FACING THE CHALLENGES OF OUR TIME

CSEM DIGITAL HEALTH ACTIVITIES IN BERN

OPTICAL BLOOD PRESSURE MONITORING

Hypertension – a silent and deadly disease

According to WHO, hypertension (high blood pressure) affects 1 in 3 persons aged over 50 worldwide. The number of people living with this chronical disease doubled between 1990 and 2019, from 650 million to 1.3 billion. Hypertension causes millions of diseases and deaths every year. The annual worldwide cost of high blood pressure is estimated at $370 billion.

Nearly half of people with hypertension are unaware of their condition, and therefore do not treat it early enough, hence running the risk of causing serious cardiovascular diseases such as stroke or heart attack.

A first step in hypertension treatment is to know the disease and monitor blood pressure continuously and on an out-patient basis. The first non-invasive blood pressure measurements were done with a sphygmomanometer invented in 1881 in Austria. Since then, the method using an arm cuff has only slightly evolved. It can be cumbersome and stressful, as it requires patients to visit a medical location, making continuous monitoring difficult.

> The technology developed by CSEM has a positive societal impact, with the potential to sustainably improve the health of millions of people worldwide. It offers a wide range of possible developments.
>
> **Jens Krauss**
> VP Systems • CSEM

AKTIIA

www.aktiia.com

Blood pressure monitoring on the arm wrist

Aktiia has developed clinically validated software algorithms that enable continuous blood pressure measurement via optical sensors worn at the wrist. It is the result of more than 15 years of research carried out at CSEM.

Aktiia's device is the first product to automatically measure hypertension without any effort required by the wearer. The data is visualized in a free companion application, and with a simple click, a digital summary can be easily shared with a physician to deliver more targeted and timely care.

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BIOSPECTAL

www.biospectal.com

Measuring blood pressure via the camera of any smartphone

The start-up Biospectal aims to democratize blood pressure management using transdermal optical biosensing in mobile devices. Running on a typical smartphone, it uses the built-in camera to record and measure a user's blood flow via their fingertip. A measurement is rendered in ca. 20 seconds — half the time of a typical blood pressure cuff.

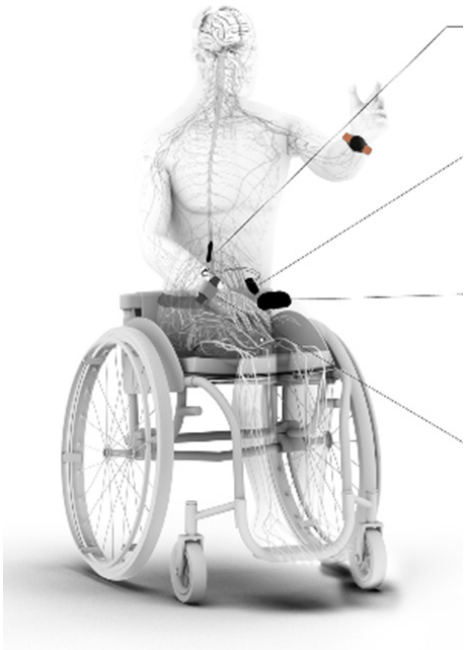
The technology is based on more than ten years of research and development at CSEM and five years of clinical testing, notably at Lausanne University Hospital.

Key benefits include:

- Shortens the pathway from measurement to action in a clinical regimen
- Ease of use with an existing, ubiquitous device — the smartphone — removes adherence barriers
- Allows users to measure and monitor their blood pressure in their 'natural' environment
- Data insights via global device network will provide high value for drug development and lower insurance costs.

ONWARD Medical

www.onwd.com



Blood pressure monitoring system for people with spinal cord injuries

ONWARD Medical is a medical technology company creating innovative therapies to restore movement, independence, and health in people with spinal cord injury (SCI).

They produce an external system for non-invasive, programmed stimulation of the spinal cord. Its first indication – among others – is to improve the blood pressure regulation. Hemodynamic instability is highly prevalent, affecting almost 75% of people with SCI (nearly 500,000 people in the US & Europe)

A participant described the following advantages

- Longer car trips are now possible
- Faster transfers from bed to wheelchair and wheelchair to car; one participant reported reduction in morning transfer from 45 minutes to 2-3 minutes
- Able to start more intensive rehab therapy for first time since injury
- Contemplating return to school and work for first time since injury