# Using a Complex Clinical Algorithm to Predict Treatment Intent from the Radiotherapy Dataset (RTDS)

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## BACKGROUND

The treatment intent of radiotherapy is easy to define as treatment with the aim of cure (radical) or symptom control (palliative). However it has been poorly reported[1] due to the multiple factors which contribute to the decision making and further confounded by the variation in treatment techniques, modern technologies available and dose prescribing.

It was recommended that intent be omitted from the national radiotherapy dataset, RTDS until such a time that there was clinical guidance or protocol in the use of radical and palliative intent. Until April 2013 therefore RTDS did not collect treatment intent as a data item. The authors have produced an algorithm of other clinical data items in RTDS to be able to report intent on historical radiotherapy activity in the UK.

## METHOD

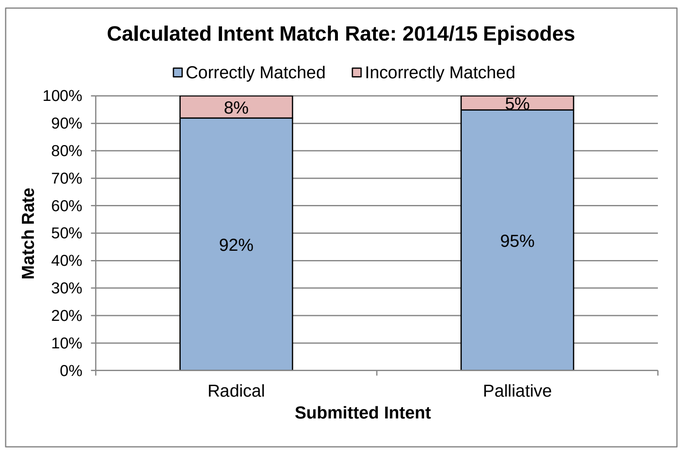
Using individual patient (episode of radiotherapy) records, the algorithm analysed primary cancer diagnosis, the anatomical site and region treated, the prescribed dose and fractionation, the radiotherapy technique and the number of attendances to predict the treatment intent based on the clinical rules shown in the table. The output from this algorithm is known as the *calculated intent*. The algorithm was programmed using T-SQL language and ran as a SSIS package against the National RTDS database. The algorithm was tested for exactitude by comparing the actual data entries for treatment intent collected in the RTDS known as *submitted intent* with the data entries of calculated intent.

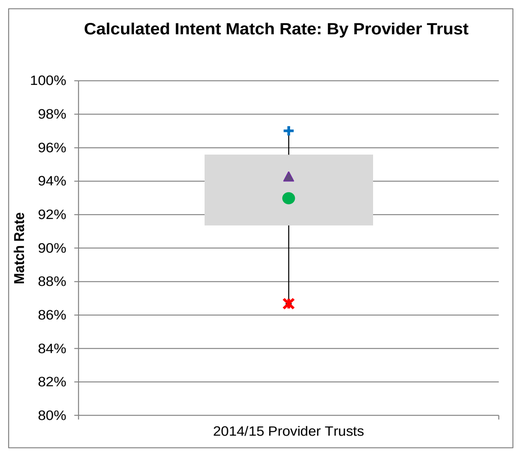
| Clinical Rules for the Algorithm |
|---|
| Brachytherapy episodes are RADICAL, except for episodes with a primary diagnosis of lung (C34) or oesophagus (C15) cancer |
| Episodes containing a prescription of 15 or more fractions are RADICAL |
| Episodes with a non cancer primary diagnosis are RADICAL |
| For providers where the majority of primary breast cancer (C50 & D05) episodes with prescription of 13 or more fractions, are RADICAL |
| Episodes for primary lung cancer (C34) which containing a prescription with the region coded as prophylactic and treatment site coded as brain (Z01) are RADICAL |
| Episodes with a prescription coded with a region as primary or regional nodes, with a high dose, low fractionation and treated on a linear accelerator with stereotactic capabilities are RADICAL |
| Episodes for testicular cancer (C62) with a prescription coded with a region as primary or regional nodes are RADICAL |
| Episodes for rectal cancer (C19, C20 & C21) with a prescription coded with a region as primary and a dose fractionation of 25Gy in 5# are RADICAL. |
| Episodes for skin cancer (C43 & C44) with a prescription coded with a region as primary are RADICAL. |
| Episodes for breast cancer (C50 & D05) with a prescription coded with a region as prophylactic and treatment site of pelvis (Z75) are RADICAL. |
| Episodes for prostate cancer (C61) with a prescription coded with a region as prophylactic and treatment site of breast (Z15) are RADICAL |
| Episodes containing a prescription with the region coded as metastatic are PALLIATIVE (20%) |
| |
| Exceptions: Arterio - venous malformation, Benign disease, Hypofractionated, Prophylactic brain irradiation (PCI) for small cell lung cancer, Stereotactic Ablative, SABR, Brain radiosurgery, Testicular para-aortic or dogleg, Preoperative RT for rectal cancer (rule 8),Non-melanoma skin cancer, Artificial menopause, Breast bud irradiation for prevention of gynaecomastia |

## CONCLUSION

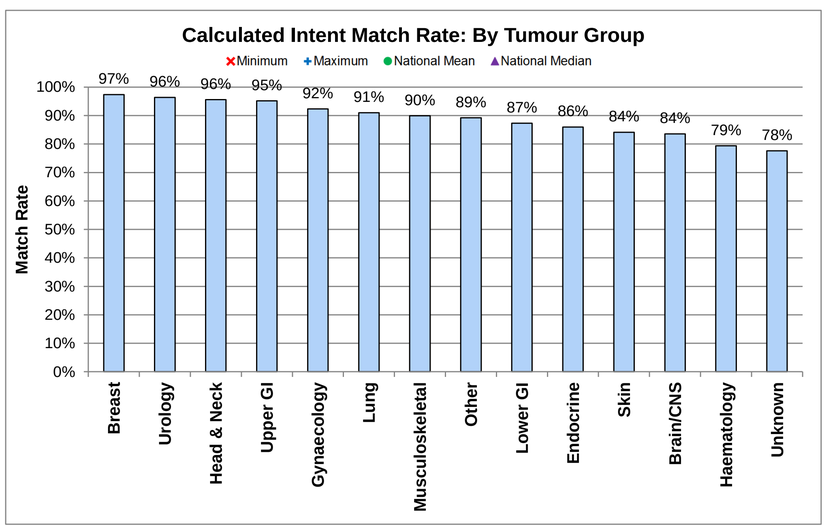
This algorithm can be used to report treatment intent on cohort based population analyses using RTDS. It could be developed further with additional complex rules, to improve those areas where the match rate is lower, and also to account for newer protocols. Care should be taken when looking at specific tumour groups or Trusts due to the variation in match rates.

## RESULTS

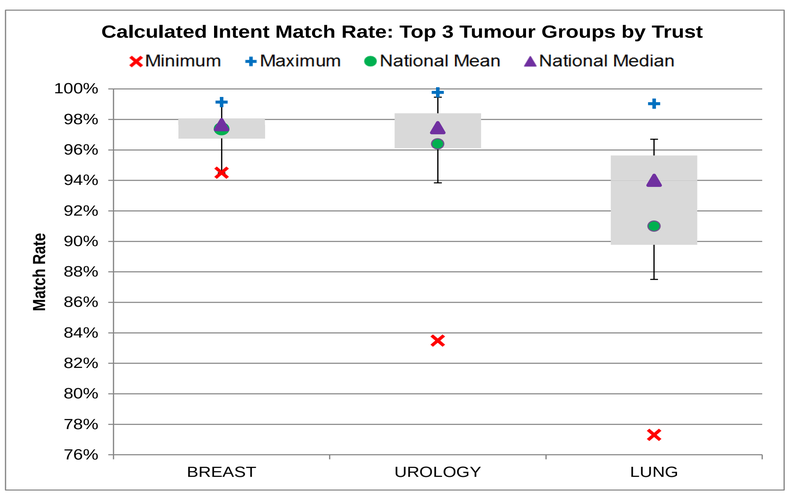



The results showed an overall 93% match rate for all episodes. This rate varied between Trusts from 78% to 97%.




Analysis of the match rate by tumour group also showed differing results. Some of the more common tumour groups have a much higher match rate – e.g. breast cancer at 97% accounting for 30% of all episodes. Interrogating the data by Trust and tumour group, showed some wide variation between Trusts.




The match rate for Breast Episodes showed a small variation between Trusts, with the minimum Trust match rate of 94% and maximum of 99%.

Lung Episodes, whilst still having a high overall match rate of 91%, had a much wider variation between Trusts, from 77% minimum to 99% maximum.

**References**

[1]Palliative or curative treatment intent affects communication in radiation therapy consultations. *Timmermans LM1, van der Maazen RW, Leer JW, Kraaimaat FW.*

Further analysis which included prescribed dose and fractionation for individual cancers would give guidance for future reporting treatment intent in RTDS.

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