

# MPCE News

## Reducing radiation risks to patients during brain CT examinations

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Collaboration between industry, ABM Health Board's [Radiation Protection Service](#) and Radiology staff has resulted in the production of a novel disposable X-ray shield.



Head CT examinations may result in significant and unnecessary X-ray exposure to the lens of the patient eye. The level at which a single dose of radiation begins to have a negative effect on the eye, causing visual impairments such as cataracts, has been estimated by the International Commission on

Radiological Protection to be relatively high. However, the Commission has recently suggested the lens of the eye may be more sensitive to radiation than previously considered, and are expected to soon announce a reduction of this level. Since the patient's eyes are often in the primary X-ray beam during Head CT examinations, and the number of patients imaged in this way is increasing especially in the management of stroke, optimisation of doses through the use of shielding is recommended.

A barium sulphate vinyl, manufactured and supplied by Kemmetech Ltd, has been extensively researched and developed by ABM Health Board's Radiation Protection Adviser together with Radiology staff at Princess of Wales Hospital for use as a suitable X-ray shield.

*Pictured left: Louisa Davies - CT Radiographer, Simon Evans - Radiation Protection Adviser, Jo Lewis - CT Radiographer*

Explaining the benefits of the shield, Simon Evans, Radiation Protection Adviser based in the [Department of Medical Physics and Clinical Engineering](#) said:

**“Patient’s eyes are often directly exposed during head CT and the shield (pictured right in situ) provides a significant reduction in dose to the**



**lens. In comparison to other commercially available and expensive products this material is latex free, inert and inexpensive making it ideal for single use in order to prevent cross contamination between patients.**

**"The shield has limitations, since its position over the eyes introduces artefacts (errors) in the image towards the front of the head which could affect clinical evaluation. For this reason the use of the shield is not recommended when imaging structural diseases of the orbits and orbital content, sinuses and facial trauma.**

**"However, the shield is suitable for use in brain imaging when used in conjunction with a foam stand-off material developed by the Radiology Department. Use of the stand-off results in image artefacts appearing further towards the front of the head and ensures that the brain region is unaffected."**



Following its successful development, Kemmetech Ltd has recently made the shield commercially available to a global market with particular interest in the United States and China. In recognition of the innovation provided within the Health Board the company is currently in discussion with Welsh Health Supplies over the provision of the product at a significantly reduced cost to

the NHS in Wales. The company have also provided free samples to the Radiographers in Princess of Wales Hospital which have been well received by staff and patients.

The Radiation Protection Adviser will continue to collaborate with the company on the development of the shielding material for use on paediatric patients and for application in other areas of diagnostic radiology such as Cardiology.

*Pictured left: Evidence of Image artefacts (i.e. errors such as the appearance of faint lines and areas of lost information) towards the front of the head due to the introduction of the eye shield.*

To find out more about this work please contact [simon.evans@wales.nhs.uk](mailto:simon.evans@wales.nhs.uk)