



## Topic Exploration Report

This report summarises the results of a brief exploration to establish the quantity and quality of existing high-level evidence on the procedure of interest.

Topic:	Daily online Image-Guided Radiotherapy (IGRT) with reduced treatment margins for people with anal cancer
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### Purpose

HTW researchers conducted a rapid review of evidence on the implementation and use of daily online imaging with reduced treatment margins (planning target volume; PTV) for people with anal cancer. This exploratory summary will inform the prioritisation of radiotherapy procedures to be introduced at Velindre Cancer Centre (VCC), alongside expert opinion and other considerations. It could also be used to clarify the scope of an evidence appraisal. Some of the background information and resource impact considerations was submitted by clinical teams at VCC.

### Background

The main objective of radiotherapy treatment is to destroy tumours without harming the healthy tissues which surround them. Imaging in radiotherapy is used to ensure the patient is set up in the correct position, the target is adequately covered and surrounding organs at risk have not moved too close to treatment field. "Online" refers to this process being performed prior to delivering the treatment so appropriate movements can be made.

### Proposed question

What is the effectiveness of daily online imaging for people with anal cancer who are having post-surgery radiotherapy with reduced treatment margins?

Proposed PICO	
Population	Patients with anal cancer who are having definitive chemoradiotherapy with reduced treatment margins
Intervention	Daily online (adaptive) image-guided radiotherapy (IGRT)
Comparator	Initial online IGRT (fractions 1-3), followed by weekly online IGRT (with offline treatment in between)
Outcome measures	<p><i>Interim/proxy measures:</i></p> <ul style="list-style-type: none"> <li>• <i>Reduction in Planning Target Volume (PTV)</i></li> <li>• <i>Proportion of patients who require revision of their treatment plan</i></li> </ul> <p>Clinical effectiveness:</p> <ul style="list-style-type: none"> <li>• Survival/progression-free survival</li> <li>• Local/regional failure-free survival</li> </ul> <p>Safety: Toxicity</p> <p>Costs of:</p> <ul style="list-style-type: none"> <li>• Ongoing service provision (e.g. staff time for treatment planning and delivery; consumables; maintenance of equipment)</li> <li>• Long-term requirement for further treatment if poor control or toxicities (e.g. retreatments, palliative care, clinic attendances/scans)</li> </ul>

**Summary of findings**

Searches identified very limited evidence on the effectiveness of this intervention. The evidence search National guidelines published in 2015 support the use of daily online imaging for IMRT with reduced margins. The recommendations made in these guidelines are described by the authors as evidence-based, but the rationale for the recommendations and the evidence underpinning them is not clear. A UK audit of anal cancer radiotherapy concluded that IMRT delivered according to this guidance reduced acute toxicity and minimised treatment interruptions in comparison with previous two-phase conformal techniques.

**Economic impact**

The costing approach takes the form of a limited scope cost evaluation. The linear accelerator time and staffing costs were assumed to represent the most significant cost differentials between the two approaches. 5 minutes of both, the linear accelerator and radiographer (grade 6) were included. Per patient costs (28 fractions) amounted to £519 (2017 GBP). Radiographer time contributed £110 (£0.78 per minute), linear accelerator time was costed at £409 (£2.92 per minute).

## Prioritisation criteria

**Clinical impact** (Potential for the technology to have an impact on patient-related health outcomes):

There is low quality evidence suggesting potential improvement

**Budget impact** (Impact of the technology on health care spending):

Estimated costs suggest a budget impact of ~£23,000 per year based on 45 patients.

**Population impact** (The size of the population that would be affected by the technology):

An estimated 45 patients per year.

**Equity** (The technology has the potential to introduce, increase, or decrease equity in health status):

No equity issues identified.

## Questions for researcher

Based on the sources you have identified, is your impression that the evidence is likely to:

- favour implementation of the procedure?
- favour standard care?
- be inconclusive? Yes

Whilst the evidence suggests that the treatment may have better outcomes using additional online imaging, the extent of the clinical benefit is unclear.

## Questions for topic proposer

- Does audit data provide any evidence on the effectiveness of daily online imaging specifically (rather than the effectiveness of IMRT in general)?
- Will the results of the PLATO trial provide any evidence on the effectiveness of daily online imaging specifically?
- Is there any ongoing research in this area other than that identified?

## Topic proposer response (25 February 2019)

Agree direct evidence for daily online is lacking. I suspect there will never be a RCT for this as it is driven by common sense. Daily online allows us to reduce size of PTV. A smaller PTV will result in less dose to bowel. Dose to bowel is directly proportional to risk of toxicity.

The PLATO trial will not address the lack of randomised evidence as all arms in the trial get daily online.

## Sources of evidence

- Muirhead, R., Adams, R., Gilbert, D., Harrison, M., Glynne-Jones, R., Sebag-Montefiore, D., & Hawkins, M. A. (2015). National guidance for IMRT in anal cancer. Available at: <http://analimrtguidance.co.uk/national-anal-imrt-guidance-v3.pdf>
- Muirhead, R., Drinkwater, K., O'Cathail, S. M., Adams, R., Glynne-Jones, R., Harrison, M., & Gilbert, D. C. (2017). Initial Results from the Royal College of Radiologists' UK National Audit of Anal Cancer Radiotherapy 2015. *Clinical Oncology*, 29(3), 188-197.

## Appendix - Brief literature search results

Resource	Results
<b>UK guidelines and guidance</b>	
<a href="#">NICE</a> <i>We searched for guidelines, technology appraisals, diagnostics, interventional procedures, and medical technologies guidance.</i>	We did not identify any guidance on the use of daily online imaging with radiotherapy to treat anal cancer.
<a href="#">Healthcare Improvement Scotland</a> <i>We searched the HIS website for any relevant advice and hand-searched Scottish Health Technologies Group and Scottish Intercollegiate Guidelines Network publications.</i>	We did not identify any guidance on the use of daily online imaging with radiotherapy to treat anal cancer.
<a href="#">Guidelines International Network</a>	We did not identify any guidance on the use of daily online imaging with radiotherapy to treat anal cancer.
<b>Secondary literature and economic evaluations</b>	
<a href="#">ECRI</a>	We did not identify any guidance or technology assessments on the use of daily online imaging with radiotherapy to treat anal cancer.
<a href="#">Cochrane library</a> <i>We searched for relevant Cochrane Reviews.</i>	We did not identify any Cochrane Reviews on the use of daily online imaging with radiotherapy to treat anal cancer.
<a href="#">Medline</a> <i>We searched the Medline database for systematic reviews, meta-analyses, economic evaluations only.</i>	We did not identify any relevant secondary evidence on the use of daily online imaging with radiotherapy to treat anal cancer.
<b>Primary studies</b>	
<a href="#">Medline</a> <i>We searched the Medline database for studies of any design.</i>	<ul style="list-style-type: none"> <li>Muirhead, R., Drinkwater, K., O'Cathail, S. M., Adams, R., Glynne-Jones, R., Harrison, M., &amp; Gilbert, D. C. (2017). Initial Results from the Royal College of Radiologists' UK National Audit of Anal Cancer Radiotherapy 2015. <i>Clinical Oncology</i>, 29(3), 188-197.</li> </ul>
<a href="#">Cochrane library</a> <i>We searched the Cochrane Trials database for studies of any design.</i>	We did not identify any relevant evidence on the use of daily online imaging with radiotherapy to treat anal cancer.

<b>Ongoing secondary research</b>	
<a href="https://clinicaltrials.gov">Clinicaltrials.gov</a>	No relevant trials identified
<a href="https://www.isrctn.com/">ISRCTN registry</a>	PLATO - Personalising anal cancer radiotherapy dose. ISRCTN88455282. <a href="https://doi.org/10.1186/ISRCTN88455282">https://doi.org/10.1186/ISRCTN88455282</a>
<b>Other sources</b>	
Identified from information in the Radiotherapy Objective Proposal:	<ul style="list-style-type: none"> <li>Muirhead, R., Adams, R., Gilbert, D., Harrison, M., Glynne-Jones, R., Sebag-Montefiore, D., &amp; Hawkins, M. A. (2015). National guidance for IMRT in anal cancer. Available at: <a href="http://analimrtguidance.co.uk/national-anal-imrt-guidance-v3.pdf">http://analimrtguidance.co.uk/national-anal-imrt-guidance-v3.pdf</a></li> </ul>

<b>Date of search:</b>	17 <sup>th</sup> October 2018
<b>Concepts searched:</b>	anal cancer, IMRT, PTV, daily imaging