



Welcome to the 16th 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 RTEs to professionals in the radiotherapy community to positively influence local practice and improve patient safety.

Now published three times a year, *Safer RT* will contain key messages and trends from the preceding four-month period 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 RT* will be published in September 2015 and will be available at <https://www.gov.uk/government/collections/medical-radiation-uses-dose-measurements-and-safety-advice>.

Helen Best
Editor

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As highlighted in issues 14 and 15 of *Safer RT*, the PSRT continues to develop the learning from RTEs and their analysis.

The draft causative factor taxonomy is currently being piloted across ten clinical sites. The final taxonomy will be made available for use across the radiotherapy community to support trends analysis.

In parallel, work on refining the pathway coding is underway (see page 3). Comments from across the radiotherapy community have already been received. In addition, it is proposed that this work will include the introduction of safety barriers,

also known as critical control points or detection methods. These include any process steps whose primary function is to prevent the occurrence of errors.

Once agreed by the PSRT, this will be shared with the pilot sites for comment.



The Radiotherapy Team is based at PHE CRCE Chilton

EDITORIAL HEADLINE

Development of the Patient Safety Incident Management System (DPSIMS) Project

The NRLS is a database of patient safety incident reports submitted by NHS organisations across England and Wales, and directly by patients, specifically for the purposes of learning. Hospitals regularly upload incident reports from their local systems to the NRLS, where they are analysed by national patient safety experts to spot trends, specific incidents of concern or emerging risks to patient safety. Radiotherapy departments include the TSRT trigger code in reports so that these might be highlighted for national analysis by PHE and lessons shared with the professional community.

The DPSIMS Project (previously known as the NRLS Development Project) was started in 2014. It is a three-year project to specify and procure a replacement for the NRLS, to support the ability of the NHS to learn and improve on the basis of reported experience.

Engagement to date has included a survey, focus group and workshops for patient advocates and professional users of the NRLS, providing an opportunity to influence the future of patient safety reporting and learning. More recently, a series of clinical site visits to explore the potential impact of various options for the NRLS successor system on local level provision has been conducted with ten sites, the findings of which will be published in the coming weeks.

Further information can be found at

<http://www.england.nhs.uk/ourwork/patientsafety/dpsims-dev/>.

RTE Data Analysis: December 2014 to March 2015

Data Analysis

Submissions from 56 NHS UK RT departments contributed to this issue's full data analysis, for 1 December 2014 to 31 March 2015, which is available at <https://www.gov.uk/government/collections/medical-radiation-uses-dose-measurements-and-safety-advice>. This is a slight increase from 52 at the last analysis, 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 RTEs. A breakdown of primary process codes by classification levels is also included.

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

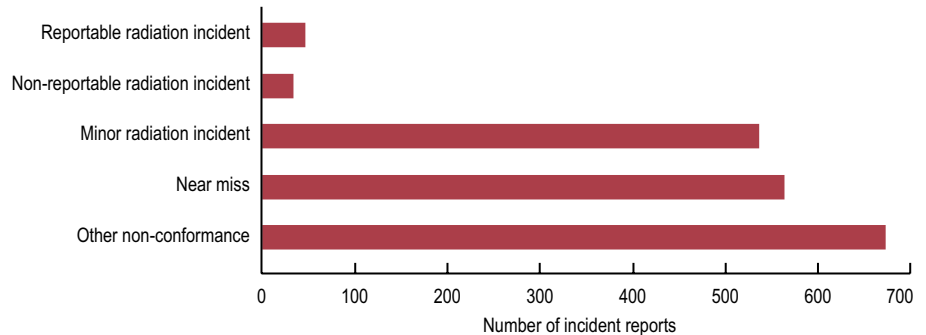
Classification of RTEs

Of those RTEs reported for the period December 2014 to March 2015, 1772 out of 1851 reports (95.7%) were classified as minor radiation incidents, near misses or other non-conformances (see Figure 1). This is consistent with previous analyses. 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 46 (2.5%) of all reports. Pretreatment 'positioning of patient' comprised 6 (13%) and treatment 'on-set imaging: approval process' comprised 5 (10.9%) of all level 1 RTEs reported for this time period. Non-reportable radiation incident reports (level 2) made up 33 of all reports (1.8%). 'On-set imaging: approval process' and 'movements from reference marks' each comprised 4 (12.1%) of all level 2 RTEs.

Of the 536 minor radiation incidents (level 3) reported, 119 (22.2%) of this subset were related to 'on-set

Figure 1 Classification breakdown of RTE reports using the TSRT9 trigger code, December 2014 to March 2015 (1851 reports)



imaging: production process', making it the most frequently occurring code in this classification. The second most frequently occurring type of incident, at 64 (11.9%), was 'use of on-set imaging'. On-treatment imaging is discussed further in issue 12 of *Safer RT*.

The most commonly occurring RTE process code in the near miss (level 4) classification was treatment 'on-set imaging: approval process', with 46 reports (8.1%).

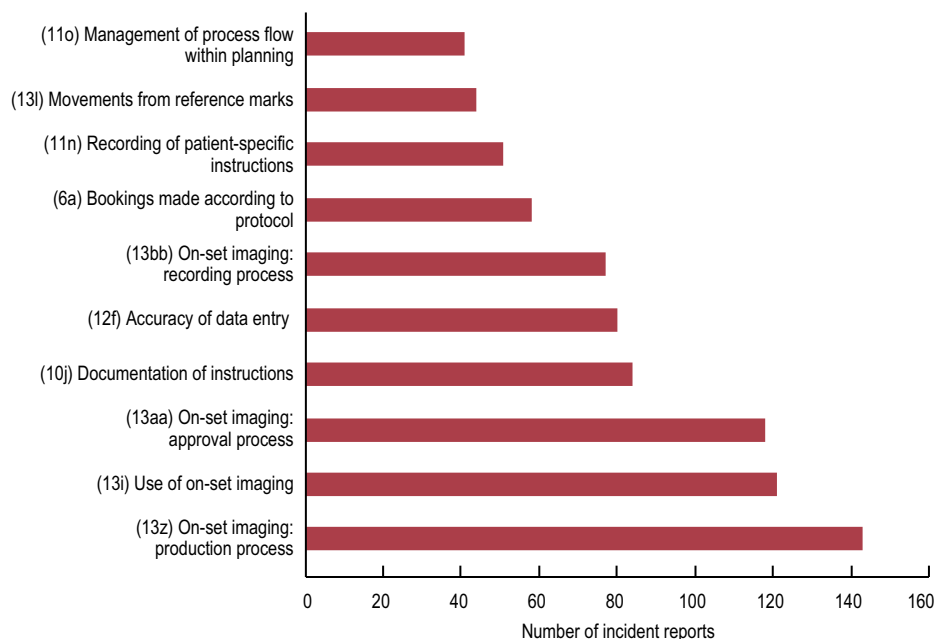
Within the non-conformance (level 5) classification, 'bookings made according to protocol' had 49 reports

(7.3%), 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 RTEs occurred) for this dataset are shown in Figure 2. Imaging process codes contributed to 459 of the reports in the main themes (56.1%), making up 24.7% of all reports in this reporting period. Of note, 'on-set imaging: production process' contributed to 143 of the reports in the main themes (17.5%). This will be discussed further in the *Error of the Month*.

Figure 2 RTE main themes (817 out of 1851 reports), for December 2014 to March 2015 (with process code indicated)



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

Consistency Checking

Consistency checking on the application of the TSRT classification and pathway coding by local RT departments is undertaken by PHE staff on all RTE reports.

Classification

The classification or severity of the event was amended for 31 (1.6%) reports in this reporting period. The amendments were made from 25 (80.6%) reports classified as near misses and 6 (19.4%) reports classified as non-conformances. Of the near misses reclassified, the majority (24) were changed to minor radiation incidents. If an RTE includes an unintended exposure, including on-set imaging, this will be classified as a minor radiation incident or above.

Classification allocated by department	Text description	Reclassification in consistency checking	Comments
Near miss	Images taken for planning procedure, no confirmed diagnosis, departmental protocol requires confirmed diagnosis. Patient ultimately not for radiotherapy treatment	Reportable radiation incident	Although no treatment given, planning images taken before confirmed diagnosis, resulting in unnecessary dose
Near miss	Digital moves completed in incorrect direction, on-set images acquired showing incorrect move. Re-set and moved in correct direction and repeated on-set imaging	Minor radiation incident	Although treatment in correct area, additional on-set imaging taken

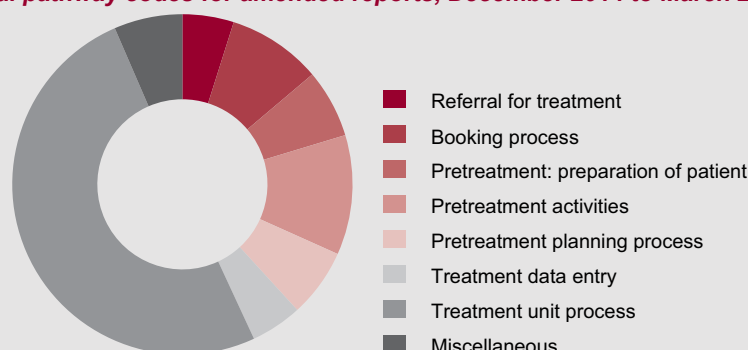
Primary pathway coding

The pathway coding was amended for 127 (6.8%) reports in this reporting period.

The amendments were made on reports associated with the entire patient pathway. Of these, 78 (61.4%) were coded locally from 'other' process codes. PHE staff attributed existing pathway codes to these reports. This suggests there is a need to reduce the ambiguity of some of the terms used in the pathway coding. Reports locally coded as 'other' which could not be amended to existing pathway codes made up 82 (4.4%) of the reports in this reporting period.

This highlights the need for refinement of the pathway coding to reflect current practice. This work is currently being undertaken.

Original pathway codes for amended reports, December 2014 to March 2015



For this reporting period the most frequently changed pathway coding was found in the treatment unit process, at 62 (50.4%) reports.

Pathway coding

Pathway coding allocated by department	Text description	Newly assigned pathway code
Treatment unit, setting of couch position (13q)	Skin blemish used instead of tattoo	ID of reference marks (13k)
Pretreatment activities, positioning of patient (10b)	Consultant unavailable for set-up as requested	Availability of staff with competency appropriate for procedure (20a)

ERROR OF THE MONTH

On-set imaging

TSRT Process Code:

On-set imaging: production process (13z)

This code accounted for 143 (7.7%) RTEs reported from December 2014 to March 2015. It has been the most commonly occurring RTE since June 2014. The majority of these reports, 138 (96.5%), were lower level incidents having little or no effect on the planning or delivery of individual patient treatments.

This RTE is associated with the incorrect production of on-set imaging. The main themes highlighted within these reports included exposed images being unusable due to over-exposure, the incorrect field size exposed or unsuitable positioning of the image panel. This RTE is also associated with equipment malfunction; such errors should also be reported locally and to the MHRA and the relevant manufacturer.

How can we minimise the risk of this RTE occurring?

Points to consider

- 1 Produce and follow clearly defined and up-to-date protocols
- 2 Clearly define individual responsibilities
- 3 Ensure staff are adequately trained, competent and appropriately entitled in the use of the technology
- 4 Ensure adequate instructions are available on the clinical requirement of imaging
- 5 Capture image parameters on day 1 and action if further optimisation is required
- 6 Ensure on-set imaging has been optimised
- 7 Put in place contingency plans in case of equipment failure
- 8 Investigate repeat incidents. Consider removal of equipment from practice
- 9 Monitor locally reported RTEs to identify further preventive action
- 10 Audit repeated failure to review and update procedures

GUEST EDITORIAL

Radiotherapy Management of Cancer Patients with a Cardiac Implanted Electronic Device: A Clinical Guideline

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A national review of cardiac device policies being used in radiotherapy departments across the UK was carried out in 2013. This reported that most policies do not reflect current best evidence¹. To address this, the Royal College of Radiologists, the Society and College of Radiographers and the Institute of Physics and Engineering in Medicine formed a multidisciplinary working party. This group, comprising clinical oncology, cardiology, therapeutic radiography and medical physics experts, has developed evidence-based guidelines for the management of cancer patients receiving radiotherapy with a cardiac implanted electronic device (CIED).

The number of cancer patients with CIEDs receiving radiotherapy is increasing². Most medical treatments pose little danger to the functioning of CIEDs. However, radiotherapy has the potential to alter device function³. There is limited published research on the effect of radiotherapy on CIEDs, but there is evidence to show that radiotherapy even at low doses can cause malfunction or failure⁴.

The American Association of Physicists in Medicine (AAPM) published a report in 1994 on the safe use of radiotherapy in patients with pacemakers⁵. A later review was produced by Frizzell et al in 2009 and, in 2012, Hurkmans et al updated the AAPM guidelines^{6,7}. The AAPM report does not take into account advances in CIED technology and radiotherapy treatment technology and delivery.

Despite this, it still forms the basis of most CIED departmental radiotherapy policies in the UK¹.

The multidisciplinary working party has developed a UK guideline which reviews the evidence, defines current 'gold standard' practice and provides recommendations for the safe delivery of radiotherapy in patients who have a CIED.

Summary of recommendations

- CIEDs should not be placed directly in the radiotherapy treatment beam
- the cumulative radiotherapy dose received by the pacemaker should not exceed 2 Gy
- patients with rate-adaptive pacemakers should be reviewed by cardiology and consideration given to temporary deactivation of the sensor while receiving radiotherapy
- the cumulative radiotherapy dose received by an implantable cardiac defibrillator (ICD) should not exceed 0.5 Gy
- the photon beam energy should be less than 10 MV
- the dose contribution from on-treatment verification imaging should be taken into account when calculating cumulative radiotherapy dose
- patients should be allocated an appropriate risk stratification group
- the patient's cardiologist should be informed in advance of any planned radiotherapy for advice on monitoring during radiotherapy and subsequent follow-up

- patients with CIEDs should be fully informed of the potential short- and long-term risks of radiotherapy: this should be included in the patient information available from the cardiology department in addition to radiotherapy patient information

Conclusion

The guideline has been developed to support the safe management of patients with a CIED receiving radiotherapy. It is based on current best evidence, and can be adapted to suit local practice in radiotherapy departments. We are conducting research to further define the effect of radiotherapy on modern CIEDs.

References

- 1 Lester JF et al. Clin Oncol 2014; 26: 45–50.
- 2 Brooks N et al. Br J Cardiol 2005; 12: 192–8.
- 3 Last A. Br J Radiol 1998; 71: 4–10.
- 4 Hurkmans CW et al. Radiother Oncol 2005; 76: 93–8.
- 5 Marbach JR et al. Med Phys 1994; 21: 85–90.
- 6 Frizzell B. Comm Oncol 2009; 6: 469–71.
- 7 Hurkmans CW et al. Radiother Oncol 2012; 7: 198.

DATES FOR THE DIARY

8–9 June	UKRO, Coventry
28 September	BIR, IR(ME)R update
23 October	BIR, RTE study day
September	<i>Safer Radiotherapy</i> , Issue 17