



Ambulatory Obstructive Sleep Apnea Examination

The Device

The Device

- Telemedical recorder of physiological parameters of the patient during sleep
- For hospital and ambulatory use
- Sends the collected signals via the GSM network
- Certified medical device (CE)
- Sends data in near real time
- Made of biocompatible materials
- Connection to a telemedicine platform



Registered Signals

- Saturation
- Pulse
- Airflow
- Abdomen movements
- Chest movements
- ECG lead II (optional)
- Sound intensity - snoring signal

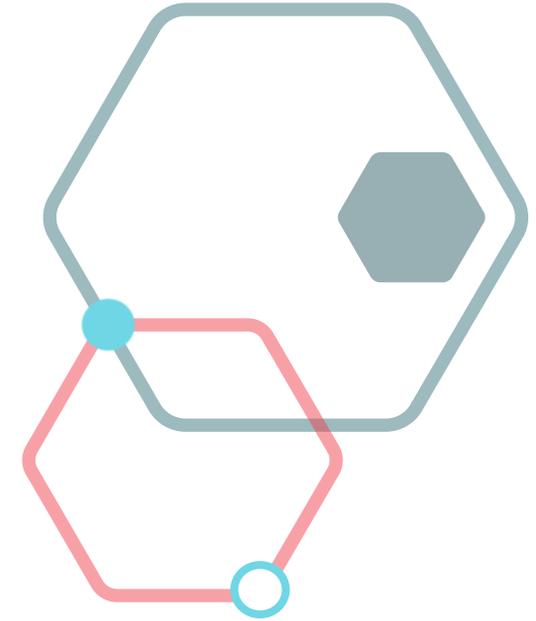


NONIN®

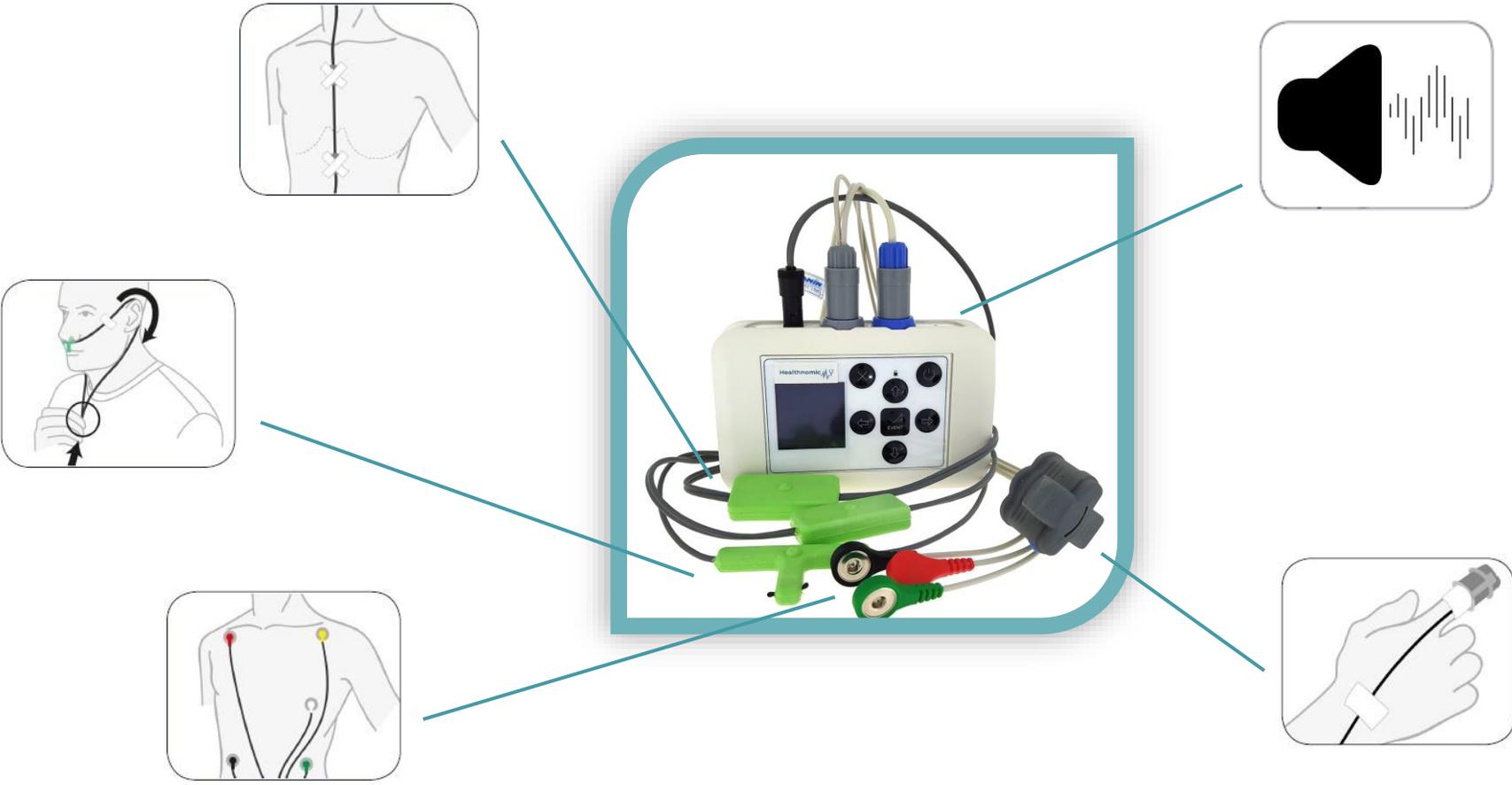
Accelerometric-thermistor sensor

3 electrode set

Internal device microphone

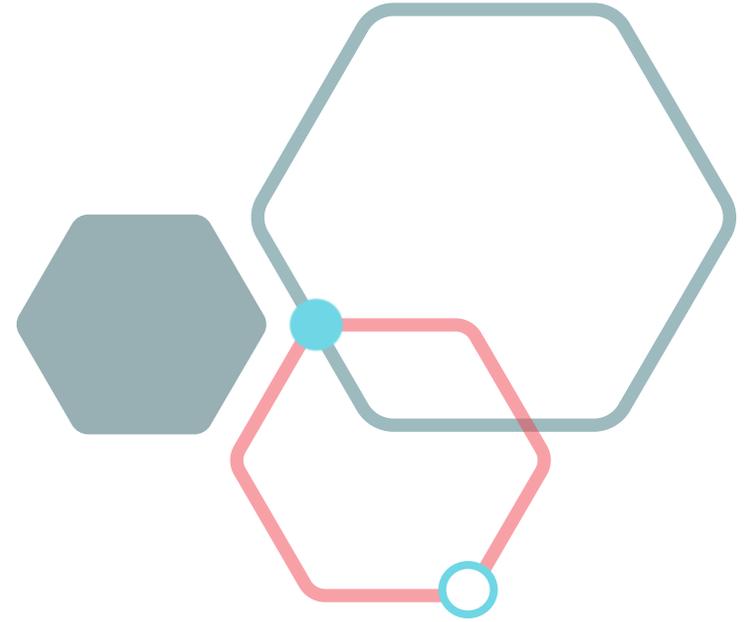


Sensor Placement



Device Set

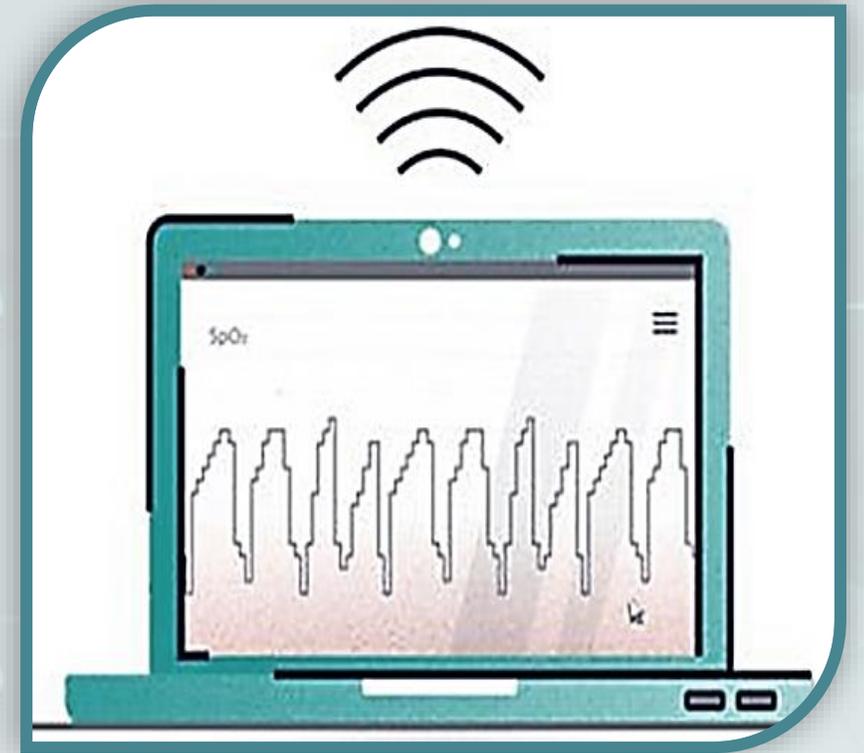
- Recorder
- Sensors
- Patches for attaching sensors
- ECG electrodes
- Belt for the device placement
- Charger
- Instructions for the patient
- Instructions for the doctor



Telemedicine Platform

Telemedicine Platform ApneaHealth

- The platform is available via a browser from any PC with Internet access
- It enables the coordination of patients, staff and ordering tests
- Each customer has a separate website for their sole use - Healthnomic employees cannot access it, ensuring compliance with the GDPR
- The platform has a user-friendly module for examination description implemented in the UCD (User-Centered Design) approach
- Modern data processing and event detection algorithms have been implemented
- A scalable solution from one-man practice to large-scale clinics with numerous staff



Platform View

In the platform, we can distinguish:

- **Main (side) panel** - used to select the main themes of activities
- **Working field**
- **Control buttons** - used to change user settings or change the role

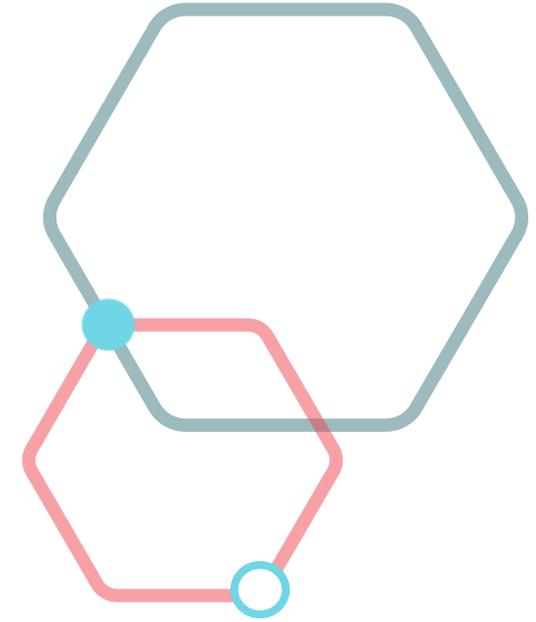
Id badania	Imię i nazwisko	pesel pacjenta	data	Status
359	AA		01.12.2020 11:00	Przerwane
298	Ewa X	12345678910	23.10.2020 13:30	Przerwane
297	T K	12345678989	20.10.2020 23:30	Zakończono
295	Jan Testowy	12345678910	20.10.2020 23:30	Przerwane
281	Jan Testowy	12345678910	08.10.2020 20:00	Przerwane
253	Jan Testowy	12345678910	15.09.2020 14:00	Zakończono
238	Jan Testowy	12345678910	11.09.2020 15:00	Zakończono
231	Kazimierz TestCMP	8020202228	02.09.2020 20:00	Przerwane
230	Zbigniew Test2	81010101114	31.08.2020 14:30	Przerwane
229	Karol Test1	80202020200	31.08.2020 19:00	Przerwane
228	Jan Testowy	12345678910	29.08.2020 14:30	Przerwane
220	Jan Testowy	12345678910	23.06.2020 11:00	Opisano technicznie
210	Ewa X	12345678910	23.06.2020 11:00	Zakończono
208	Jan Testowy	12345679812	13.06.2020 22:00	Przerwane
207	Jan Testowy	12345678910	13.06.2020 21:00	Przerwane
206	Jan Testowy	12345678910	13.06.2020 21:00	Przerwane
204	Jan Testowy	12345678910	01.06.2020 12:00	Przerwane
194	Jan Testowy	12345678910	13.05.2020 20:00	Przerwane
187	Jan Testowy	12345678910	09.04.2020 11:00	Przetwarzane
186	Jan Testowy	12345678910	07.04.2020 15:00	Przetwarzane

Examination Course



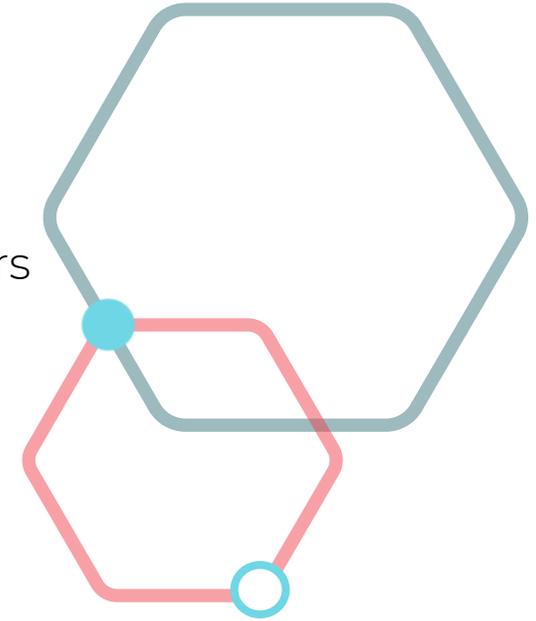
Device Setup For The Examination

1. Package completeness check
2. Checking the correct operation of sensors
3. Check the battery level
In the case of a level lower than the maximum – plug the device to the charger (full charging cycle takes at least 6 hours)
4. Training the patient in the use of the device
5. Handing the device over to the patient
6. Order the examination in the telemedical platform



At The Patient's

- At home, before going to bed, the patient puts on the device and the sensors
- Turns the device on with the 'Power' button
- Locks the device with the button marked with a padlock
- He goes to sleep



Healthnomic and its Customer Service is responsible for the correct conduct of the test.*

The device sends data live to the platform, where it is visible to Customer Service. In the event of improper sensor connection or other potential errors, an Healthnomic employee contacts the patient to ensure the proper conduct of the test.

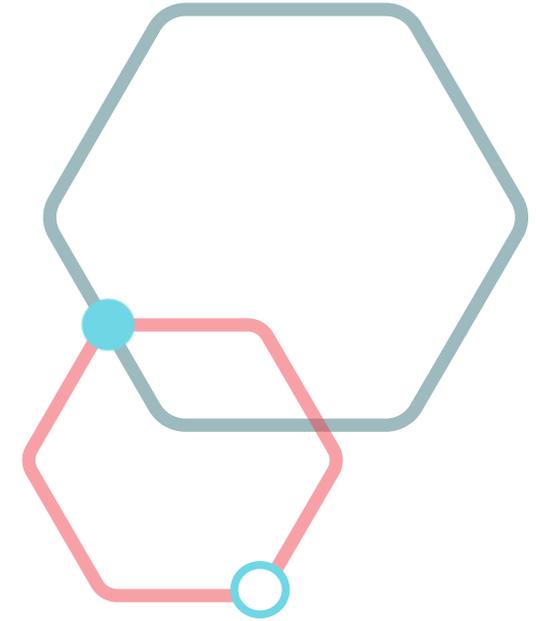
*depending on the terms of the contract



After The Examination

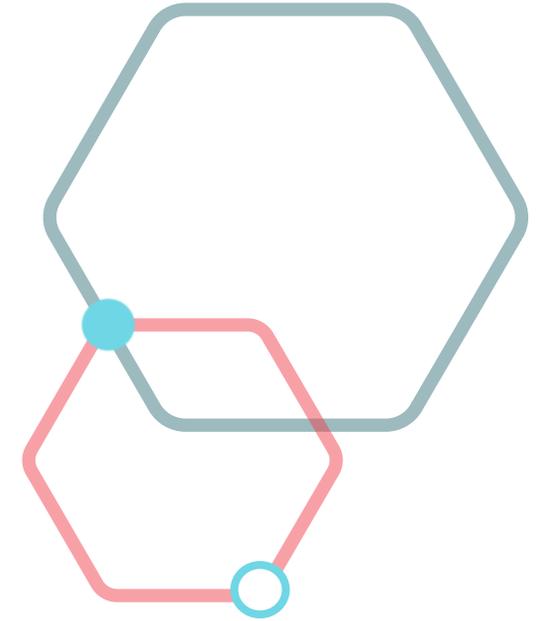
The patient disconnects the device and hands it over to the clinic. Then it is necessary for the personnel to:

- Check the completeness of the set
- Clean the set with an alcohol-based detergent
- Connecting the switched on device to the charger
- Placing the device in a place with GSM network coverage in order to send the remaining data (the arrows on the top panel inform about communication of the device with the platform)
- Charging min. 6 h
- Turning off the device until the next examination



After The Examination

- After sending all the data, the system analyzes the collected signals using its algorithms
- Then their result is confirmed by the Healthnomic Technician
- The technical description process takes no more than 48 hours
- The client physician is informed about the available test result
- The client physician can confirm the result and generate a report
- The report is generated in for of a PDF file and can be downloaded, printed and given to the patient



Sample Report

Clinic Logo

Examination Data
 Date: 03.12.2019 23:30
 Examination number: 81

Patient Data
 Name and Surname: Test Test
 ISNEE: 00000000000000
 Age: 0
 BMI: 10000
 Height: 1 cm
 Sex: Man

Requested By
 Name: _____
 Address: _____
 City: _____
 Phone: _____

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Saturation and pulse

ODI 4 %:	81.91	<10
Min. SpO ₂ [%]:	64 %	
Avg. SpO ₂ [%]:	87 %	>90%
Max. SpO ₂ [%]:	98 %	
Max. desaturation:	29 %	
Min. pulse:	58 BPM	>40
Avg. pulse:	81 BPM	
Max. pulse:	112 BPM	<90

Events table

	share [%]	time [h]	number
Normal breath	41%	02:37:21	
Obstructive apnea (OA)	38.6%	02:28:04	289
Mixed apnea (MA)	0%	00:00:00	0
Central apnea (CA)	0.8%	00:03:11	3
Artifact	19.6%	01:15:17	124

Examination time

Examination start: 23:30:00
 Examination end: 07:00:00
 Total examination time: 07:30:00
 TST: 05:40:38 >6:00:00
 T90: 62.26 %

Events

AHI/RDI: 65.35 <5
 AI: 47.73 <5
 HI: 17.61 <5

Other

Scoring Index (SI): 0
 Scoring duration: 00:00:00

Description

Patient: Test Test, year of birth: 03.12.2019, BMI = 10000. Based on the polygraphic examination taken using S80 device no 18 on 03.12.2019 23:30 diagnosed as follows:
 1. The examination lasted 07:30:00. Omitting periods of nondiagnostic time examination caused by probable lack of sleep or sitting/standing position or artifacts - examination lasted 05:40:38.
 2. 484 arterial oxygen saturation level (SaO₂) decreases were registered, maximum by 0.129%, minimum SaO₂ level was 64%, average SaO₂ level 87% (norm > 90%), desaturation index - ODI4% was 81.91 (norm < 10), time spent in hypoxia below 90% (T90) was 02:58:01, representing 52% of the examination.
 3. Apnea: 289 obstructive apnea, 3 central apnea, 0 mixed-type apnea were registered. During the examination also 109 hypopnea episodes were registered (the longest 0:146 s - norm 30s).
 4. Respiratory Disturbance Index/Apnea-Hypopnea index (RDI/AHI) reached 65.35 (norm < 5), apnea index (AI) reached 47.73 (norm < 5), hypopnea index (HI) reached 17.61. Sleep Related Breathing Disorders occurred the most frequently in the supine position. Also in this position the highest RDI/AHI and AI values were noticed.
 5. Average heart rate = 81, minimum heart rate = 58, maximum heart rate 112.

Summary:
 The result of the examination shows: severe degree Sleep Related Breathing Disorders of Obstructive Apnea Type.
 Described by: Aleksandra Janczke-Doornik, MD, PhD.

Physician Signature: _____

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Date: 03.12.2019 23:30 Name and Surname: Test Test
 Examination number: 81 ISNEE: 00000000000000 Physician

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Sleeping position

position	time [min]	share [%]	TPO [%]	AHI/RDI	HI share [%]	CA share [%]	MA share [%]	SI share [%]	SE time [min]	OA time [min]	MA time [min]	CA time [min]	HI number	OA number	MA number	CA number	SI number	ODI 4%	Min. SpO ₂ [%]	Avg. SpO ₂ [%]	Max. SpO ₂ [%]	Max. pulse [BPM]	Avg. pulse [BPM]	Min. pulse [BPM]	SI	
back	278	79.16	58.83	70.97	7.18	30.27	0	1.18	19.35	128.58	0	0	3.19	49	282	0	0	88.76	84	88	112	109	78	62	8	
abdomen	1	0.29	31.65	136.71	61.03	0	0	0	0.67	0	0	0	3	0	0	0	0	45.67	89	90	93	87	73	64	8	
left side	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8
right side	42	12.4	44.59	48.28	33.88	0	0	0	14.32	0	0	0	34	0	0	0	0	59.64	68	89	96	107	77	58	8	
standing / sitting	0	0.01	33.33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1200	87	90	93	108	81	64	8	
sensor put incorrectly	27	8.03	22.03	32.89	35.27	1.42	0	0	9.65	0.39	0	0	14	1	0	0	0	90.43	84	92	97	109	78	62	8	

Hourly summary

Time	TPO [%]	AHI/RDI	SE time [min]	OA time [min]	MA time [min]	CA time [min]	HI number	OA number	MA number	CA number	ODI 4%	Min. SpO ₂ [%]	Avg. SpO ₂ [%]	Max. SpO ₂ [%]	Max. pulse [BPM]	Avg. pulse [BPM]	Min. pulse [BPM]	DC	SCF	SI
23:43	53.42	82.75	0	28	0	0	0	0	0	0	14.98	64	87	92	86	110	82	39.32	48.65	0
00:43	42.88	77.44	4	27	0	0	0	0	0	0	16.71	64	85	88	111	84	80	44.28	55.44	0
01:43	58.6	72.86	2	30	0	0	11	6	59	0	88.32	68	86	98	112	84	64	41.82	50.51	0
02:43	53.62	69.22	0	20	0	0	1	39	0	0	77.88	69	87	98	108	84	66	40.29	47.52	0
03:43	48.65	46.92	5	14	0	1	10	21	0	1	80.65	64	87	97	110	82	65	38.39	43.65	0
04:43	40.47	43.96	13	13	0	0	19	21	0	0	68.14	67	88	98	107	76	60	33.13	32.48	0
05:43	51.84	59.94	17	4	0	1	44	5	0	1	65.81	65	87	98	107	76	58	31.7	30.34	0

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Date: 03.12.2019 23:30 Name and Surname: Test Test
 Examination number: 81 ISNEE: 00000000000000 Physician

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Charts



We are looking
forward to worinkg
together

sales@healthnomic.pl

Healthnomic 
smart medicine