card

Then the application will ask you to choose the gender of the patient. ⑤

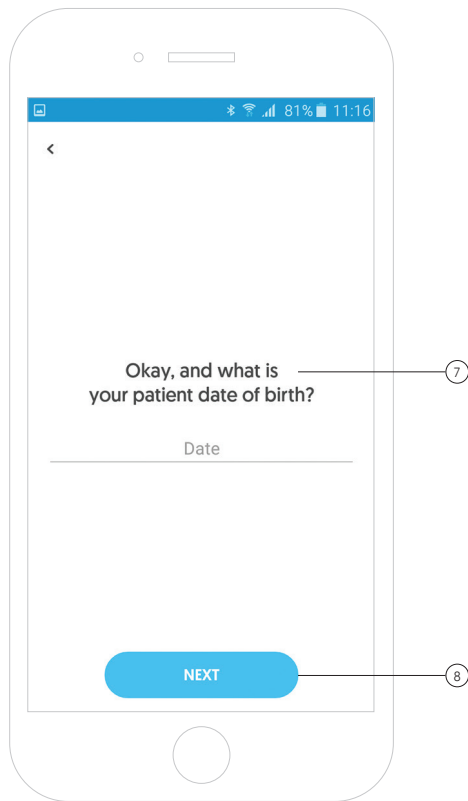
After selecting the gender, click **"Next"**. ⑥



Adding patient's card

In the next step, the application will ask you for the date of patient's birth. ⁽⁷⁾

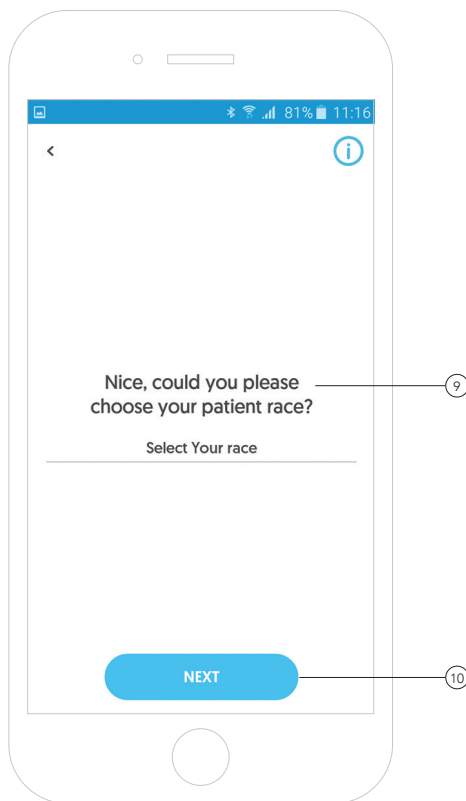
After filling the date of birth, click **"Next"**. ⁽⁸⁾



Adding patient's card

The application will then ask you to select the appropriate patient's race from the list. ⑨

After selecting the appropriate race, click **"Next"**. ⑩



Adding patient's card

In the next step, the application will ask you for patient's height and weight. ⁽¹¹⁾

After filling in the data, click **"Next"**. ⁽¹²⁾

Great, we're almost done.
What is your patient
height and weight?

Body height [cm]

Body weight [kg]

NEXT

Adding patient's card

In the penultimate step, the application will ask you to provide the patient's phone number. ⁽¹³⁾

This step is not mandatory.

After filling in the data, click **"Next"**. ⁽¹⁴⁾

Perfect.
Could you add your patient phone?
(Optional)

(+00) Phone number

NEXT

Adding patient's card

In the last step, the application will ask you to provide additional information about the patient, such as:

- Is the patient a smoker? (15)
- Does the patient take medication? (16)

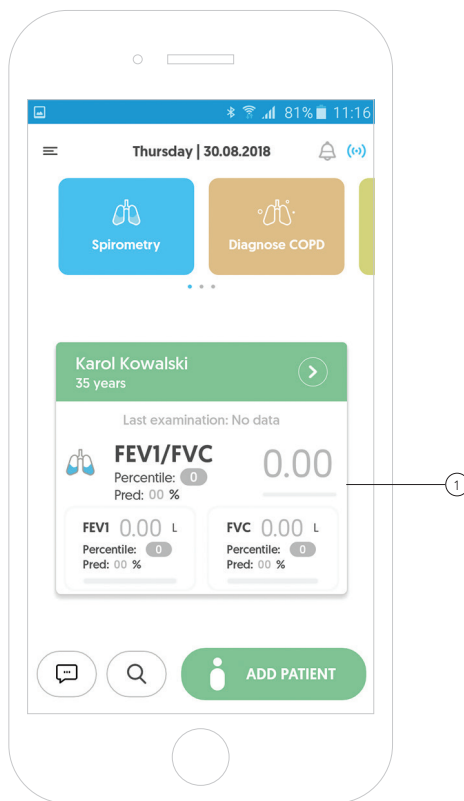
In addition, the application allows you to add a short note about the patient and add up to 3 tags characterizing the patient. (17)

After filling in the data, click **"Finish"**. (18)

The screenshot shows a mobile app interface with a status bar at the top displaying a back arrow, signal strength, Wi-Fi, 81% battery, and the time 11:16. The main content area has a blue header with a back arrow. Below the header, the text "Thank you! Could you add something more?" is displayed. There are two toggle switches: "Patient is a smoker?" (15) and "Patient take any drugs?" (16). Below these are three "ADD" buttons for tags. A "Short description:" label is followed by a text input field (17). At the bottom is a large blue "FINISH" button (18).

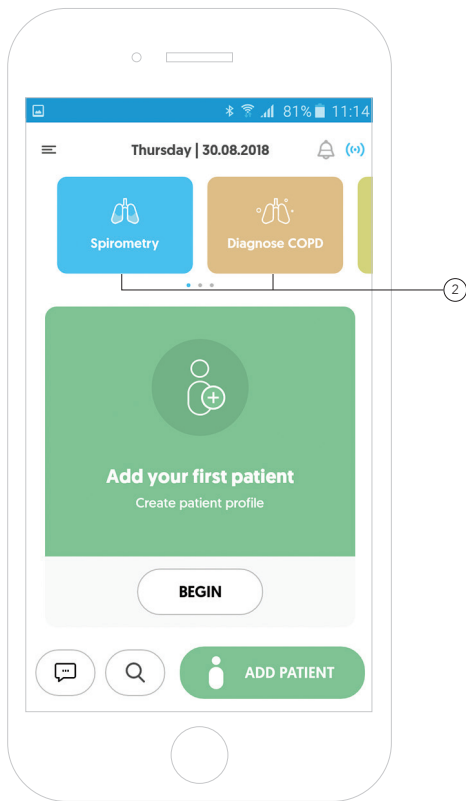
Main panel of AioCare PRO application

View of the main application panel with the added patient's card. ①



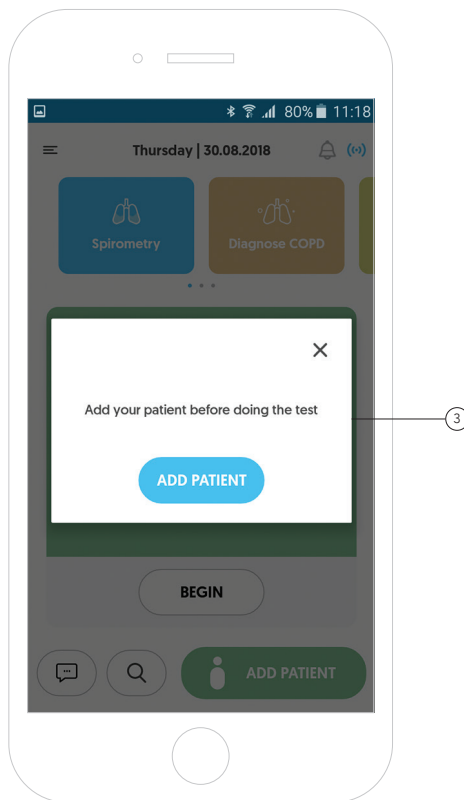
Caution

If there is no patient added in the application, clicking on the test tile information about adding the patient will be displayed. ②



Caution

In the displayed window, you can directly go to the add patient wizard by clicking on the **"Add patient"** button. ③



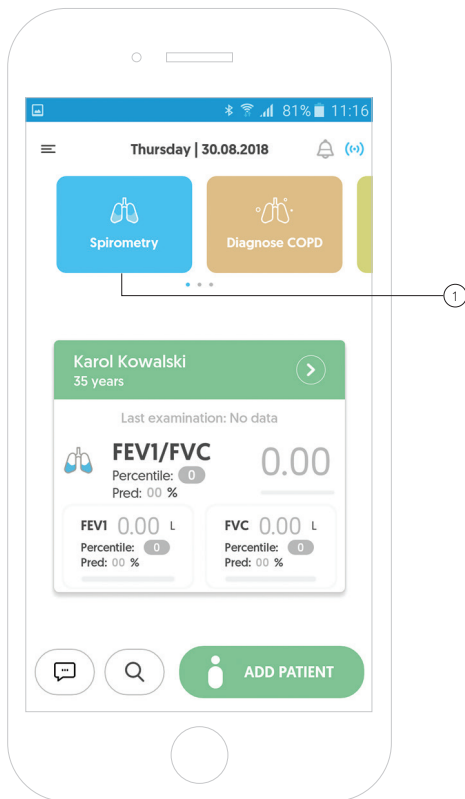


Conducting an examination



Spirometric measurement

To perform a spirometry measurement, click on the **"Spirometry"** tile. ①



Spirometric measurement

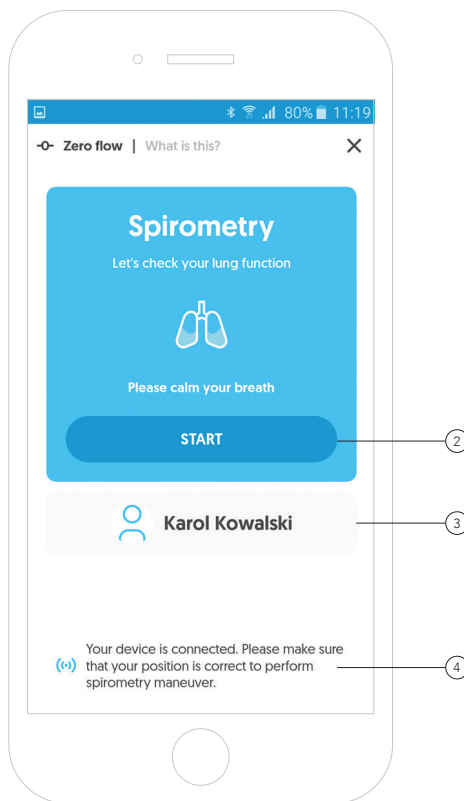
Remember to perform the measurement you must be connected to the device.

To perform the measurement for the selected patient, click the **"Start"** button. ②

To perform the test on another patient, click on the patient and select the patient from the list of patients. ③

The connection between the application and the device is marked with a color:

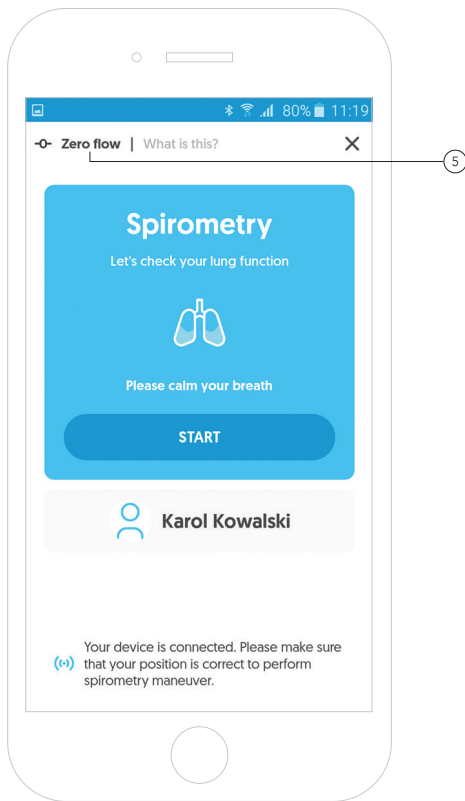
- Gray indicates that the device is not connected.
- Blue indicates that it is connected. ④



Spirometric measurement - Zero flow

Always perform flow resetting
before starting the measurement.

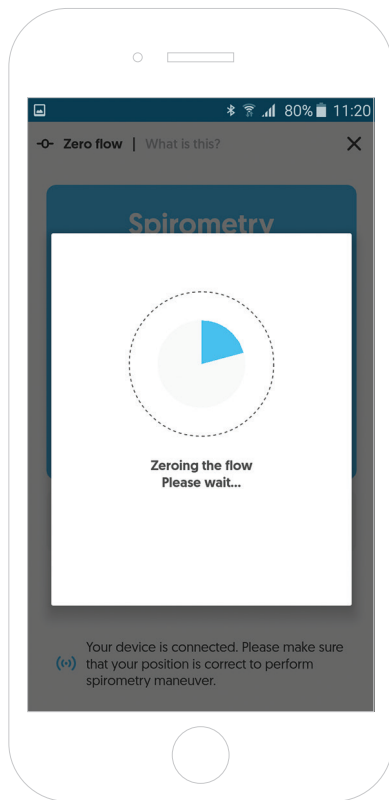
Click the text **"zero flow"**
and follow the instructions. ⑤



Spirometric measurement - Zero flow

The **"zero flow"** process is necessary to ensure correct results. The process takes only 5 seconds.

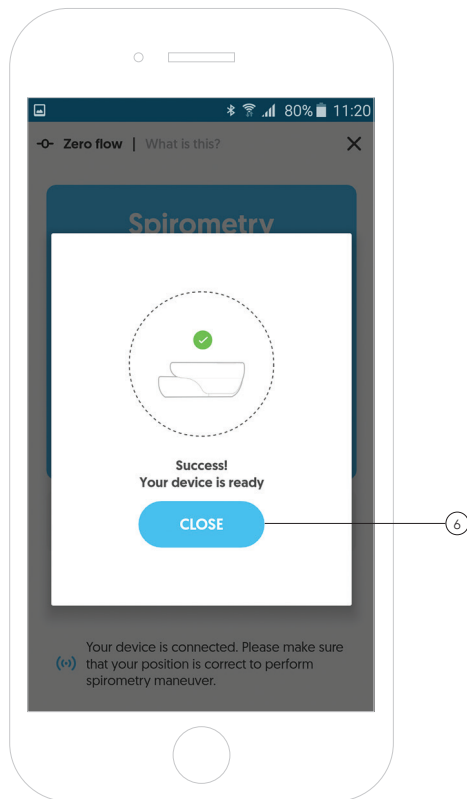
During the flow resetting the spirometer should remain stationary and away from the free flow (e.g. open window).



Spirometric measurement - Zero flow

After correct completion of the flow resetting process, the device is ready for the first measurement.

To return to the beginning of the test, click **"Close"**. ⑥

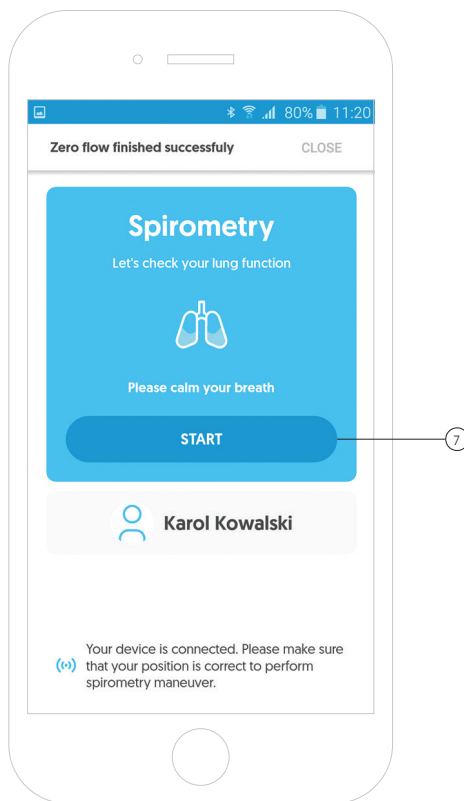


Spirometric measurement – measurement summary

The screen shows that the device is connected and the process of flow resetting has been performed.

In this way, the application and the device are ready to start measurements.

To perform the measurement on a given patient, click the **"Start"** button. (7)

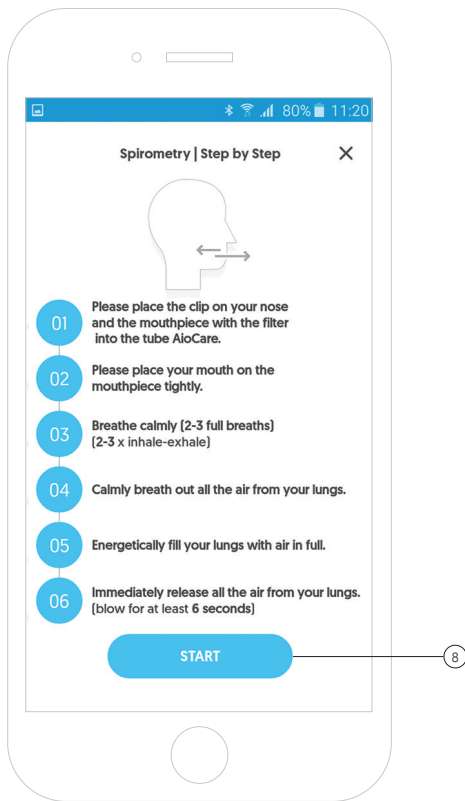


Spirometric measurement – short instruction

To go to the measurement, click **"Start"**.⁽⁸⁾

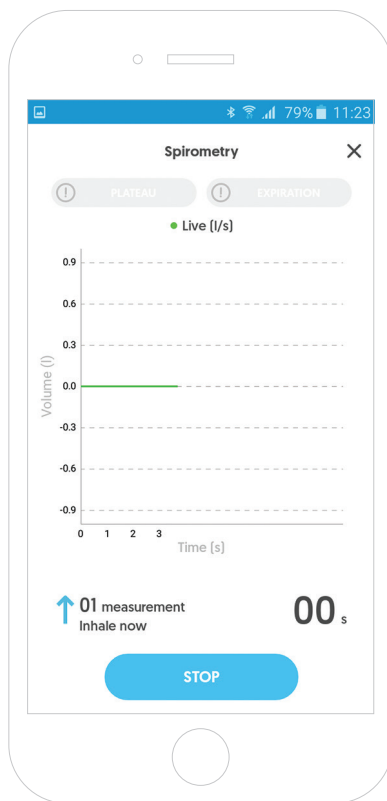
Short instruction:

1. Please place the clip on your nose and the mouthpiece with the filter into the tube AioCare.
2. Please place your mouth on the mouthpiece tightly.
3. Breathe calmly (2-3 full breaths) (2-3 x inhale-exhale).
4. Calmly breath out all the air from your lungs.
5. Energetically fill your lungs with air in full.
6. Immediately release all the air from your lungs. (blow for at least 6 seconds)



Spirometric measurement

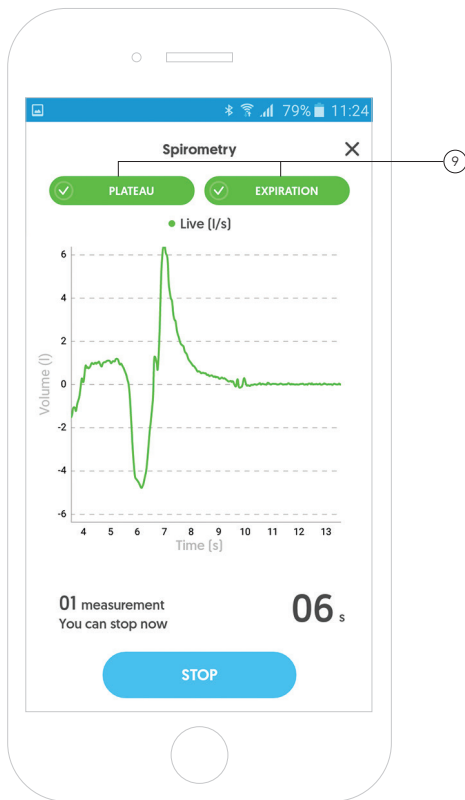
An animation showing the patient's breath will appear on the screen.



Spirometric measurement

During the measurement, when the plateau criterion or expiration criterion is fulfilled, the application will highlight the corresponding message. ⑨

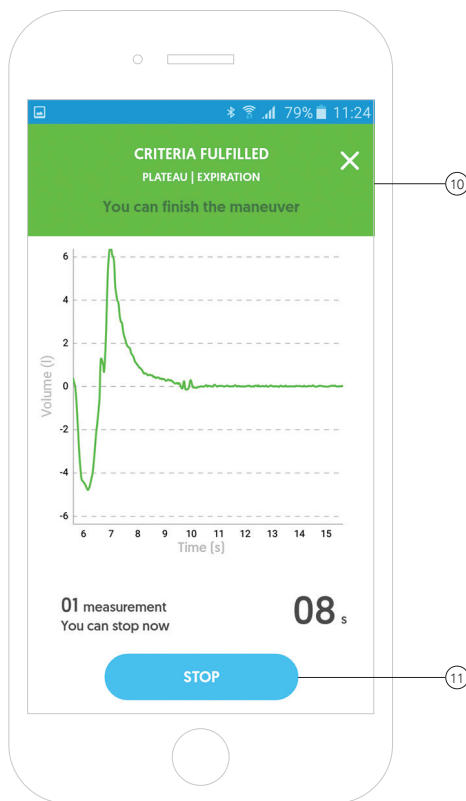
For the measurement to be carried out correctly, both criteria must be fulfilled.



Spirometric measurement

After the correct measurement, the application will display a message about the possibility of completing the measurement. (10)

To end the given spirometry measurement and go to the measurement summary, click the **"Stop"** button. (11)



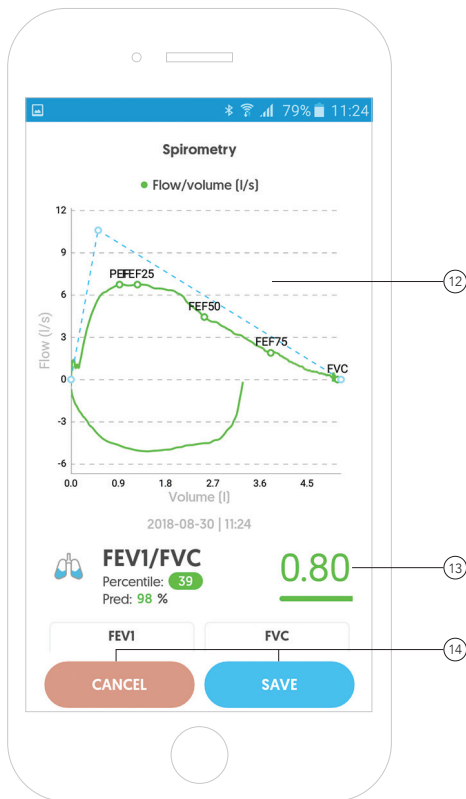
Spirometric measurement

In the measurement summary, the application presents a flow and volume diagram on which PEF, FEF25, FEF50, FEF75 and FVC parameters are marked. ⁽¹²⁾

Below the graph are shown the most important values such as FEV1/FVC, FEV1, FVC, PEF or expiration time. ⁽¹³⁾

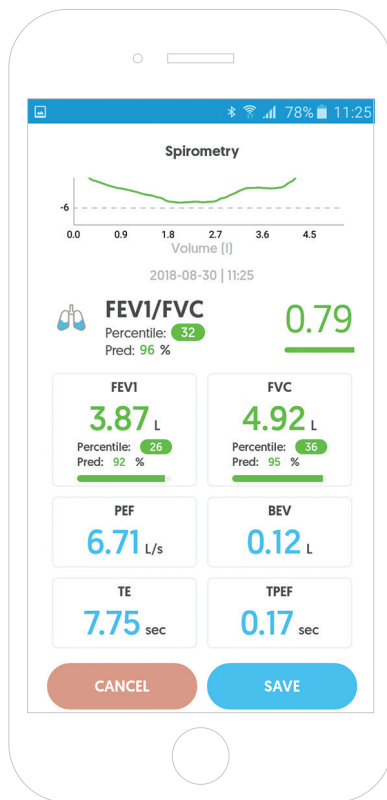
To check more parameters, move the screen down.

You can **"Save"** or **"Cancel"** the measurement by clicking the appropriate button. ⁽¹⁴⁾



Spirometric measurement – Measurement summary

A view of all displayed parameters for a given measurement.

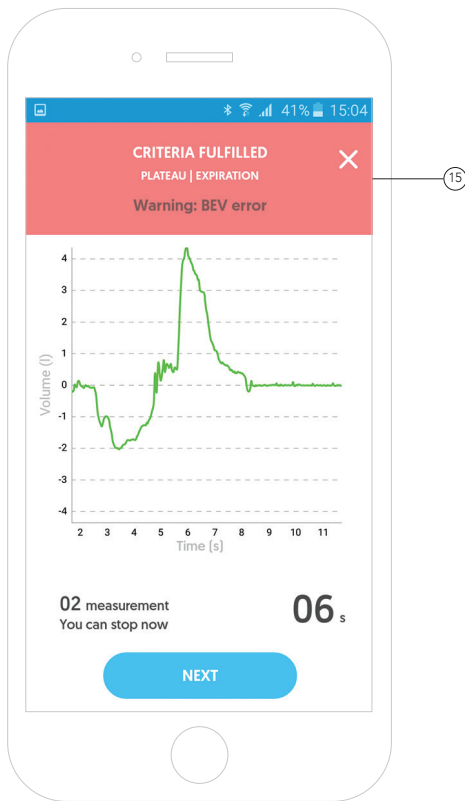


Spirometric measurement – Errors during measurement

During the measurement, errors typical for spirometry may occur. The application will detect them and inform the doctor. (15)

List of errors:

- 1. BEV error** (Back extrapolation error) - make sure that after a deep breath you exhale immediately all the air, do not stop the air.
- 2. Plateau error** - continue exhaling longer, make sure that there is no air left in the lungs.
- 3. Expiration Time Error** (Too short exhalation) - continue to exhale for at least 6 seconds.
- 4. Cough detection** - make sure that you are letting out the air, try not to cough.
- 5. Data error** (Wrong data) - make sure that you are performing sequence of 3 normal breaths, followed by a deep breath and quick exhale.
- 6. PEF error** (Time to PEF error) - remember to exhale quickly.



Spirometric measurement

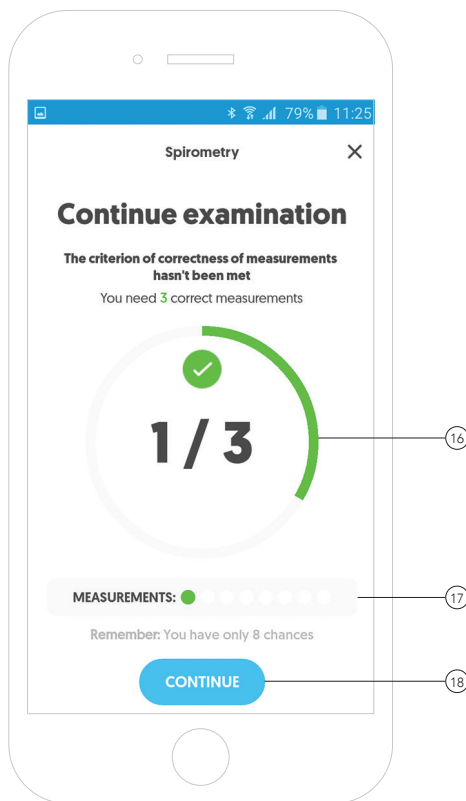
The spirometric test can include up to 8 individual measurements.

To perform the whole test correctly, the criterion of repeatability and the criterion of correctness should be fulfilled. ⁽¹⁶⁾

Measurements are presented using red or green circles: ⁽¹⁷⁾

- Green indicates that the measurement has been performed correctly.
- The red color means that the measurement has not been carried out correctly.

To go to the measurement summary, click **"Continue"**. ⁽¹⁸⁾

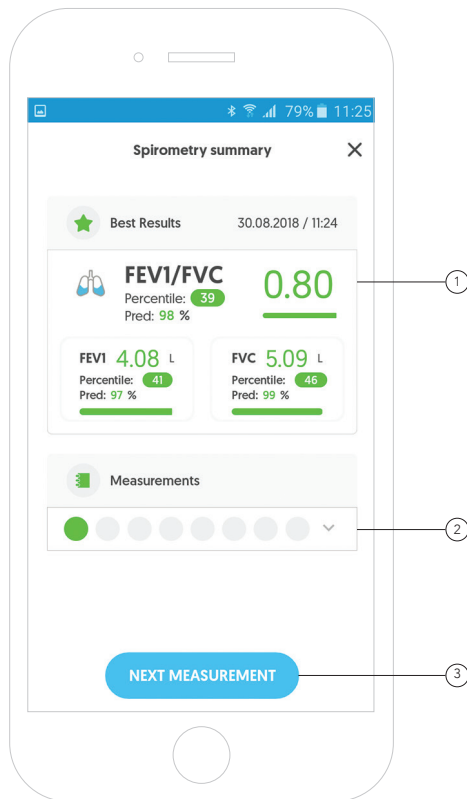


Spirometric measurement – Measurement summary

The application displays the best results for FEV1/FVC, FEV1 and FVC parameters from all measurements performed in a given study. ①

In addition, the application allows the doctor to view all measurements carried out in a given study. ②

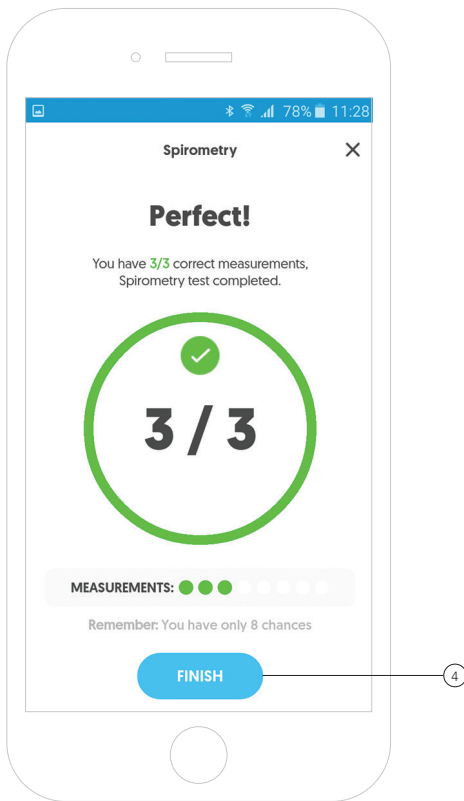
To go to the next measurement, press the **"Next measurement"** button. ③



Spirometric measurement – Measurement summary

After completing 3 correct, repeatable measurements, the application will inform the doctor about the completed spirometric test.

To end the measurement, click **"Finish"**. ④

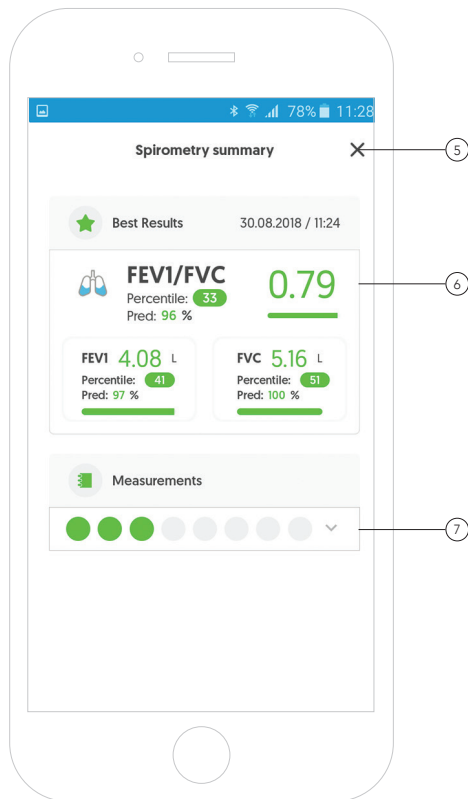


Spirometric measurement – Measurement summary

By pressing the **"X"** button, you can return to the main screen. (5)

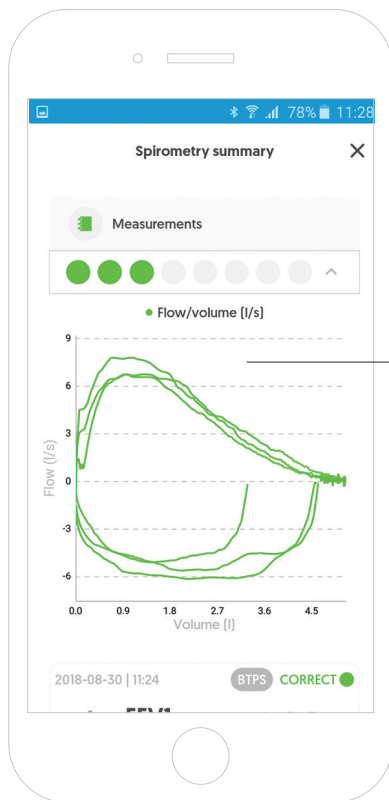
After fulfilling the criterion of measurements repeatability, the application will display the best results of FEV1/FVC, FEV1 and FVC from the entire study. (6)

The application gives you the opportunity to analyze each measurement separately. To do this, click on the measurements. (7)



Spirometric measurement – Measurement summary

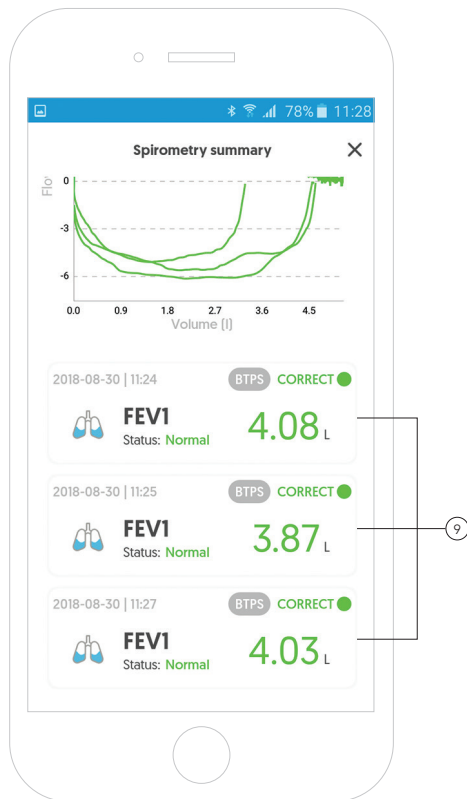
After expanding measurements, the application presents in a graphical form all measurements in one graph. ⑧



Spirometric measurement – measurement summary

In addition, the application gives you the opportunity to analyze a particular measurement. ⑨

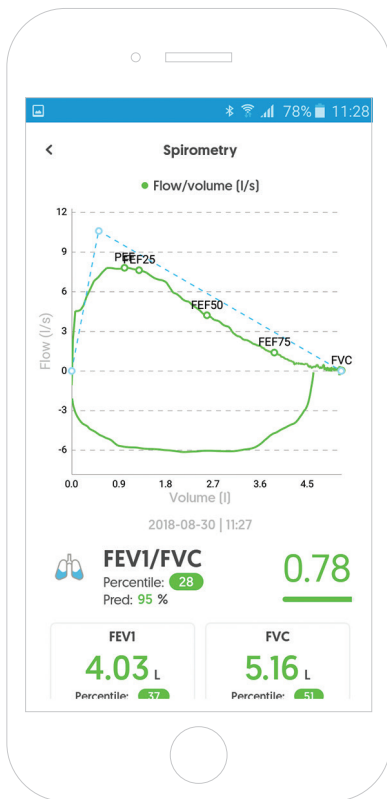
To view the details of a given measurement, click on the particular measurement.



Spirometric measurement – Measurement summary

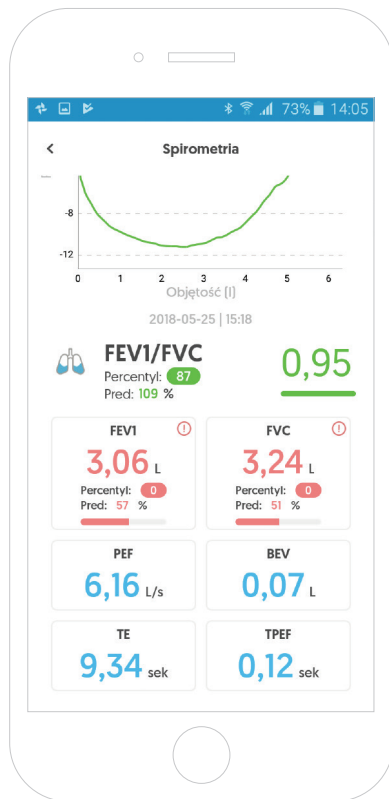
After clicking on a given measurement, the application will present detailed information on the selected one.

To see more details of the selected measurement, move the screen down.



Spirometric measurement – Measurement summary

Further details of the selected measurement.

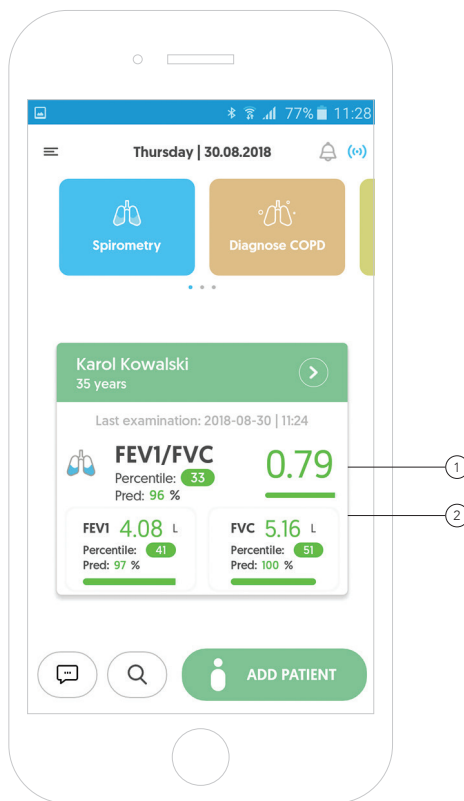


Patient's card

After the test, the results are saved on the patient's card.

On the application's main screen, the best patient's results from the most recent test are displayed in the patient's card. ①

To view the details of the patient and the examination, click on the patient's card. ②

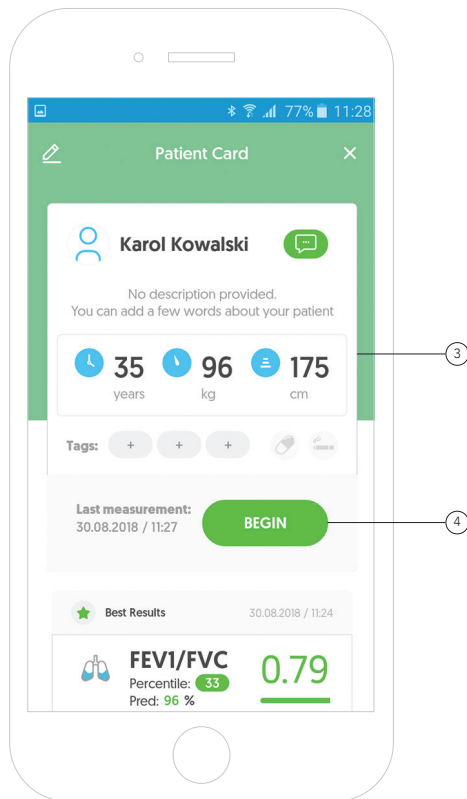


Patient's card – details

In the first part of the patient's card, the application displays patient's information that was entered when the patient's profile was created. (3)

After clicking the **"Begin"** button, the application will allow you to select 1 of 4 types of tests. (4)

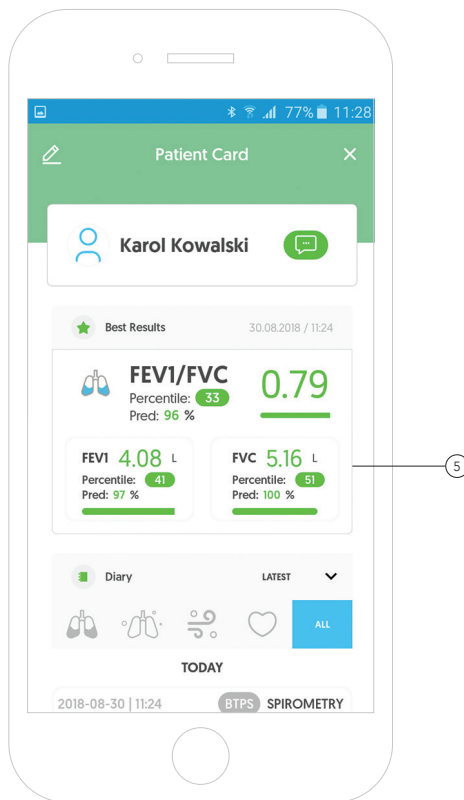
By moving the screen down, we will receive additional information.



Patient's card – details

In the further part of the screen, the best results of FEV1/FVC, FEV1 and FVC are displayed from the last, correctly performed spirometric test. ⁽⁵⁾

By moving the screen down, we will receive additional information.

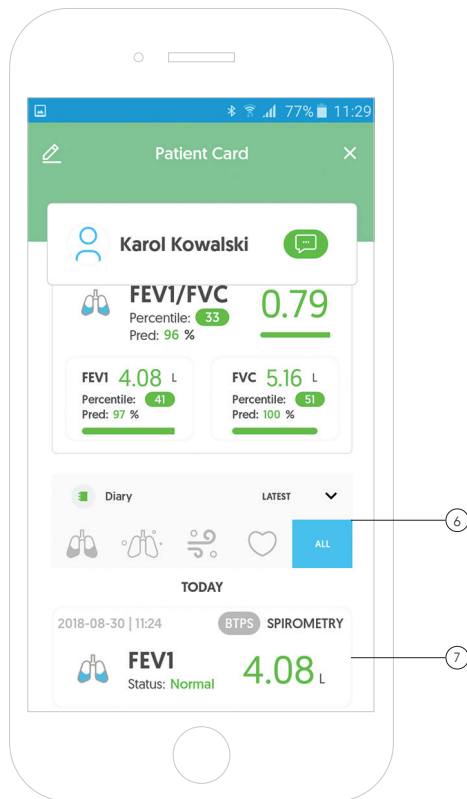


Patient's card – details

The patient's card also has a diary containing all tests of the selected patient.

The application allows you to sort tests by clicking on the appropriate icon for a given examination. ^⑥

At the end of the selected patient's card, all tests are displayed. After clicking on the selected test, the application will display details about the entire test as well as individual measurement. ^⑦





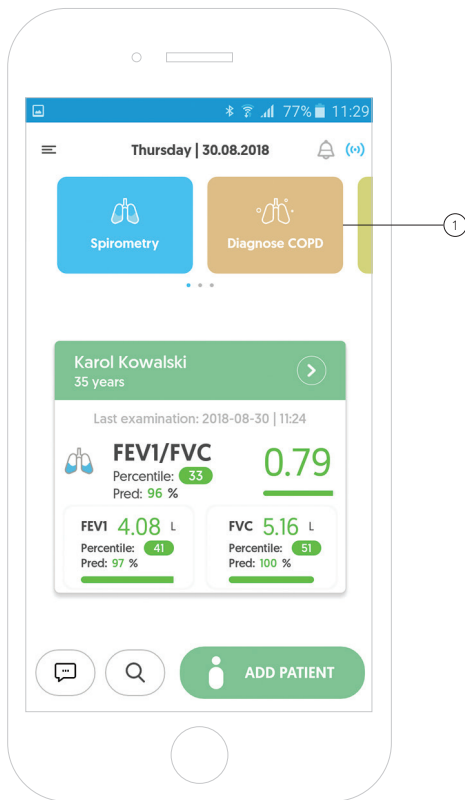
COPD diagnostics



COPD diagnostics

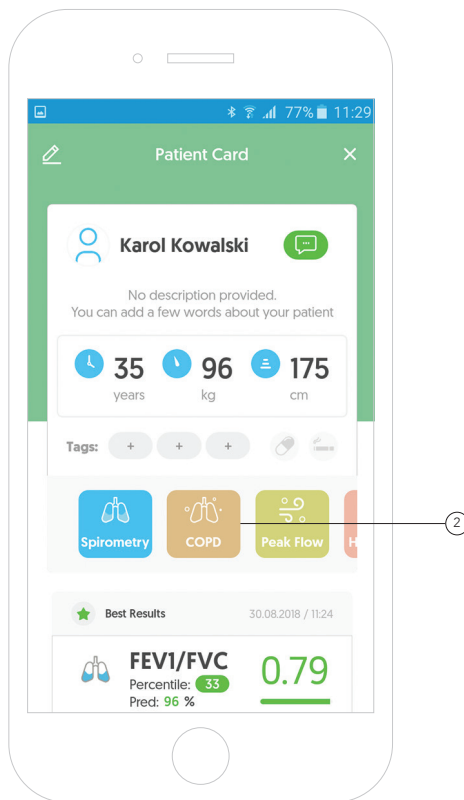
To diagnose COPD for a new patient who does not have a patient's card created yet, click on the **"Diagnose COPD"** tile. ①

Remember! To perform the measurement, you must be connected to the device.



COPD diagnostics

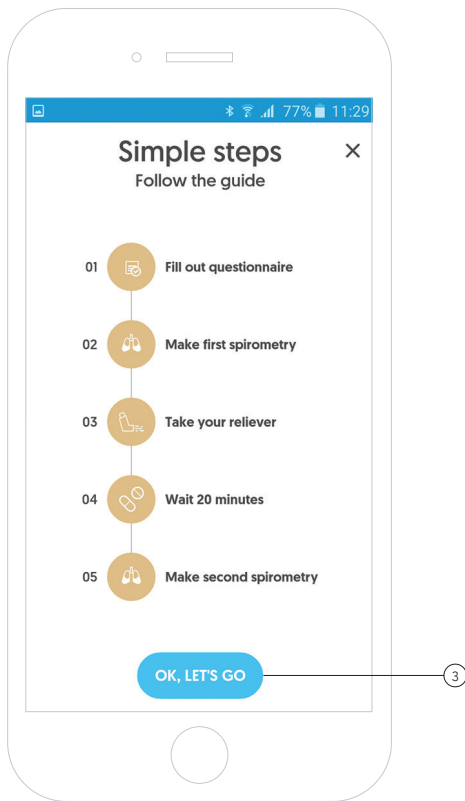
On the other hand, in order to perform an measurement for a patient who is already registered in the application, go to the selected patient's card and click **"Begin"** button, then select the COPD button and follow the instructions. ②



COPD diagnostics

The screen shows a short diagnostic procedure for COPD.

To go to step 1 of the COPD diagnostics, click the **"Ok, let's go"** button.^③



COPD diagnostics – step 1


The first step in the diagnosis of COPD is granted by the patient's response to five short questions yes or no type:

1. Do you cough most days?
2. Do you bring up phlegm in the morning?
3. Do you walk at a slower pace than other people of the same age?
4. Are you older than 40 years?
5. Are you a smoker or ex-smoker?


To go to the next question, select one of the given answers and click on the **"Next"** button. (4)

STEP 01 / 05 Questionnaire X

Question addressed to a patient



Do you cough most days?



☐ Yes

☐ No

NEXT (4)


COPD diagnostics – step 1

If at least 4 questions are answered by the patient negatively (no), then the test is interrupted because the patient does not meet the requirements of the COPD diagnostics.

To go to the next step in the COPD diagnostics, select one of the given answers and click on the **"Send"** button. ⁽⁵⁾

STEP 01 / 05 Questionnaire X

Question addressed to a patient



Are you a smoker or ex-smoker?

● ● ● ● ●

☐ Yes

☐ No

BACK SEND ⁽⁵⁾

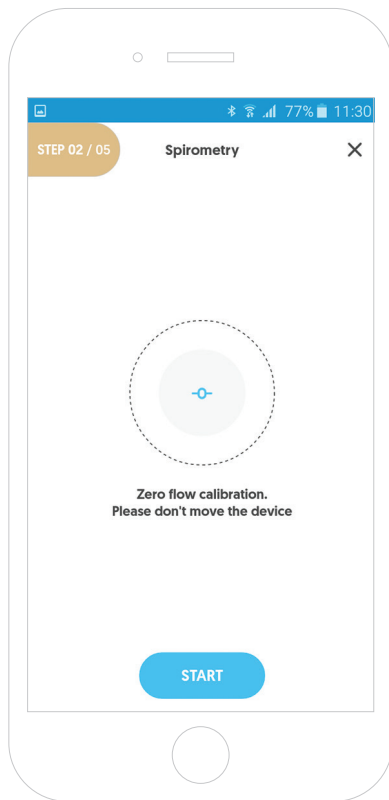
COPD diagnostics – step 2

After going to step 2, the flow is reset.

The process of resetting the flow looks in the same way as in the case of a spirometric test.

The “zero flow” process is necessary to ensure correct results. The process takes only 5 seconds.

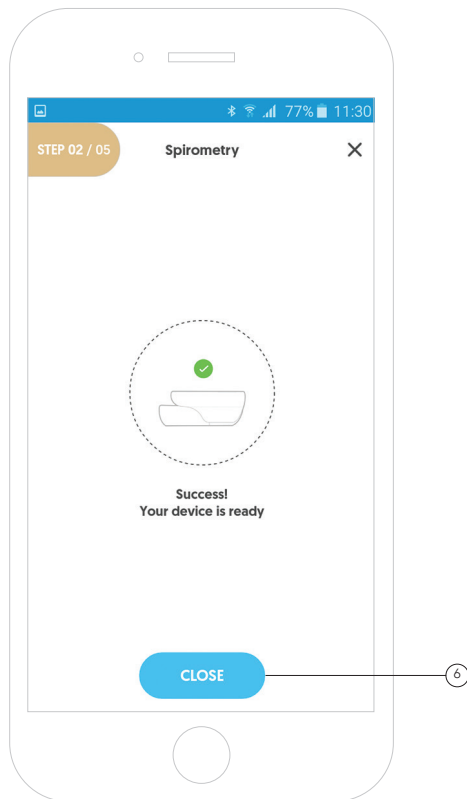
During the flow resetting the spirometer should remain stationary and away from the free flow (e.g. open window).



COPD diagnostics – step 2

After correct completion of the flow resetting process, the device is ready for the first measurement.

To return to the beginning of the test, click **"Close"**. ⑥



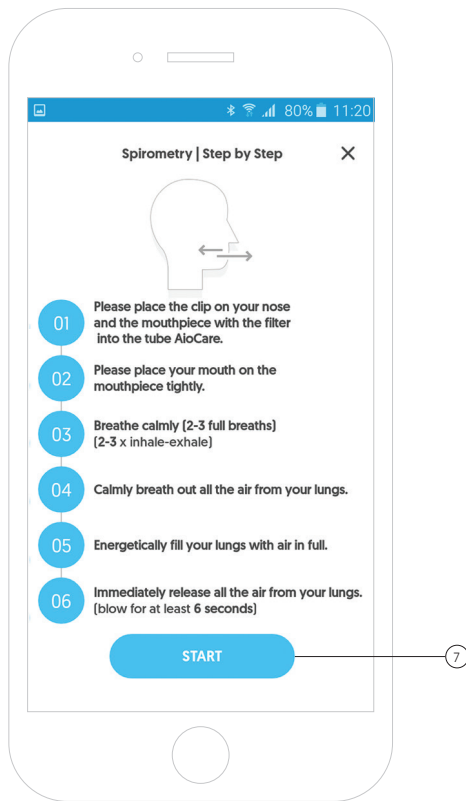
COPD diagnostics – step 2

The screen presents a brief instruction on spirometry measurement.

To go to the measurement, click **"Start"**.^⑦

Short instruction:

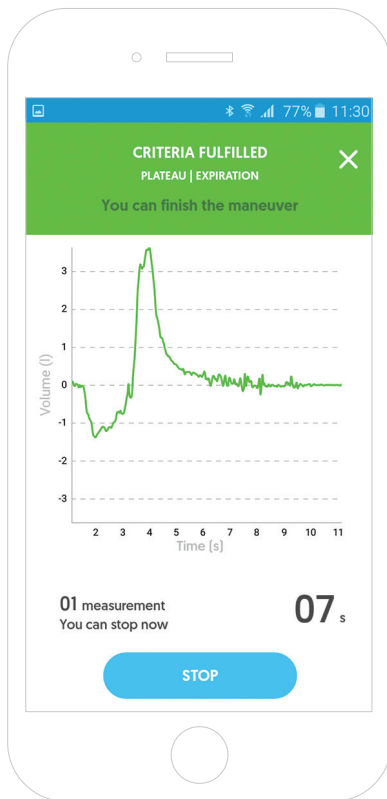
1. Please place the clip on your nose and the mouthpiece with the filter into the tube AioCare.
2. Please place your mouth on the mouthpiece tightly.
3. Breathe calmly (2-3 full breaths) (2-3 x inhale-exhale).
4. Calmly breath out all the air from your lungs.
5. Energetically fill your lungs with air in full.
6. Immediately release all the air from your lungs. (blow for at least 6 seconds)



COPD diagnostics – step 2

The measurement principle in COPD diagnostics module is the same as in the case of measurement in the Spirometry module.

For the measurement to be carried out correctly, both the repeatability and the criterion of correctness should be fulfilled.



COPD diagnostics

– step 3

After completing a minimum of 3 correct, repeatable measurements, the application will display a short survey consisting of 2 questions addressed to the patient.

To go to the next question, select one of the given answers and click on the **“Save & next step”** button. ①

STEP 03 / 05 Reliever X

Any β 2-mimetics with short duration of action taken in last 8 hours?

☐ Yes

☐ No

Any β 2-mimetics with long duration of action taken in last 8 hours?

☐ Yes

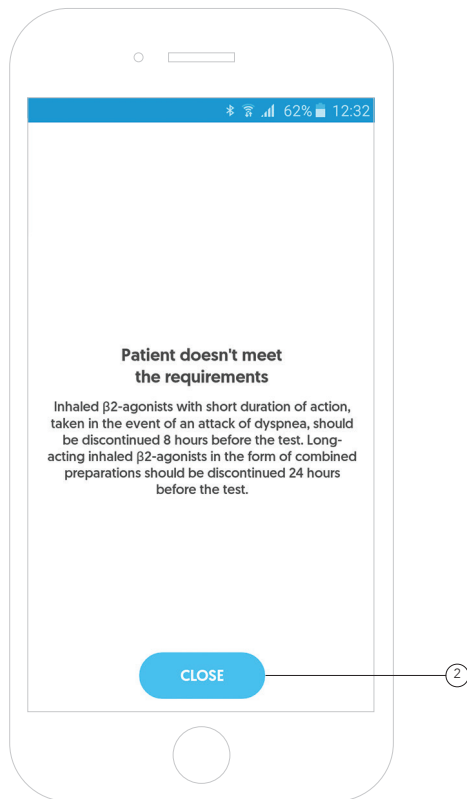
☐ No

SAVE & NEXT STEP ①

COPD diagnostics – step 3

If at least one question is answered positively by the patient, then a screen appears informing that the patient does not meet the requirements of the COPD diagnostics.

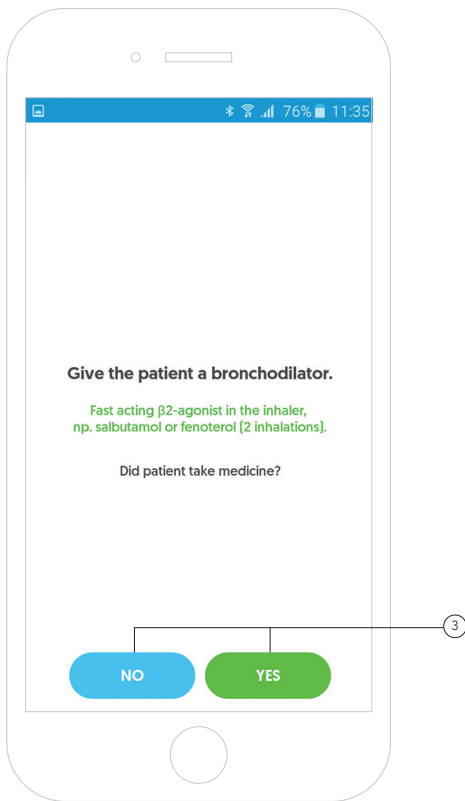
After clicking the **“Close”** button, the application terminates the COPD diagnostics. ②



COPD diagnostics – step 3

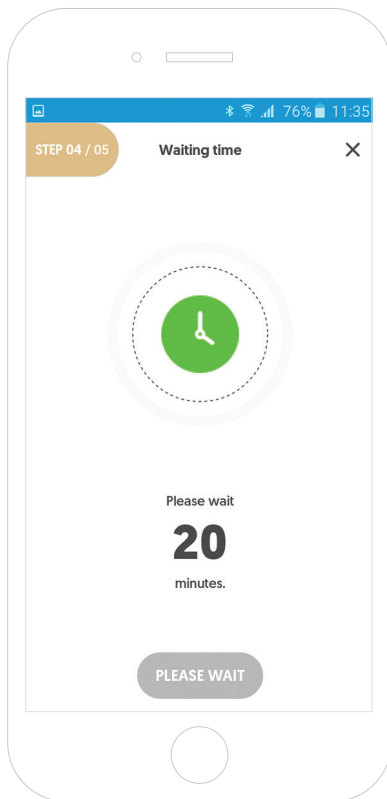
At this stage, the patient should take a medicine type Salbutamol.

To continue the COPD diagnostics, click **"Yes"** or discontinue the diagnosis by clicking the **"No"** button. ③



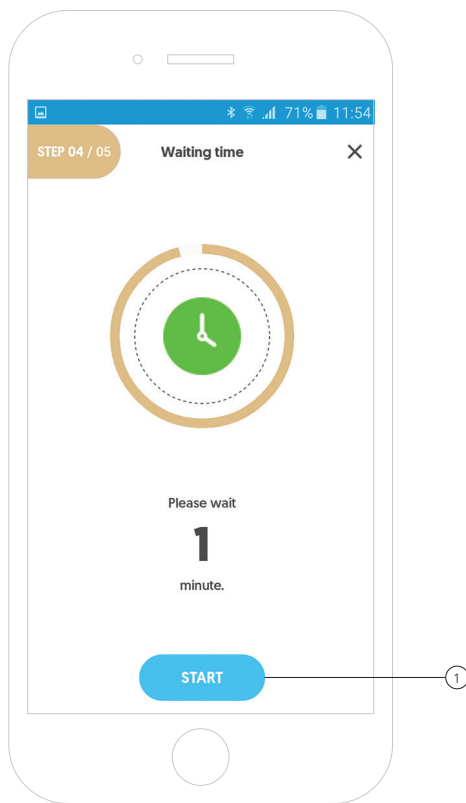
COPD diagnostics – step 4

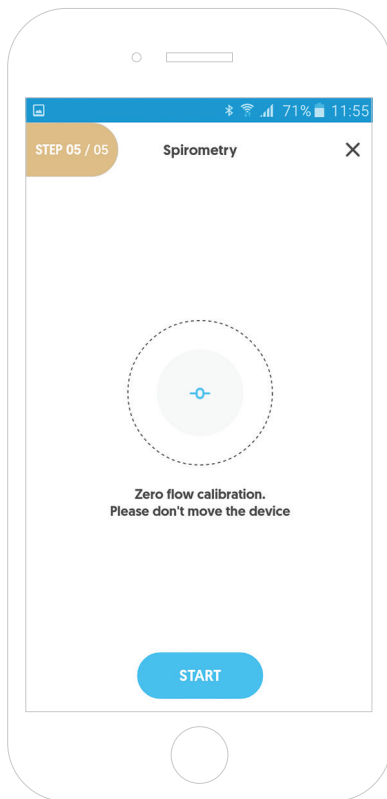
After taking the medication by the patient, wait 20 minutes.



COPD diagnostics – step 4

After 15 minutes, the “Start” button starts to be active and the application allows you to go to the next step in COPD diagnostics. ①





COPD diagnostics – step 5

After going to step 5, the flow is reset again.

The process of resetting the flow looks in the same way as in the case of a spirometric test.

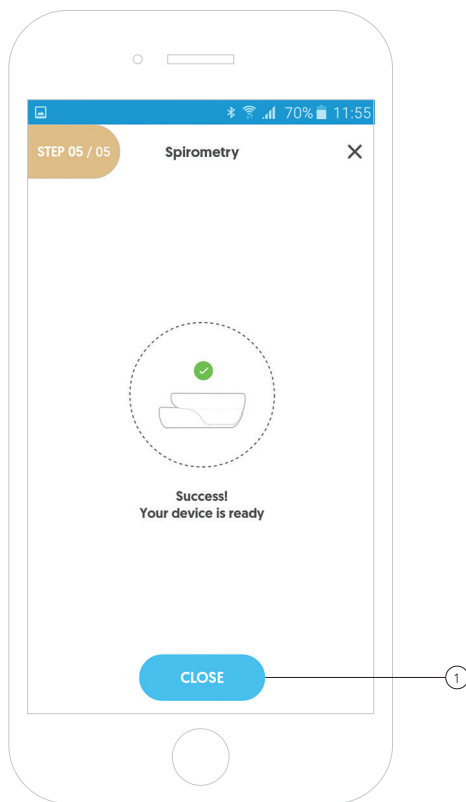
The “zero flow” process is necessary to ensure correct results. The process takes only 5 seconds.

During the flow resetting the spirometer should remain stationary and away from the free flow (e.g. open window).

COPD diagnostics – step 5

After correct completion of the flow resetting process, the device is ready for the first measurement.

To continue the diagnosis, click **"Close"**. ①



COPD diagnostics – step 5

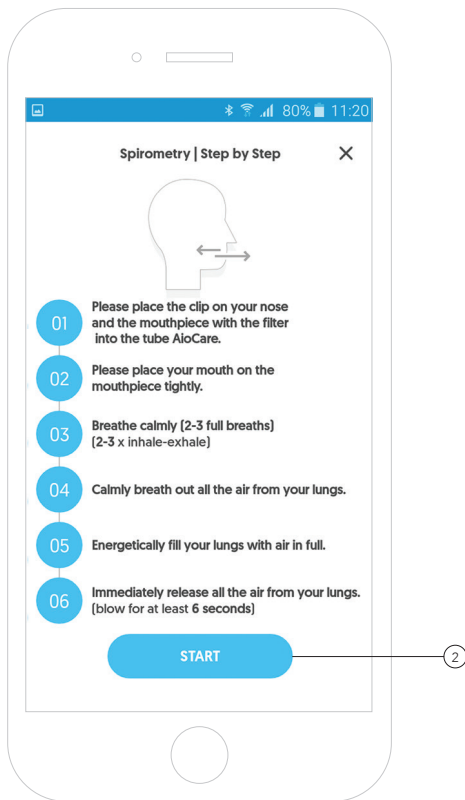
The final step in the COPD diagnostics is to conduct a spirometric test after administration of the drugs.

The screen presents a brief instruction on spirometry measurement.

Short instruction:

1. Please place the clip on your nose and the mouthpiece with the filter into the tube AioCare.
2. Please place your mouth on the mouthpiece tightly.
3. Breathe calmly (2-3 full breaths) (2-3 x inhale-exhale).
4. Calmly breath out all the air from your lungs.
5. Energetically fill your lungs with air in full.
6. Immediately release all the air from your lungs. (blow for at least 6 seconds)

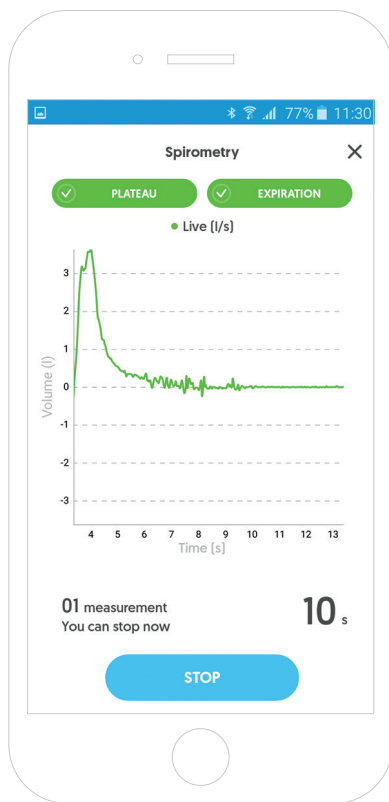
To go to the measurement, click **"Start"**.⁽²⁾



COPD diagnostics – step 5

The measurement principle in COPD diagnostics module is the same as in the case of measurement in the Spirometry module.

For the measurement to be carried out correctly, both the repeatability and the criterion of correctness should be fulfilled.



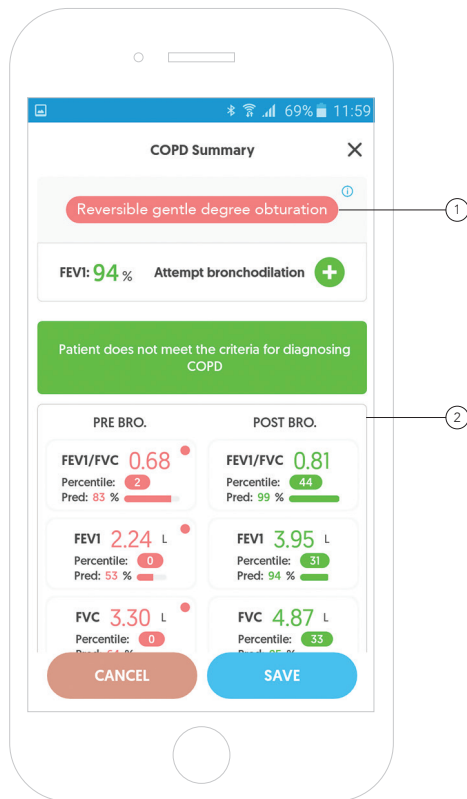
COPD diagnostics – results comparison

After performing a proper spirometric test, the application will present and compare the results from the study before and after the patient administering diastolic drugs.

Information on the degree and reversibility of the detected obturation is presented on the screen as well as the result of the diastolic test. ①

The application compares the values of the most important parameters such as FEV1/FVC, FEV1 and FVC. ②

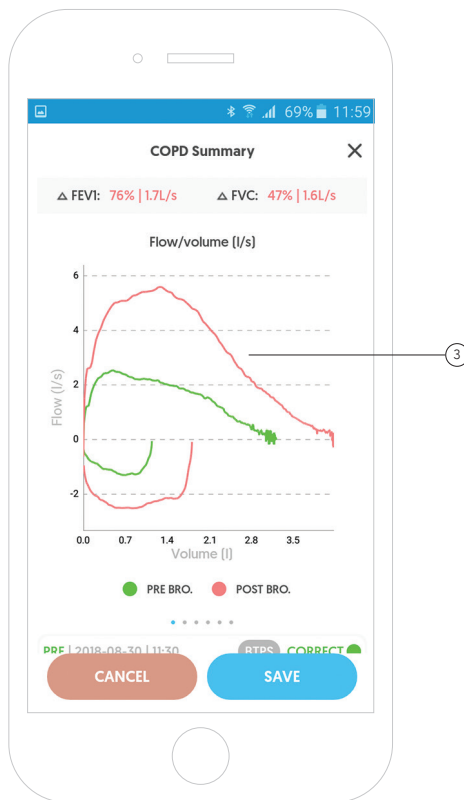
By moving the screen down, we will receive additional information.



COPD diagnostics – results comparison

Below is a graph of flow and volume before and after administration of drugs for each measurements of the performed tests. ③

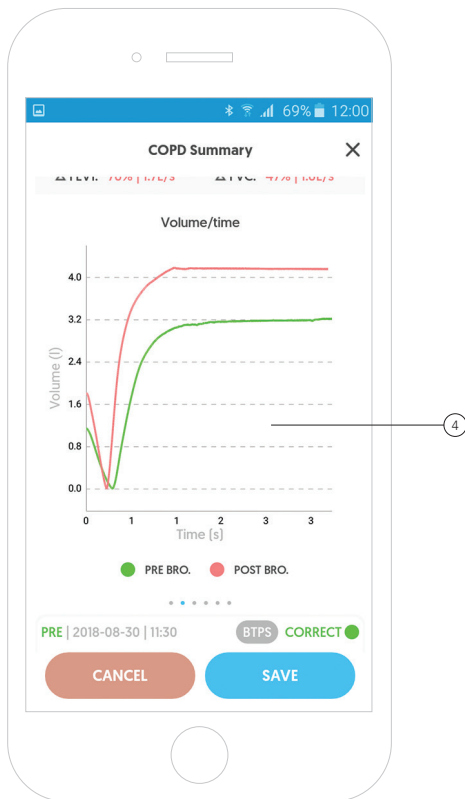
By moving the graph to the right, we will receive additional information.



COPD diagnostics – results comparison

In addition, the application presents a graph of volume and time before and after administration of medicines for each measurement from the examination. ④

By moving the screen down, we will receive additional information.

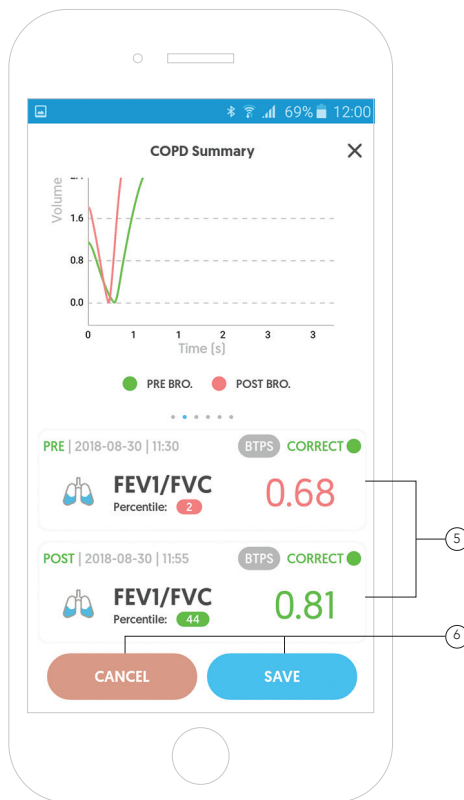


COPD diagnostics – results comparison

At the end of the summary of COPD diagnostics, there are spirometric tests of the patient before and after administration of the medicines.

By clicking on the selected examination, we will receive detailed information about the examination. ^⑤

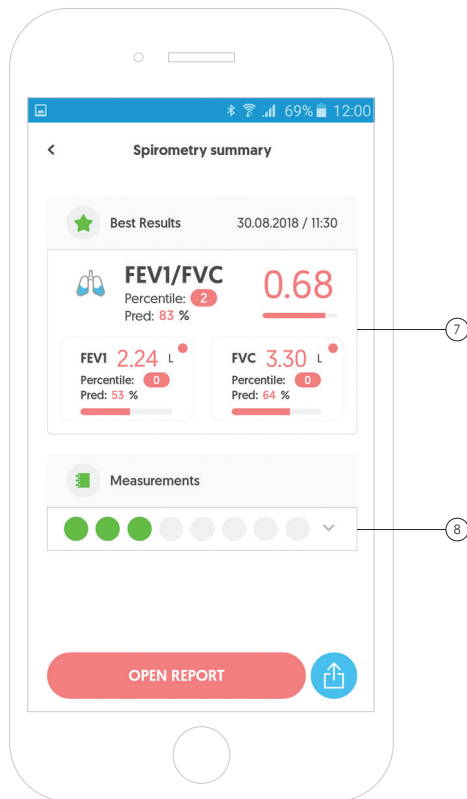
To save the diagnosis of COPD on the patient's card, click **"Save"** or click **"Cancel"** if you cancel the test. ^⑥



COPD diagnostics – results comparison

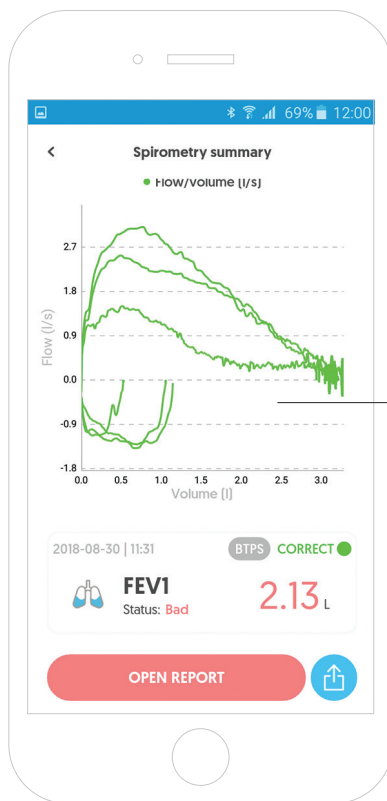
After clicking on a selected test (pre- or post-treatment examination) the application will present the best results of the most important parameters. ⁽⁷⁾

The application gives you the opportunity to analyze each measurement separately. To do this, click on the measurements. ⁽⁸⁾



COPD diagnostics – results comparison

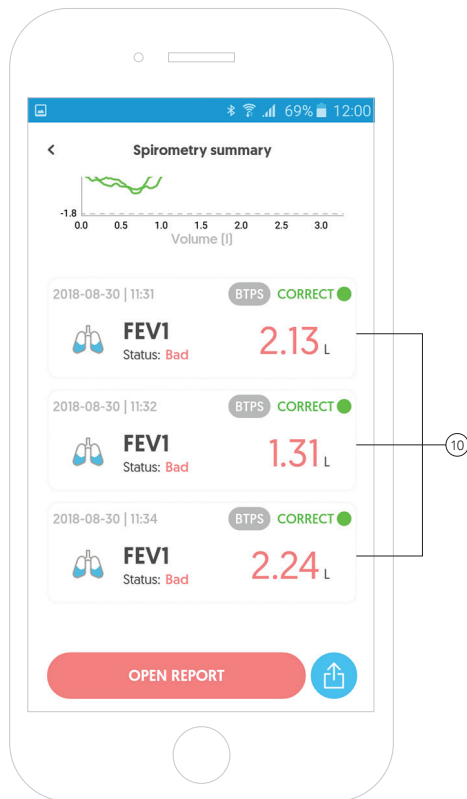
After expanding measurements, the application presents in graphical form all measurements in one graph. ⑨



COPD diagnostics – results comparison

In addition, the application gives you the opportunity to analyze a particular measurement. ⁽¹⁰⁾

To see the details of a given measurement, click on the measurement.





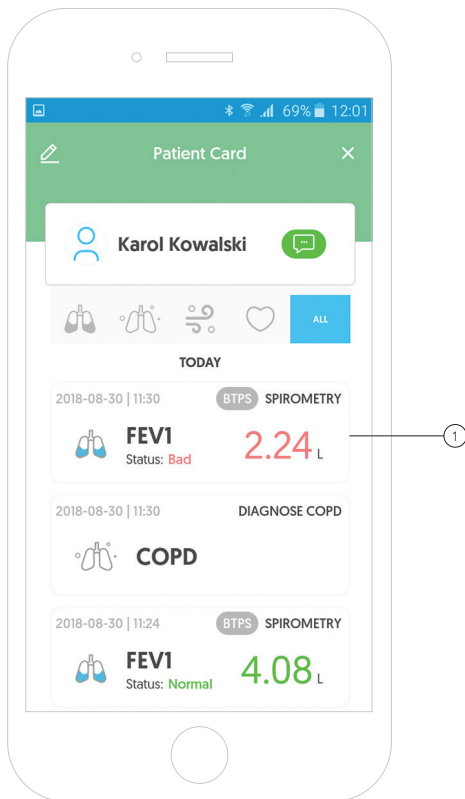
Reports



Report – data export

To open or export a report from the entire test or one examination, go to the patient's card and then search for the appropriate test.

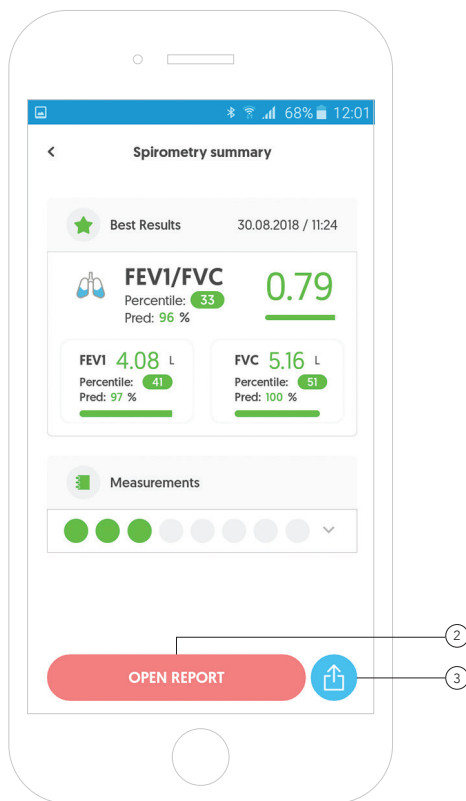
By clicking on the selected examination, we will receive detailed information about the study. ①



Report – data export

In order to open a report from the entire examination, click on the red **"Open Report"** button. ②

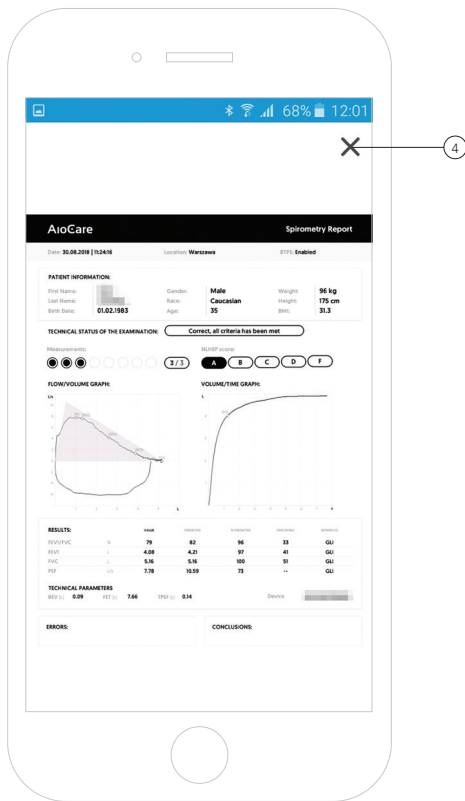
To export the report and send it to the email, click the blue icon. ③



Report – report preview

After clicking the red button, the spirometric test report will open in the application.

To return to the previous view, click **"X"** in the upper right corner in the screen. ④



Report – data export

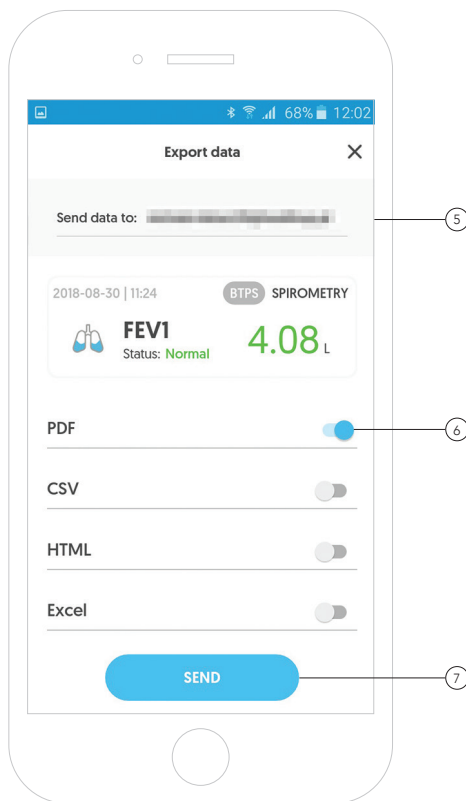
In order to send a spirometric test report (export data), first enter the appropriate email address to which the data will be sent. ⑤

Warning:

The default set e-mail address is the address the user logged into the application.

Then select the format in which the data should be presented by moving the appropriate slider. ⑥

To export the report and send it to the email, click the blue **"Send"** button. ⑦

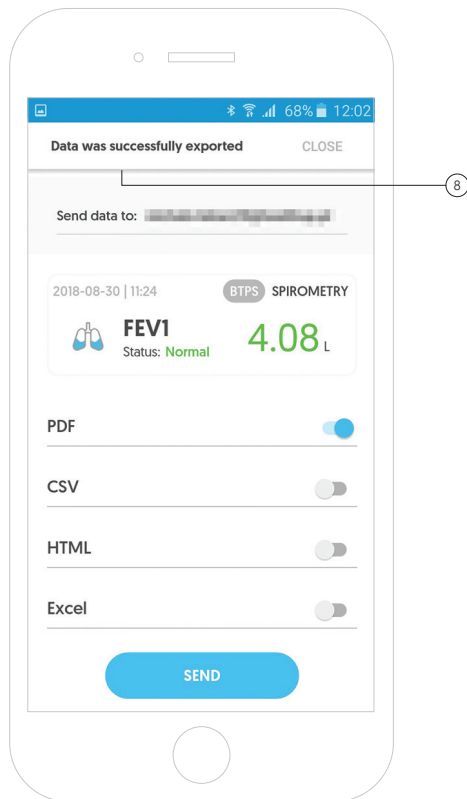


Report – data export

After correctly exporting the data (report), a corresponding message will appear at the top of the screen. ⑧

Warning!

To export data (generate a report) it is necessary to connect the mobile device to the internet

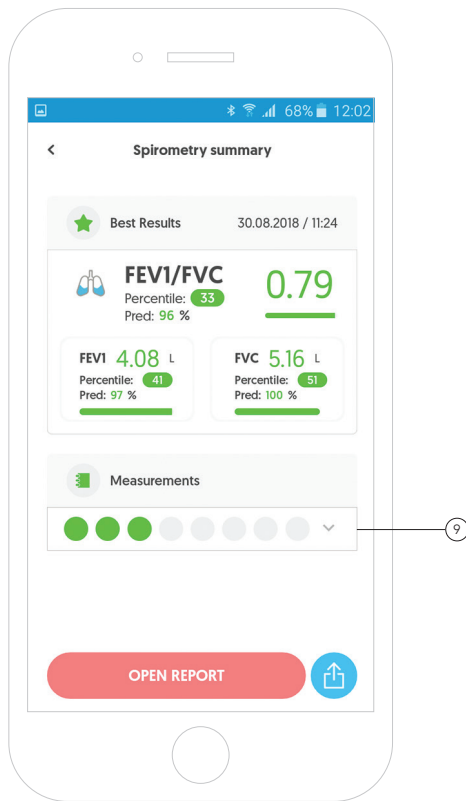


Report – Export of data from a single measurement

Export of data (generating a report) from a single measurement takes place in the same way as in the case of exporting data from the entire survey.

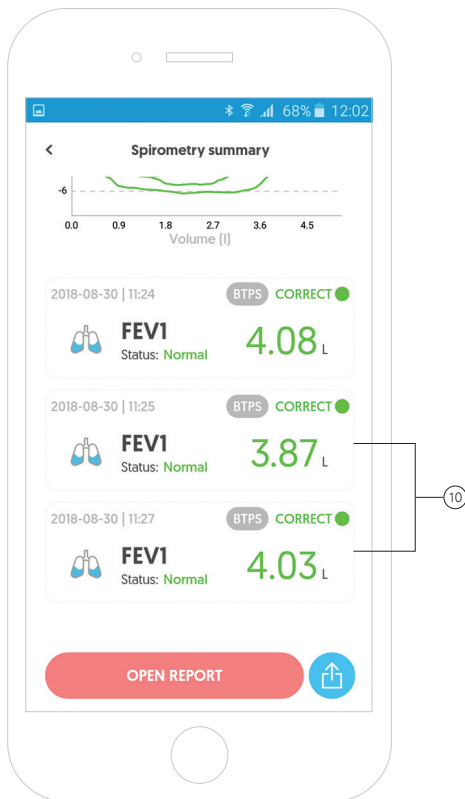
To do this, go to the study summary on the patient's card and click on the measurements. ⑨

The application will display detailed information about the measurements made in this study.



Report – Export of data from a single measurement

By clicking on a given measurement, we will receive detailed information about a given measurement. ⁽¹⁰⁾



Report – Export of data from a single measurement

To open a report from a single study, click the red **"Open Report"** button. (11)

To export the report and send it to an email, click the blue icon and proceed in the same way as for exporting data for the entire study. (12)



AioCare
Thank you!

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