enhancement, with steeper slopes between steps. In this system, the mean pixel value varies depending on the processing setting. In the stepwedge profile, the extremity processing differs markedly from the rest. For the other vendor, the mean pixel value does not change between processing settings when looking at the uniform aluminum sheets. In the stepwedge profiles there were marked differences between different clinical processing settings in mean pixel value at low thicknesses, with values progressively converging as thickness increased; the convergence point was highly kV-dependent.

European Journal of Medical Physics 149S1 (2026) 106032
doi:10.1016/j.ejmp.2026.106032

O1508
AI RECONSTRUCTION IN COMPUTED TOMOGRAPHY: A MULTIVENDOR EVALUATION COMBINING OPEN-ACCESS CTDimQ PLAFTORM AND ANTHROPOMORPHIC PHANTOMS

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Background and Aims: CT AI reconstruction (also known as Deep-Learning Reconstruction-DLR) is manufacturer dependent and mostly trained with patient data, with little information disclosed about their performance. The quantitative benchmark of DLR against clinically used iterative algorithms can help to understand their performance, limitations and potential promised dose reduction.
Aims: To evaluate image quality of CT AI reconstruction benchmarked against the iterative clinical standard using advanced image quality metrics combined with anthropomorphic phantoms.
Methods and Materials: A PMMA adult thorax phantom with two 3D printed TPU lung vessel tree inserts and a commercial paediatric phantom, both containing 3D printed nodules (geometric shapes and segmented from patient data (TCIA database): TPU, PA11, PA12, PP materials) were scanned (GE Revolution) with clinical thorax-standard protocols and reconstructed with IR and DLR. An open-access platform (CTDimQ) was used to evaluate CT-values in selected ROIs, histograms, NPS, noise maps and SSIM across repeated acquisitions.
Results: CT-values of certain materials/tissues (vessels, nodules, 3D-printed powder trap mimicking infection) showed a significant downwards shift (vessels: down to –50HU for commercial phantom and –15HU for 3D printed-phantom), whereas for nodules shift was down to –100HU. NPS showed a peak height reduction with DLR (20–25 times) and a shift towards lower frequencies (0.46 mm-1 vs 0.28 mm-1), in both phantoms. Blurrinnes in DLR was captured with higher differences in SSIM in structure edges. Both phantoms lack lung parenchyma which may induce a bias compared to patient data. As a next step, equivalent analysis need to be performed with representative patient data comparing DLR and IR.

European Journal of Medical Physics 149S1 (2026) 106033
doi:10.1016/j.ejmp.2026.106033

ORAL–MRI AND OTHER NON IONISING MODALITIES INCLUDING AUDIOLOGY, LASERS

O123
UNIFORM THERMAL DOSE DELIVERY TO MULTIPLE TUMOUR SPHEROIDS USING A HOLOGRAPHIC FOCUSED ULTRASOUND SYSTEM

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Background and Aims: Hyperthermia is used in cancer treatment due to its ability to enhance radio- and chemo-sensitivity. Focused ultrasound enables non-invasive, localised hyperthermia, but achieving uniform thermal dose delivery over multiple targets remains technically challenging. In-vitro tumour spheroids offer a relevant platform for studying hyperthermia effects, yet conventional systems are limited in throughput and dose uniformity. This work presents a holographic lens-focused ultrasound hyperthermia system designed to deliver a uniform iso-thermal dose simultaneously to multiple tumour spheroids, with real-time thermometric control.
Methods and Materials: A single-element high-intensity focused ultrasound transducer was combined with custom-designed, 3D-printed acoustic holograms generated using time-reversal simulations. Two hologram design strategies were investigated: an iso-pressure approach producing multiple equal-amplitude acoustic foci, and an iso-thermal approach using spatially varying acoustic pressures to compensate for thermal diffusion. Tumour spheroids (U87-MG glioma) were positioned in tissue-mimicking gel phantom incorporating three wells and embedded thermocouples. Temperature was monitored in real time and thermal dose quantified as cumulative equivalent minutes at 43 °C (CEM43). Spheroids were exposed to ultrasound-induced hyperthermia (7.5–120 CEM43) or to matched thermal doses delivered using a PCR thermocycler. Post-treatment spheroid growth and metabolic activity were measured over 10 days.
Results: The iso-thermal hologram achieved highly uniform thermal dose delivery, with differences below 4%, compared with variations exceeding 60% for the iso-pressure design. Ultrasound-induced hyperthermia resulted in dose-dependent growth inhibition and reduced metabolic activity, with spheroid shrinkage observed at 120 CEM43. For equivalent thermal doses, ultrasound exposure produced greater biological effects than conductive heating, indicating the contribution of non-thermal ultrasound mechanisms.

European Journal of Medical Physics 149S1 (2026) 106034
doi:10.1016/j.ejmp.2026.106034

O402
QUALITY ASSURANCE PROGRAMME UPDATE FOR ULTRASOUND EQUIPMENT AT HOSPITAL CLÍNICO SAN CARLOS

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Background and Aims: Ultrasound quality control testing has been carried out in our centre by the Medical Physics Department since 2019. In 2024, new ultrasound systems and transducers were