NightWatch
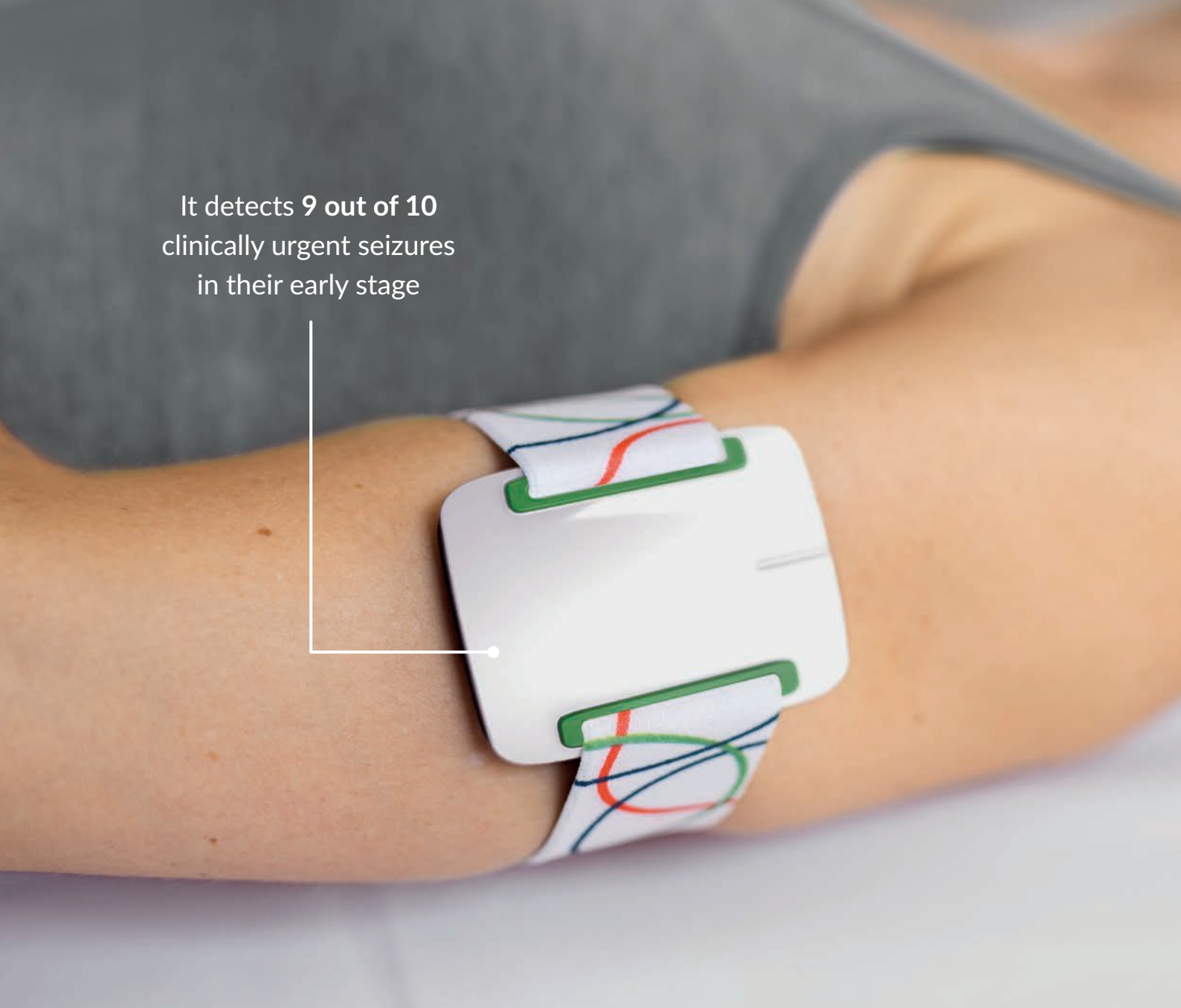
A proven and reliable detection system for epileptic seizures during sleep

NightWatch

It detects **9 out of 10** clinically urgent seizures in their early stage

NightWatch is a safe and effective seizure-detection system

NightWatch is intended for patients, parents/caregivers and care professionals who are searching for an effective way to be warned on time about epileptic seizures during sleep.

NightWatch consists of a comfortable wireless armband that closely monitors heartbeat and motion when the wearer is lying in bed. When NightWatch measures a possibly severe epileptic seizure, a wireless warning signal is sent to a caregiver in another room via the corresponding base station.

Benefits of NightWatch

NightWatch is suitable for professional caregiving environments as well as for home use.

NightWatch improves the quality of care and alleviates the task of the caregiving professional on duty. The chances of medical complications can be reduced because adequate help can be offered early on. NightWatch is easy to use, as it does not have to be set up and is directly applicable within existing caregiving processes by linking it to existing nurse call systems.

- ♥ **Alleviates caregiving duties**

- 🛡 **High reliability**

- 👆 **Does not have to be configured**
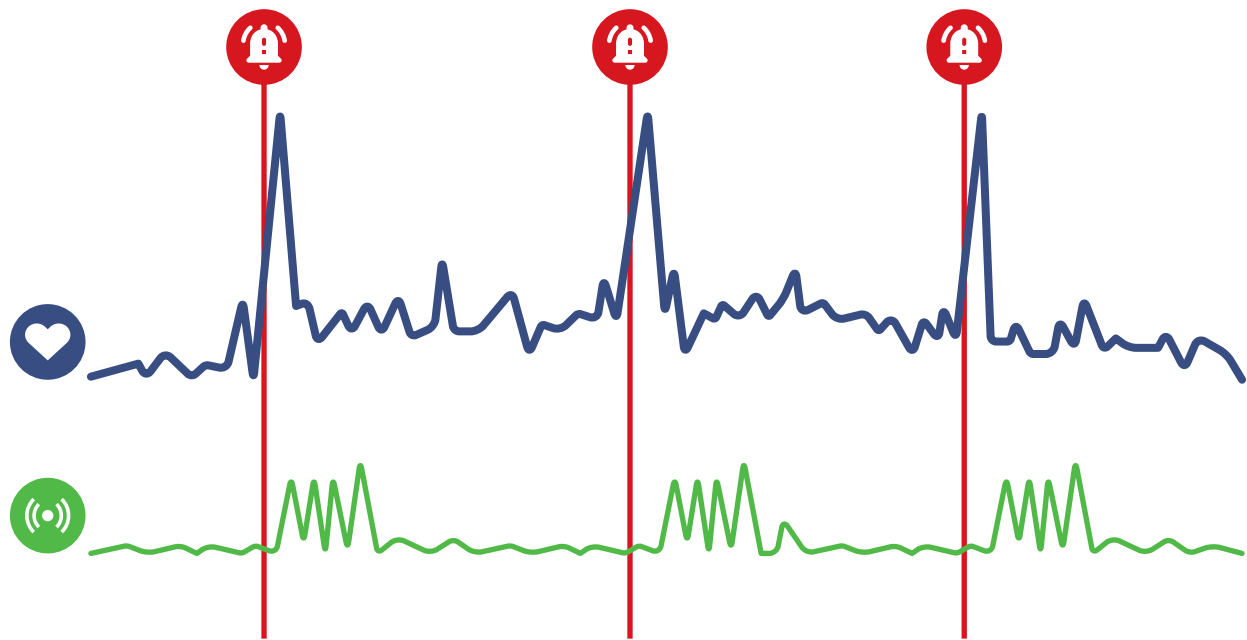
- 🏠 **Suitable for professional and home use**

- 🔄 **Works stand-alone or with existing call systems**

A unique collaboration between science and practice

NightWatch was developed by epilepsy centers in the Netherlands (Kempenhaeghe and SEIN) in collaboration with patient associations, UMC Utrecht and TU/Eindhoven.

A clinical study conducted in 2017 and 2018 shows that **9 out of 10** clinically urgent nightly seizures can be registered by using NightWatch.

Benefits for healthcare professionals

Developed by medical specialists, caregivers and patient organizations

Gives patients more privacy and caregivers more rest

Works significantly better than alternative detection methods

Clinical study results

In the study, one group of 34 patients who had more than one clinically urgent nightly seizure per month wore the NightWatch arm module for three months, measuring heart rate (photoplethysmography) and motion (3-D accelerometry). All the seizures were classified using video.

Over a total period of 1826 nights 809 major seizures were detected. Major seizures include tonic-clonic seizures, tonic seizures longer than 30 seconds, and hyperkinetic and clustered myoclonic seizures. Compared with the control group, which used a popular bed mat, the bed mat detected 3 out of 10 major seizures while NightWatch detected 9 out of 10.

The attending caregivers participated in the questionnaire and indicated that NightWatch reacts sooner when urgent help had to be offered, is easy to use, and gives more rest/freedom compared to the control group.

NightWatch detects[1]:

96%
of all tonic-clonic seizures

80%
of all other clinically urgent attacks, including generalized tonic, hyperkinetic and clustered myoclonic seizures

Epileptic seizures

Worldwide more than 50 million people suffer from epilepsy. About 30% find no relief from epileptic seizures despite taking medication. Nightly attacks can be particularly dangerous to one's health.

This condition has a major impact for patients as well as for their environment. It poses risks of accidents and premature death and has social and societal consequences.

The NightWatch fits all caregiving systems

The NightWatch system consists of an arm module that is worn on the upper arm by the user during sleep.

Sensors in the arm module measure changes in heart rate and motion. Smart algorithms ensure that possible clinically urgent seizures are detected and communicated (via a wireless DECT signal) to the base station, which can be as far as 15 meters from the patient – for example in the parents' bedroom.

Sensors in the arm module measure change in heart rhythm and movements

Possible clinically urgent seizures are detected and transmitted to the base station
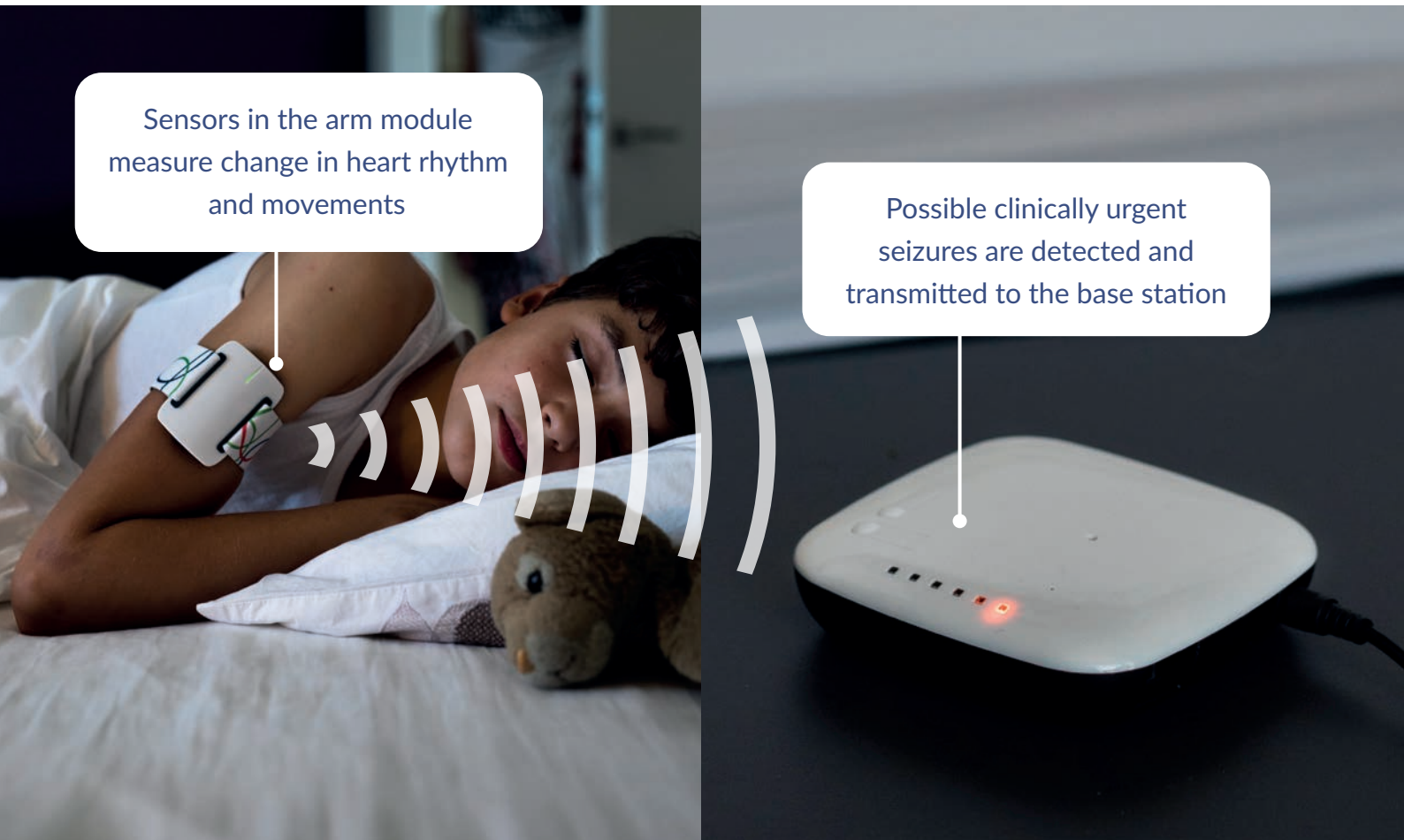
NightWatch also offers the option to record and read the measurements later via a portal so that more perspective can be gained in the course of several nights.

Features

- **Reliable seizure detection for every caregiving system**
- **Safe and stable wireless connection**
- **Monitors and gives insight**

Nurse call system

The base station can be connected to any caregiving call system so that possible clinically urgent seizures can be immediately communicated to the nursing professional.

Optional GSM Module

NightWatch users who live on their own can use a special, optional GSM module that can call up to five telephone numbers of selected care providers in clinically urgent cases. This module also has an emergency button that wearers themselves can operate if they need immediate help.

Precise and versatile

NightWatch can detect various types of seizures with a high level of precision, including:

- ⚠ Tonic seizures
- ⚠ Tonic-clonic seizures
- ⚠ Hypermotor seizures
- ⚠ Clustered myoclonic seizures

	Arm module	Base station
Application	Upper arm	Notification caregiver
Environment	Home, care institution, hospital, independent living	
Weight	35 grams	90 grams
Dimensions	72mm x 52mm x 14mm	100mm x 100mm x 28mm
Grid voltage	100V-240V AC / 50Hz-60Hz	
Power usage	0,1A (RMS) max	0,2A (RMS) max
Motion measurements	3D accelerometry	
Heart rate variations	Photoplethysmography (PPG)	
Wireless connection	DECT ule FC CID: Y82-SC14S, CE0470 Indoor range = 15 meters GSM call (optional)	
Connectors	RJ-11 Monitoring center RJ45	
Registration	CE Medical device class I	
Body contact	Arm module class BF	

Clinical data

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4. Ryvlin P, Ciumas C, Wisniewski I, Beniczky S, Wearable devices for sudden unexpected death in epilepsy prevention. Epilepsia 2018
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