



# angioCode

## AngioCode-301

Health Tracker

### Working with a Computer



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# **Chapter**

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I

# 1 Introduction

This section contains introductory information about the AngioCode-301 device, hereinafter referred to as “device” or AngioCode.

## 1.1 Purpose of the device



**AngioCode-301**

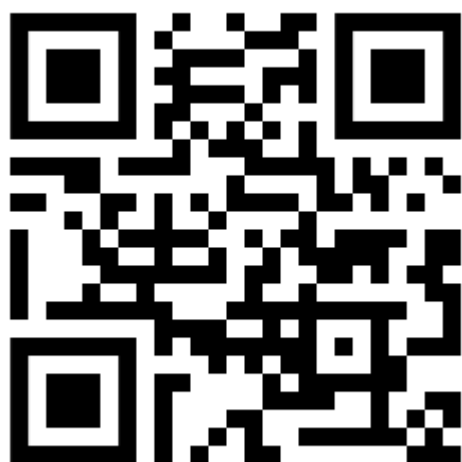
The **AngioCode-301** is a mobile health tracker that allows assessing the state of the cardiovascular system at home. The purpose of its creation is to help detect in advance the symptoms of cardiovascular diseases - such as hypertension, atherosclerosis, coronary heart disease, pre-infarction and pre-stroke conditions. These symptoms usually appear long before you feel them and decide to see a doctor. The results are stored on a personal computer or mobile device and can be transferred further for accumulation and analysis to the cloud storage.

### Measured indicators

- **Oxygen saturation.** Spectral analysis of the blood flow allows you to determine how much hemoglobin in the body is in the oxygen-bound state. Especially important indicator for people with chronic lung diseases.
- **Pulse rate.** The most important parameter that allows assessing the overall fitness of the cardiovascular system.
- **Vascular age.** Indicates the condition of small arteries, the main function of which is to provide optimal blood supply to the tissues of the organs;
- **Vascular stiffness.** Assessment of arterial condition, its ability to smooth blood pulsations created by the left ventricle of the heart. Evaluation of the parameter makes it possible to assess the risk of capillary damage and impaired blood microcirculation in various organs.
- **Pulse wave type.** Assesses your arteries. The moments of formation of maxima of direct and reflected blood pressure waves and what phase of the cardiac cycle they correspond to are determined.
- **Systole duration.** The ratio of the systole duration to the total duration of the cardiac cycle reflects the features of the working cycle of the myocardium.
- **Stress level.** Reflects the state of the centers that regulate the mode of operation of the body as a whole and the cardiovascular system in particular.

**The AngioCode device can be used to run tests and view test results in the following ways:**

- Offline. The device is controlled by buttons on its housing. Information is displayed on the built-in display of the device.
- The device can be connected to a [personal computer](#) with Windows operating system. The application for working with the device can be downloaded from the link [https://angiocode.com/en\\_w301](https://angiocode.com/en_w301). The device is connected to a computer with a USB cable.
- The device can be controlled using a mobile phone or tablet with Android operating system version 6.0 and above. The device can communicate with a phone via Bluetooth interface version 4.0 or higher (Bluetooth Low Energy, BLE), as well as via USB interface using an OTG cable. The mobile application is available at the following link:



[https://angiocode.com/en\\_a301](https://angiocode.com/en_a301)

Documentation for the device and software is available at the following links:

User manual: [https://angiocode.com/en\\_pdf301](https://angiocode.com/en_pdf301)

Working with the device: [https://angiocode.com/en\\_qs301](https://angiocode.com/en_qs301)

Working with a computer: [https://angiocode.com/en\\_wpdf301](https://angiocode.com/en_wpdf301)

Working with a smartphone or a tablet: [https://angiocode.com/en\\_apdf301](https://angiocode.com/en_apdf301)

Updating the firmware of the device, i.e. the program, which is located in the device itself and which actually conducts tests, is possible only when the device is connected to a computer, or when the device is connected to a phone/tablet via USB. After updating the application version, the device may once give information that it is desirable to update the firmware version.

**Warning! AngioCode-301 is not a medical device! This is a device for monitoring physiological parameters at home. Any data obtained using the device is for informational purposes only and cannot be used for diagnosis, treatment or therapy. For all questions about the operation of the device, you can contact [Customer service https://angiocode.com/support](https://angiocode.com/support)**

## 1.2 System requirements

The AngioCode software operates under the following operating systems:

Operating system	32-bit	64-bit
Windows XP	✓	
Windows 7	✓	✓
Windows 8	✓	✓
Windows 10	✓	✓

## 1.3 Developer information

### **AlmaCode**

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Web: <https://www.almacode.com>

# Chapter

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II

## 2 Working with a computer

This section describes the AngioCode dialog boxes and windows.

### 2.1 Installation of the AngioCode software

Several AngioCode software versions can be installed on one computer at the same time. Software updates are available via the Internet.

When installing the updated software, the installer determines which versions of the AngioCode software is already installed on the computer and offers to transfer the desktop environment from the existing version to the version to be installed. The desktop environment includes AngioCode configuration files. The user database is the same for all versions of AngioCode, it is not replaced when installing a new version and is not removed when uninstalling it.

Next, you will be prompted to uninstall old versions of the AngioCode software from your computer:

#### 2.1.1 Installation of the USB driver

When installing the AngioCode program, the driver is installed automatically. If the installation fails, the driver installer window remains on the screen.

The AngioCode device may or may not be connected to a computer. It is still preferable to connect the device *after* installing the package (respectively, the driver), because in this case the operating system will not display the dialog boxes “Found new equipment...”. If the device was connected before the package was installed and the “Found new equipment...” dialog box appeared, it should be closed without performing any actions.

When connecting a USB device after installing the driver, it will take some time (several seconds) for the system to initialize the parameters associated with the device. During this time, the device will not work yet.

If the system already has a driver installed, the system checks its version. If the installed driver has a later version than the one being installed, then the system does not perform any action, otherwise the installed driver will be updated.

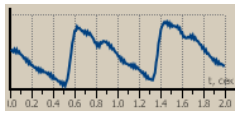
Usually, after installing the driver, rebooting the system is not required. However, if such a need arises, you will be prompted to reboot the system.

The driver installer is also available after installing the package - in the AngioCode folder there is a label “USB Device Driver Installer”. If you encounter problems installing the driver, this installer will help you solve them.

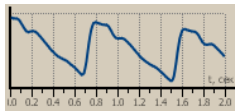
### 2.2 Using AngioCode with a laptop

If the AngioCode device is connected to a notebook, tablet or netbook, it must be borne in mind that the notebook's power supply often creates strong interference with the device's photosensor:





Sensor signal in the presence of interference



Sensor signal without interference

Interference to the sensor signal is likely to reduce the reliability of the test results, therefore, when testing with a notebook, it is recommended to disconnect its power supply from the mains. **Please note that you should unplug the power supply from the wall socket, and not from the notebook.** If it is impossible to disconnect the notebook from the network, then you should place its power supply and wires as far as possible from the AngioCode device and its cable.

In the [AngioCode](#) settings there is an option “Display warning before test start if notebook is connected to the power outlet”. By default, this option is enabled, and a warning is issued before the start of the test (working on a notebook connected to the network is automatically recognized by the program).

## 2.3 Synchronizing with the Internet

The AngioCode device provides the ability to synchronize user data and test results with a cloud storage. The synchronization scheme is very similar to the scheme used by mobile phones to synchronize contacts and other account data. When synchronization is enabled, the data of registered users and the results of their tests will be the same on all computers where these users are present. In the context of synchronization, a user is understood as an individual registration record entered into a database on a computer.

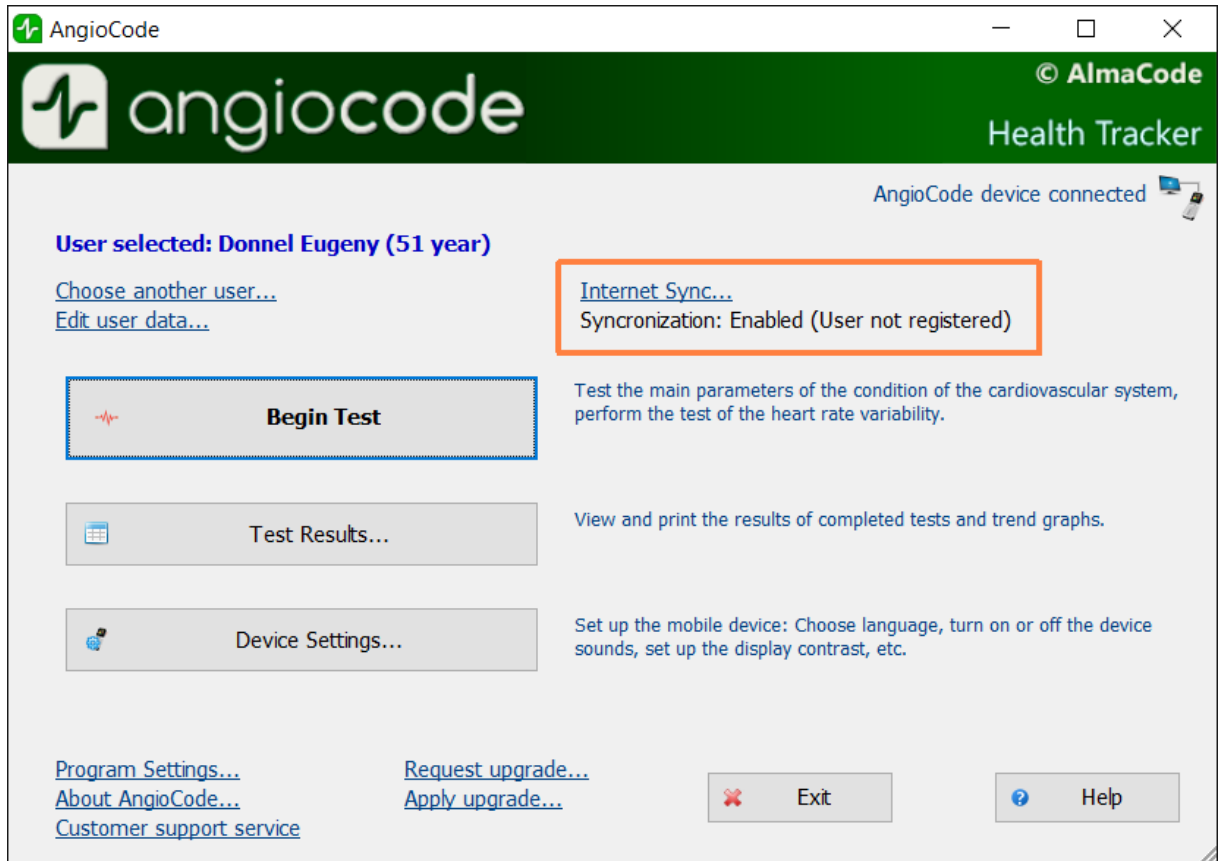
Each user of the program is registered in the AngioCode cloud database separately, i.e. has its own username and password. Synchronization of test results data is performed only for registered users. The AngioCode user can be registered either directly from the AngioCode program or via the <https://www.angiocode.com> website.

Personal information of users, namely last name, first name and middle name, is not stored in the cloud. Only the username and password are used to identify users.

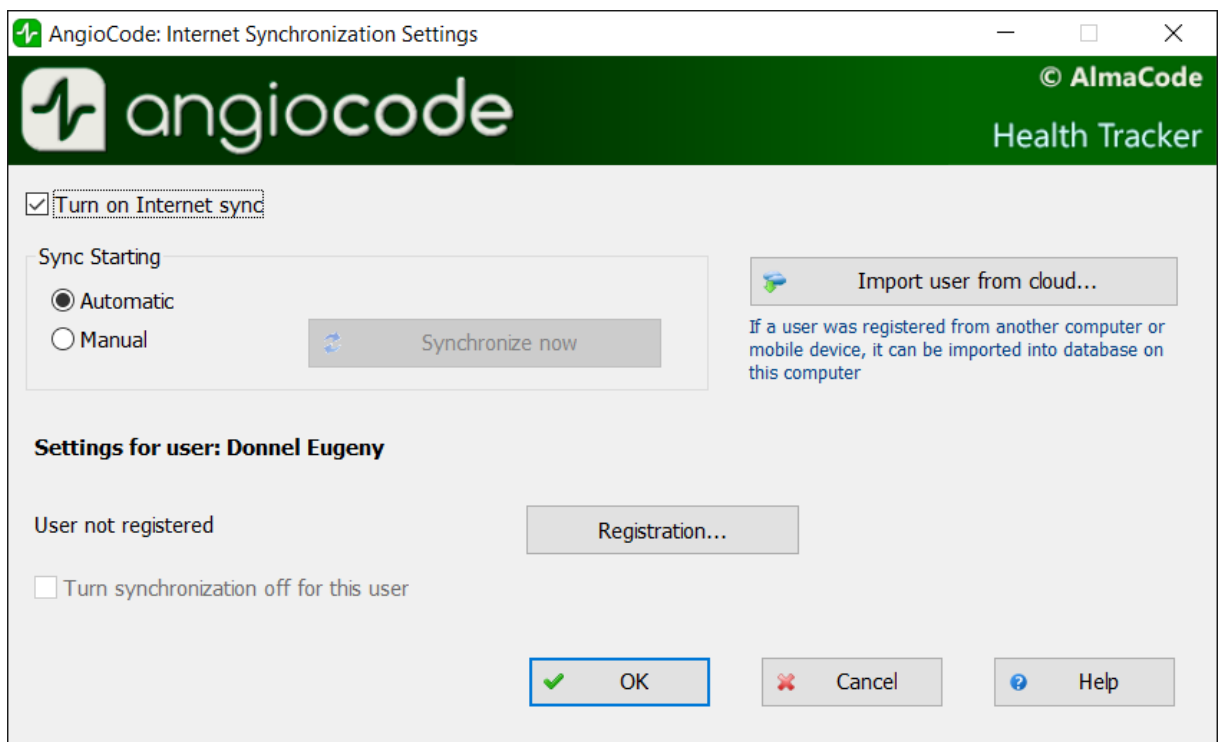
You can disable synchronization both for all users at once, and for each separately.

### Cloud synchronization management

The [program's home dialog box](#) displays the synchronization status:



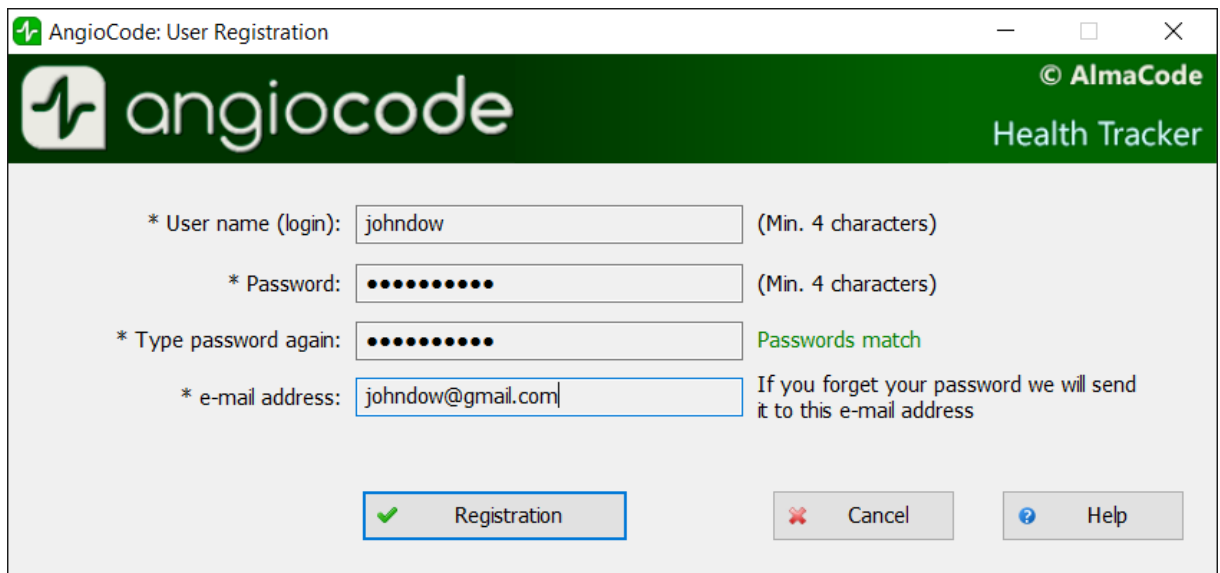
Selecting the “Internet synchronization” link opens the synchronization settings dialog box:



The “**Turn on Internet sync**” option controls the overall synchronization state. When synchronization is disabled, the program does not make any attempts to access the cloud storage.

The settings of the **“Sync starting”** group control how synchronization is started: when automatically started, synchronization is performed after any changes in the local database (adding, changing, deleting users and test results). Since synchronization is performed in the background, and the amount of data being transferred is relatively small, you should switch to manual synchronization only with paid Internet traffic or a slow connection.

Below are the settings for the current user. If there is no user registration, you can register it with the **“Registration”** button:



The screenshot shows a window titled "AngioCode: User Registration". The window has a green header bar with the AngioCode logo on the left and "© AlmaCode Health Tracker" on the right. Below the header, there are four input fields with labels and validation messages:

- \* User name (login):  (Min. 4 characters)
- \* Password:  (Min. 4 characters)
- \* Type password again:  Passwords match
- \* e-mail address:  If you forget your password we will send it to this e-mail address

At the bottom, there are three buttons: "Registration" (with a green checkmark icon), "Cancel" (with a red X icon), and "Help" (with a blue question mark icon).

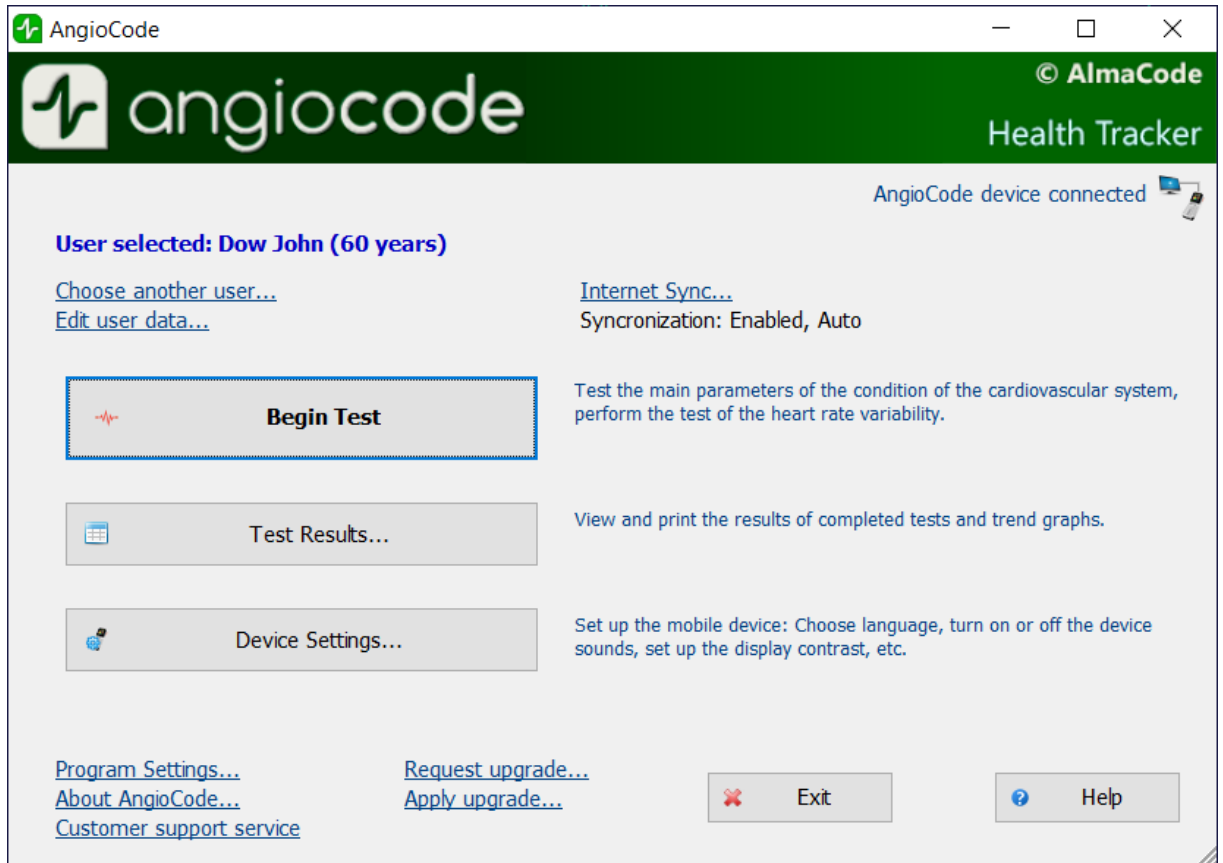
You can also register through the <https://www.angiocode.com> program website. On the website, you can view test results, graphs of trend indicators, etc.

The **“Turn synchronization off for this user”** option controls the synchronization state for this particular user.

The **“Import user from cloud”** button allows adding to the local database a user who was registered on another computer, mobile device, or through the program website. You are prompted to enter the username and password of this user. After checking the correctness of the input, you will be prompted to enter for the imported user his first name, last name, middle name, because no personal information is stored in the cloud (the rest of the data - date of birth, sex, etc. is copied from the cloud). Then the test results are loaded into a local database and subsequently synchronized in the same way as for other users.

## 2.4 Home dialog box

This dialog box is displayed on the AngioCode startup.



The AngioCode device status is displayed in the upper right corner of the dialog box. To install the device's USB driver, see ["Installing AngioCode software"](#).

The **"Choose another user"** link opens the ["Choose the user"](#) dialog box. Use this dialog box to select another user from the database, as well as to add a new user or delete an existing one.

The **"Edit user data"** link opens a dialog box of the same name where you can specify user data: Full name, date of birth, height, etc.:

<b>Last Name:</b>	Dow
First Name:	John
Middle Name:	
<b>Birthday:</b>	Jan 1, 1962
<b>Sex:</b>	<input checked="" type="radio"/> Male <input type="radio"/> Female
Weight, kg:	90
<b>Height, cm:</b>	184
e-mail:	john.dow@gmail.com

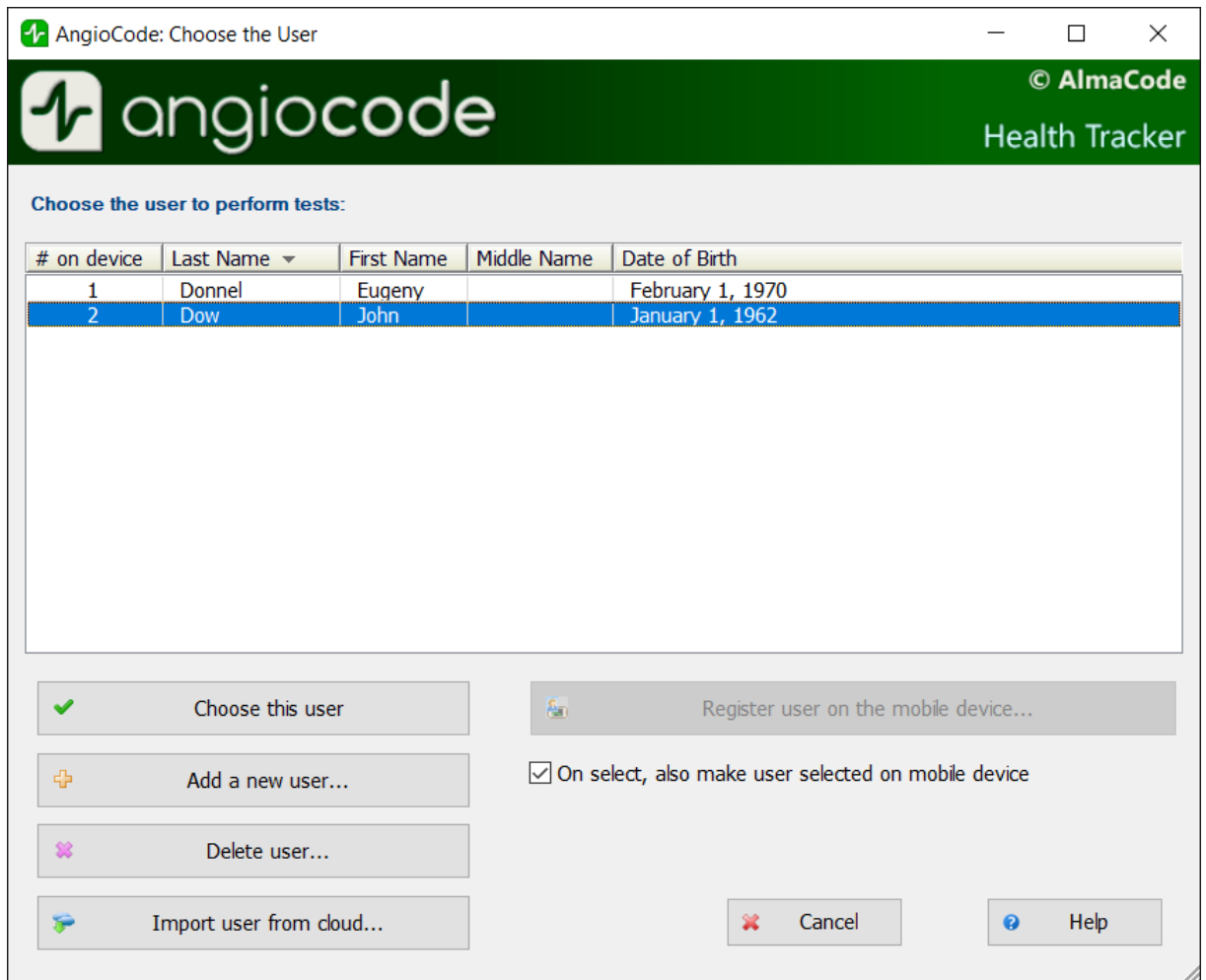
The “**Begin test**” button is available when the device is connected to the computer. Before the start of the test, a series of dialog boxes is given with instructions on how to conduct the test.

The “**Test results**” button displays the “[Test results](#)” dialog box. Using this dialog box, you can view the results of the tests performed, get detailed information about each test, print a medical report, delete unnecessary results, etc.

The “**Program settings**” link opens the [settings dialog box](#), where you can set AngioCode parameters.

## 2.5 “Selecting a user to work with” dialog box

Use this dialog box to select another user from the database, as well as to add a new user or delete an existing one.



The **“Import user from cloud”** button opens a dialog box where you can enter the login and password of the user who was registered in the AngioCode cloud storage to the local database from another computer or mobile device. See [Internet sync](#).

You can only delete a user explicitly in the “Choose the user” dialog box, and you can delete test results in the [“Test results”](#) dialog box.

## 2.6 “Test results” dialog box

Using this dialog box, you can view the results of the tests, get detailed help about each test, print a final report, delete unnecessary results, etc. Note that this dialog box can be resized just like any Windows window.

AngioCode: Test Results

© AlmaCode Health Tracker

Dow John (60 years)

#	Date	Heart Rate	Oxygen Saturation	Pulse Index	Vascular Aging	Vascular stiffness	Pulse Curve Type	Ejection Duration, %	Stress In
1	Jan 13, 2022 16:48	61	97.2	2.0	N/C	11.3	A:100	29	371
2	Dec 20, 2021 12:22	67	96.8	2.9	71	4.2	A:84,B:14,C:2	29	125
3	Dec 20, 2021 12:13	67	96.8	4.2	66	9.7	A:95,B:1,C:4	30	204
4	May 20, 2020 14:24	67	97.1	0	N/C	6.8	A:100	N/C	260
5	Jan 14, 2020 12:41	62	97.1	0	N/C	21.0	A:100	N/C	89
6	Jan 14, 2020 12:05	94	96.3	0	N/C	-14.1	C:100	N/C	236
7	Dec 16, 2019 17:40	79	95.8	0	N/C	-2.9	A:5,B:33,C:62	N/C	1235
8	Nov 13, 2019 16:26	84	96.9	0	N/C	-13.0	C:100	N/C	624
9	Sep 20, 2019 15:27	57	97.4	0	N/C	-25.3	B:5,C:95	N/C	87
10	Jul 16, 2019 13:32	86	96.0	0	N/C	0.3	B:14,C:86	N/C	1682
11	Jun 21, 2019 10:41	84	95.9	0	N/C	-2.2	B:24,C:76	N/C	498
12	Jun 21, 2019 10:29	88	96.5	0	N/C	7.1	A:38,B:33,C:29	N/C	620
13	Jun 19, 2019 15:14	81	94.2	0	N/C	-9.0	C:100	N/C	275

[View results](#)
[Details...](#)
[Print results...](#)
[Trends...](#)
[Comment...](#)
[Import database...](#)

[Print trend graphs and results table...](#)  
[Open trend graphs and results table in browser](#)  
[Test statistics...](#)  
[Delete selected record...](#)  
[Delete test data from the device memory...](#)

[Close](#)
[Help](#)

The **“View results”** button generates a final report based on the results of assessments of the body state indicators and opens it in an HTML browser. An example is provided [here](#).

The **“Details”** button opens the [“Evaluation of indexes”](#) dialog box, where you can view detailed information about each of the indexes.

The **“Print results”** button allows printing the results of the selected test. Read about possible printing issues [here](#).

The **“Trends”** button opens the [“Trend graphs”](#) dialog box. In this dialog box, you can clearly see how the scores of indexes change from test to test.

The **“Comment”** button allows editing the comment to the test. Comments are displayed in the window to the right of the “Oxygen saturation” field (to see the comments, the window can be scrolled horizontally with the scroll bar at the bottom of the window or simply stretched). Comments to the test are also displayed in the final report.

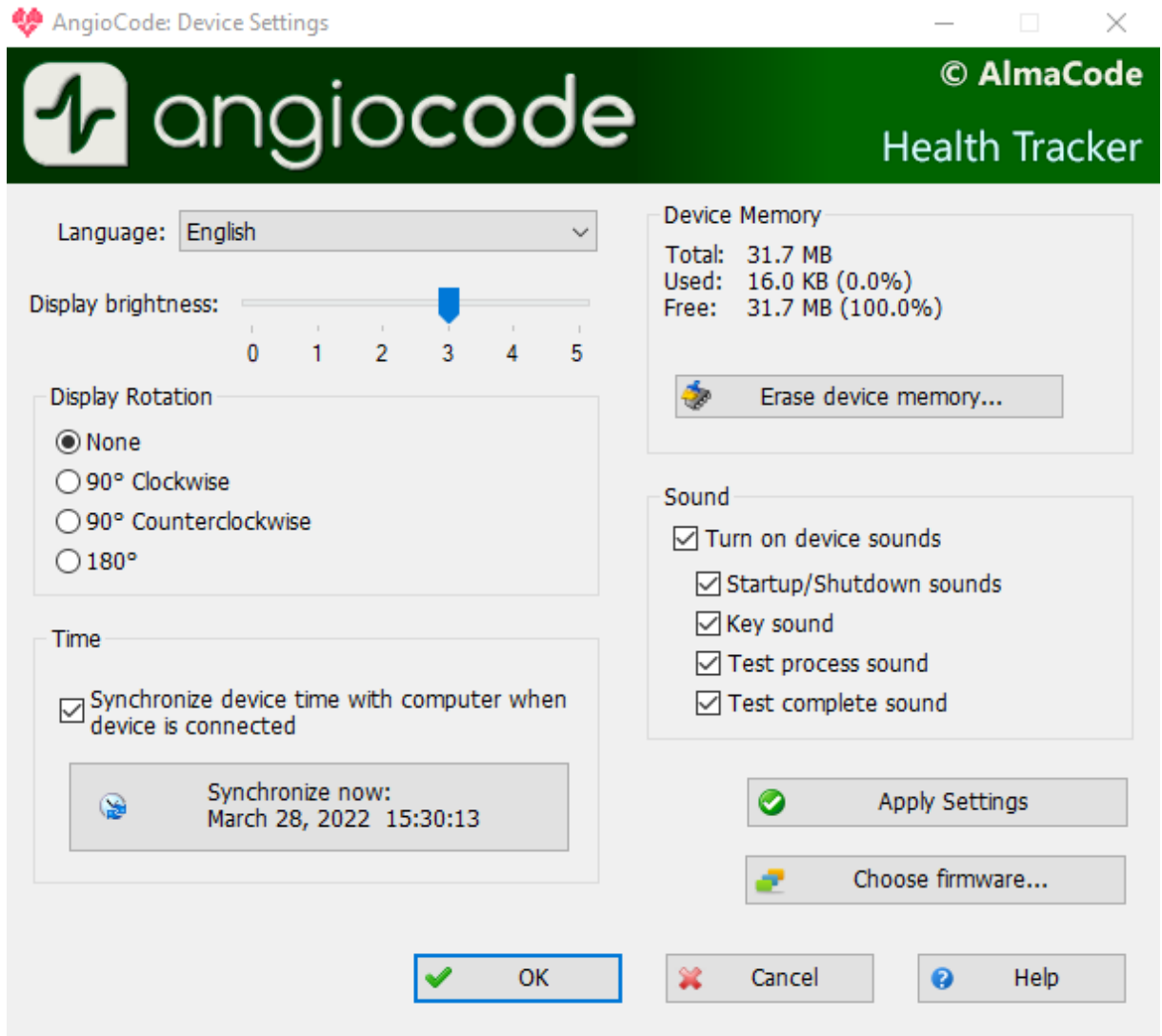
The **“Print trend graphs and results table”** link allows printing graphs of trends in indexes and a table of test results on a printer connected to a computer.

The **“Test statistics”** button opens the [dialog box of the same name](#) with statistics of tests conducted for certain periods of time.

The **“Delete selected record”** link deletes the record selected in the list from the database. Using the Shift, Ctrl and left mouse buttons, you can select several entries in the list and delete them all at once.

## 2.7 “Device settings” dialog box

In this dialog box, you can change the **AngioCode-301** program settings.



In the “**Interface language**” list you can select the language of the device interface

On the “**Display brightness**” scale, you can set the brightness of the device screen.

The “**Display Rotation**” setting allows selecting the orientation of the image on the device screen.

The “**Synchronize device time with computer when device is connected**” option enables automatic synchronization of the device's built-in clock with the computer's clock.

In addition, synchronization is possible at any time by pressing the “**Set now**” button

In the “**Device memory**” section, information is available on the state of the device's non-volatile memory, which stores test results.

When pressing the “**Erase device memory**” button, it will be completely cleared.

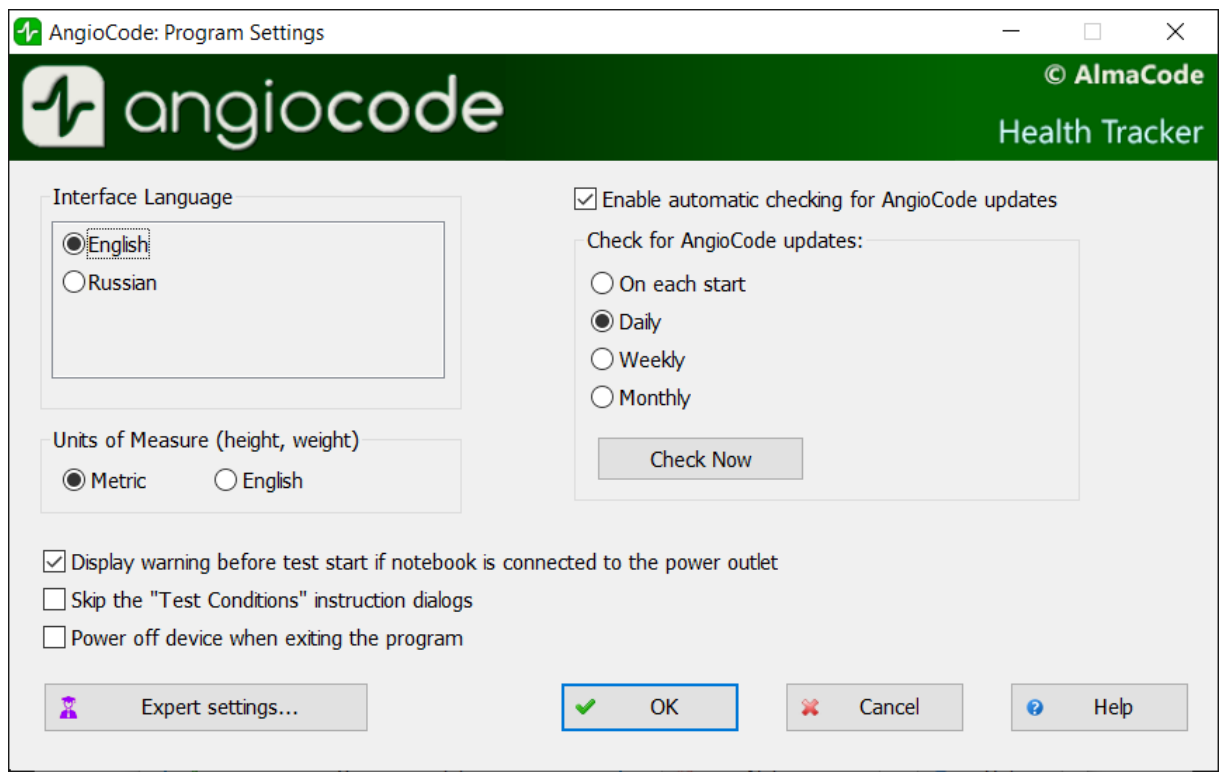
In the “**Sound**” section, options are available to enable/disable the sound indication of the device.

By pressing the “**Apply settings**” button, the selected settings will be entered into the non-volatile memory of the device



## 2.8 “Program settings” dialog box

In this dialog box, you can configure the behavior of the AngioCode program:



In the “**Interface language**” list, you can select the language of the program interface.

The “**Enable automatic checking for AngioCode updates**” option enables automatic checking for software updates. It is recommended to use the latest version of the software, since not only the software for the computer is updated and improved, but also the software in the device.

The “**Display warning before test start if notebook is connected to the power outlet**” option: laptop power supplies usually create strong interference with the device's photosensor. The AngioCode program recognizes the work on a laptop connected to the power supply. If this option is set, then before the start of the test, a warning will be issued with a recommendation to disconnect the laptop from the network for the duration of the test. See also [Using AngioCode with a laptop](#).

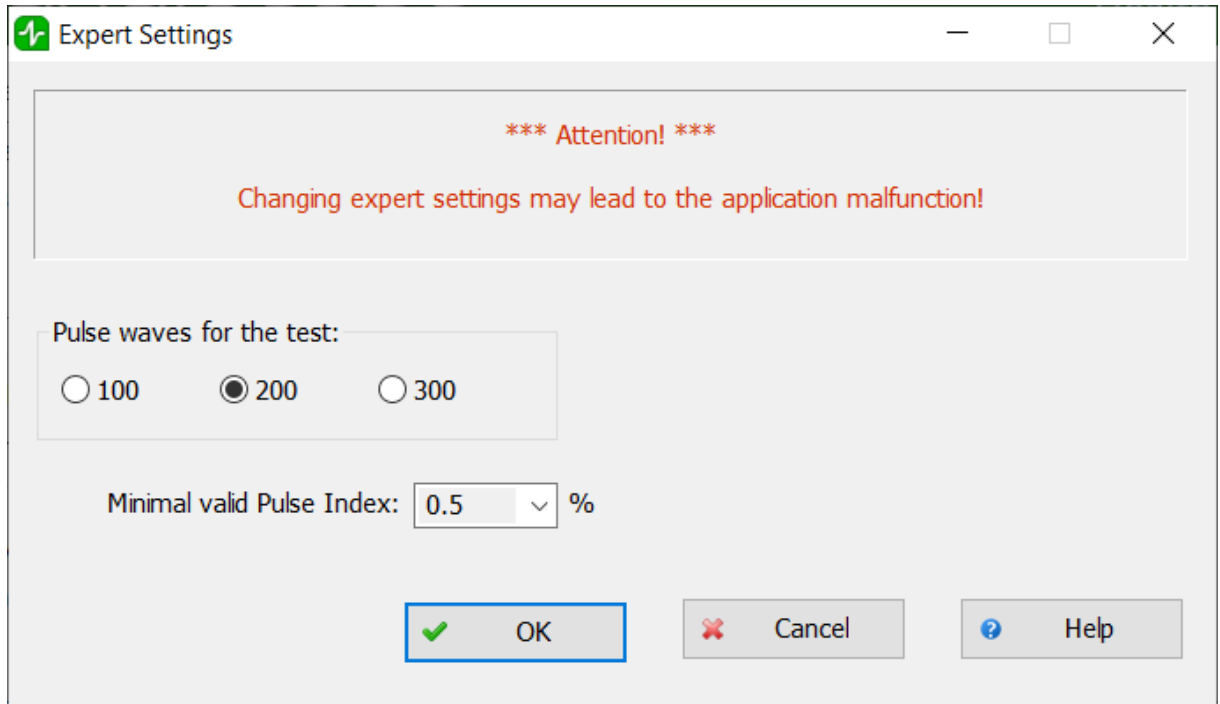
The “**Units of measure**” settings specify which units will be used for users' height and weight: centimeters and kilograms, or inches and feet.

The “**Skip the “Test conditions” instruction dialogs**” option: do not display dialog boxes for instructions on test conditions and recommendations.

The “**Expert settings**” button gives access to the management of test parameters other than the standard ones. It is recommended to leave these settings as default.

## 2.9 “Expert settings” dialog box

This dialog box gives access to the management of test parameters other than the standard ones. These settings are recommended to be left unchanged.



The **“Pulse waves for the test”** parameter determines the number of pulse waves that will be collected to generate performance indicators. The default value is 200. It is about 3 minutes. Better results are available at the setting - 300 (5 minutes). Express evaluation is possible at - 100 (1.5 minutes). When choosing the number of waves equal to 100, the error in estimating the level of stress increases.

The **“Minimal valid pulse index”** parameter determines the minimum signal quality received by the program. Under normal circumstances, values less than 0.5 should not be selected.

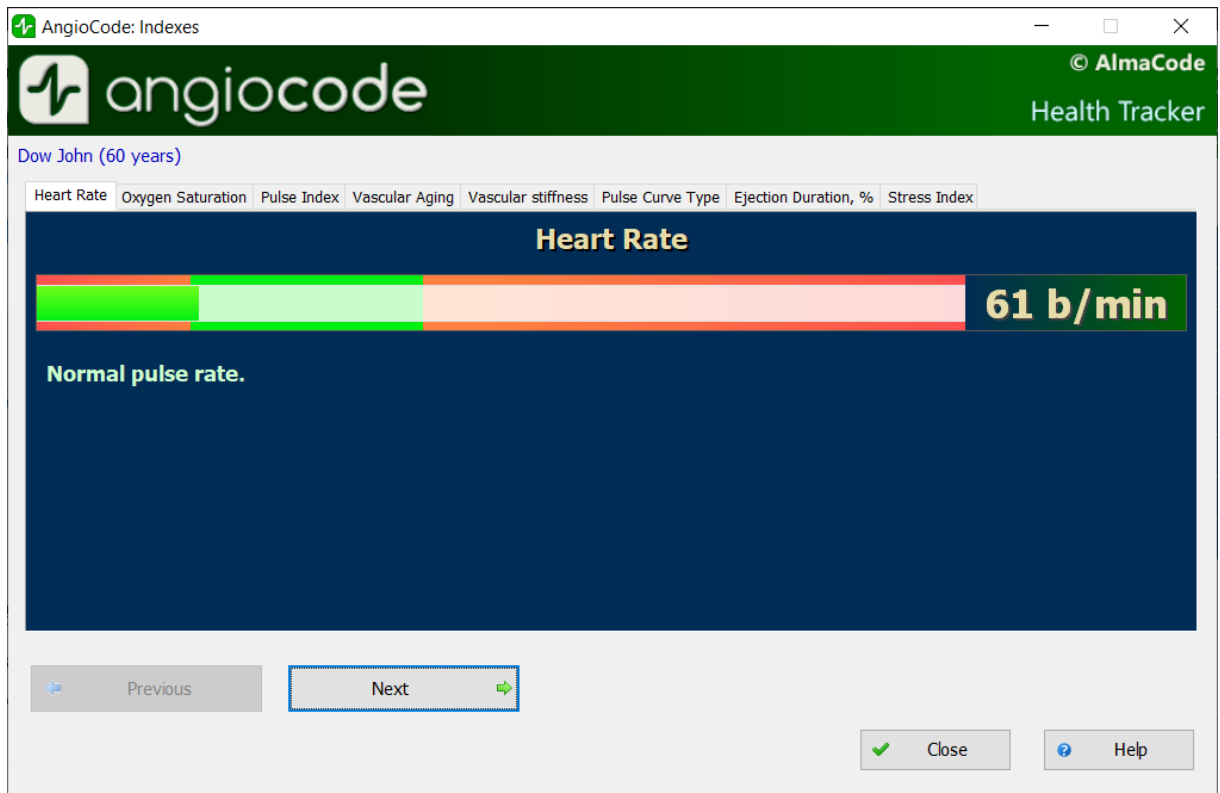
## 2.10 “Indexes assessments” dialog box

In this dialog box, you can view a description of each of the indexes. The dialog box has several tabs according to the number of indexes to be evaluated. You can scroll through the tabs one by one using the “Next” and “Previous” buttons, as well as by clicking on the title of the desired tab.

When displaying the results for each indicator, the program gives its assessment graphically, in the form of a color scale with an index, and numerically. Depending on the color marked with the pointer, the following evaluation options are distinguished:

- **green** - good condition
- **yellow** - satisfactory condition
- **red** - unsatisfactory condition, if there are consistently negative results for some time, it is recommended to consult a specialist.

### 2.10.1 “Heart rate” tab



Heart rate or the number of heartbeats per minute. The inverse of this value is the pulse wave duration. The device evaluates the duration of each pulse wave, calculates the instantaneous value of the pulse frequency, and determines the average value based on the test results.

This is an important indicator, primarily reflecting the fitness of the body. The higher the resting heart rate, the less trained the body and the cardiovascular system in particular. Regularly exercising people have a resting heart rate of 55-60, which can be evaluated as an excellent condition, 60-80 - good, over 90 - bad.

A more qualitative assessment of the body's fitness can be obtained by conducting stress tests.

As an option:

1. Determine the pulse rate in a normal resting state.
2. Do 20 squats in 30 seconds.
3. After 3 minutes, reassess heart rate and calculate the difference between the second and first results.

Result:

- good fitness - up to 5 beats;
- satisfactory - 5-10 beats;
- low - more than 10 beats.

### 2.10.2 “Oxygen saturation” tab

Oxygen, inhaled with atmospheric air, is transferred to the organs with the help of a special carrier protein - hemoglobin, which is contained in red blood cells, erythrocytes. The oxygen level in the blood or

the oxygen saturation degree of the blood shows how much hemoglobin in the body is in a state associated with oxygen.

Saturation - saturation (SpO<sub>2</sub>) of blood hemoglobin with oxygen is a vital indicator, the value of which is determined by:

- pumping function of the heart
- ability of the lungs to oxygenate the blood
- state of hemoglobin, oxygen carrier.

Normally, almost all hemoglobin is associated with oxygen, while the hemoglobin saturation with oxygen varies in the range from 96% to 99%. A steady decrease in the level of saturation below 95% can be observed in diseases of the respiratory and cardiovascular systems, as well as in severe anemia, with a decrease in hemoglobin levels.

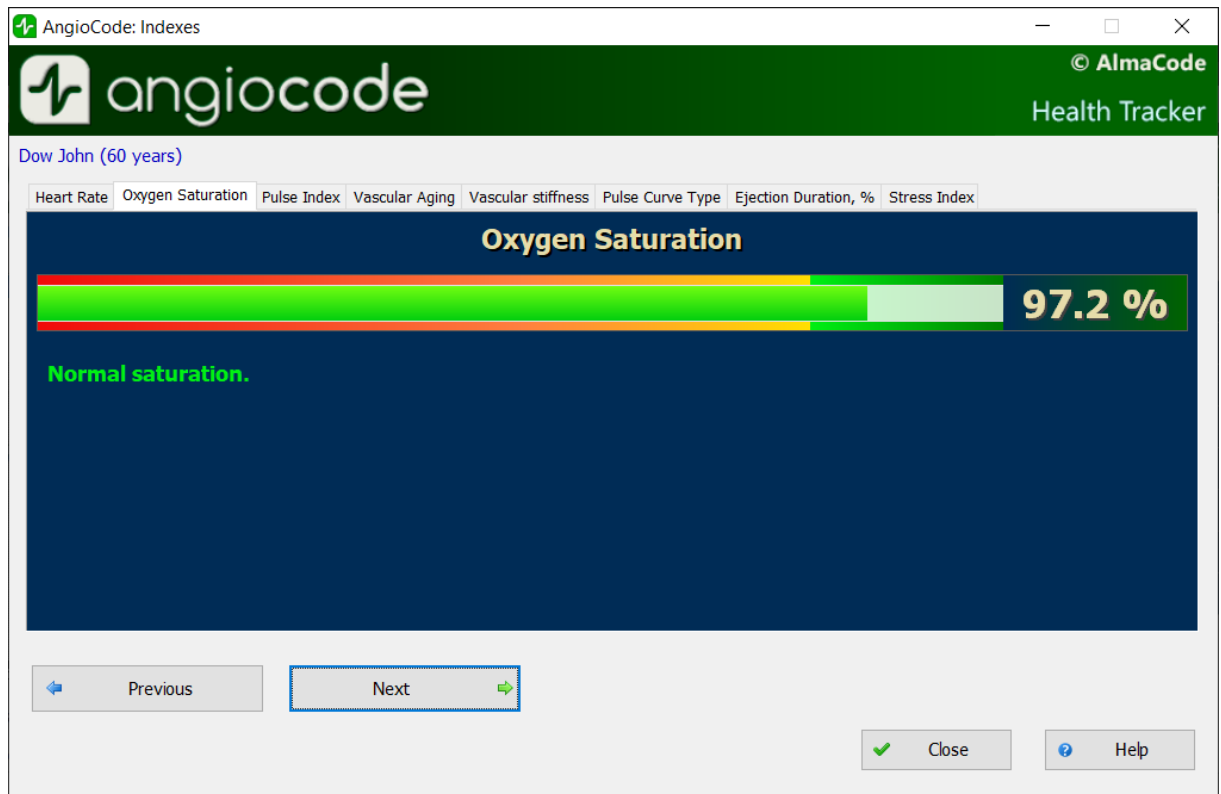
With chronic diseases of the heart and lungs, a decrease in this indicator may indicate an exacerbation of the disease, in such situation, one should seek medical help. A decrease in the level of saturation of hemoglobin with oxygen against the background of a cold, flu, acute respiratory viral infections, pneumonia and other lung diseases may indicate a complicated course of the disease.

The saturation level indicator is important for people with chronic lung diseases, including chronic bronchitis.

When performing a study, it should be taken into account that a number of factors can lead to an error in assessing the level of oxygen in the blood. Such factors include the presence of a manicure, especially with the use of dark shades of varnish, the movement of hands or trembling of the fingers during the examination, the presence of a strong external light source - solar or artificial, and the close proximity of sources of strong electromagnetic radiation, such as mobile phones. The low temperature in the study room can also lead to errors in the SpO<sub>2</sub> assessment.

There may be slight individual fluctuations in the saturation level. To correctly interpret the score for this indicator, several tests should be performed. This will reveal the individual characteristics of fluctuations in the level of oxygen in the blood, and will help to correctly interpret certain changes in the future.

A sharp decrease in SpO<sub>2</sub> by 3-4% of normal values can be a sign of the development of diseases such as influenza or pneumonia.



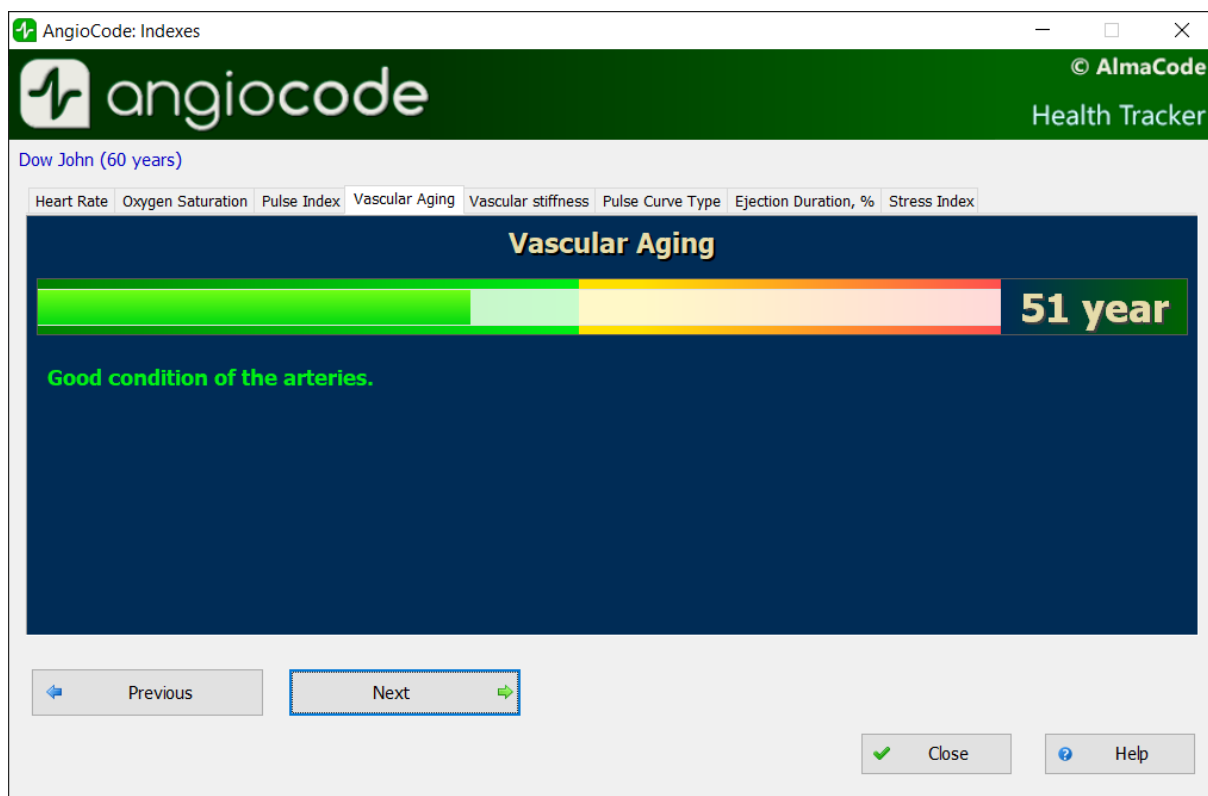
### 2.10.3 “Age of the vascular system” tab

If your vascular age is less than the passport age, then this is good. A constant significant excess of the vascular age over the passport age may be a recommendation for consultation with a specialist. At the same time, you can note a decrease in vascular age against the background of an increase in blood pressure and pulse rate.

It is important to fix this indicator at a certain time of the day and on the same hand, better on the working one.

Right for right-handed, left for left-handed persons.

A good time is the morning hours from 9 to 11 a.m.

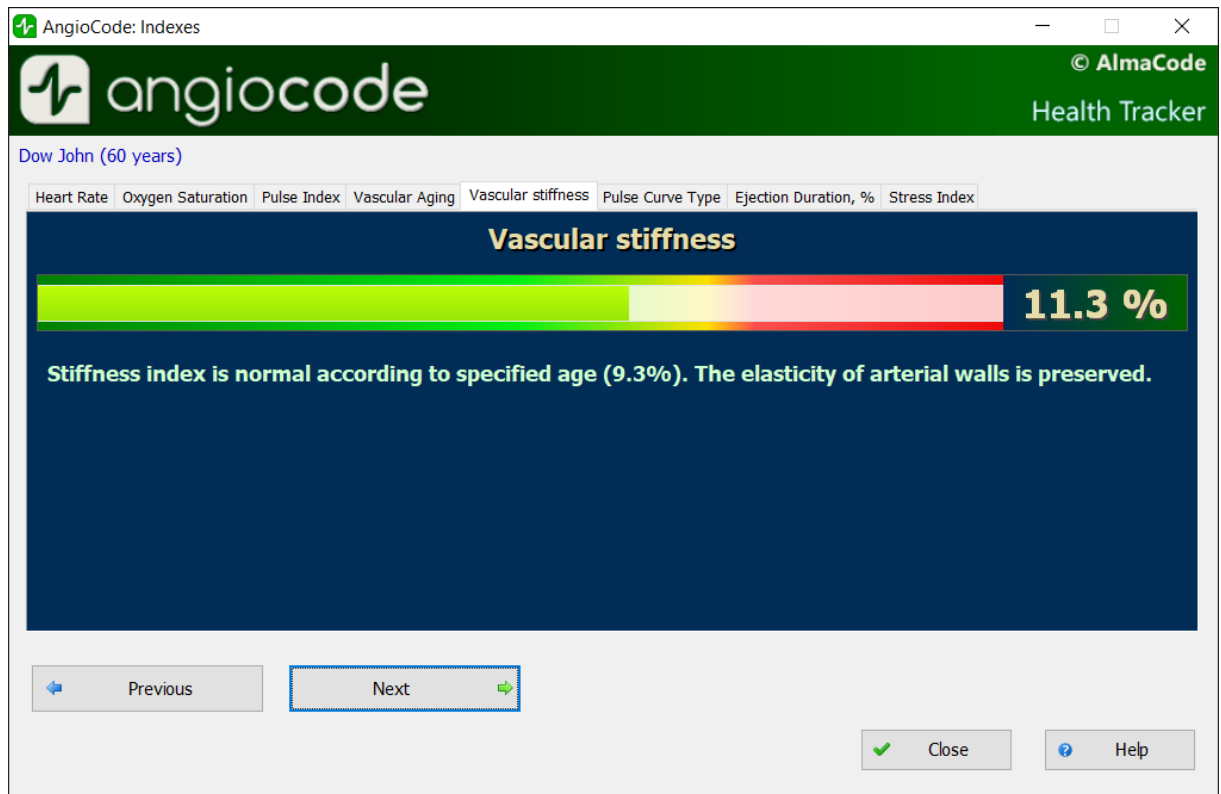


#### 2.10.4 “Vascular stiffness” tab

Here the sign in front of the number is important. If it is negative, then this rather indicates the preserved elasticity of the arteries. The greater the negative value of the stiffness percentage, the better the condition of the large arteries.

The normal values of this indicator depend on the age of the subject: in the age category from 18 to 35 years, a negative value from -40% to -5% is considered the norm. In the age category over 40 years, the norm ranges from -5% to 5%. For people older than 55 years, positive values of this indicator are typical. Of course, the aging process is irreversible and inevitably leads to a gradual increase in vascular stiffness, but regardless of your age, you should strive to reduce the vascular stiffness index through a healthy lifestyle.

For a correct assessment of this indicator, it is necessary to first set the real age of the user in the device.

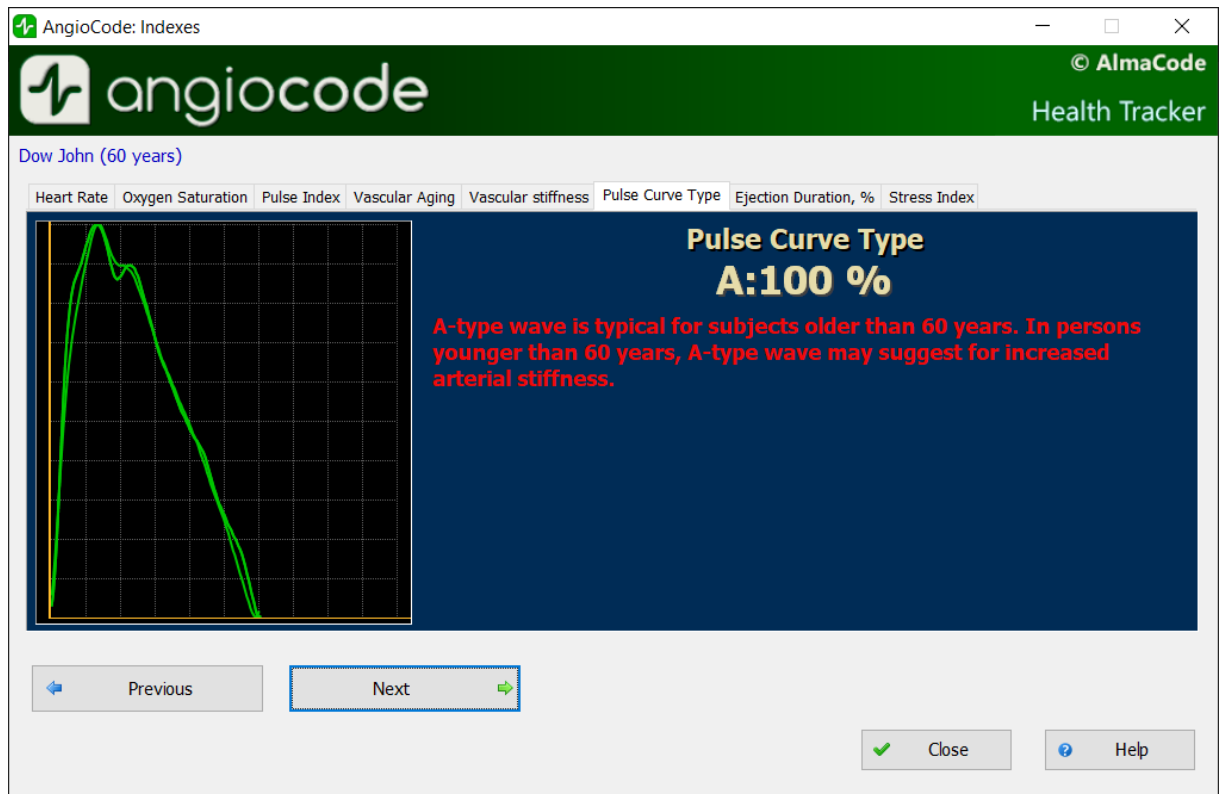


### 2.10.5 “Pulse curve type” tab

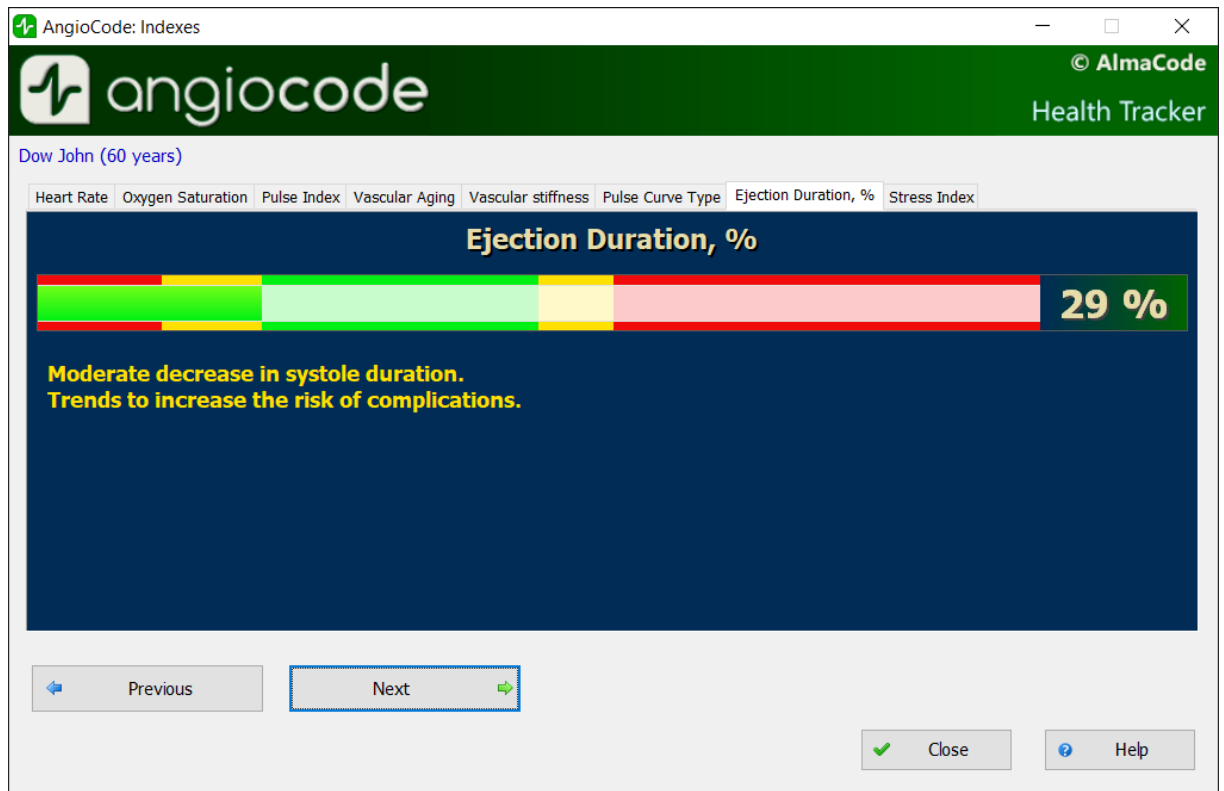
Pulse waves are divided into three types according to their shape.

Type C indicates good condition of the arterial wall, type B - satisfactory condition and type A - unsatisfactory condition. It is not uncommon to see more than one type of curves in a test. In this case, the higher the percentage of C-type curves, the better.

- Wave type C is observed in persons younger than 30 years, who most likely do not have risk factors of cardiovascular disease related to atherosclerosis.
- Wave type B curve is observed in persons over 40 years, or in younger ones, but possibly having risk factors of cardiovascular disease.
- Wave type A is observed in the elderly people over 55 years, but can also be encountered in younger people, with the likelihood of impairment or temporarily, with overworked conditions. In young people, wave A is often found in chronic sleep deprivation.



### 2.10.6 “Systole duration” tab



The ratio of systole duration to total cardiac cycle duration (ED%) reflects the characteristics of the myocardial work cycle.



Systole is the time of tension and work of the heart muscle, diastole is the time of relaxation, recovery, blood supply. The approximate ratio of systole to pulse wave length in the normal range is 1/3 or 33%. When the heart rate increases, the duration of the cardiac cycle shortens mainly due to diastole. Sometimes the systole duration increases up to 50% or more, entering the zone of myocardial instability. To assess this index, methods have been adopted to convert the systole duration to the value expected at a pulse rate of 60 beats per minute.

The ED% values are characterized by the following qualitative intervals:

- less than 25%: pronounced decrease of systole duration. Increased risk of complications;
- 25% - 29%: moderate decrease in systole duration. Tendency toward an increased risk of complications;
- 29% - 40%: normal systole duration;
- 40% - 43%: moderate excess of systole duration over normal. Decreased heartbeat stability, risk of arrhythmia.
- more than 43%: pronounced excess of systole duration over normal. Significant decrease in the heartbeat stability, increased risk of arrhythmia.

The boundaries of the assessment of this indicator for women can be shifted by +1%, for men by -1%. Or rely on the averages given.

Exceeding the systole duration is associated with a decrease in the heartbeat stability and increases the risk of arrhythmia. Sustained reduction in systole duration may accompany increased risks of cardiovascular complications.

Causes of systole duration exceeding the norm may be:

- Myocardial infarction;
- Reduced myocardial contractility;
- Enlargement of the left ventricular myocardium;
- Congenital peculiarities of the body;
- Certain medications taken;
- Alcohol abuse;
- Lack of potassium, magnesium;
- Low-protein diet.

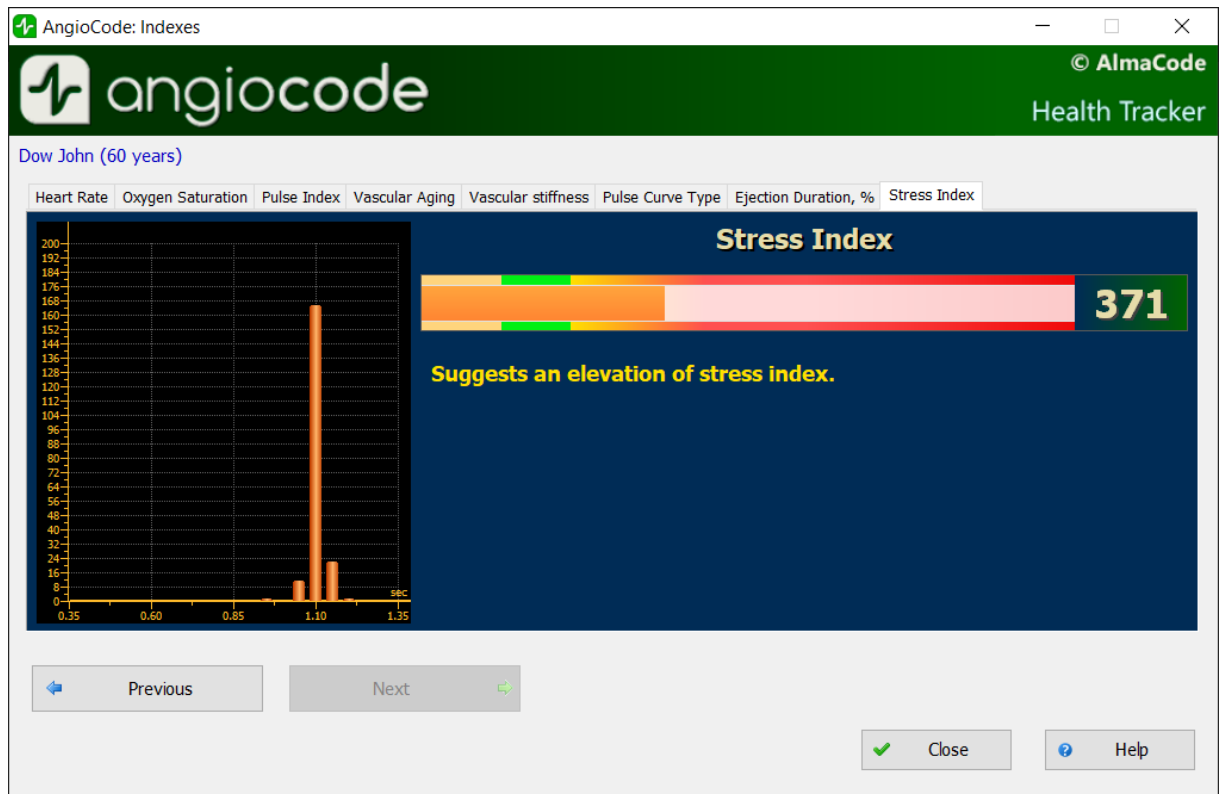
### 2.10.7 “Stress index” tab

The indicator reflects the state of the centers that regulate the mode of operation of the body and the cardiovascular system in particular. Values less than 150 indicate a good, balanced state of regulation. Exceeding this threshold value indicates an excessive tension of regulatory mechanisms, and an index value of 900 or more indicates pronounced dysregulation.

The indicator is calculated based on the analysis of the distribution of the duration of pulse waves.

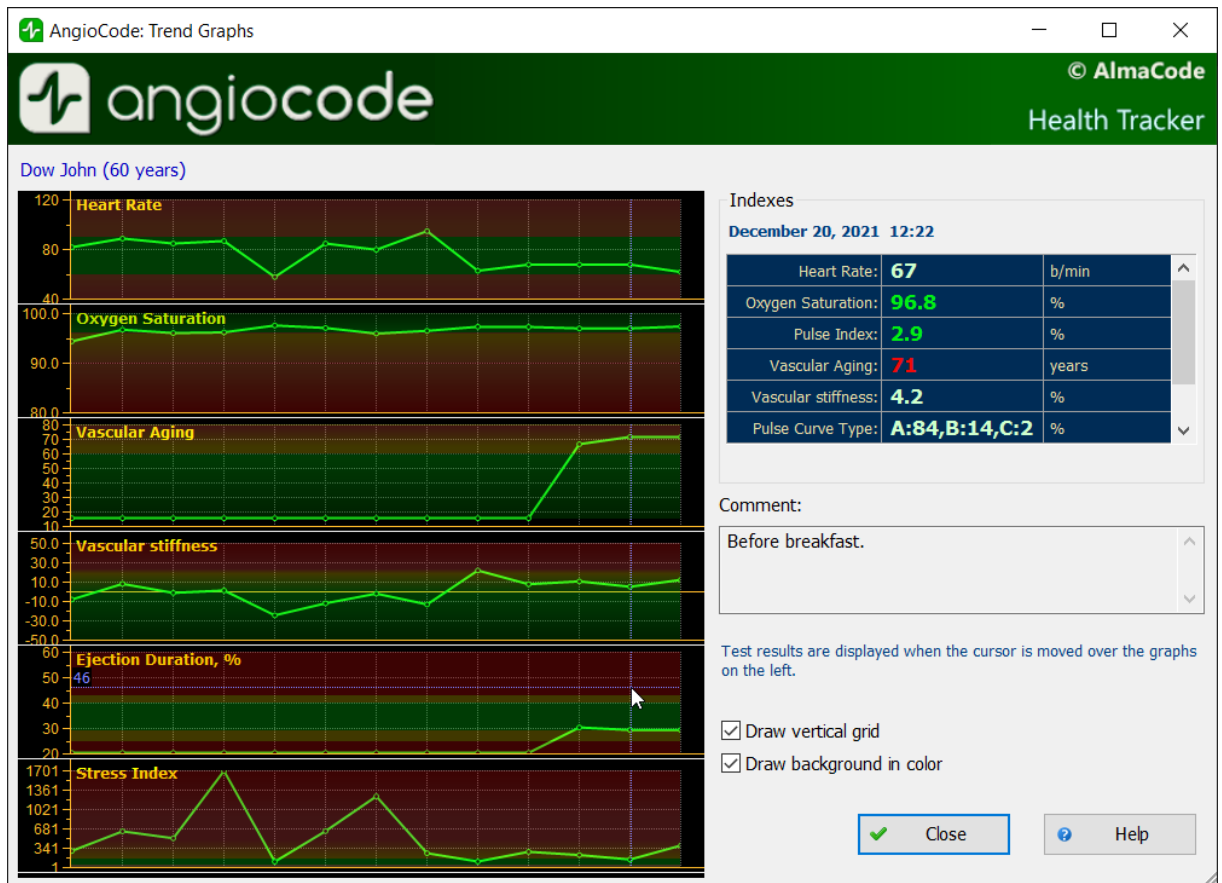
- 50 ... 150 - norm
- 150 ... 500 - stress, physical activity, fatigue, decrease in reserves with age
- 500 ... 900 - angina pectoris, psychophysiological fatigue, significant stress
- 900 . 1500 - significant violation of regulatory mechanisms

**Comment:** With arrhythmias, serious violations of the respiratory function, this indicator is not applicable. The result obtained in this case gives a falsely low indicator of stress.



## 2.11 “Trend graphs” dialog box

In this dialog box, you can see how the assessments of indexes change from test to test. Note that this dialog box can be resized just like any Windows window.



In the left part of the dialog box there are graphs of changes in indexes. The number of points on each graph corresponds to the number of tests performed.

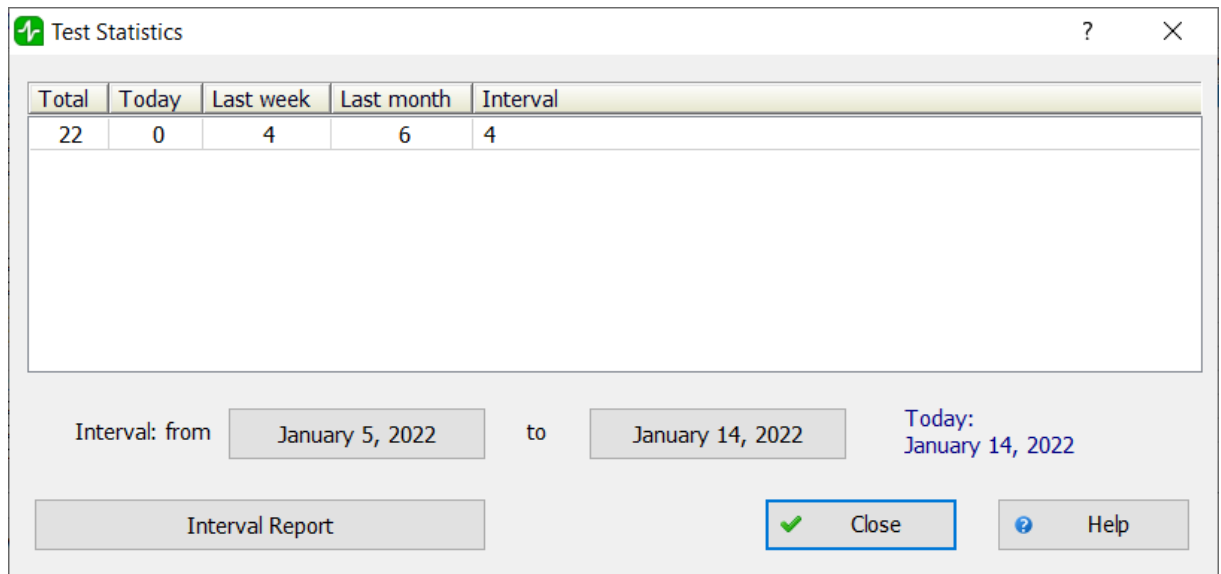
When moving the mouse cursor over the graphs, the results of the corresponding test and, if available, a comment to it, are displayed on the right. The date and time of the test is displayed at the top of the list of results.

Disabling the “**Draw vertical grid**” option removes the vertical grid on the graphs, which can be useful for a large number of tests. Each vertical line corresponds to one test, regardless of the date of the test.

Disabling the “**Draw background in color**” removes the background color indication, which indicates “good” and “bad” areas of indicator values.

## 2.12 “Statistics of performed tests” dialog box

In this dialog box, you can see the statistics of tests conducted for certain periods of time. Statistics are calculated for all users who are registered in the database.



Total	Today	Last week	Last month	Interval
22	0	4	6	4

Interval: from January 5, 2022 to January 14, 2022 Today: January 14, 2022

Interval Report Close Help

Using the buttons with dates, you can set the start and end dates of the time interval for which the statistics are calculated, displayed in the column under the heading “For the specified interval”.

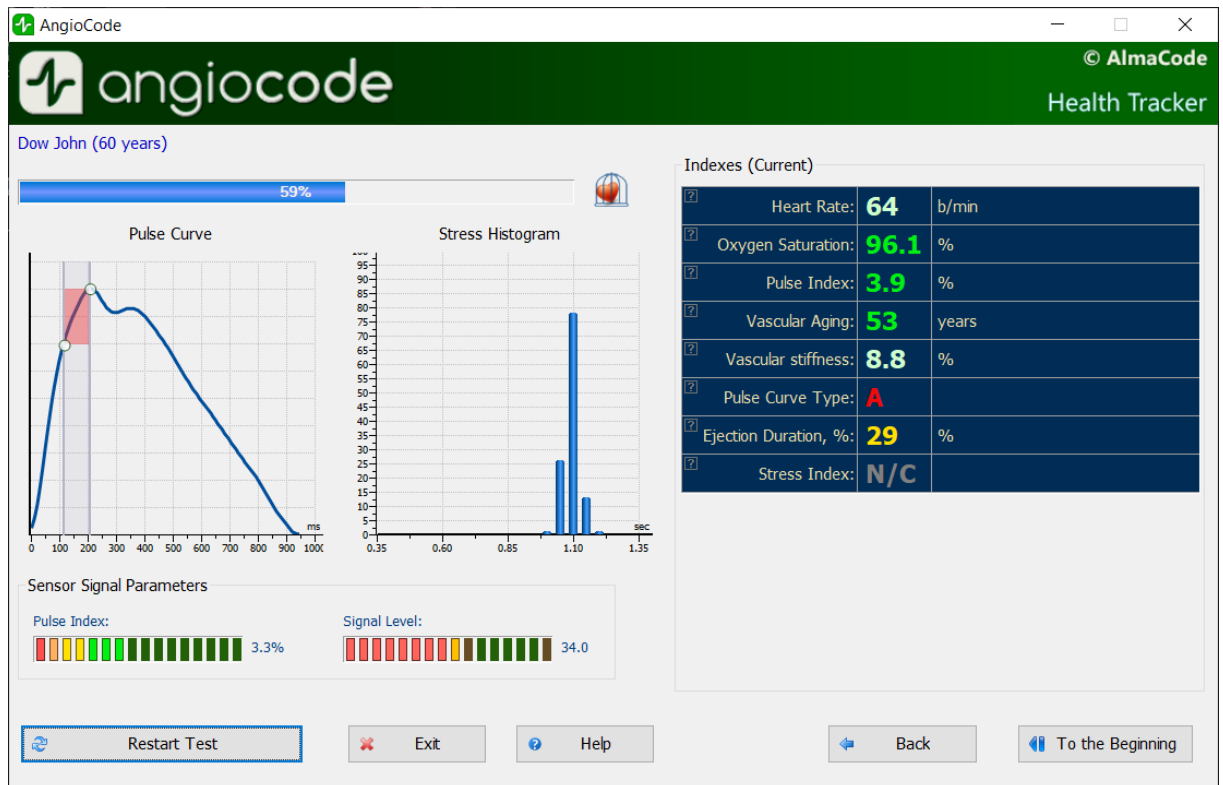
## 2.13 Dialog boxes with instructions for the test procedure

Before performing the test, you are prompted to familiarize yourself with the procedure for preparing the user for the test and the conditions for conducting the test. The instructions are presented in the form of a series of dialog boxes, accompanied by photographs with explanatory text. All dialog boxes have a “**Skip Instructions**” button, which allows going directly to the [test dialog box](#).

You can also permanently disable instructions using the corresponding option in the [program settings dialog box](#).

## 2.14 “Test start” dialog box

This dialog box is designed to test the state of the body and, in particular, the cardiovascular system.



In the upper left part of the window, under the user's first and last name, there is the **test status indicator**. During the test, it displays the degree of completion in percent. The duration of the test depends on several factors - the user's heart rate, the position of the sensor on the finger, the perfusion index (see below), etc. The test is terminated when the device collects enough pulse waves of acceptable quality for analysis. Upon successful completion of the test, the result is stored in the database automatically.

Under the test status indicator, there is a **sensor signal graph**, where the signal coming from the sensor of the device is visible in real time, and a **stress index diagram**.

Below are two diagrams that indicate the quality of the signal received from the sensor. The **perfusion index** should not be less than 1, and the **signal level** should be within 3...120. If these conditions are not met, then the test results will be unreliable, about which a warning message will be issued.

Reasons for poor signal quality can be:

- Low finger temperature, which is especially common among female users. It is necessary to warm up the hands, it is not recommended to use hot water for this.
- Opaque nail polish. In this case, it is allowed to turn the device on the finger by 90 degrees, so that the nail was on the side.

The **"Restart test"** button restarts the test procedure. If a restart occurs before the current test has been completed, then the test results are not stored in the database.

In the right part of the dialog box there is a **list of assessed indexes**. During the test, the values of the indexes correspond to the last recognized pulse wave. At the end of the test, the average values of the indexes are displayed.

At the end of the test, the buttons below the list of indicator values become available:

The **“View result”** button generates a final report based on the results of assessments of the body state indexes and opens it in an HTML browser. An example is provided [here](#).

If the **“Automatically open the final report”** option is enabled, then it is generated and opened automatically at the end of the test.

The **“Detail”** button opens the [“Indicator assessments”](#) dialog box, where you can view a description of each assessment.

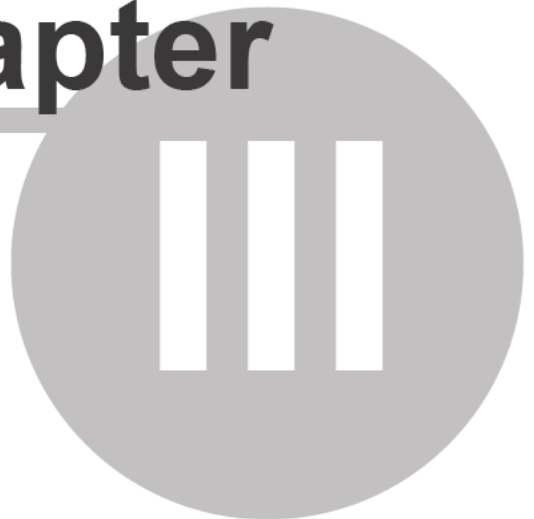
The **“Print result”** button allows printing the final report on a printer connected to your computer. Read about possible printing issues [here](#).

The **“Comment”** button allows entering a comment on the test. Comments are displayed in the test results dialog box to the right of the “Oxygen saturation” field, and are also displayed in the final report.

The **To the beginning**” button closes this dialog box and opens the [AngioCode](#) home dialog box.

# Chapter

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## 3 Appendices

### 3.1 Assessment of the body state - conducting a test

The human cardiovascular system connects all parts of the body. Everything that happens to the body and mind of a person affects how the heart works, how blood flows through the vessels. And vice versa, any changes in the cardiovascular system, the state of the heart and blood vessels respond in all parts of the body.

To obtain reliable data, when working with the **AngioCode-301** device, follow simple but necessary rules. Start by reading the sections of the manual:

- [Preparation for the test](#)
- [Choosing the time and place of the test](#)
- [Behavior during the test](#)
- [Placing the device on the finger](#)
- [Hand position](#)

#### 3.1.1 Preparation for the test

The parameters of the cardiovascular system sensitively respond to the state of the body and its nervous system. Try to exclude factors that distort the results before conducting the test.

With a healthy lifestyle, exclude at least a day before the test:

- tobacco smoking
- taking vasoactive drugs
- caffeine intake
- alcohol intake
- taking stimulants ("energy drinks")
- heavy physical activity

If you are prescribed drugs for permanent use, you smoke, or have other permanent addictions, the test will also be indicative. In this case, remember that not you are being tested, but, say, "You and tobacco". One cigarette right before a vascular checkup can ruin your performance for ten years of unhealthy life.

***Rest for at least ten minutes in a warm, darkened, quiet room immediately before the test.***

***Cold hands can result in a low perfusion index. Warm your hands if necessary.***

***Dark nail polish may interfere with the operation of the device. If it is not possible to remove the varnish, turn the device 90 degrees so that the sensor light passes along the nail.***

#### 3.1.2 Choosing the time and place of the test

You can perform the test anywhere, anytime. It is enough to remember that time and place affect the results. It is good if you have the opportunity to choose a quiet, warm room without bright lighting. You can take the test in a lying or sitting position, on the right or left hand. Care should be taken to ensure that the hand during the test was located approximately at the level of the heart. This is especially important for the test in a sitting position. The metatarsal and elbow joints should be located stable and motionless, for example, on a table.

***Avoid direct sunlight, illumination from a working TV, computer monitor, and other rapidly changing light sources on the device.***

***You can only compare data obtained in the same way:***

- at the same time of day
- in the same body position
- on the same hand



For example, you regularly run three tests a day:

- in the morning before getting up, on the right hand, lying
- before dinner, on the right hand, sitting
- in the evening before going to bed, on the right hand, lying

It will make sense to compare morning with morning, dinner with dinner, evening with evening.

### 3.1.3 Behavior during the test

To reduce errors during the test, follow the following rules:

- stay calm
- relax your arms, legs, stomach
- breathe easy
- do not move your hand and finger with the device
- don't talk
- don't laugh
- avoid vibration
- exclude bright light

### 3.1.4 Placing the device on the finger

- Fold out the support from the bottom of the device.
- Turn your right hand palm down.
- Hold the device in your left hand with the screen up, the button on the right.
- Insert the index finger of your right hand into the lock.
- Make sure that the sensor is under the pad of your finger. It feels like a small depression.

### 3.1.5 Hand position

- **In a lying position** place the right hand with the device along the body on a dense pillow, or in the middle of the chest.
- **In a sitting position** place the right hand with the device on the surface of the table. The elbow should also be on the table.
- **Remember the selected hand position** and use it every time.

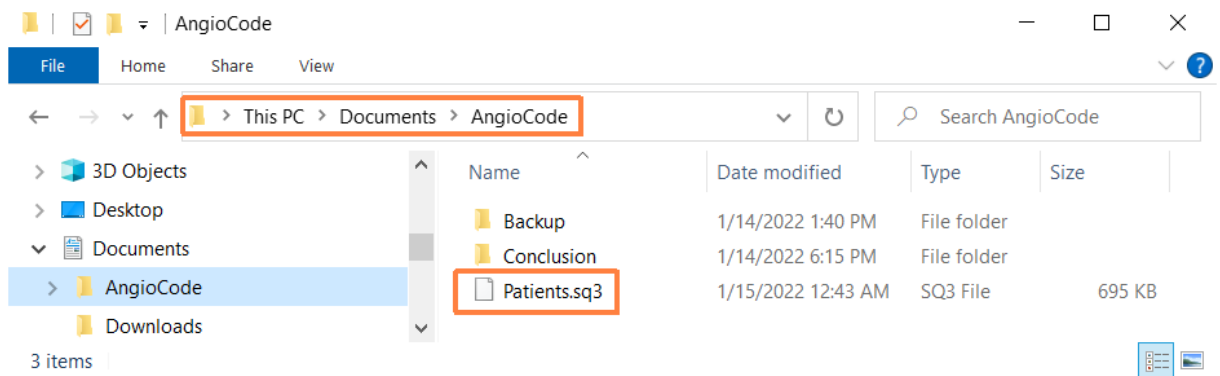
## 3.2 AngioCode database information

The database file AngioCode has a name **Patients.sql3**. The package comes with a database, which already contains several virtual users for demonstration purposes. At the first start of the AngioCode program, this database file is copied to the folder:

Under Windows 7, 8, 10:

**C:\Users\<user name>\Documents\AngioCode**

In Windows Explorer, this folder is visible as a subfolder in "Documents":



The database file is not removed when the AngioCode package is uninstalled and is not updated when new versions are installed. So all AngioCode versions use the same database and do not require any configuration when installing new versions.

Please note that the database is different for each Windows user of the same computer.

To transfer the AngioCode database to another computer, just copy the file **Patients.sq3** to the appropriate folder on another computer.

### 3.3 Personal conclusion example

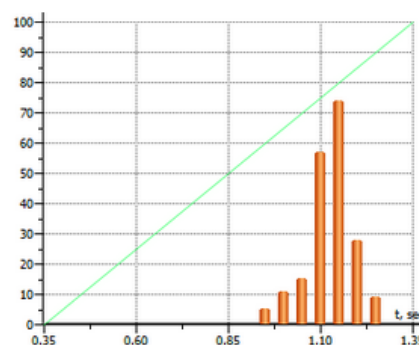
#### Dow John

Sex: Male, Age: 60, Height: 184 cm, Weight: 90 kg, Registered: January 14, 2022 14:58, e-mail: qwaunz@gmail.com

Pulse Wave Graphs



Stress Index Diagram



#### Results

Index	Norm	Measured Value	Description
Heart Rate	60...90 bpm	58 b/min	Pulse rate is less than normal values (bradycardia).
Oxygen Saturation	96%...99%	96.7 %	Normal saturation.
Pulse Index	PI > 1.5%	1.7 %	Sufficient PI level. The data is suitable for processing.
Vascular Aging	53...60	42 years	Good condition of the arteries.
Vascular stiffness	-0.7%...19.3%	-2.0 %	Stiffness index is less than normal values corresponding to a good condition of arteries' walls (9.3%).
Pulse Curve Type	B	A:73,B:23,C:4 %	A-type wave is typical for subjects older than 60 years. In persons younger than 60 years, A-type wave may suggest for increased arterial stiffness. B-type wave is typical for subjects older than 40 years. C-type wave is typical for younger subjects in the age of 18-35 years with normal elasticity of arterial walls.
Ejection Duration, %	29% <= %ED < 40%	28 %	Moderate decrease in systole duration. Trends to increase the risk of complications.
Stress Index	50...150	62	Normal value. Optimal work of cardiovascular regulatory centers.

#### Attention!

**The AngioCode is not a medical device! This is a device for monitoring physiological parameters at home. Any data obtained using the device is only of informational value and cannot be used for diagnosis, treatment, or therapy.**

AngioCode: January 14, 2022 18:15 <http://www.angiocode.ru>  
AngioCode assessment provides educational information reflecting the individual's current state of fitness and wellness.  
The AngioCode assessment does not replace the advice of a licensed physician.

### 3.4 Possible printing issues

Different printers have their own settings, and certain combinations of these settings may cause printing from the AngioCode program to fail. If this happens, then try changing the value of the option "Output TrueType as graphics" in the properties of the printer that is used for printing. This option may also be called "Send TrueType as Bitmap".

You can completely avoid printing problems by installing a virtual printer, for example, [doPDF](#). Printing to this kind of virtual printer creates a PDF file that you can either print or use to share test results in a visual form.

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