



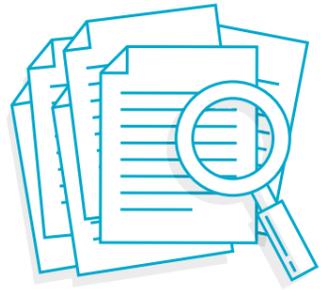
# Hyperthermia is not always Hyperthermia

Why methods matter

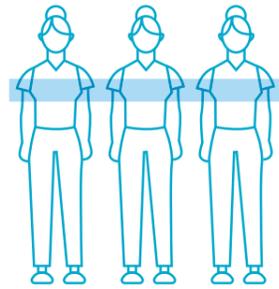


# Clinical Results LRBC

**Swiss Study at KSA:** A meta-analysis of 34 studies revealed that the **overall complete response** rate for locoregional recurrent breast cancer increases by 22% to 60%



**34** STUDIES



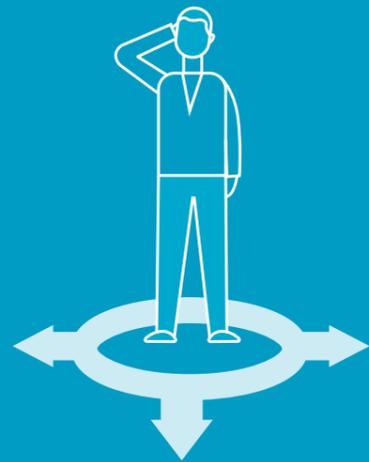
**2,110** PATIENTS



**60%** RESPONSE RATE



*Datta, Niloy R.* et al. Hyperthermia and Radiation Therapy in Locoregional Recurrent Breast Cancers: A Systematic Review and Meta-analysis. *Int J Radiation Oncol Biol Phys*, Vol. 94, No. 5, pp. 1073–1087, 2016

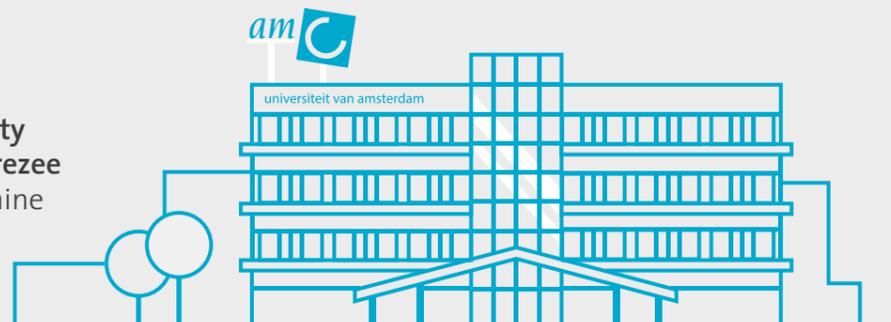


## However....

**Not everyone who claims to offer hyperthermia can deliver this benefit.** Firstly, the two methods of hyperthermia – capacitive and radiative – are very different. Plus only certain systems on the market are capable of achieving the required results.

# Dutch Study at AMC investigates heating characteristics

This is why in a recent study at the Department of Radiation Oncology, **Academic Medical Center the University of Amsterdam**, Dr. H.P. Kok and Dr. J. Crezee compared the two methods to determine which one is more effective.



# In-house planning software analyzes heating efficiency

Using the in-house hyperthermia planning software, the researchers computed the heat delivery in terms of the specific absorption rate (SAR) and with regard to the temperature distribution.

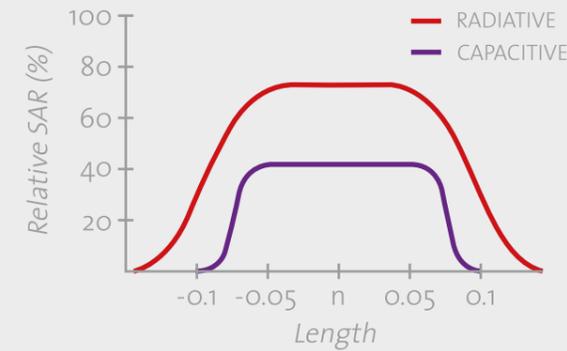


## 1. Detailed phantom simulations under different conditions

The comparative simulations were performed on a perfused muscle-equivalent phantom and phantoms with a superficial fat layer, assuming cylindrical target regions. **The researchers then**

**examined a real patient model with a breast cancer recurrence derived from CT data**, with the target assumed to have muscle-like properties, fat properties or heterogeneous properties in each case.

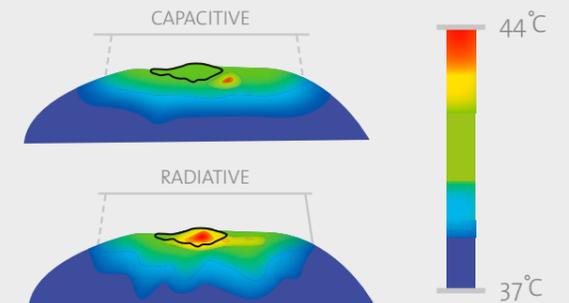
## 2. Simulated power and temperature distributions compared for both heating methods



Relative SAR profiles were compared at the phantom surface and directly below the fat layer. Capacitive heating yields the maximum SAR in the fat layer, while radiative heating has its maximum in muscle tissue.

## 3. Radiative heating produces higher target temperatures without overheating heterogeneous normal tissue

**Capacitive heating results in undesirable hot spots, while for radiative heating the power absorption below the fat layer is substantially higher.** For the patient models, the simulated temperature distributions were compared after scaling the power density such that the maximum temperature is 44 °C.



# Advantages of radiative hyperthermia

FACTOR  
2-4

Radiative heating yields a temperature in the target volume 0.4–1.1 °C higher compared to capacitive heating. This corresponds to a factor 2–4 difference in the thermal dose.

## International Journal of Hyperthermia concludes:



Since higher tumour temperatures can be achieved before treatment limiting hot spots occur when using radiative heating in heterogeneous anatomies, clinical use of this technique will benefit clinical results.



## Read the entire article here:



*Kok HP, Crezee J.* (2017) A comparison of the heating characteristics of capacitive and radiative superficial hyperthermia. *Int J Hyperthermia* Jan 8:1-9

# Radiative Hyperthermia the Superior Method

Feature	Capacitive Systems Other	Radiative Systems Pyrexar
Statistically significant benefits phase III (HT+RT)	—	✓
Control of spatial energy steering	—	✓
FDA-approved	—	✓

