

Summer 2023

To whom it may concern,

Exposure to radiation in theatre – provision of PPE to orthopaedic surgeons

Exposure to ionising radiation during image guided procedures has been associated with a higher incidence of breast cancer in female healthcare workers. Lead or lead equivalent gowns are used to reduce radiation exposure, but studies have shown that current gowns provide inadequate protection to breast tissue, as they leave the upper outer quadrant and axilla exposed.

Ionising radiation is a known human carcinogen and breast tissue is highly radiation sensitive, with a linear relationship between increasing exposure and increasing risk. One-in-seven women will develop breast cancer and most are in the upper outer quadrant of the breast. Breast cancer is a multifactorial disease with genetic, environmental and occupational risk factors. Ionising radiation is a mitigatable factor and exposure should be kept as low as reasonably practicable. Providing protective gowns with adequate breast covering could reduce radiation exposure and potentially help prevent breast cancer in female healthcare workers.

Existing observational evidence suggests a link between exposure to ionising radiation at work and breast cancer. Studies of female US orthopaedic surgeons reported a 2.9-fold to 3.9-fold increase in the prevalence of breast cancer, compared with an age matched female population. The risk persisted at double the expected level after sensitivity analysis to address selection bias. Female plastic and urological surgeons, who had similar lifestyles and pregnancy histories to the orthopaedic surgeons, did not share this increased risk. A small Finnish study highlighted that breast cancer occurred at 1.7-fold the expected rate in radiologists, surgeons and cardiologists, compared with female physicians not working with radiation. Following dialogue with BOA, the UK Health Security Agency (UKHSA) is undertaking work to quantify the risk to orthopaedic surgeons from occupational exposure to radiation. The BOA is also in dialogue with the Health and Safety Executive Agency to look at how best to secure additional protection.

In the meantime, to ensure that exposure is reduced as much as possible, in addition to increasing the distance from the source, all workers must be shielded with effective protective clothing. Evidence from the US and from provisional testing here in the UK has shown that standard tabard gowns do not protect the breast or axilla from radiation. Increased coverage results in reduction in dose, so vest tops should be well-fitted to the individual and as close to the axilla as possible. Different body shapes and sizes require trialling different options to find the best fit. Designs that protect the upper outer quadrant of the breast include the addition of axillary coverage or sleeves.

Every NHS Trusts should provide effective protective equipment that enhances the safety of all their staff.

While the BOA continues to work with regulatory bodies and with manufacturers to develop best practice, and standards to improve the PPE and ensure adherence by employers, NHS trusts should ensure that:



- A range of PPE reflecting different body shapes and sizes is available – female orthopaedic surgeons should not be using tabard gowns.
- Vests should be fitted to the size of the individual and as close to the axilla as possible.
- Minimum lead thickness should be 0.35mm.
- Detachable sleeves should be avoided.

If you have any questions on this matter, do please contact: Gary Robjent, Head of Policy and Public Affairs (g.robjent@boa.ac.uk)

For further information: <https://www.boa.ac.uk/standards-guidance/radiation-exposure-in-theatre.html>

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Deborah Eastwood'.

Deborah Eastwood,
President