

## ThermoBreast – Safe and pleasant breast cancer screenings become a regular part of your self-care routine!

There is no denying that breast cancer is a heartbreaking experience for many of us. Some of us have lost a loved one, others have supported a friend through a devastating diagnosis, and some have suffered personally. According to the American Cancer Society (ACS), 1 in 8 women has a chance of developing breast cancer in her lifetime. Another startling statistic from the World Health Organisation (WHO) reports that in 2020, there were 2.3 million women diagnosed with breast cancer and 685 000 deaths worldwide.

### Early detection, early treatment

The results of a study headed by the National Institute for Health and Care Research (NIHR) revealed that the annual screening of women aged 40 or above saves one life per every thousand women checked. The World Health Organization (WHO) also stated that when breast cancer is identified and treated at its initial stages, it can have a cure rate close to 90%. It is thus obvious that early detection saves lives.

However, while mammography remains the gold standard for breast cancer diagnostics, its efficiency drops to as low as 50% in women under 40 years with dense breast tissue. The study led by UC Davis Health has found that half of all women will experience at least one false positive mammogram over a decade of annual screening. Lastly, mammography screenings use doses of ionising radiation to create images, which is a disturbing disadvantage. Other standard diagnostic methods, like ultrasound and magnetic resonance imaging (MRI), have several limitations as well. Ultrasound, for instance, has a high false positive rate and cannot image areas deep inside the breast. The most sensitive breast cancer detection modality, MRI, is often unaffordable or simply unavailable. The researchers from Harvard Medical School warn that one MRI can easily “cascade” into more medical services and diagnoses, causing unnecessary harm and cost. Their research found that 1000 patients who received an MRI had 50 more imaging tests, 173 procedures, 130 visits, 30 diagnoses and 3 hospitalisations, as well as 158 additional doctor’s visits for findings unrelated to breast cancer.

The need for effective alternative screening methods is evident, and the ThermoBreast project works on a new modality that has the potential to be the solution. Its imaging technology includes a risk-free, non-contact, and cost-efficient screening, that is applicable to women of any age and breast density, aiming to detect the disease at its earliest stages. ThermoBreast’s unique approach presents an opportunity to unlock the potential of dynamic thermography, drastically enhancing breast cancer prevention, diagnostics, and monitoring.

The 4-year project with a multidisciplinary consortium of 19 international partners from 11 countries, aims to contribute to EU’s Mission on Cancer and Beating Cancer Plan by introducing a completely new approach in breast diagnostics and monitoring while reducing the burden on women and female patients and their families, health care professionals and others who are directly or indirectly affected by breast cancer.

### Using ThermoBreast to fight cancer

So what is it, exactly?

ThermoBreast introduces a new vertical in harmless breast cancer screening using AI-based dynamic thermal imaging. Here is how it works. The screening is performed with a next-generation thermal imaging device, patented by the project coordinator ThermoMind Ltd. It includes highly sensitive infrared sensors that can detect temperature differences up to 0.02°C. Together with computer processing, these high-resolution sensors produce a video stream (thermograms) that shows how the temperature of a patient’s entire chest area changes over time. The device is able to pick up on extremely subtle changes in the temperature and blood flow of breast tissue. Why is it important? Because changes in any of these variables might be an early sign of a tumour or lesion formation. In order to form and grow, breast tumours require a lot of blood supply, which is why their



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growth is always accompanied by a sudden change and anomaly of heat and blood flow. You won't feel it happening, but the ThermoBreast device alerts a clinician about it immediately.

Another vital component of the ThermoBreast screening, which makes it truly innovative, is advanced artificial intelligence (AI) analysis. In other words, its AI model is designed to interpret dynamic thermal patterns and detect potential cancerous activity. This way, the ThermoBreast solution offers an excellent means of identifying areas of interest within thermograms and marking those for physicians to inspect. This predictive power of the AI-based thermography can enable the detection of cancer even before a tumour has formed.

## A paradigm shift in breast cancer examination with ThermoBreast device

Thermography has been mainly used as a supplementary screening tool. The recent improvements of infrared sensors and the development of efficient computer vision models have propelled a number of conducted studies confirming its potential to be a safe and reliable tool for earlier breast cancer detection and prediction.

ThermoBreast will perform the largest prospective clinical study of its kind at 10 clinical sites worldwide to train and validate its solution and provide evidence of its clinical benefits in comparison to other modalities. This will allow health policymakers to adopt better patient screening and monitoring programmes by including ThermoBreast as a supplementary imaging modality. The implementation of ThermoBreast technology will reduce the rate of false negatives and overdiagnosis of other modalities in population-based screenings.

The Thermobreast project will bring new knowledge in the areas of thermal sensing technology, bioinformatics, vascularity analysis, and medical AI, promoting further research in these areas. Due to its seamless screening and automated analysis, it will not be prone to human subjectivity, providing the physician with instant, unbiased answers to support their decision-making. Finally, ThermoBreast technology will revolutionize the standard examination process. In hospital settings, the device will be located in a controlled-temperature room and operated by certified nurses and technicians. Upon installation, it can screen 17 women per day, ultimately lessening the physical and mental strain of breast cancer patients and healthcare providers.

***Follow the progress of ThermoBreast at [thermobreast.eu](https://thermobreast.eu) and on [LinkedIn](#), [Facebook](#) and [Twitter](#) to stay up-to-date with the latest results and events.***



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## Facts and Figures

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  - Technion - Israel Institute of Technology, Israel
  - Technical University of Munich, Germany
  - Academisch Ziekenhuis Groningen, Netherlands
  - Vrije Universiteit Brussel, Belgium
  - Cancer Patients Europe, Belgium
  - Assuta Medical Centers Ltd., Israel
  - Institut Gustav Roussy, France
  - Hospital of Lithuanian University of Health Sciences Kaunas Clinics, Lithuania
  - Sheba Medical Center, Israel
  - University College Cork, Ireland
  - Universitätsklinikum Heidelberg, Germany
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  - accelopment Schweiz AG, Switzerland
  - The University of Texas MD Anderson Cancer Center, United States
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