**Response to 2nd Appraisal Consultation Document (ACD) for**

**Multiple Technology Appraisal of INTRABEAM Radiotherapy System for Adjuvant Treatment of Early Breast Cancer**

**from the Institute of Physics and Engineering in Medicine (IPEM)**

- Has all of the relevant evidence been taken into account?
- Are the summaries of clinical and cost effectiveness reasonable interpretations of the evidence?
- Are the provisional recommendations sound and a suitable basis for guidance to the NHS?

The vision of the Institute of Physics and Engineering in Medicine (IPEM) is to constantly improve human health by the application of physics and engineering to prevention, diagnosis and treatment of disease through research, innovation, education and clinical practice. As such, we support the use of existing equipment (and resources) to further research into the efficacy of intra-operative breast radiotherapy.

It is disappointing that the TARGIT trialists have not released long-term follow up data for the patients in this trial, when median five year follow up was achieved in January 2015. We share the concerns of oncologists who have criticised the methodology and presentation of results from this trial, and support the recommendation that the higher risk of recurrence should be explained to patients seeking this treatment option. This discussion should be with an oncologist.

At the time of first report, 6 INTRABEAM units were reported to be used in the UK. A recent survey by IPEM suggests 5 NHS units and 3 private units are currently available (Palmer et al Br J Radiol 2016). However, several of these have been moth-balled by restrictions on use, or have changed their radiotherapy physics support centre, and the numbers of patients treated in 2016 was very low. Therefore we strongly recommend:

* Centres with obsolete equipment, or those requiring major capital upgrade, are not included in the current recommendations;
* A minimum of six months is given to allow re-training of staff and mobilisation of resources (even though the long term resource requirements may be equal to external beam radiotherapy);
*No centre is permitted to start treatment unless close involvement of medical physics expertise and clinical scientists has been established;
*Tariffs for treatment are set by NHS England, following the economic analysis

by the HTA (e.g. £2069 per treatment, table 33, Picot et al SHTAC 2014).

The appraisal consultation document (p4) describes the recommended dose as 20Gy at the surface of the tumour bed, which attenuates to 5-7Gy at 1cm depth. The TARGIT trial protocol allows dose prescription either to the surface, or 6Gy at 1cm depth, however modelling studies (Ebert and Carruthers Med Phys 2003, Eaton Med Phys 2012) recommend the prescription at depth approach to minimise variation between units.

The Xoft Axxent system (NICE MIB76) is almost identical in terms of radiation profile and delivery method (Eaton Br J Radiol 2015), therefore treatments should be allowed with this device also, but only with the same tariff, and when data are collected in the same system.

Finally, funding for the data collection both at the recruiting centres and the central registry should be identified before treatments commence, and form part of the tariff used to support this process.

We hope that this feedback is helpful to NICE.

This response has been prepared by some members of IPEM's Radiotherapy Special Interest Group and approved by IPEM's Science, Research and Innovation Council.