Public Health England

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Safer Radiotherapy

Radiotherapy Newsletter of Public Health England

September 2016 Issue 20

Welcome to the 20th issue of *Safer Radiotherapy.* 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 England 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 radiotherapy 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 four-month periods of RTE reports.

Any comments and suggestions for inclusion in the newsletter would be gratefully received. They should be sent to **radiotherapy@phe.gov.uk**

Thanks to all contributors to this issue. The next issue of *Safer Radiotherapy* will be published in January 2017 and will be available at **https://www.gov.uk/government/collections/medical-radiation-uses-dose-measurements-and-safety-advice.**

Madeleine Ottrey
Interim Editor

INSIDE THIS ISSUE

Patient Safety in Radiotherapy Steering Group (PSRT)

Leslie Frew, Head of Radiotherapy Physics Service, Belfast City Hospital and IPEM representative on the PSRT since its establishment in 2010 has stepped down from the group. Leslie's dedication to improving patient safety through the promotion of appropriate use of ionising radiation was evident in his immense contribution to the group's work.

The PSRT welcomes Dr Carl Rowbottom, Head of Physics, The Clatterbridge Cancer Centre, as the new IPEM representative. Carl's significant knowledge and experience of radiotherapy service delivery and keen interest in safety culture will be instrumental in the future development of the PSRT's work programme.

The *Development of Learning from RTE guidance document* will shortly be published in association with the professional bodies.

This document includes a refinement of the radiotherapy pathway coding and proposal of causative factor and safety barrier taxonomies. These will be adapted for use as part of the development of the national analysis of RTE.

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The Radiotherapy Team is based at PHE CRCE Chilton

EDITORIAL HEADLINE

Fourth Biennial Report on Radiotherapy Errors and Near Misses

The fourth biennial report on data submitted for analysis under the national voluntary reporting and learning scheme has been published by PHE.

A total of 12,691 RTE reports from UK NHS RT providers are presented. Inclusion of data from each of the UK administrations demonstrates consistent themes in the occurrence of these events. This report highlights no significant change in the percentage of Level 1 and 2 incidents, a slight increase in Level 3 and 4 incidents and a decrease in Level 5 incidents. In addition this report will enable benchmarking exercises and facilitate comparison of local analysis with the national picture.

The UK inspectorates for IR(ME)R also shared anonymised synopsis of closed reportable radiation incidents from the same time period and these are included in the analysis.

It should be noted that the vast majority of these reports are lower level incidents having little or no significant effect on the planning or delivery of individual patient treatments. Over the past six years reporting levels have increased by 282% reflecting a mature patient safety culture and a continued commitment to improving patient safety by NHS RT providers.

You can find the biennial report at:

https://www.gov.uk/government/publications/radiotherapy-errors-and-near-misses-data-report

RTE Data Analysis: April to July 2016

Data Analysis

Submissions from 57 NHS UK RT providers contributed to this issue's full data analysis, covering April to July 2016. It is available at **www.gov.uk/government/collections/medical-radiation-uses-dose-measurements-and-safety-advice**. This is an increase from the previous analysis when 55 providers submitted data, reflecting the strong reporting culture that continues in the UK RT community.

The analysis includes data on primary process coding and severity classification of the RTE. A breakdown of primary process codes by classification levels is also included.

New and existing NHS radiotherapy providers are welcome to contact radiotherapy@phe.gov.uk for advice on how to submit data.

Classification of RTE

Of those RTE reported for the period April to July 2016, 2659 out of 2732 reports (97.3%) 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.

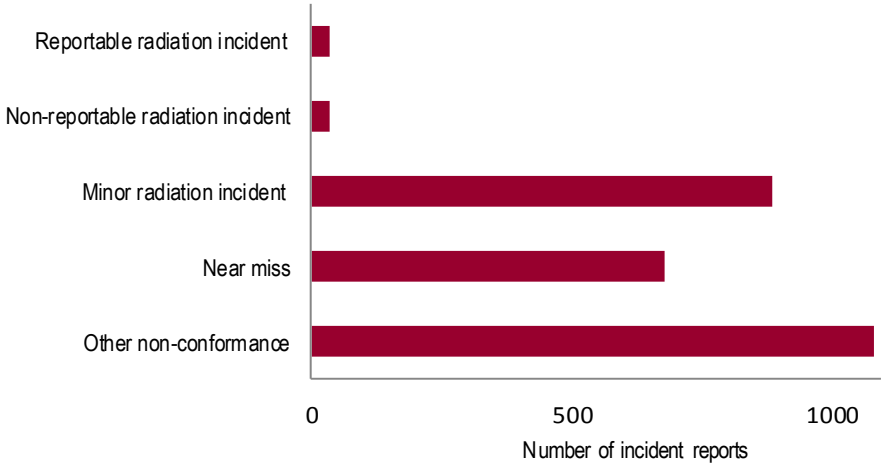
Reportable radiation incidents (Level 1) made up 36 (1.3%) of all reports. 'Localisation of intended volume' comprised 8 (22.2%) and 'Production of images demonstrating correct detail' comprised 3 (8.3%) of all Level 1 RTE reported for this time period. Non-reportable radiation incident reports (Level 2) made up 37 of all reports (1.4%). 'On-set imaging: approval process' comprised 6 (16.2%) of all level 2 RTE, which is consistent with the previous analysis. Level 1 and Level 2 reports made up 73 (2.7%) for this reporting period which is an increase from previous analysis (1.7%).

Of the 890 minor radiation incidents (Level 3) reported, 342 (38.4%) 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 analyses.

The most commonly occurring RTE process code in the near miss (Level 4) classification was 'accuracy of data entry' with 84 reports (12.3%).

Within the non-conformance (Level 5) classification 'documentation of instructions' had 70 reports (6.4%) making this the most frequently occurring RTE in this classification.

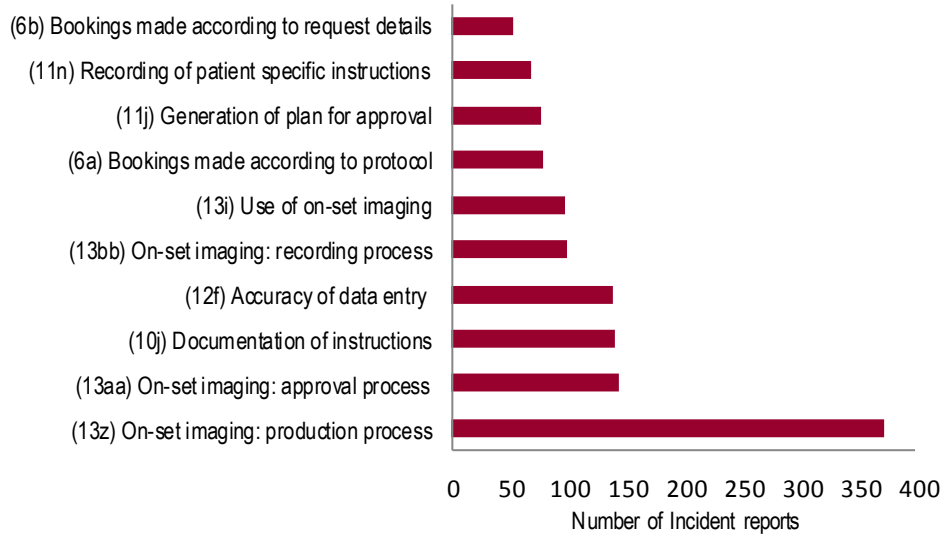
Figure 1 ***Classification breakdown of RTE reports using the TSRT9 trigger code, April to July 2016 (2732 reports)***



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*. Imaging process codes contributed to 715 of the reports in main themes (56.3%), making up 26.2% 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 *Issue 7 and 18 of Safer RT*.

Figure 2 ***RTE main themes (1270 out of 2732 reports), for April to July 2016 (with process code indicated)***



The data analysed is submitted by the RT community. If you have any suggestions on how the analysis can be improved, please email the Radiotherapy Team at **radiotherapy@phe.gov.uk.**

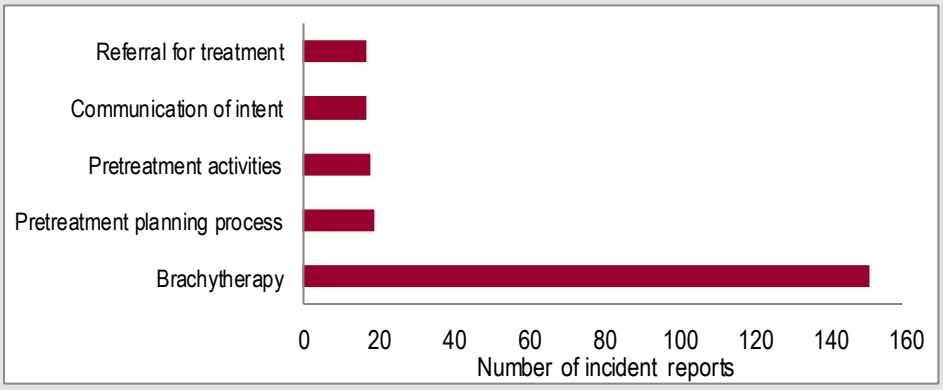
Brachytherapy Error Review

Brachytherapy RTE make up a very small percentage of the total number of RTE reported (0.9%, n = 279). Due to the small numbers the entire database to date was analysed (29,684 RTE).

Further analysis shows the proportion of higher level errors (Level 1 and 2 RTE) is larger in brachytherapy in comparison to all radiotherapy errors (6.8% in brachytherapy compared to 2.9% in all RTE). A possible reason for this could be treatment is delivered in larger doses over fewer fractions and so the likelihood of an unintended overdose is greater if an error occurs. 18.6% (n = 52) of the brachytherapy reports resulted in the patient getting a dose other than that prescribed (Level 3). The remaining 74.6% (n = 208) brachytherapy RTE were near misses or non-conformities.

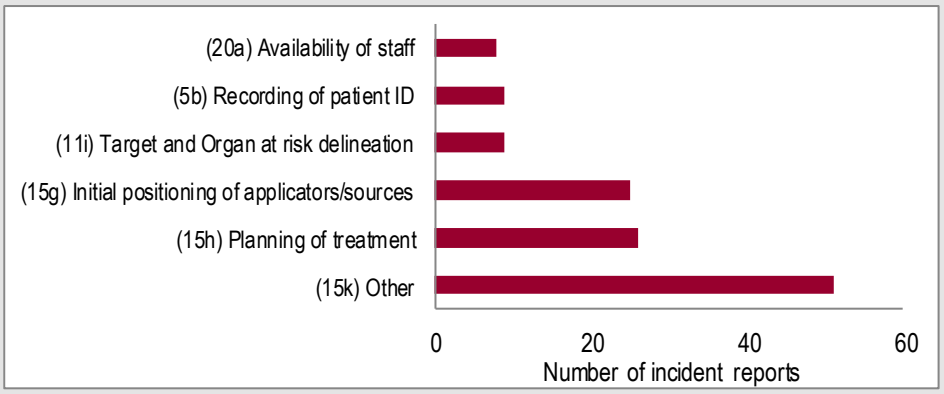
The graphs below show the top five process codes and the most common subcodes for brachytherapy errors. The majority of these errors are primarily coded using the brachytherapy process code.

Top five process codes for brachytherapy RTE



The most common subcode reported for brachytherapy errors is the brachytherapy process subcode 'other'. This could be due to the ambiguity of coding these errors. It is hoped the guidance document outlining the development of learning from RTE, due to be published in the near future, will aid the coding of these errors. The second most common subcode reported was the brachytherapy process subcode 'planning of treatment' (15h). This is discussed further in this issue's 'Error of the Month'.

Most common subcodes for brachytherapy RTE



Radiotherapy Quality Special Interest Group (RTQSIG)

RTQSIG was formed in 2015 amalgamating the expertise, knowledge and experience of two locality groups with special interest in radiotherapy quality management: LASER and MOSQuITO. Operating on a voluntary basis, RTQSIG aims to maximise available resources, national effort for the benefit of good governance and drive the recognition of radiotherapy quality professionals without geographic boundaries and including all disciplines. Currently the group has 30 NHS and non NHS member departments from the Midlands, Southeast and London. RTQSIG welcomes members from any other locality groups. The first meeting will be in the Spring of 2017 at SCoR headquarters and annually thereafter. To join the group and for further information go to:

https://www.networks.nhs.uk/nhs-networks/london-and-south-east-radiotherapy-quality/rtq-sig-terms-of-reference

ERROR OF THE MONTH

Brachytherapy

TSRT Process Code:

Planning of treatment (15h)

This was the most common RTE reported within the brachytherapy process code.

Examples of this type of error relate to the activity of seeds being input incorrectly in the planning system or data for an incorrect size applicator used in a calculation.

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.

2 Consider appropriate use of imaging techniques to inform the planning process, e.g. CT, MRI.

3 Protocols should be in place to clearly define what data is checked by planners and prescribers throughout the pathway and how the results of these checks are to be recorded [TSRT page 40].

4 Create an appropriate environment with minimal distractions for staff, as planning requires high levels of concentration and responsibility [TSRT pages 5, 10 and 35].

5 Ensure checking of plans and calculations are carried out independently [TSRT page 40 and 41].

6 Ensure operators are adequately trained and competent, with maintained training records. They should be detailed and specific to particular procedures, tasks and equipment as appropriate.

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

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GUEST EDITORIAL

Safety considerations in brachytherapy practice.

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Brachytherapy is a highly specialised practice with approximately 3% of radiotherapy patients receiving this treatment. Across the UK, brachytherapy services have evolved in unique ways, influenced by different drivers and barriers, with staff carrying out variable and often overlapping roles.

There are a number of specific safety considerations those practicing brachytherapy may wish to consider:

1. Commissioning:

- A thorough understanding of the planning system and afterloader mitigates the risk of introducing systematic errors during commissioning, e.g. how the system handles source decay, the dosimetric source model, the algorithm used in inverse planning, the position of the first dwell position in each applicator type.
- An external dosimetry audit in the commissioning of a new system.
- Use of templates and protocols stored in the planning system to reduce the likelihood of error in input of data.

2. QA:

- QA checks, including measurement to verify source activity, are particularly important after each source exchange and software upgrade.
- Daily checks on alarms, afterloader functions, emergency stops and connectivity.
- Additional radiation protection requirements include an independent gamma alarm and written emergency procedures covering failure of the afterloader to retract the source which must be regularly rehearsed.

3. Planning:

- An independent plan check should verify: identification, definition, reconstruction and labelling of applicators, target volume dose coverage and dose to critical organs, some check on overall treatment time and/or independent check of a point dose calculation, accounting for any EBRT.

4. Applicator positioning and imaging:

Applicator positioning can be challenging due to difficult access to the tumour or tumour bed, with invasive techniques, anaesthetics and analgesia often necessary. The required surgical skill of the oncologist has led to the development of RCR guidelines[1] for minimum numbers of cases for each oncologist for each type of procedure which has now been adopted by the National Service Specification. Clinicians should also review their practices and network with colleagues to reduce risks wherever possible.

- Image guidance is well established in external radiotherapy, but it is less widely adopted in some areas of brachytherapy. The use of ultrasound guided placement of intrauterine applicators in cervical brachytherapy to reduce uterine perforations may reduce the need to abandon treatment and reduce delays caused by rescheduling and repeat anaesthetics.
- The high dose gradients characteristic of brachytherapy can be exploited to increase the therapeutic ratio and opportunities for dose escalation with the aim of benefits to local control rates, survival and reduced toxicities. Guidelines from GEC-ESTRO have been driving cervical brachytherapy services forwards over the past 10 years[2]. Also the introduction of MR imaging has allowed clinicians to contour target volumes and move away from point dose prescriptions leading to dose escalation and reduced doses to organs at risk. However, imaging inaccuracies and an increased risk of unintended changes in applicator positioning and organ motion due to increased planning times can lead to significant dose changes.

Finally effective patient review and follow up is clearly a cornerstone of patient safety in brachytherapy delivery.

To join the radiographers Brachytherapy Forum, visit SCoR website and click on the 'Special Interest Groups' page: http://www.sor.org/practice?

References

1. The Royal College of Radiologists. Implementing image-guided brachytherapy for cervix cancer in the UK. London: The Royal College of Radiologists, 2009
2. Pötter R, Haie-Meder C, Limbergen EV, et al. Recommendations from Gynaecological (GYN) GEC ESTRO Working Group (II): Concepts and terms in 3D image-based treatment planning in cervix cancer brachytherapy—3D dose volume parameters and aspects of 3D image-based anatomy, radiation physics, radiobiology. Radiother Oncol 2006; 78:67–77

DATES FOR THE DIARY

22-November	SRP, Implementation of BSS in the
27-29 January 2017	SCoR, 2017 Annual RT conference, Newcastle
January 2017	*Safer Radiotherapy, Issue 21*