Public Health England

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Safer Radiotherapy

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The Radiotherapy Team is based at PHE CRCE Chilton

Welcome to the new look edition of Safer Radiotherapy (RT). The aim of the newsletter is to provide a regular update on the analysis by PHE of radiotherapy error (RTE) reports. These anonymised reports are submitted on a voluntary basis through the National Reporting and Learning System (NRLS) of NHS Improvement or directly to PHE, to promote learning and minimise recurrence of these events. Safer RT is designed to disseminate learning from RTE to professionals in the RT community to positively influence local practice and improve patient safety.

Published three times a year, Safer RT contains key messages and trends from the analysis of RTE reports. This issue focuses on the palliative pathway. Any comments and suggestions for inclusion in the newsletter can be sent to radiotherapy@phe.gov.uk and would be gratefully received. Thanks to all contributors to this issue. The next issue of Safer Radiotherapy will be published in May 2017 and will be available at

https://www.gov.uk/government/collections/medical-radiation-uses-dose-measurements-and-safety-advice

Helen Best, Editor

Departments contributing to the national voluntary reporting and learning system

Between 2010 and 2014 100% of NHS RT providers had submitted RTE reports using the TSRT9 trigger. However, for the reporting period December 2015 to November 2016 only 58 out of 61 departments shared RTE for national analysis and learning, leaving three departments either not reporting or not using the TSRT9 trigger code to report RTE through the NRLS. It is recommended that RTE are shared on a monthly basis to allow timely dissemination of learning. If any departments require support please contact PHE staff at **radiotherapy@phe.gov.uk.**

On-site advice on patient safety in clinical practice is provided by the RT team at PHE. A survey will be undertaken by PHE to obtain the thoughts of the RT community on these visits. Please look out for the survey which will be emailed to heads of RT services soon.

The Department of Health has published guidance on investigation and notification of medical exposures much greater than intended, this can be found here **https://www.gov.uk/government/publications/the-ionising-radiation-medical-exposure-regulations-2000**

Development of learning from RTE guidance document

The guidance document containing the refinement of the RT pathway coding to include safety barriers (SB) and a proposed causative factor (CF) taxonomy has been published by PHE, in association with the professional bodies. Definitions and examples on the application of the taxonomies are available within the guidance document.

Causative factors may be broken down in to root causes (immediate cause of an incident) and contributory factors (latent weakness that allows the immediate cause of an initiating event to happen). The guidance document proposes a new CF taxonomy so that each of these events can be captured. The taxonomy is to be applied alongside the RT pathway coding.

The RT pathway coding has been refined to reflect contemporary RT practice, 14 additional subcodes have been added to the pathway and further descriptors are included to reduce ambiguity of terminology. SB are any process steps whose primary function is to prevent errors occurring or propagating through the RT workflow. Codes which act as SB have been identified within the refined RT pathway coding.

The PSRT proposes these developments would be implemented locally and shared for national analysis through existing mechanisms already used for reporting and learning from RTE. We would like to thank all of those who have contributed to this work from across the RT community. You can find the guidance document at **https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/579541/DL_guidance_finalNB211216.pdf**

IAEA e-learning programme

The IAEA has created an e-learning programme called safety and quality in radiotherapy designed to provide continuing education to radiotherapy professionals regarding safety and quality in radiotherapy. The e-learning offers participants an opportunity to improve their understanding of safety in radiotherapy, learn techniques to reduce and avoid radiotherapy incidents and understand the value and use of incident learning systems. Further information can be seen at **https://rpop.iaea.org/RPOP/RPoP/Content/News/e-learning.htm**

A new guidance page is available which brings together the web pages from various bodies across the UK who regulate the use of radioactive substances and radiation generators, this can be viewed at **https://www.gov.uk/guidance/regulatory-controls-for-radiation-protection-in-the-uk**

RTE Data analysis: August to November 2016

Submissions from 58 NHS UK providers contributed to this issue's full data analysis, covering August to November 2016, one of which was from a referring centre as opposed to a RT provider. It is available at **www.gov.uk/government/collections/medical-radiation-uses-dose-measurements-and-safety-advice**. The analysis includes data on primary process coding and severity classification of the RTE.

Classification of RTE

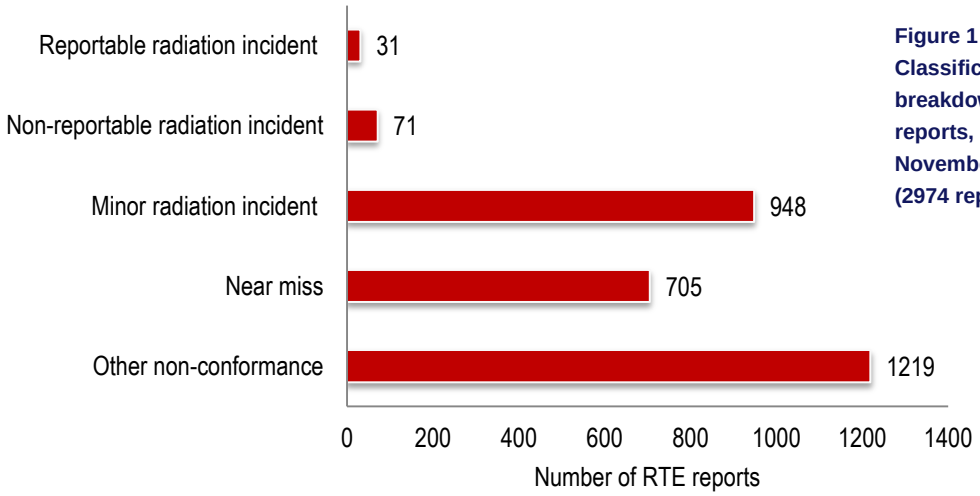

Figure 1 Classification breakdown of RTE reports, August to November 2016 (2974 reports)

Of those RTE reported for the period August to November 2016, 2872 out of 2974 reports (96.6%) were classified as minor radiation incidents, near misses or other non-conformances (see figure 1). These are lower-level incidents which would have no significant effect on the planning or delivery of individual patient treatments. Reportable radiation incidents (level 1) made up 31 (1.0%) of all reports. 'Setting of couch position/angle' comprised 5 (16.1%) of all level 1 RTE reported for this time period. Non-reportable radiation incident reports (level 2) made up 71 of all reports (2.4%). 'On-set imaging: approval process' comprised 8 (11.3%) of all level 2 RTE. Level 1 and level 2 reports made up 102 (3.4%) for this reporting period which is an increase from previous analysis (2.7%, n = 73).

Of the 948 minor radiation incidents (level 3) reported, 349 (36.8%) of this subset were related to the 'on set imaging: production process', making it the most frequently occurring code in this classification, consistent with previous analysis. The most commonly occurring RTE process code in the near miss (level 4) classification was 'accuracy of data entry' with 66 reports (9.4%). Within the non-conformance (level 5) classification 'management of process flow within planning' had 107 reports (8.8%) making this the most frequently occurring RTE in this classification.

Primary process code

The main themes (points in the patient pathway where the majority of reported RTE occurred) for this dataset are shown in figure 2. On-set imaging process codes contributed 699 of the reports in main themes (52.3%), making up 23.5% of all

reports for this reporting period. Consistent with the previous analysis 'on-set imaging: production process' is by far the most commonly occurring process code. Guidance on this error can be found in issues 7 and 18 of Safer RT.

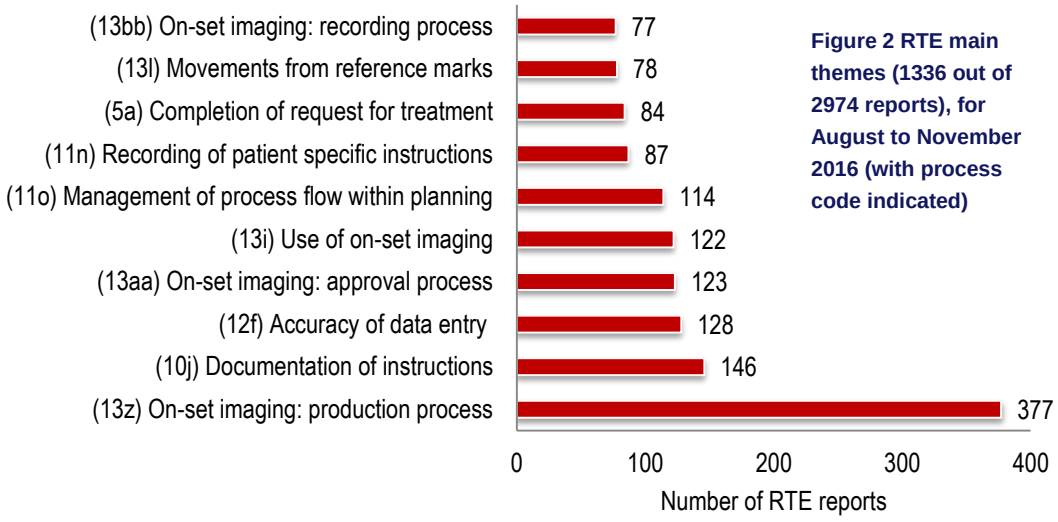

Figure 2 RTE main themes (1336 out of 2974 reports), for August to November 2016 (with process code indicated)

Error of the Month

Manual Calculations TSRT Process Code:
Calculation process for non-planned treatments **(11r)**
Calculation checking process for non-planned treatments **(11s) (SB)**

How can we minimise the risk of this RTE occurring?
Points to consider

1. Produce and follow clearly defined and up to date procedures and protocols for all patients including out-of-hours working

2. Ensure appropriate booking of patient appointments, to manage workflow and ensure appropriately trained and entitled staff are available for these duties

3. Independent and robust methodologies which have been approved by the MPE should be employed for calculating and checking monitor units

4. Calculations should be independently checked by a different entitled operator using a different method, for example a reverse calculation
(TSRT recommendations 7 and 11)

5. Ensure operators are adequately trained, competent and entitled to act as an operator, with up to date training records

6. Training and training packages should be agreed by the MPE, detailed and specific to particular procedures, tasks and equipment as appropriate

7. Create an appropriate environment with minimal distractions for staff (TSRT pages 5, 10 and 35)

8. Ensure repetitive checking requiring intense concentration is undertaken for short periods in an appropriate environment with minimal distractions for staff. Alternate activities with more diverse tasks (TSRT pages 5, 9, 10 and 35)

9. Standardised treatment protocols should be used to allow definition of an expected range of monitor units (TSRT recommendation 10)

10. Monitor locally reported RTE to identify common occurrences and introduce preventative action

Palliative calculation codes 11r

Process subcode 'calculation process for non-planned treatments' **(11r)** identifies where calculation processes for non-planned treatments are conducted incorrectly. For the reporting period December 2013 to November 2016, 58 RTE contained the primary process subcode 11r. Examples of these types of reports included using the incorrect energy, incorrect factors for the calculation and incorrect calculation process. Of note 65.5% (n = 38) of these reports contained the secondary process subcode 'calculation checking process for non-planned treatments' (11s) which indicates the checking process failed for over half of these incidents.

Figure 3 illustrates a higher percentage of reportable radiation incident reports containing 11r process subcode (5.2%, n = 3) when compared with the total dataset for the same reporting period December 2013 to November 2016 (1.1%, n = 89).

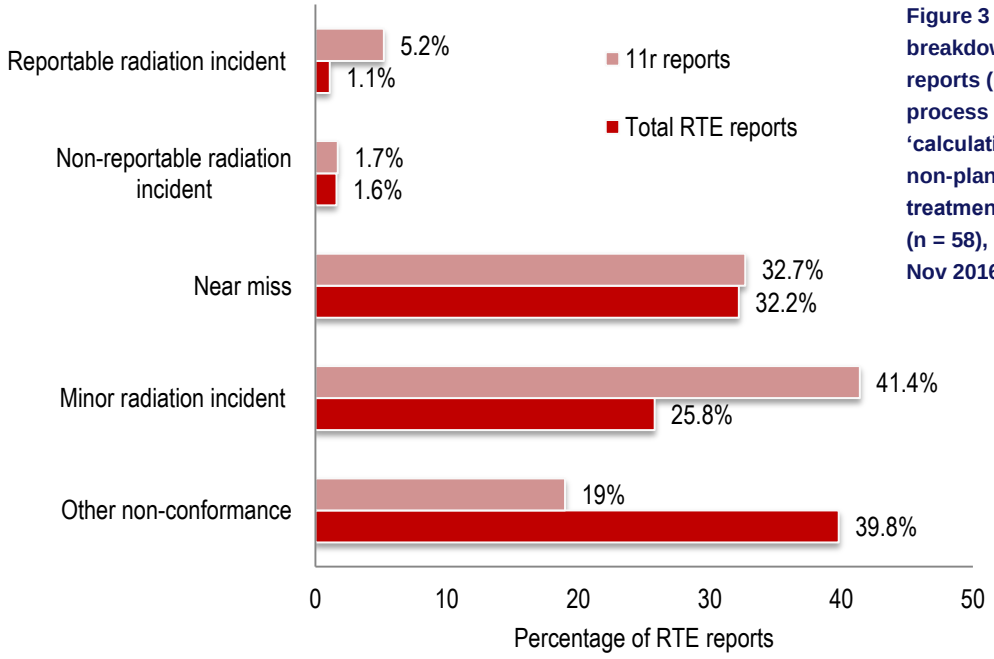

Figure 3 Classification breakdown of total RTE reports (n = 8055) and process subcode 'calculation process for non-planned treatments' (11r) (n = 58), Dec 2013 to Nov 2016

IPEM RT imaging working party

In June 2016, a new working party was formed by the Institute of Physics and Engineering in Medicine (IPEM) to audit typical imaging doses and image quality for the full range of X-ray imaging procedures undertaken in RT departments. This working party will initially focus on the use of CT for planning scans, and the application of on treatment CBCT imaging with an aim to publish a range of typical doses for common procedures. It is hoped that making this data available will enable better optimisation of imaging. Calls for data contributions to this work will be announced throughout 2017, starting with planning CT doses this month. All centres are encouraged to contribute to this important work to ensure the results of this study are truly reflective of current practice throughout the UK. For further information, please contact **tim.wood@hey.nhs.uk**

Unintended overexposure of a patient during radiotherapy treatment at the Edinburgh Cancer Centre in September 2015

Between 14 and 18 September 2015, a patient received a dose of ionising radiation much greater than intended while undergoing a course of palliative radiotherapy in Scotland. Since the incident resulted from a procedural error, rather than from equipment failure, it was reported and investigated by the Inspector warranted by the Scottish Ministers for the IR(ME) Regulations. The report on this unintended overexposure was published in July 2016 by the Scottish Government. The report contains 18 recommendations intended to minimise the possibility of any similar errors and to enhance patient safety. The report can be viewed at **http://www.gov.scot/Publications/2016/07/8854**

Guest Editorial

Palliative pathway at Peterborough City Hospital (PCH)

Helen Gregory, Macmillan Consultant Therapy Radiographer in Palliative Oncology

The development of the role of a consultant radiographer in palliative oncology at PCH was initiated with the intention to improve service delivery to patients undergoing palliative RT, by optimising the use of existing and developing services. This editorial will focus on the considerations of existing departmental processes when developing a palliative pathway.

Scope of practice It has been important to define a scope of practice for the consultant radiographer-led palliative RT service. This has included identification of the role, training, responsibilities and definition of patient criteria. For patients with brain and bone metastases and metastatic spinal cord compression (MSCC), the scope of practice enables the radiographer to independently undertake patient consent and review, field definition and approval and the entitlement to act as a

referrer and/or practitioner and operator. Agreement and approval within the departmental QA system from all clinicians is required prior to autonomous practice.

Clinical protocols In parallel with the radical treatment pathways, palliative treatment regimens (dose and fractionation), field placement and time to treatment are defined within a clinical protocol; agreed and approved within the departmental QA system. The clinicians and the consultant radiographer are required to adhere to defined regimes. Non-standard regimes require a process of peer review, ensuring that the change is clinically justified in each patient case.

Consultant portfolio The author has undertaken an agreed portfolio of training and clinical experience, including consent for treatment and field/volume definition. This is again in parallel with all other areas of clinical practice within the department and allows for peer review, discussion and reflection with the supervising clinicians.

Pre-treatment The pre-treatment process, CT, virtual simulation and electronic dose calculation and checks within the palliative pathway replicates that of radical treatments. Since 2011, nearly 7000 palliative fractionations have been given. For all MV photon treatments a full 3D dose calculation and dose check have been completed, again reflecting the radical pathways. This has allowed not only the ability to visualise and calculate tissue doses for retreatments but also provides the opportunity to use more conformal techniques and in some cases, VMAT.

Service evaluation Audit and evaluation of the radical treatment pathways is an important aspect of service development throughout the department, and it is essential that this is replicated within the palliative setting. The radiographer-led service has enabled audit of both the MSCC and whole brain RT pathways and evaluation of the data is currently being undertaken. There are a number of opportunities to advance the provision of palliative RT in innovative ways[1].

Conclusion Despite the differences in dose and fractionation there is little difference in the processes within the radical and palliative pathways. This encourages parity and consistency for patient experience and safety within the service overall.

1. Blyth, C.M. Anderson, J. Hughson, W. and Thomas, A. (2001) An innovative approach to palliative care within a radiotherapy department. Journal of Radiotherapy in Practice, 2. 85 – 90.

Dates for the diary	
2 March	Radiotherapy quality special interest group (RTQ SIG) inauguration meeting, London
24 March	BIR, Palliative Radiotherapy, London
25 April	IPEM, Superficial radiotherapy: treatment of the future, Birmingham
5-9 May	ESTRO 36, Vienna
May	Safer Radiotherapy Issue 22