

# **Radiotherapy Costing and Tariff Development Project**

## **Update for 2009/10 Reference Costs**



**March 2011**

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# National Cancer Action Team

## Radiotherapy Costing and Tariff Development

### Update for 2009/10 Reference Costs

#### 1 Background

- 1.1 When Reference Costs for radiotherapy in 2006/07 and 2007/08 were reviewed by the Department of Health (DH) and the National Cancer Action Team (NCAT), they showed a wide variation in the activity volumes and unit costs reported. This raised concerns that there were significant variations in data quality.
- 1.2 As a result, NCAT developed a costing template to capture key data in relation to how providers recorded radiotherapy activity and costed the service. This was widely circulated among radiotherapy providers for them to complete.
- 1.3 To follow up this initiative, NCAT commissioned Bailey and Moore to undertake a review of radiotherapy costing in 2010. The basis of this review was a meeting with every radiotherapy provider in England to discuss their approach to costing radiotherapy. These meetings were informed by an analysis of the latest radiotherapy Reference Costs, which at the time was the 2008/09 collection, and the NCAT costing template, if the provider had completed it.
- 1.4 Bailey and Moore published a report of their findings (*Radiotherapy Costing and Tariff Development*) in July 2010. With the publication of 2009/10 Reference Costs, the analysis contained in the report has been refreshed and revised comparative data forms the basis of this update report.

#### 2 Analysis of 2009/10 Reference Costs

- 2.1 The Reference Costs exercise is a national collection of cost data undertaken by the Department of Health (DH) each year in June. Every NHS provider submits this data, based on the previous financial year's accounts. Our July report was based on the 2008/09 Reference Costs collection.
- 2.2 2009/10 Reference Costs were published on the DH web site in January 2011<sup>1</sup>.
- 2.3 The data downloaded from the DH web site showed that there were 50 providers of radiotherapy services in England in 2009/10. Imperial College NHS Trust, who did not submit for the 2008/09 collection, has now provided data for fractions, but not planning events. Two PCT providers that had apparently submitted in error for 2008/09 are absent from the 2009/10 collection.
- 2.4 As in our previous report, the providers above have been divided into 5 peer groups of 10 providers each, based on the fractions of treatment delivered in 2009/10 as reported in Reference Costs. This was to enable radiotherapy departments of similar size to be compared

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<sup>1</sup> [http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH\\_123459](http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_123459)

in groups rather than geographically which would, for example, compare small satellite units with major cancer centres. Changes in volumes reported since 2008/09 have meant that several trusts have moved between groups.

- 2.5 A list of all providers that submitted Reference Costs for radiotherapy in 2009/10 and their allocated peer group, with 2008/09 equivalents included for comparison, is attached at **Appendix 1**.
- 2.6 An overview of the national picture, shown at **Appendix 2**, shows the following key data items:
- Planning – number of events and total cost
  - Treatment – number of fractions and total cost
  - Number of Linacs on site (including service efficiency and non-operational machines but excluding those not used for NHS treatment such as R&D or private patients)
- 2.7 The following comparative data are shown at **Appendix 3** and as charts at **Appendix 4**:
- Planning – unit cost (average cost per planning event)
  - Treatment – unit cost (average cost per fraction delivered)
  - Number of fractions per planning event
  - Ratio of total costs of planning : total costs of treatment
  - Average number of fractions delivered per Linac
  - Total cost quantum (planning and treatment) divided by number of Linacs used
- 2.8 This comparison should enable each Trust to see their own data compared to other Trusts in their peer group, as well as looking at the average for the peer group and the national average.
- 2.9 The comparative data also illustrates the wide range of values that were submitted by Trusts as part of their Reference Costs submission and provides an indicator of where there might be issues regarding the accuracy of counting and/or costing.
- 2.10 The costs used in the comparative data were all deflated by each Trust's Market Forces Factor (MFF). The MFF is a measure of "unavoidable" cost differences between NHS providers based on their geographical location, principally caused by rates of staff pay and the cost of land and buildings. The MFF for each provider is published each year. It is normal practice to deflate all submitted costs by the MFF to ensure a fair "like for like" comparison between Trusts in different parts of England.

### **3 Analysis of changes since 2008/09 Reference Costs**

#### **Trusts with significant changes**

- 3.1 There were 4 providers who reported significantly different numbers of fractions delivered in 2009/10 compared to 2008/09. These are summarised in Table 1 overleaf:

**Table 1: Trusts with significant changes**

|   | Fractions reported 2009/10 | Fractions reported 2008/09 | Percentage change |
|---|----------------------------|----------------------------|-------------------|
| Southampton University Hospitals NHST       | 75,828                     | 38,835                     | 95%               |
| Brighton & Sussex University Hospitals NHST | 33,017                     | 1,069                      | 2,989%            |
| Taunton & Somerset NHSFT                    | 9,764                      | 288                        | 3,290%            |
| Imperial College Healthcare NHST            | 2,926                      | 0                          | -                 |

3.2 Although the reasons for these changes would need to be confirmed with all the Trusts concerned, the following observations can be made:

- In the case of Southampton, the Trust advised that there was an error in their submission and that the actual volume of fractions delivered in 2009/10 was 37,052
- The activity reported by Brighton & Sussex is likely to be the correction of erroneous data submitted in the 2008/09 collection
- Taunton & Somerset opened a new PFI facility for 2 linacs in early 2009 and therefore the 2009/10 data will now reflect the effect of this new capacity in full
- Imperial College, who submitted no data in 2008/09, have now submitted data, but the 3,000 fractions reported does not appear to be consistent with the number of linacs believed to be in operation (6).

### Changes to overall data

3.3 Overall, the data shows a somewhat greater degree of consistency between Trusts. This is demonstrated in the tables overleaf, which compare 2009/10 Reference Costs to those submitted for 2008/09 for planning (Table 2) and treatment (Table 3).

3.4 Tables 2 and 3 reflect the 2009/10 Reference Costs as submitted by each provider except for the following adjustments:

- The data submitted by Southampton University Hospitals NHST has been amended to reflect the correct volume of fractions, as stated in section 3.2 above
- The data submitted by Imperial College NHST has been excluded, as it is unlikely to be correct, as stated in section 3.2 above, and its inclusion in any statistical measure skews the result significantly
- Data submitted by Peterborough and Stamford Hospitals NHSFT has been excluded because they are a small atypical provider without any linacs.

**Table 2: Comparison of average unit costs for reported planning events**

|                             | 2009/10       | 2008/09       |
|-----------------------------|---------------|---------------|
| <b>Average unit cost</b>    | <b>£574</b>   | <b>£533</b>   |
| Lowest unit cost            | £88           | £85           |
| Highest unit cost           | £1,478        | £1,562        |
| <b>Range</b>                | <b>£1,390</b> | <b>£1,477</b> |
| Lower quartile              | £349          | £301          |
| Upper quartile              | £854          | £795          |
| <b>Inter-quartile range</b> | <b>£505</b>   | <b>£494</b>   |
| <b>Standard deviation</b>   | <b>£345</b>   | <b>£351</b>   |

**Table 3: Comparison of average unit costs for reported fractions**

|                             | 2009/10     | 2008/09       |
|-----------------------------|-------------|---------------|
| <b>Average unit cost</b>    | <b>£126</b> | <b>£123</b>   |
| Lowest unit cost            | £49         | £41           |
| Highest unit cost           | £313        | £1,106        |
| <b>Range</b>                | <b>£263</b> | <b>£1,065</b> |
| Lower quartile              | £104        | £98           |
| Upper quartile              | £147        | £154          |
| <b>Inter-quartile range</b> | <b>£43</b>  | <b>£57</b>    |
| <b>Standard deviation</b>   | <b>£47</b>  | <b>£155</b>   |

3.5 The degree of improvement in reporting fractions is significant, as several outliers have moved towards the average. Table 3 demonstrates a clear reduction in range, inter-quartile range and standard deviation of the data submitted. However, there is no significant improvement in the data for reported planning events, reflecting the difficulties highlighted in the July report concerning the recording and costing of this activity.

## **4 Potential impact of a National Tariff**

4.1 As part of this update, an indicative national tariff has been calculated by Healthcare Resource Group (HRG) based on 2009/10 Reference Costs. This has been calculated by taking the national average unit cost for each HRG, deflated by each provider's MFF.

4.2 A single tariff has been calculated for each HRG, irrespective of whether the patient was an inpatient, outpatient or day attender when receiving radiotherapy planning or treatment. This is for the following reasons:

- The feedback received at the meetings with providers indicated that these categories were not captured consistently across providers

- Current Radiotherapy Data Set guidance recommends recording all activity as outpatient activity, irrespective of whether the patient is admitted or not
  - Many providers reported that the costs of radiotherapy were not significantly different between different modalities of care.
- 4.3 The indicative tariff calculated is attached at **Appendix 5**. It should be stressed that this purely illustrative, for the purposes of assessing the potential impact of such a change, and does not reflect DH policy in any way.
- 4.4 It is then possible to model the impact on each Trust of introducing such a tariff as the basis for Trust income, compared to the costs reported in Reference Costs. This analysis is attached at **Appendix 6**.
- 4.5 The analysis shows that many Trusts could be affected significantly if such a tariff were to be introduced, assuming Reference Costs reflects accurately the true cost of delivering their radiotherapy service. Some Trusts would be funded for significantly more than their reported costs and some significantly less. This illustrates that there remains a wide degree of variation from the national average cost across Trusts, even though this has reduced since 2008/09.
- 4.6 One other factor that may be of concern is that the general trend is for Trusts in peer groups 1 to 3 to attract tariff income in excess of their reported costs. Whereas Trusts in peer groups 4 and 5 tend to attract income below their reported costs. This implies that larger Trusts would benefit from the introduction of a national tariff, at the expense of smaller ones.
- 4.7 Therefore the conclusions reached in our July report remain pertinent. Any such national tariff would need to be introduced with extreme care and with further refinements over and above a simple national average price, so as not to destabilise the service financially. At the very least, Reference Costs data would need to be significantly “cleaned”, for example by using only the data falling within the inter-quartile range and ignoring outlying data.

## 5 Conclusions

- 5.1 Many of the findings and recommendations from the July report remain relevant and these are summarised at **Appendices 7, 8 and 9** for ease of reference.
- 5.2 Although positive progress is evident from the analysis of the 2009/10 Reference costs submission, it is apparent that the quality of costing radiotherapy services remains varied across organisations.
- 5.3 Therefore, the introduction of a tariff system will pose a risk to the continued development of radiotherapy services. Those Trusts that do not have a clear analysis of their position in relation to national and peer group averages are likely to suffer under the introduction of a tariff, whether nationally or locally determined.
- 5.4 A clear understanding of costs, their drivers and the underlying activity will be key to ensuring the best possible radiotherapy services for patients can continue on a sound financial footing. As a contribution to the continued understanding of these issues, our guidance notes issued with the July report are also attached herewith as **Appendices 10 and 11**.

## Reference Costs 2009/10

## Fractions by Trust and Peer Group Ranking

|  | 2009/10 Reference Costs |                  |                        | 2008/09 Reference Costs  |                        | Increase/<br>Decrease in<br>Fractions |
|--|-------------------------|------------------|------------------------|--------------------------|------------------------|---------------------------------------|
|  | Fractions<br>Delivered  | Activity<br>Rank | Activity<br>Peer Group | Fractions<br>Delivered   | Activity<br>Peer Group |                                       |
|  | 2009/10                 |                  |                        | 2008/09                  |                        |                                       |
| CLATTERBRIDGE CENTRE FOR ONCOLOGY NHS FOUNDATION TRUST         | 88,784                  | 1                | 1                      | 89,479                   | 1                      | -0.8%                                 |
| THE CHRISTIE NHS FOUNDATION TRUST                              | 85,442                  | 2                | 1                      | 82,028                   | 1                      | 4.2%                                  |
| LEEDS TEACHING HOSPITALS NHS TRUST                             | 70,238                  | 3                | 1                      | 67,103                   | 1                      | 4.7%                                  |
| MAIDSTONE AND TUNBRIDGE WELLS NHS TRUST                        | 59,901                  | 4                | 1                      | 54,198                   | 1                      | 10.5%                                 |
| THE NEWCASTLE UPON TYNE HOSPITALS NHS FOUNDATION TRUST         | 58,817                  | 5                | 1                      | 52,976                   | 1                      | 11.0%                                 |
| THE ROYAL MARSDEN NHS FOUNDATION TRUST                         | 57,859                  | 6                | 1                      | 49,324                   | 1                      | 17.3%                                 |
| SHEFFIELD TEACHING HOSPITALS NHS FOUNDATION TRUST              | 56,103                  | 7                | 1                      | 57,741                   | 1                      | -2.8%                                 |
| UNIVERSITY HOSPITAL BIRMINGHAM NHS FOUNDATION TRUST            | 55,547                  | 8                | 1                      | 51,509                   | 1                      | 7.8%                                  |
| CAMBRIDGE UNIVERSITY HOSPITALS NHS FOUNDATION TRUST            | 54,314                  | 9                | 1                      | 51,656                   | 1                      | 5.1%                                  |
| GUY'S AND ST THOMAS' NHS FOUNDATION TRUST                      | 46,931                  | 10               | 1                      | 44,872                   | 2                      | 4.6%                                  |
| LANCASHIRE TEACHING HOSPITALS NHS FOUNDATION TRUST             | 45,325                  | 11               | 2                      | 43,564                   | 2                      | 4.0%                                  |
| UNIVERSITY HOSPITALS BRISTOL NHS FOUNDATION TRUST              | 43,206                  | 12               | 2                      | 45,148                   | 1                      | -4.3%                                 |
| EAST AND NORTH HERTFORDSHIRE NHS TRUST                         | 42,019                  | 13               | 2                      | 44,722                   | 2                      | -6.0%                                 |
| GLOUCESTERSHIRE HOSPITALS NHS FOUNDATION TRUST                 | 40,209                  | 14               | 2                      | 36,326                   | 2                      | 10.7%                                 |
| UNIVERSITY HOSPITALS COVENTRY AND WARWICKSHIRE NHS TRUST       | 39,162                  | 15               | 2                      | 35,080                   | 2                      | 11.6%                                 |
| SOUTH TEES HOSPITALS NHS FOUNDATION TRUST                      | 38,385                  | 16               | 2                      | 36,716                   | 2                      | 4.5%                                  |
| OXFORD RADCLIFFE HOSPITALS NHS TRUST                           | 38,131                  | 17               | 2                      | 36,446                   | 2                      | 4.6%                                  |
| SOUTHAMPTON UNIVERSITY HOSPITALS NHS TRUST                     | 37,052                  | 18               | 2                      | 38,835                   | 2                      | -4.6%                                 |
| NOTTINGHAM UNIVERSITY HOSPITALS NHS TRUST                      | 36,651                  | 19               | 2                      | 33,575                   | 2                      | 9.2%                                  |
| ROYAL SURREY COUNTY NHS FOUNDATION TRUST                       | 36,169                  | 20               | 2                      | 32,585                   | 3                      | 11.0%                                 |
| HULL AND EAST YORKSHIRE HOSPITALS NHS TRUST                    | 35,877                  | 21               | 3                      | 32,622                   | 2                      | 10.0%                                 |
| <b>BRIGHTON AND SUSSEX UNIVERSITY HOSPITALS NHS TRUST</b>      | <b>33,017</b>           | <b>22</b>        | <b>3</b>               | <b>1,069</b>             | <b>5</b>               | <b>2988.6%</b>                        |
| UNIVERSITY HOSPITALS OF LEICESTER NHS TRUST                    | 32,920                  | 23               | 3                      | 31,921                   | 3                      | 3.1%                                  |
| POOLE HOSPITAL NHS FOUNDATION TRUST                            | 32,773                  | 24               | 3                      | 31,757                   | 3                      | 3.2%                                  |
| THE ROYAL WOLVERHAMPTON HOSPITALS NHS TRUST                    | 30,110                  | 25               | 3                      | 25,943                   | 3                      | 16.1%                                 |
| NORFOLK AND NORWICH UNIVERSITY HOSPITALS NHS FOUNDATION TRUST  | 28,611                  | 26               | 3                      | 23,775                   | 4                      | 20.3%                                 |
| NORTH MIDDLESEX UNIVERSITY HOSPITAL NHS TRUST                  | 27,624                  | 27               | 3                      | 27,059                   | 3                      | 2.1%                                  |
| PORTSMOUTH HOSPITALS NHS TRUST                                 | 26,737                  | 28               | 3                      | 29,029                   | 3                      | -7.9%                                 |
| UNIVERSITY HOSPITAL OF NORTH STAFFORDSHIRE NHS TRUST           | 25,526                  | 29               | 3                      | 23,751                   | 4                      | 7.5%                                  |
| COLCHESTER HOSPITAL UNIVERSITY NHS FOUNDATION TRUST            | 25,329                  | 30               | 3                      | 23,798                   | 4                      | 6.4%                                  |
| UNITED LINCOLNSHIRE HOSPITALS NHS TRUST                        | 25,158                  | 31               | 4                      | 27,431                   | 3                      | -8.3%                                 |
| DERBY HOSPITALS NHS FOUNDATION TRUST                           | 24,955                  | 32               | 4                      | 25,822                   | 3                      | -3.4%                                 |
| NORTHAMPTON GENERAL HOSPITAL NHS TRUST                         | 24,405                  | 33               | 4                      | 24,741                   | 3                      | -1.4%                                 |
| SOUTHEND UNIVERSITY HOSPITAL NHS FOUNDATION TRUST              | 24,336                  | 34               | 4                      | 24,634                   | 4                      | -1.2%                                 |
| BARTS AND THE LONDON NHS TRUST                                 | 23,789                  | 35               | 4                      | 24,155                   | 4                      | -1.5%                                 |
| ROYAL DEVON AND EXETER NHS FOUNDATION TRUST                    | 22,359                  | 36               | 4                      | 21,339                   | 4                      | 4.8%                                  |
| UNIVERSITY COLLEGE LONDON HOSPITALS NHS FOUNDATION TRUST       | 20,643                  | 37               | 4                      | 24,943                   | 3                      | -17.2%                                |
| BARKING, HAVERING AND REDBRIDGE UNIVERSITY HOSPITALS NHS TRUST | 19,656                  | 38               | 4                      | 19,845                   | 4                      | -1.0%                                 |
| ROYAL BERKSHIRE NHS FOUNDATION TRUST                           | 19,639                  | 39               | 4                      | 16,195                   | 4                      | 21.3%                                 |
| PLYMOUTH HOSPITALS NHS TRUST                                   | 17,568                  | 40               | 4                      | 18,935                   | 4                      | -7.2%                                 |
| ROYAL UNITED HOSPITAL BATH NHS TRUST                           | 16,585                  | 41               | 5                      | 15,190                   | 5                      | 9.2%                                  |
| ROYAL CORNWALL HOSPITALS NHS TRUST                             | 16,582                  | 42               | 5                      | 16,266                   | 4                      | 1.9%                                  |
| IPSWICH HOSPITAL NHS TRUST                                     | 14,552                  | 43               | 5                      | 14,293                   | 5                      | 1.8%                                  |
| SHREWSBURY AND TELFORD HOSPITAL NHS TRUST                      | 14,521                  | 44               | 5                      | 14,057                   | 5                      | 3.3%                                  |
| NORTH CUMBRIA UNIVERSITY HOSPITALS NHS TRUST                   | 10,288                  | 45               | 5                      | 12,815                   | 5                      | -19.7%                                |
| SOUTH DEVON HEALTHCARE NHS FOUNDATION TRUST                    | 10,075                  | 46               | 5                      | 10,894                   | 5                      | -7.5%                                 |
| <b>TAUNTON AND SOMERSET NHS FOUNDATION TRUST</b>               | <b>9,764</b>            | <b>47</b>        | <b>5</b>               | <b>288</b>               | <b>5</b>               | <b>3290.3%</b>                        |
| ROYAL FREE HAMPSTEAD NHS TRUST                                 | 9,253                   | 48               | 5                      | 10,641                   | 5                      | -13.0%                                |
| <b>IMPERIAL COLLEGE HEALTHCARE NHS TRUST</b>                   | <b>2,926</b>            | <b>49</b>        | <b>5</b>               | <i>submitted no data</i> |                        | -                                     |
| PETERBOROUGH AND STAMFORD HOSPITALS NHS FOUNDATION TRUST       | 789                     | 50               | 5                      | 814                      | 5                      | -3.1%                                 |
| <b>Grand Total</b>   | <b>1,656,612</b>        |                  |                        | <b>1,557,905</b>         |                        | 6.3%                                  |

Indicates significant change since 2008/09



**Reference Costs 2009/10**  
**Key Data by Trust**

| Organisation   | Peer Group | No. of Planning Events | Planning MFF adj Cost | No. of Fractions | Treatment MFF adj Cost | Number of Linacs |
|--|------------|------------------------|-----------------------|------------------|------------------------|------------------|
| CLATTERBRIDGE CENTRE FOR ONCOLOGY NHS FOUNDATION TRUST         | 1          | 6,937                  | £1.5m                 | 88,784           | £14.5m                 | 9                |
| THE CHRISTIE NHS FOUNDATION TRUST                              | 1          | 7,721                  | £5.8m                 | 85,442           | £10.0m                 | 12               |
| LEEDS TEACHING HOSPITALS NHS TRUST                             | 1          | 5,438                  | £2.0m                 | 70,238           | £12.0m                 | 10               |
| MAIDSTONE AND TUNBRIDGE WELLS NHS TRUST                        | 1          | 7,455                  | £1.8m                 | 59,901           | £8.1m                  | 7                |
| THE NEWCASTLE UPON TYNE HOSPITALS NHS FOUNDATION TRUST         | 1          | 4,066                  | £1.9m                 | 58,817           | £8.2m                  | 10               |
| THE ROYAL MARSDEN NHS FOUNDATION TRUST                         | 1          | 4,626                  | £3.2m                 | 57,859           | £7.9m                  | 11               |
| SHEFFIELD TEACHING HOSPITALS NHS FOUNDATION TRUST              | 1          | 2,217                  | £2.1m                 | 56,103           | £4.4m                  | 7                |
| UNIVERSITY HOSPITAL BIRMINGHAM NHS FOUNDATION TRUST            | 1          | 3,256                  | £1.1m                 | 55,547           | £5.1m                  | 8                |
| CAMBRIDGE UNIVERSITY HOSPITALS NHS FOUNDATION TRUST            | 1          | 5,229                  | £2.3m                 | 54,314           | £4.4m                  | 8                |
| GUY'S AND ST THOMAS' NHS FOUNDATION TRUST                      | 1          | 4,335                  | £5.3m                 | 46,931           | £5.1m                  | 6                |
| <b>Total, Peer Group 1</b>                                     |            | <b>51,280</b>          | <b>£27.2m</b>         | <b>633,936</b>   | <b>£79.7m</b>          | <b>88</b>        |
| LANCASHIRE TEACHING HOSPITALS NHS FOUNDATION TRUST             | 2          | 3,276                  | £2.4m                 | 45,325           | £4.3m                  | 6                |
| UNIVERSITY HOSPITALS BRISTOL NHS FOUNDATION TRUST              | 2          | 3,007                  | £1.6m                 | 43,206           | £5.1m                  | 5                |
| EAST AND NORTH HERTFORDSHIRE NHS TRUST                         | 2          | 3,626                  | £4.0m                 | 42,019           | £5.4m                  | 9                |
| GLOUCESTERSHIRE HOSPITALS NHS FOUNDATION TRUST                 | 2          | 4,432                  | £0.5m                 | 40,209           | £5.1m                  | 5                |
| UNIVERSITY HOSPITALS COVENTRY AND WARWICKSHIRE NHS TRUST       | 2          | 3,744                  | £1.8m                 | 39,162           | £3.0m                  | 5                |
| SOUTH TEES HOSPITALS NHS FOUNDATION TRUST                      | 2          | 3,205                  | £1.5m                 | 38,385           | £4.1m                  | 6                |
| OXFORD RADCLIFFE HOSPITALS NHS TRUST                           | 2          | 2,877                  | £3.1m                 | 38,131           | £5.4m                  | 6                |
| SOUTHAMPTON UNIVERSITY HOSPITALS NHS TRUST                     | 2          | 3,605                  | £0.3m                 | 37,052           | £3.6m                  | 6                |
| NOTTINGHAM UNIVERSITY HOSPITALS NHS TRUST                      | 2          | 2,499                  | £1.2m                 | 36,651           | £5.0m                  | 4                |
| ROYAL SURREY COUNTY NHS FOUNDATION TRUST                       | 2          | 1,886                  | £1.9m                 | 36,169           | £3.3m                  | 6                |
| <b>Total, Peer Group 2</b>                                     |            | <b>32,157</b>          | <b>£18.2m</b>         | <b>396,309</b>   | <b>£44.2m</b>          | <b>58</b>        |
| HULL AND EAST YORKSHIRE HOSPITALS NHS TRUST                    | 3          | 2,835                  | £2.5m                 | 35,877           | £5.6m                  | 6                |
| BRIGHTON AND SUSSEX UNIVERSITY HOSPITALS NHS TRUST             | 3          | 1,611                  | £1.6m                 | 33,017           | £3.0m                  | 4                |
| UNIVERSITY HOSPITALS OF LEICESTER NHS TRUST                    | 3          | 2,358                  | £0.5m                 | 32,920           | £5.1m                  | 4                |
| POOLE HOSPITAL NHS FOUNDATION TRUST                            | 3          | 2,554                  | £1.3m                 | 32,773           | £3.2m                  | 4                |
| THE ROYAL WOLVERHAMPTON HOSPITALS NHS TRUST                    | 3          | 4,009                  | £1.2m                 | 30,110           | £3.5m                  | 4                |
| NORFOLK AND NORWICH UNIVERSITY HOSPITALS NHS FOUNDATION TRUST  | 3          | 2,959                  | £1.5m                 | 28,611           | £3.5m                  | 4                |
| NORTH MIDDLESEX UNIVERSITY HOSPITAL NHS TRUST                  | 3          | 2,607                  | £1.2m                 | 27,624           | £1.6m                  | 3                |
| PORTSMOUTH HOSPITALS NHS TRUST                                 | 3          | 2,676                  | £1.7m                 | 26,737           | £3.8m                  | 4                |
| UNIVERSITY HOSPITAL OF NORTH STAFFORDSHIRE NHS TRUST           | 3          | 1,826                  | £2.3m                 | 25,526           | £4.4m                  | 3                |
| COLCHESTER HOSPITAL UNIVERSITY NHS FOUNDATION TRUST            | 3          | 2,535                  | £0.8m                 | 25,329           | £2.9m                  | 3                |
| <b>Total, Peer Group 3</b>                                     |            | <b>25,970</b>          | <b>£14.6m</b>         | <b>298,524</b>   | <b>£36.5m</b>          | <b>39</b>        |
| UNITED LINCOLNSHIRE HOSPITALS NHS TRUST                        | 4          | 2,303                  | £1.4m                 | 25,158           | £3.4m                  | 3                |
| DERBY HOSPITALS NHS FOUNDATION TRUST                           | 4          | 1,845                  | £2.1m                 | 24,955           | £2.6m                  | 5                |
| NORTHAMPTON GENERAL HOSPITAL NHS TRUST                         | 4          | 1,750                  | £0.9m                 | 24,405           | £3.3m                  | 3                |
| SOUTHEND UNIVERSITY HOSPITAL NHS FOUNDATION TRUST              | 4          | 3,108                  | £0.7m                 | 24,336           | £2.8m                  | 4                |
| BARTS AND THE LONDON NHS TRUST                                 | 4          | 2,122                  | £1.4m                 | 23,789           | £4.7m                  | 4                |
| ROYAL DEVON AND EXETER NHS FOUNDATION TRUST                    | 4          | 1,838                  | £1.6m                 | 22,359           | £3.3m                  | 3                |
| UNIVERSITY COLLEGE LONDON HOSPITALS NHS FOUNDATION TRUST       | 4          | 3,721                  | £3.0m                 | 20,643           | £4.7m                  | 4                |
| BARKING, HAVERING AND REDBRIDGE UNIVERSITY HOSPITALS NHS TRUST | 4          | 1,257                  | £1.7m                 | 19,656           | £2.8m                  | 4                |
| ROYAL BERKSHIRE NHS FOUNDATION TRUST                           | 4          | 1,635                  | £0.6m                 | 19,639           | £2.8m                  | 3                |
| PLYMOUTH HOSPITALS NHS TRUST                                   | 4          | 1,590                  | £1.3m                 | 17,568           | £2.5m                  | 3                |
| <b>Total, Peer Group 4</b>                                     |            | <b>21,169</b>          | <b>£14.7m</b>         | <b>222,508</b>   | <b>£32.9m</b>          | <b>36</b>        |
| ROYAL UNITED HOSPITAL BATH NHS TRUST                           | 5          | 1,491                  | £0.8m                 | 16,585           | £2.3m                  | 2                |
| ROYAL CORNWALL HOSPITALS NHS TRUST                             | 5          | 1,779                  | £0.6m                 | 16,582           | £1.3m                  | 2                |
| IPSWICH HOSPITAL NHS TRUST                                     | 5          | 1,132                  | £0.3m                 | 14,552           | £2.3m                  | 3                |
| SHREWSBURY AND TELFORD HOSPITAL NHS TRUST                      | 5          | 1,277                  | £1.9m                 | 14,521           | £0.7m                  | 2                |
| NORTH CUMBRIA UNIVERSITY HOSPITALS NHS TRUST                   | 5          | 1,401                  | £0.4m                 | 10,288           | £1.9m                  | 2                |
| SOUTH DEVON HEALTHCARE NHS FOUNDATION TRUST                    | 5          | 650                    | £0.4m                 | 10,075           | £2.5m                  | 2                |
| TAUNTON AND SOMERSET NHS FOUNDATION TRUST                      | 5          | 1,021                  | £0.6m                 | 9,764            | £3.1m                  | 3                |
| ROYAL FREE HAMPSTEAD NHS TRUST                                 | 5          | 845                    | £0.9m                 | 9,253            | £1.4m                  | 2                |
| IMPERIAL COLLEGE HEALTHCARE NHS TRUST                          | 5          | 0                      | £0.0m                 | 2,926            | £6.7m                  | 6                |
| PETERBOROUGH AND STAMFORD HOSPITALS NHS FOUNDATION TRUST       | 5          | 135                    | £0.0m                 | 789              | £0.2m                  | 0                |
| <b>Total, Peer Group 5</b>                                     |            | <b>9,731</b>           | <b>£5.8m</b>          | <b>105,335</b>   | <b>£22.5m</b>          | <b>24</b>        |
| <b>TOTAL</b>   |            | <b>140,307</b>         | <b>£80.5m</b>         | <b>1,656,612</b> | <b>£215.8m</b>         | <b>245</b>       |

## Reference Costs 2009/10

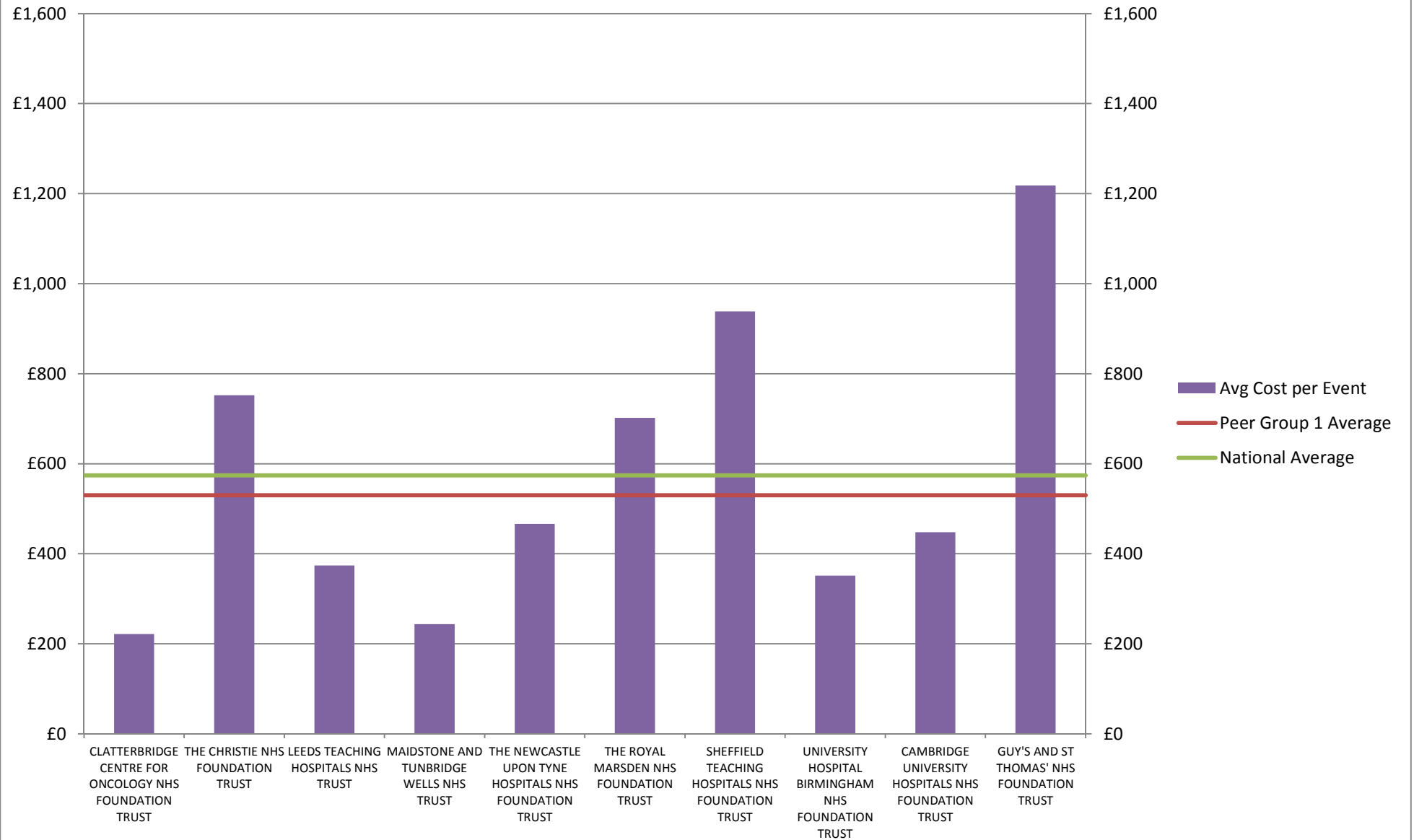
## Key Ratios by Trust

| Organisation   | Peer Group | Fractions               |                             |                    |                        |                         | Planning             |            | Thousand Fractions per Linac | Cost per Linac |
|--|------------|-------------------------|-----------------------------|--------------------|------------------------|-------------------------|----------------------|------------|------------------------------|----------------|
|  |            | Cost per Planning Event | Cost per Treatment Fraction | per Planning Event | Planning Cost fraction | Treatment Cost fraction | Cost: Treatment Cost |            |                              |                |
| CLATTERBRIDGE CENTRE FOR ONCOLOGY NHS FOUNDATION TRUST         | 1          | £222                    | £163                        | 12.8               | 10%                    | 90%                     | 10:90                | 9.9        | £1.8m                        |                |
| THE CHRISTIE NHS FOUNDATION TRUST                              | 1          | £752                    | £118                        | 11.1               | 37%                    | 63%                     | 37:63                | 7.1        | £1.3m                        |                |
| LEEDS TEACHING HOSPITALS NHS TRUST                             | 1          | £374                    | £171                        | 12.9               | 15%                    | 85%                     | 15:85                | 7.0        | £1.4m                        |                |
| MAIDSTONE AND TUNBRIDGE WELLS NHS TRUST                        | 1          | £244                    | £136                        | 8.0                | 18%                    | 82%                     | 18:82                | 8.6        | £1.4m                        |                |
| THE NEWCASTLE UPON TYNE HOSPITALS NHS FOUNDATION TRUST         | 1          | £466                    | £139                        | 14.5               | 19%                    | 81%                     | 19:81                | 5.9        | £1.0m                        |                |
| THE ROYAL MARSDEN NHS FOUNDATION TRUST                         | 1          | £702                    | £137                        | 12.5               | 29%                    | 71%                     | 29:71                | 5.3        | £1.0m                        |                |
| SHEFFIELD TEACHING HOSPITALS NHS FOUNDATION TRUST              | 1          | £939                    | £79                         | 25.3               | 32%                    | 68%                     | 32:68                | 8.0        | £0.9m                        |                |
| UNIVERSITY HOSPITAL BIRMINGHAM NHS FOUNDATION TRUST            | 1          | £352                    | £91                         | 17.1               | 18%                    | 82%                     | 18:82                | 6.9        | £0.8m                        |                |
| CAMBRIDGE UNIVERSITY HOSPITALS NHS FOUNDATION TRUST            | 1          | £448                    | £81                         | 10.4               | 35%                    | 65%                     | 35:65                | 6.8        | £0.8m                        |                |
| GUY'S AND ST THOMAS' NHS FOUNDATION TRUST                      | 1          | £1,218                  | £108                        | 10.8               | 51%                    | 49%                     | 51:49                | 7.8        | £1.7m                        |                |
| <b>Total, Peer Group 1</b>                                     |            | <b>£530</b>             | <b>£126</b>                 | <b>12.4</b>        | <b>25%</b>             | <b>75%</b>              | <b>25:75</b>         | <b>7.2</b> | <b>£1.2m</b>                 |                |
| LANCASHIRE TEACHING HOSPITALS NHS FOUNDATION TRUST             | 2          | £722                    | £94                         | 13.8               | 36%                    | 64%                     | 36:64                | 7.6        | £1.1m                        |                |
| UNIVERSITY HOSPITALS BRISTOL NHS FOUNDATION TRUST              | 2          | £530                    | £119                        | 14.4               | 24%                    | 76%                     | 24:76                | 8.6        | £1.3m                        |                |
| EAST AND NORTH HERTFORDSHIRE NHS TRUST                         | 2          | £1,114                  | £129                        | 11.6               | 43%                    | 57%                     | 43:57                | 4.7        | £1.1m                        |                |
| GLOUCESTERSHIRE HOSPITALS NHS FOUNDATION TRUST                 | 2          | £119                    | £127                        | 9.1                | 9%                     | 91%                     | 9:91                 | 8.0        | £1.1m                        |                |
| UNIVERSITY HOSPITALS COVENTRY AND WARWICKSHIRE NHS TRUST       | 2          | £474                    | £78                         | 10.5               | 37%                    | 63%                     | 37:63                | 7.8        | £1.0m                        |                |
| SOUTH TEES HOSPITALS NHS FOUNDATION TRUST                      | 2          | £464                    | £106                        | 12.0               | 27%                    | 73%                     | 27:73                | 6.4        | £0.9m                        |                |
| OXFORD RADCLIFFE HOSPITALS NHS TRUST                           | 2          | £1,061                  | £141                        | 13.3               | 36%                    | 64%                     | 36:64                | 6.4        | £1.4m                        |                |
| SOUTHAMPTON UNIVERSITY HOSPITALS NHS TRUST                     | 2          | £88                     | £96                         | 10.3               | 8%                     | 92%                     | 8:92                 | 6.2        | £0.6m                        |                |
| NOTTINGHAM UNIVERSITY HOSPITALS NHS TRUST                      | 2          | £464                    | £136                        | 14.7               | 19%                    | 81%                     | 19:81                | 9.2        | £1.5m                        |                |
| ROYAL SURREY COUNTY NHS FOUNDATION TRUST                       | 2          | £1,018                  | £90                         | 19.2               | 37%                    | 63%                     | 37:63                | 6.0        | £0.9m                        |                |
| <b>Total, Peer Group 2</b>                                     |            | <b>£567</b>             | <b>£111</b>                 | <b>12.3</b>        | <b>29%</b>             | <b>71%</b>              | <b>29:71</b>         | <b>6.8</b> | <b>£1.1m</b>                 |                |
| HULL AND EAST YORKSHIRE HOSPITALS NHS TRUST                    | 3          | £866                    | £156                        | 12.7               | 30%                    | 70%                     | 30:70                | 6.0        | £1.3m                        |                |
| BRIGHTON AND SUSSEX UNIVERSITY HOSPITALS NHS TRUST             | 3          | £1,014                  | £89                         | 20.5               | 36%                    | 64%                     | 36:64                | 8.3        | £1.1m                        |                |
| UNIVERSITY HOSPITALS OF LEICESTER NHS TRUST                    | 3          | £214                    | £154                        | 14.0               | 9%                     | 91%                     | 9:91                 | 8.2        | £1.4m                        |                |
| POOLE HOSPITAL NHS FOUNDATION TRUST                            | 3          | £491                    | £99                         | 12.8               | 28%                    | 72%                     | 28:72                | 8.2        | £1.1m                        |                |
| THE ROYAL WOLVERHAMPTON HOSPITALS NHS TRUST                    | 3          | £293                    | £115                        | 7.5                | 25%                    | 75%                     | 25:75                | 7.5        | £1.2m                        |                |
| NORFOLK AND NORWICH UNIVERSITY HOSPITALS NHS FOUNDATION TRUST  | 3          | £494                    | £121                        | 9.7                | 30%                    | 70%                     | 30:70                | 7.2        | £1.2m                        |                |
| NORTH MIDDLESEX UNIVERSITY HOSPITAL NHS TRUST                  | 3          | £454                    | £58                         | 10.6               | 42%                    | 58%                     | 42:58                | 9.2        | £0.9m                        |                |
| PORTSMOUTH HOSPITALS NHS TRUST                                 | 3          | £645                    | £143                        | 10.0               | 31%                    | 69%                     | 31:69                | 6.7        | £1.4m                        |                |
| UNIVERSITY HOSPITAL OF NORTH STAFFORDSHIRE NHS TRUST           | 3          | £1,283                  | £173                        | 14.0               | 35%                    | 65%                     | 35:65                | 8.5        | £2.2m                        |                |
| COLCHESTER HOSPITAL UNIVERSITY NHS FOUNDATION TRUST            | 3          | £322                    | £115                        | 10.0               | 22%                    | 78%                     | 22:78                | 8.4        | £1.2m                        |                |
| <b>Total, Peer Group 3</b>                                     |            | <b>£560</b>             | <b>£122</b>                 | <b>11.5</b>        | <b>28%</b>             | <b>72%</b>              | <b>28:72</b>         | <b>7.7</b> | <b>£1.3m</b>                 |                |
| UNITED LINCOLNSHIRE HOSPITALS NHS TRUST                        | 4          | £589                    | £133                        | 10.9               | 29%                    | 71%                     | 29:71                | 8.4        | £1.6m                        |                |
| DERBY HOSPITALS NHS FOUNDATION TRUST                           | 4          | £1,136                  | £106                        | 13.5               | 44%                    | 56%                     | 44:56                | 5.0        | £0.9m                        |                |
| NORTHAMPTON GENERAL HOSPITAL NHS TRUST                         | 4          | £526                    | £137                        | 13.9               | 22%                    | 78%                     | 22:78                | 8.1        | £1.4m                        |                |
| SOUTHEND UNIVERSITY HOSPITAL NHS FOUNDATION TRUST              | 4          | £232                    | £115                        | 7.8                | 20%                    | 80%                     | 20:80                | 6.1        | £0.9m                        |                |
| BARTS AND THE LONDON NHS TRUST                                 | 4          | £671                    | £199                        | 11.2               | 23%                    | 77%                     | 23:77                | 7.9        | £1.5m                        |                |
| ROYAL DEVON AND EXETER NHS FOUNDATION TRUST                    | 4          | £850                    | £145                        | 12.2               | 32%                    | 68%                     | 32:68                | 5.5        | £1.6m                        |                |
| UNIVERSITY COLLEGE LONDON HOSPITALS NHS FOUNDATION TRUST       | 4          | £806                    | £227                        | 5.5                | 39%                    | 61%                     | 39:61                | 5.2        | £1.9m                        |                |
| BARKING, HAVERING AND REDBRIDGE UNIVERSITY HOSPITALS NHS TRUST | 4          | £1,383                  | £143                        | 15.6               | 38%                    | 62%                     | 38:62                | 4.9        | £1.1m                        |                |
| ROYAL BERKSHIRE NHS FOUNDATION TRUST                           | 4          | £340                    | £141                        | 12.0               | 17%                    | 83%                     | 17:83                | 6.5        | £1.1m                        |                |
| PLYMOUTH HOSPITALS NHS TRUST                                   | 4          | £814                    | £144                        | 11.0               | 34%                    | 66%                     | 34:66                | 5.9        | £1.3m                        |                |
| <b>Total, Peer Group 4</b>                                     |            | <b>£693</b>             | <b>£148</b>                 | <b>10.5</b>        | <b>31%</b>             | <b>69%</b>              | <b>31:69</b>         | <b>6.2</b> | <b>£1.3m</b>                 |                |
| ROYAL UNITED HOSPITAL BATH NHS TRUST                           | 5          | £529                    | £140                        | 11.1               | 25%                    | 75%                     | 25:75                | 8.3        | £1.6m                        |                |
| ROYAL CORNWALL HOSPITALS NHS TRUST                             | 5          | £333                    | £79                         | 9.3                | 31%                    | 69%                     | 31:69                | 8.3        | £1.0m                        |                |
| IPSWICH HOSPITAL NHS TRUST                                     | 5          | £261                    | £161                        | 12.9               | 11%                    | 89%                     | 11:89                | 4.9        | £0.9m                        |                |
| SHREWSBURY AND TELFORD HOSPITAL NHS TRUST                      | 5          | £1,478                  | £49                         | 11.4               | 72%                    | 28%                     | 72:28                | 7.3        | £1.3m                        |                |
| NORTH CUMBRIA UNIVERSITY HOSPITALS NHS TRUST                   | 5          | £284                    | £188                        | 7.3                | 17%                    | 83%                     | 17:83                | 5.1        | £1.2m                        |                |
| SOUTH DEVON HEALTHCARE NHS FOUNDATION TRUST                    | 5          | £608                    | £250                        | 15.5               | 14%                    | 86%                     | 14:86                | 5.0        | £1.5m                        |                |
| TAUNTON AND SOMERSET NHS FOUNDATION TRUST                      | 5          | £572                    | £313                        | 9.6                | 16%                    | 84%                     | 16:84                | 3.3        | £1.2m                        |                |
| ROYAL FREE HAMPSTEAD NHS TRUST                                 | 5          | £1,021                  | £153                        | 11.0               | 38%                    | 62%                     | 38:62                | 4.6        | £1.1m                        |                |
| IMPERIAL COLLEGE HEALTHCARE NHS TRUST                          | 5          | £0                      | £2,283                      | 0.0                | 0%                     | 100%                    | 0:100                | 0.5        | £1.1m                        |                |
| PETERBOROUGH AND STAMFORD HOSPITALS NHS FOUNDATION TRUST       | 5          | £301                    | £222                        | 5.8                | 19%                    | 81%                     | 19:81                | 0.0        | £0.0m                        |                |
| <b>Total, Peer Group 5</b>                                     |            | <b>£605</b>             | <b>£154</b>                 | <b>10.6</b>        | <b>27%</b>             | <b>73%</b>              | <b>27:73</b>         | <b>4.2</b> | <b>£0.9m</b>                 |                |
| <b>TOTAL</b>   |            | <b>£574</b>             | <b>£126</b>                 | <b>11.8</b>        | <b>28%</b>             | <b>72%</b>              | <b>28:72</b>         | <b>6.7</b> | <b>£1.2m</b>                 |                |

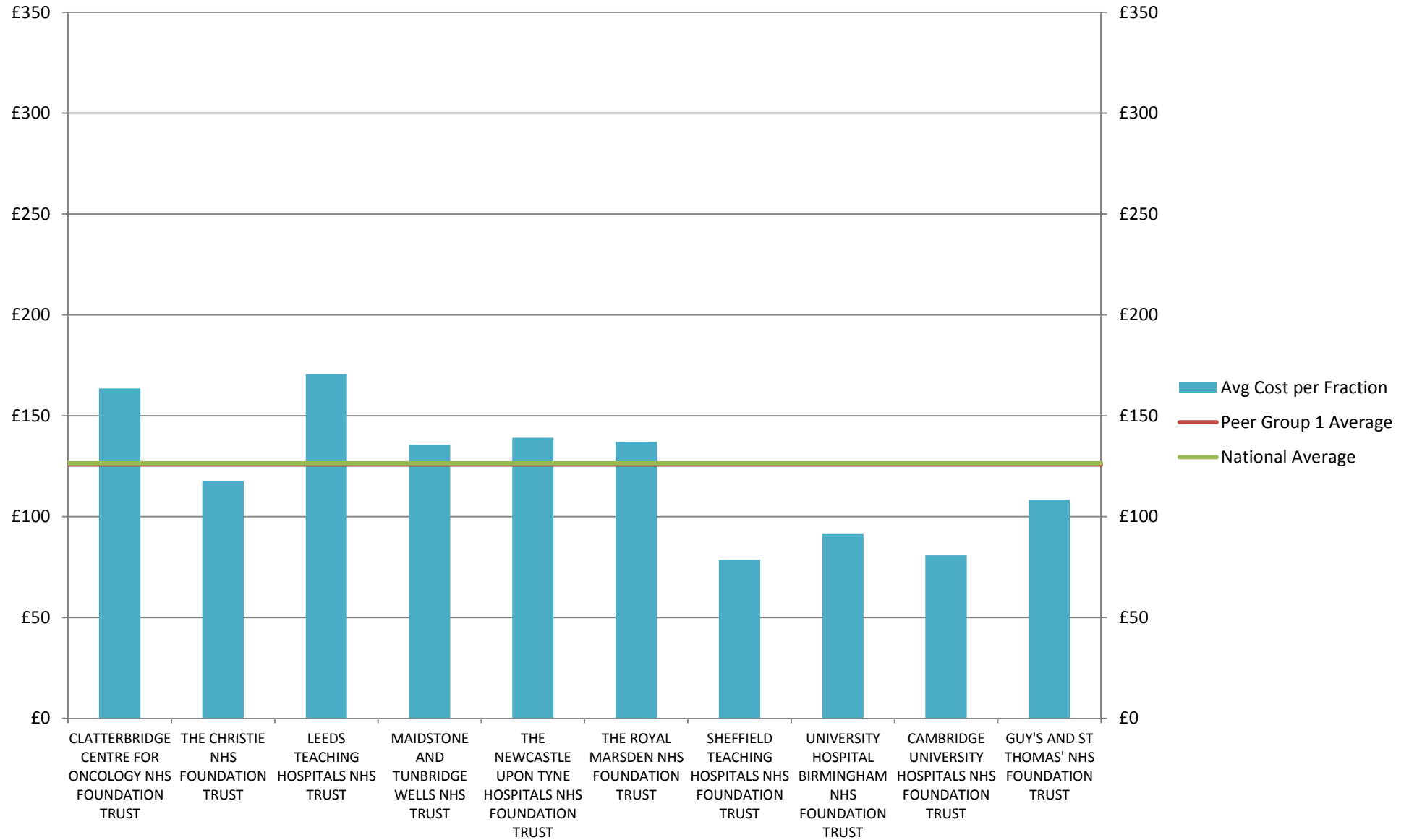
## Ranges (all excl Imperial and Peterborough &amp; Stamford):

|                                 |               |             |
|---------------------------------|---------------|-------------|
| Lowest unit cost                | £88           | £49         |
| Highest unit cost               | £1,478        | £313        |
| <b>Range</b>                    | <b>£1,390</b> | <b>£263</b> |
| Lower quartile                  | £349          | £104        |
| Upper quartile                  | £854          | £147        |
| <b>Inter-quartile range</b>     | <b>£505</b>   | <b>£43</b>  |
| <b>Standard deviation</b>       | <b>£345</b>   | <b>£47</b>  |
| Mean minus 1 standard deviation | £286          | £86         |
| Mean plus 1 standard deviation  | £976          | £180        |

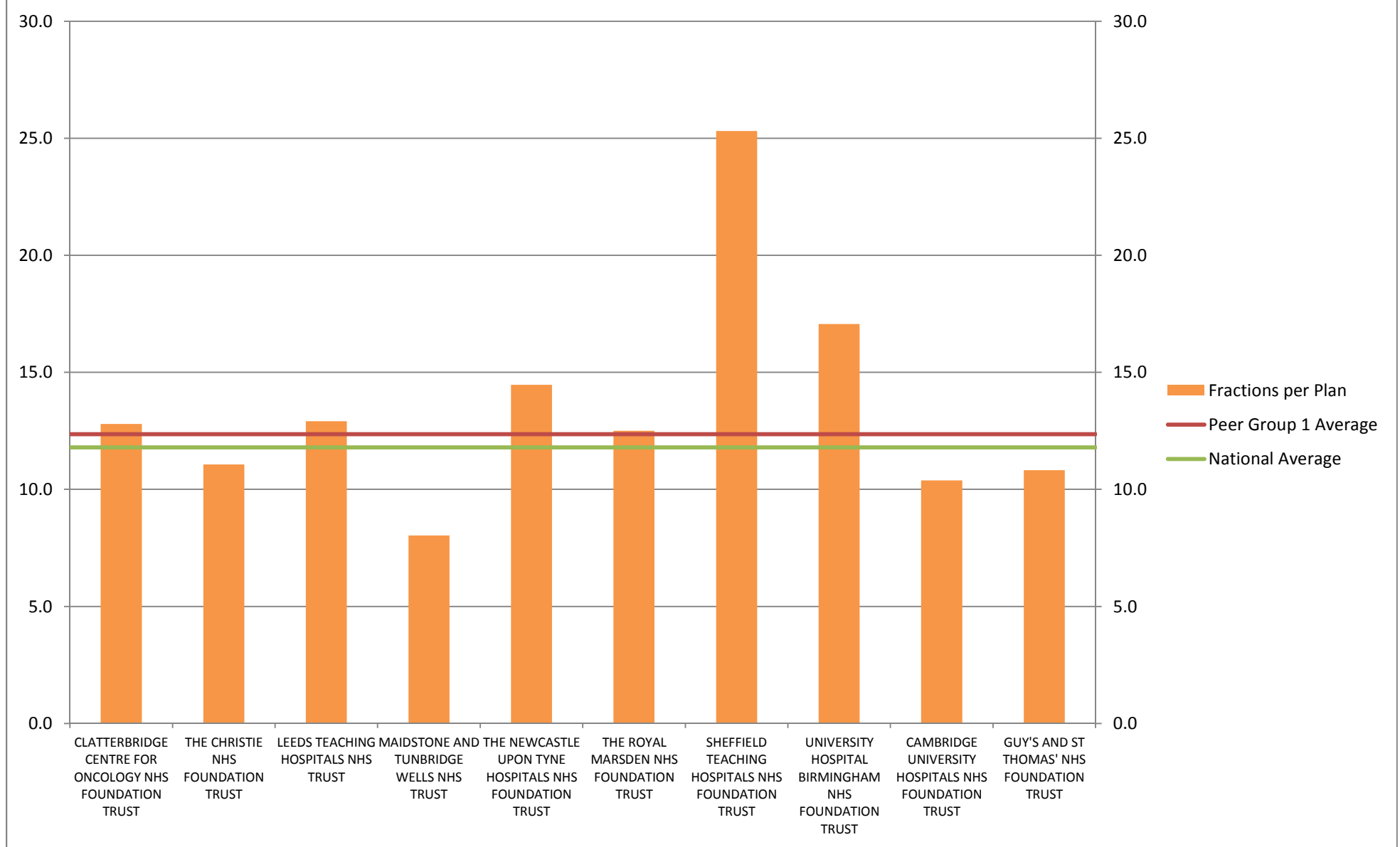
## Average Cost per Planning Event - Peer Group 1



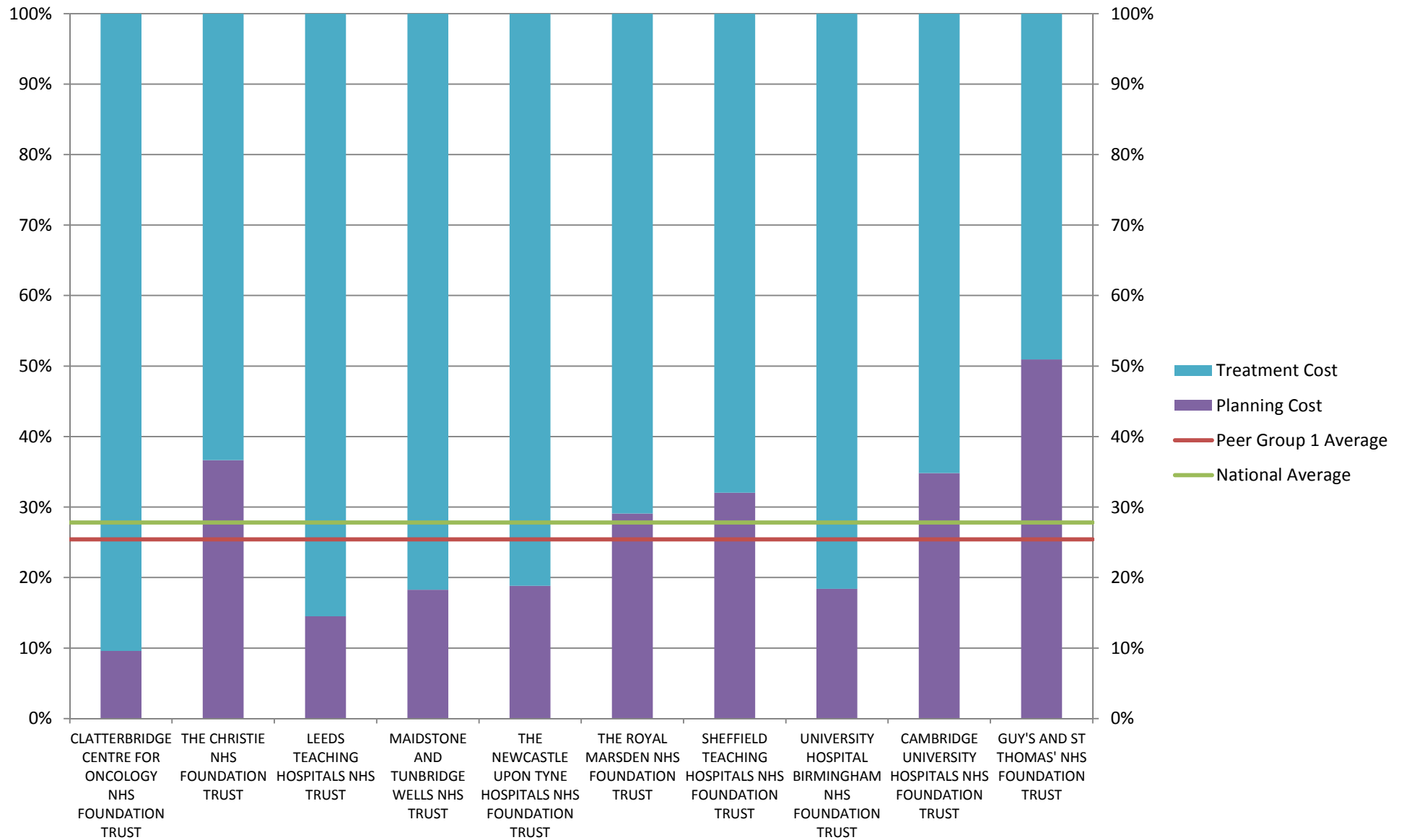
## Average Cost per Fraction of Treatment - Peer Group 1



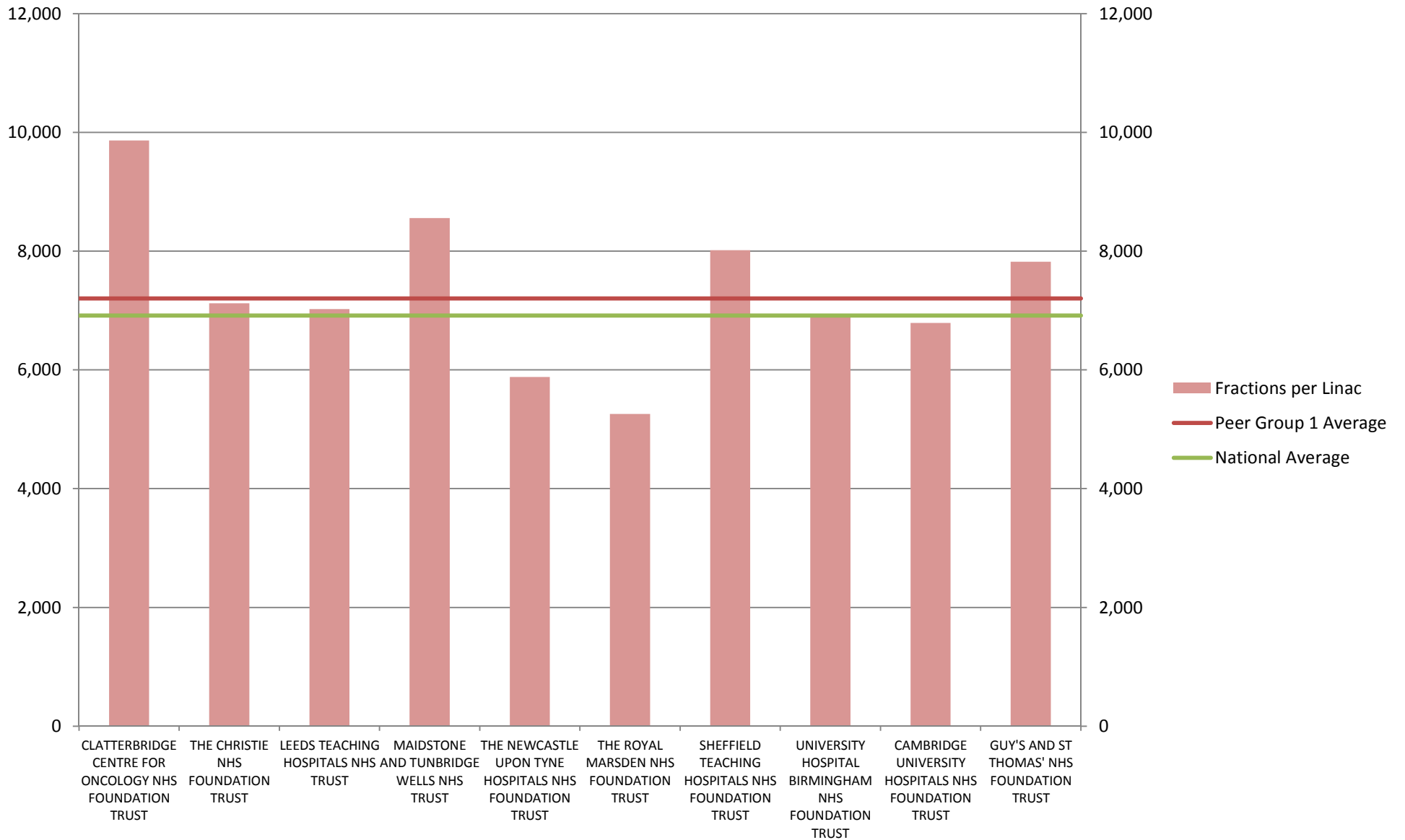
# Fractions per Planning Event - Peer Group 1



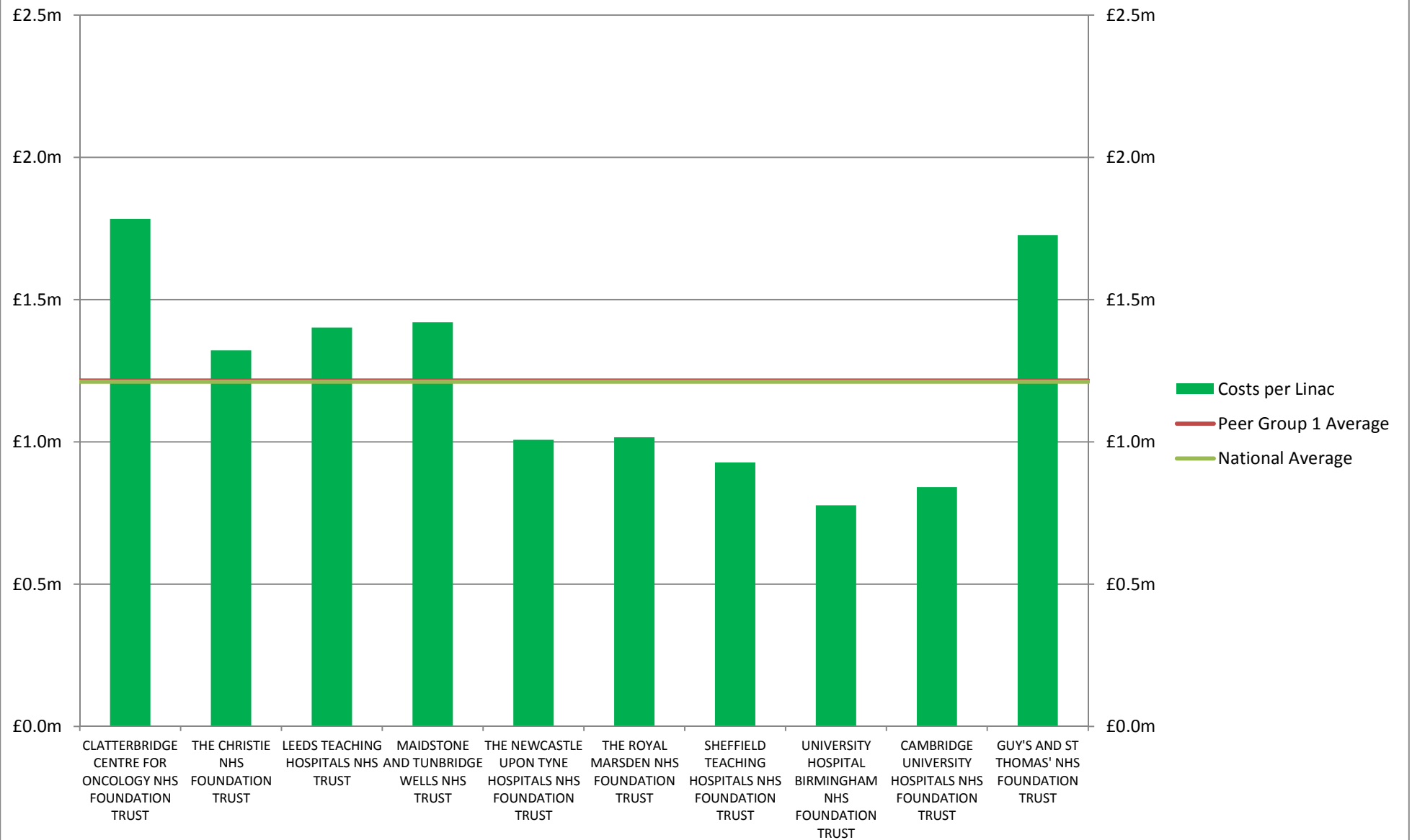
## Split of Planning Cost to Treatment Cost - Peer Group 1



## Fractions per Linac - Peer Group 1

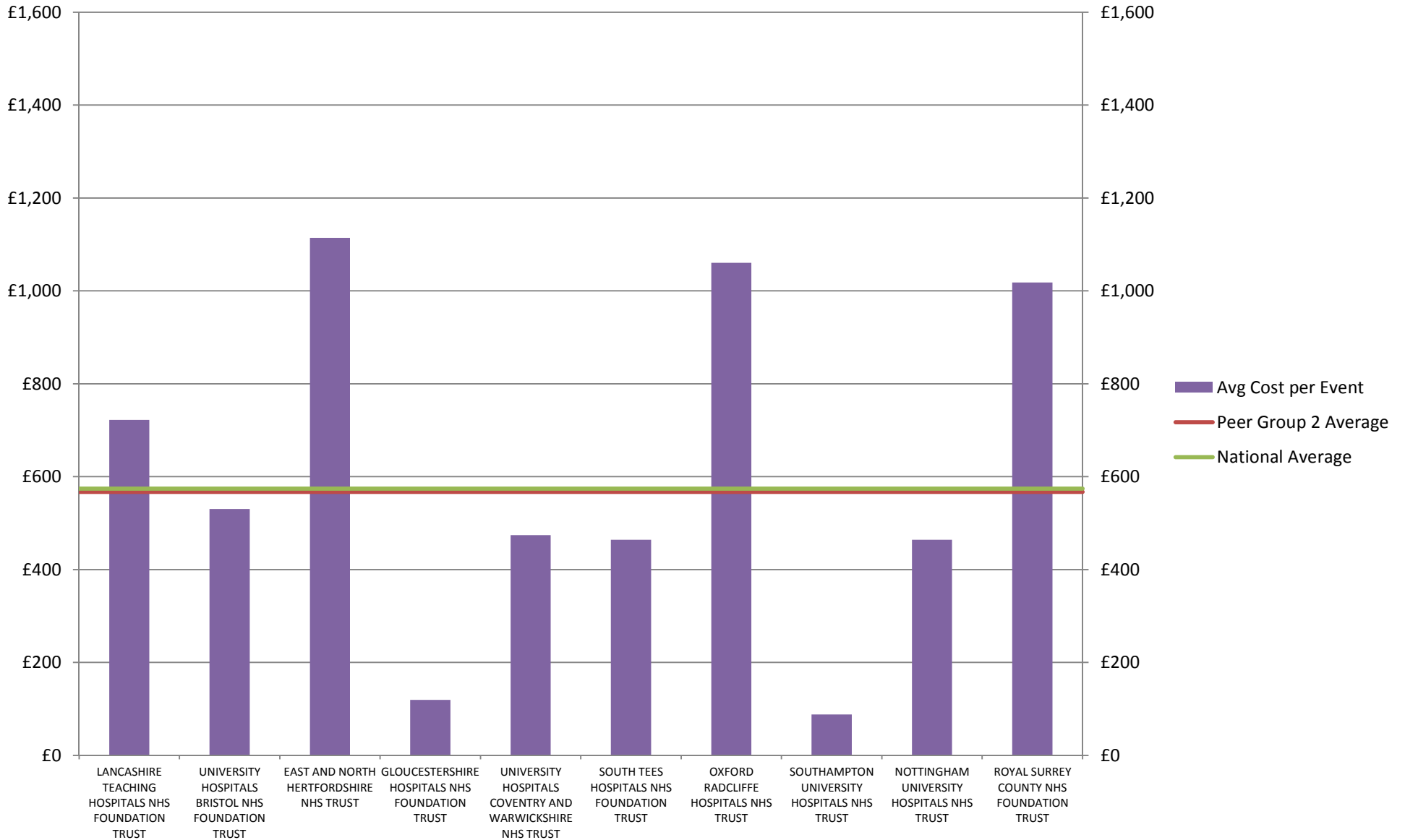


## Cost Quantum per Linac - Peer Group 1

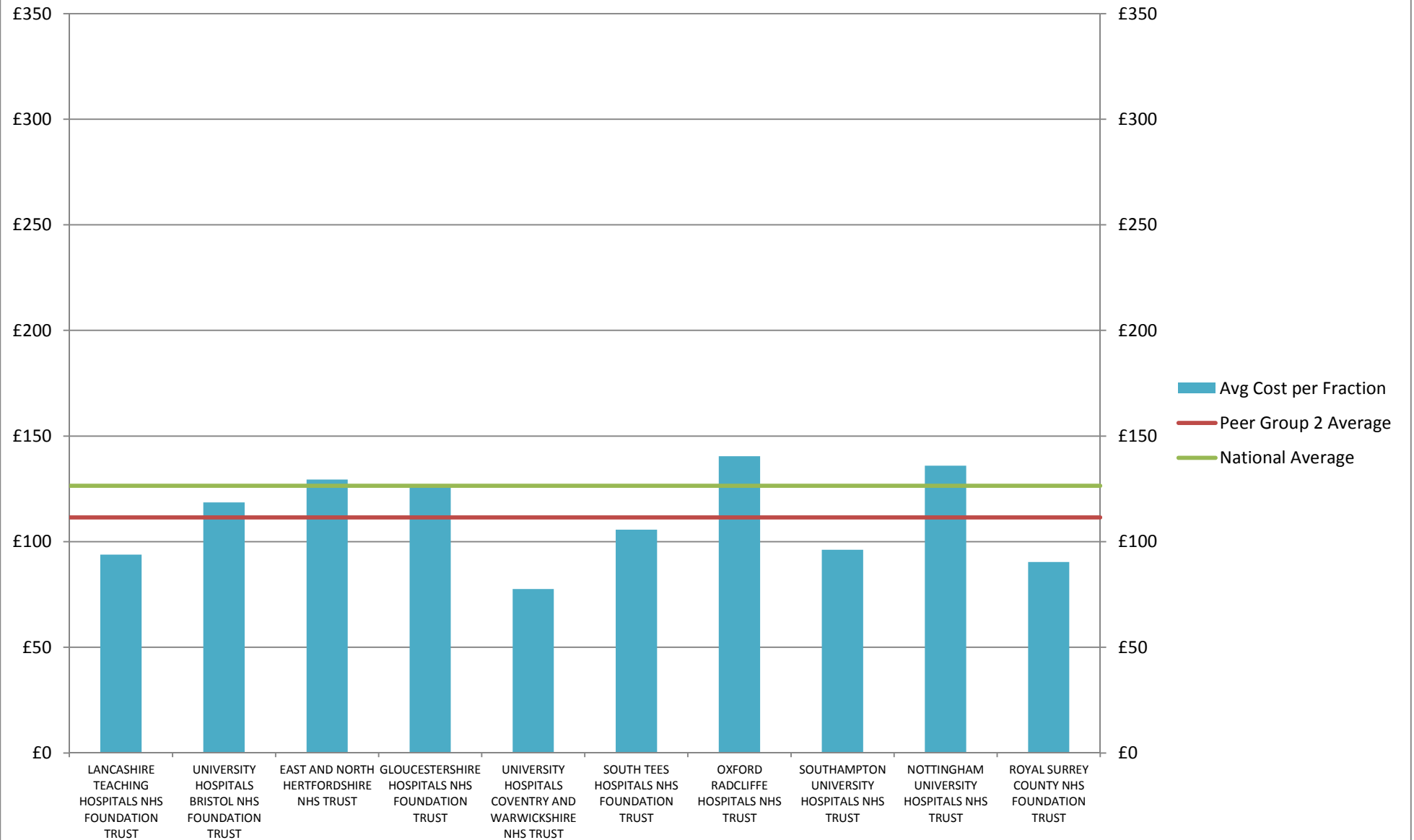




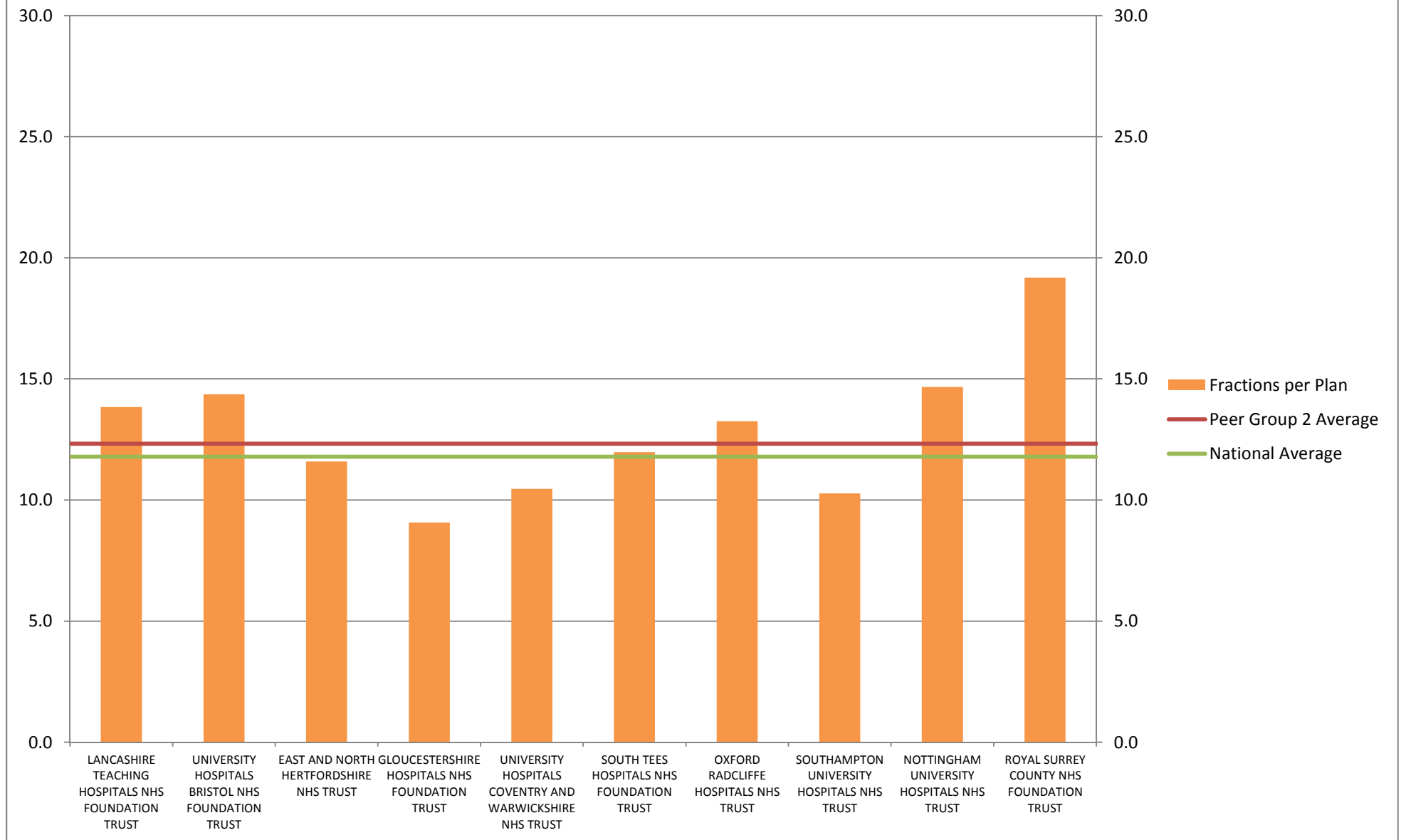
## Average Cost per Planning Event - Peer Group 2



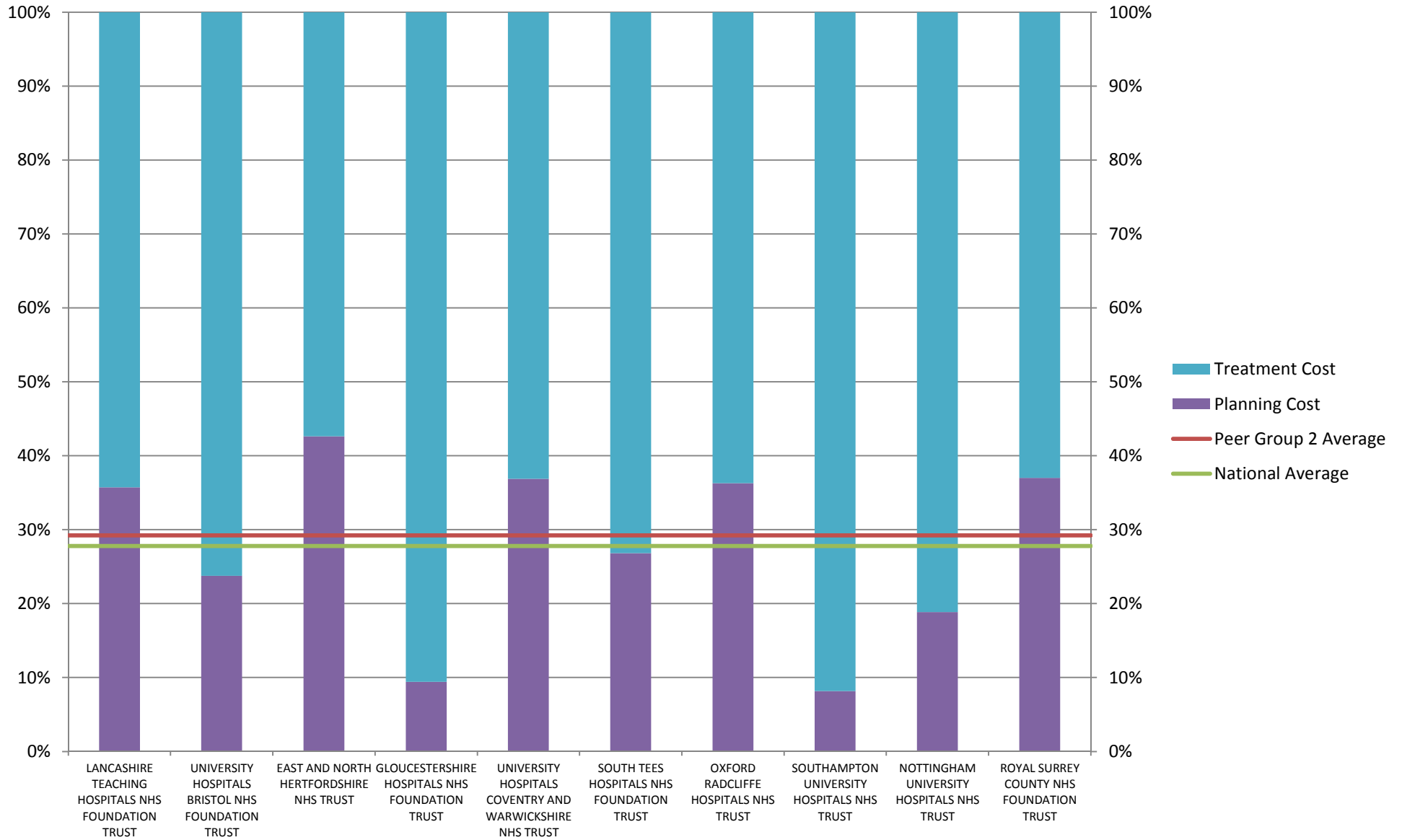
## Average Cost per Fraction of Treatment - Peer Group 2



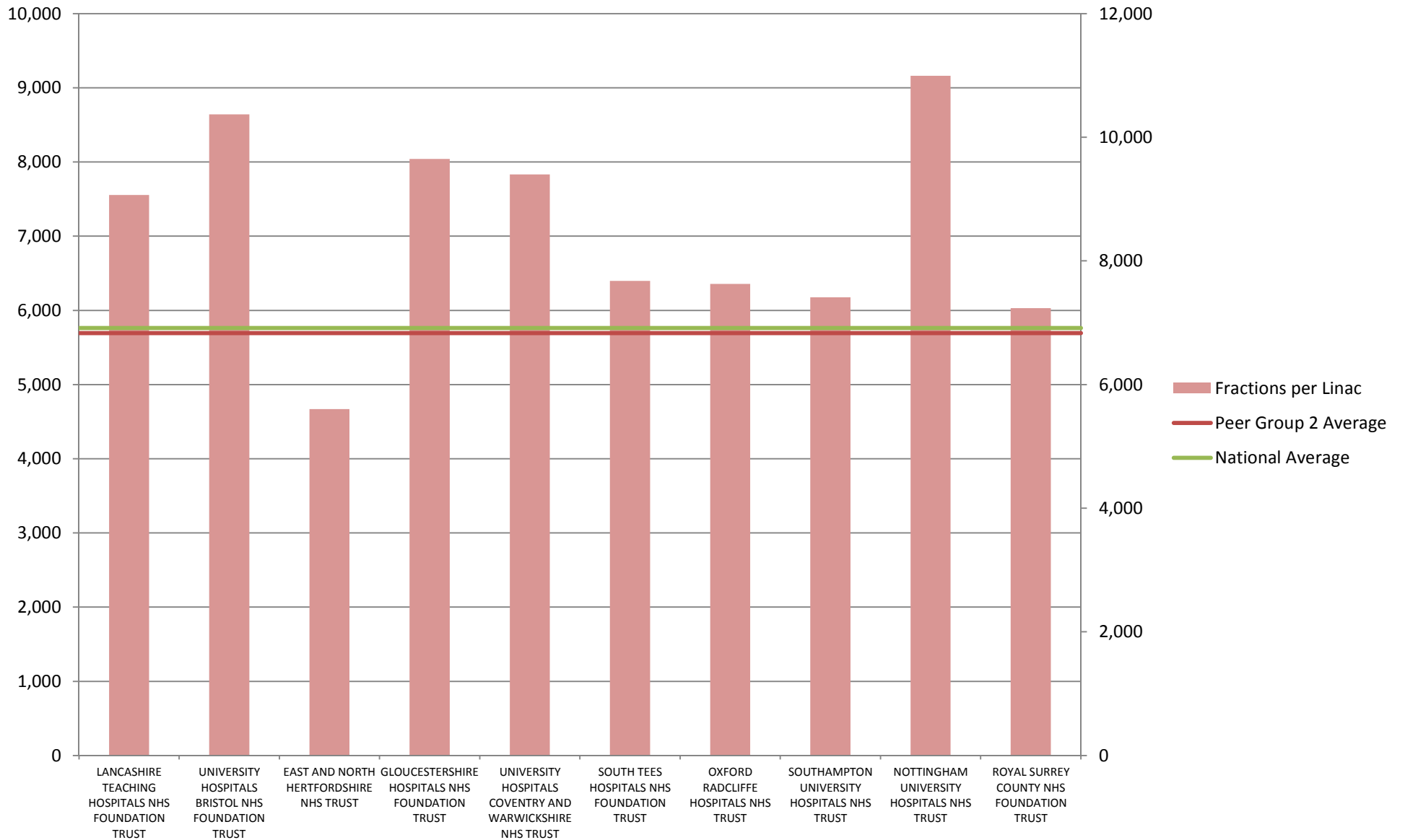
## Fractions per Planning Event - Peer Group 2



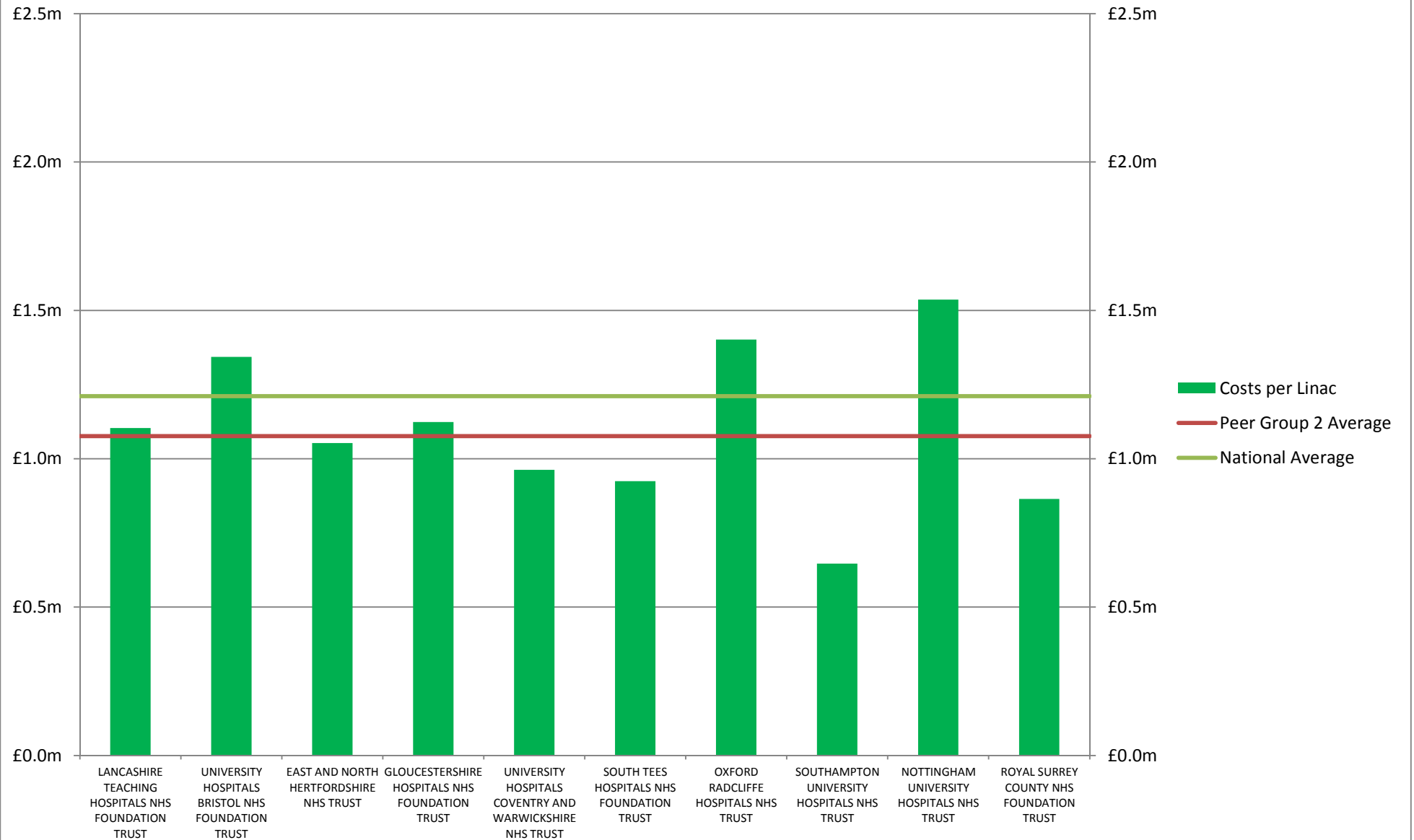
## Split of Planning Cost to Treatment Cost - Peer Group 2



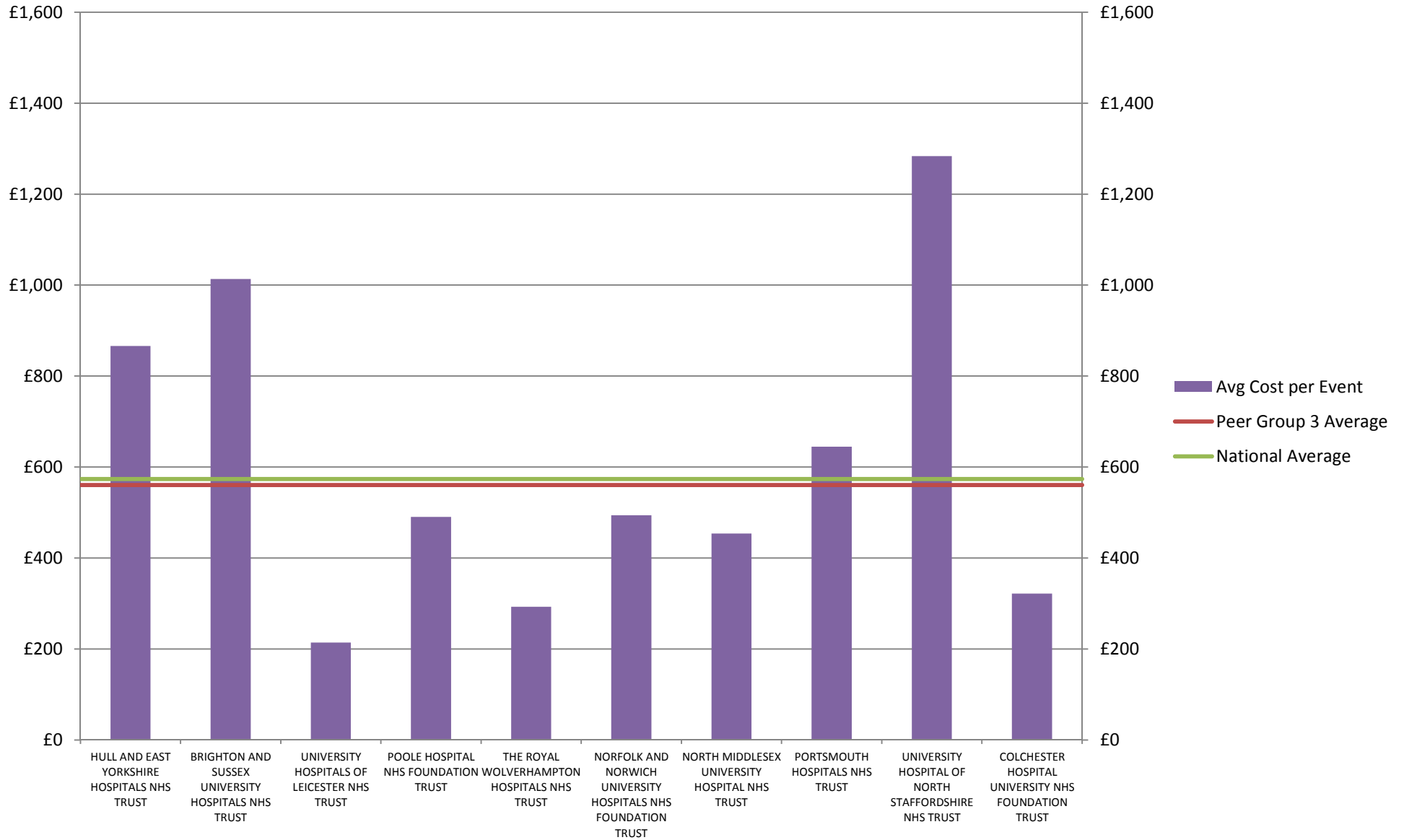
## Fractions per Linac - Peer Group 2



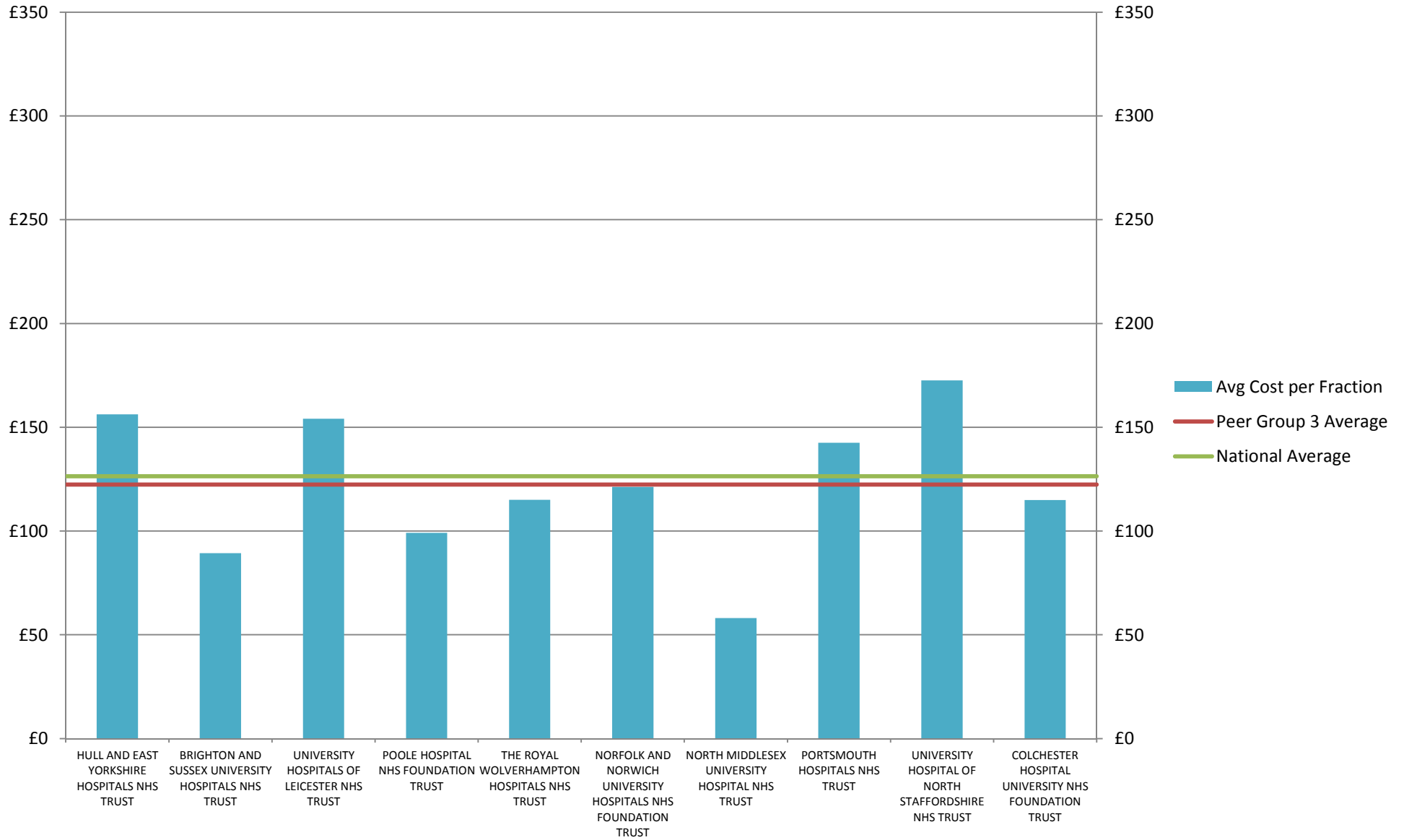
## Cost Quantum per Linac - Peer Group 2



## Average Cost per Planning Event - Peer Group 3

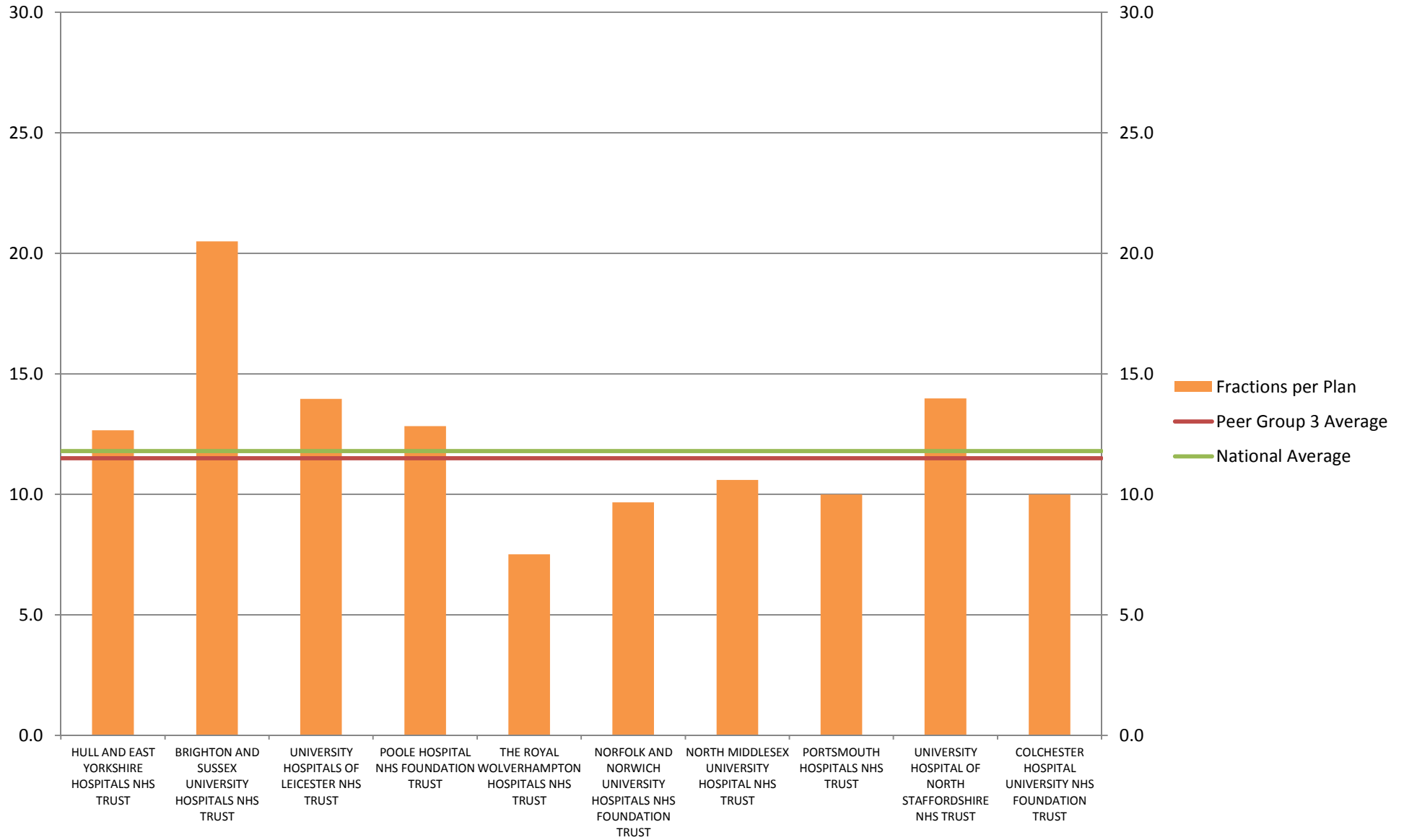


## Average Cost per Fraction of Treatment - Peer Group 3

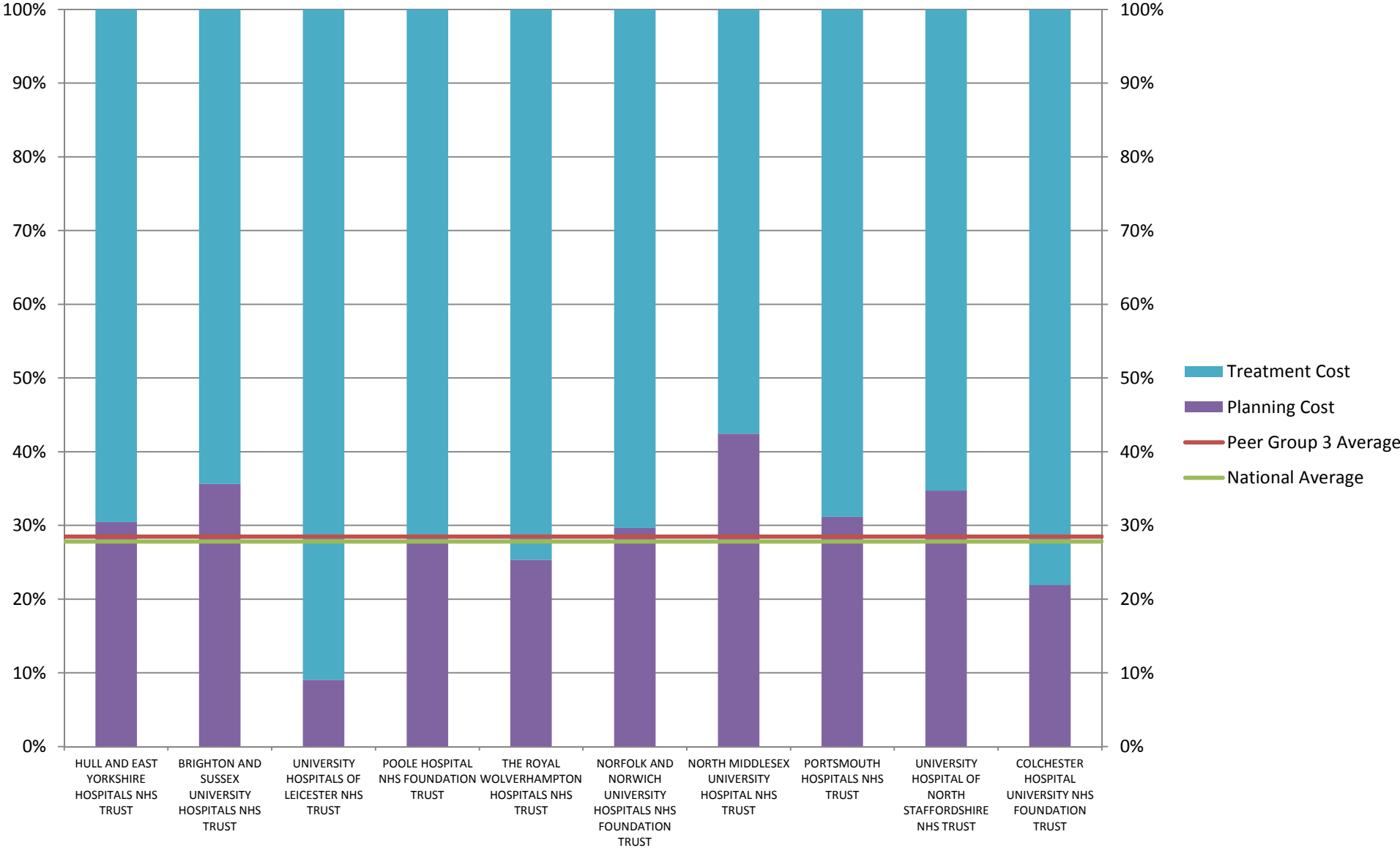




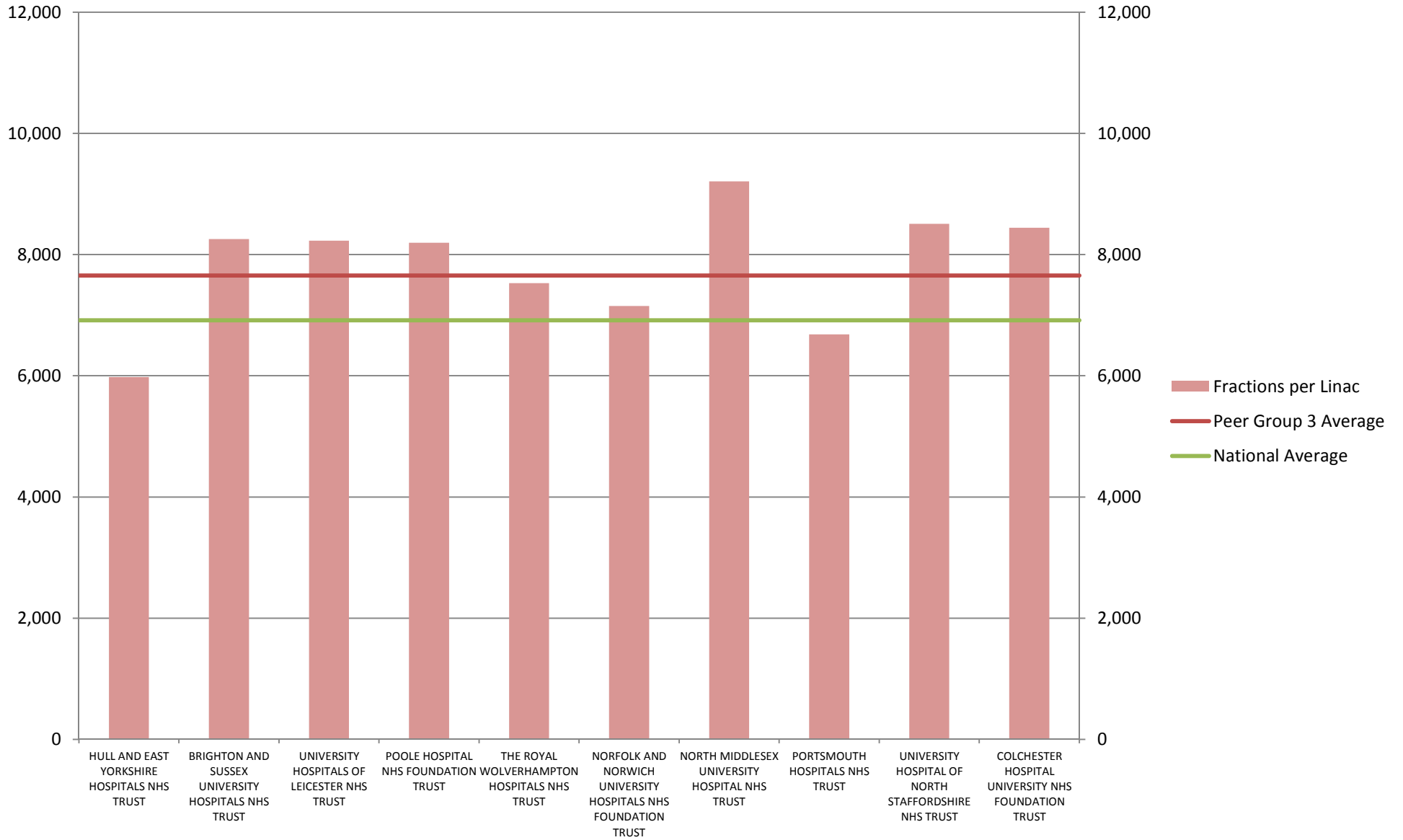
## Fractions per Planning Event - Peer Group 3



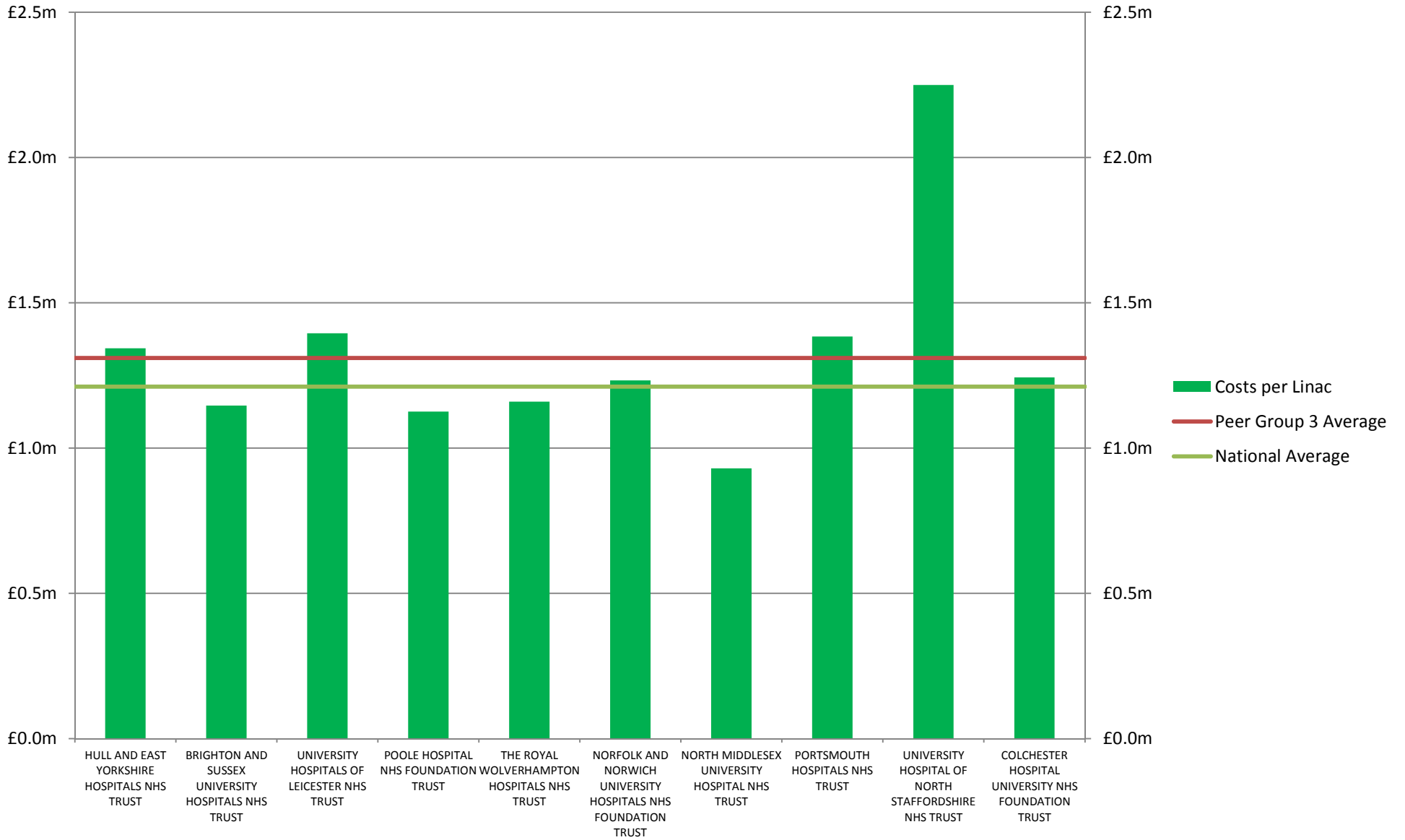
# Split of Planning Cost to Treatment Cost - Peer Group 3



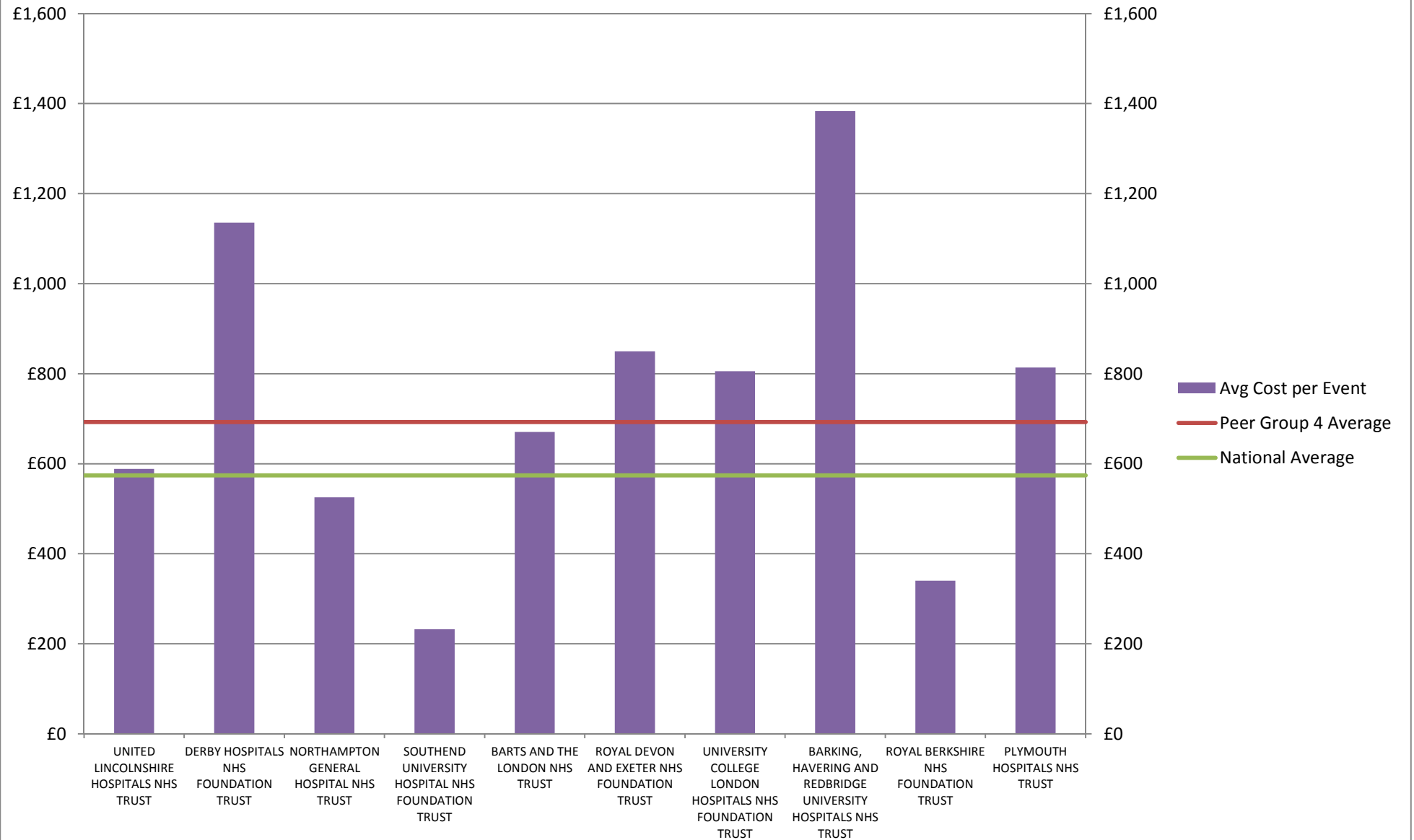
### Fractions per Linac - Peer Group 3



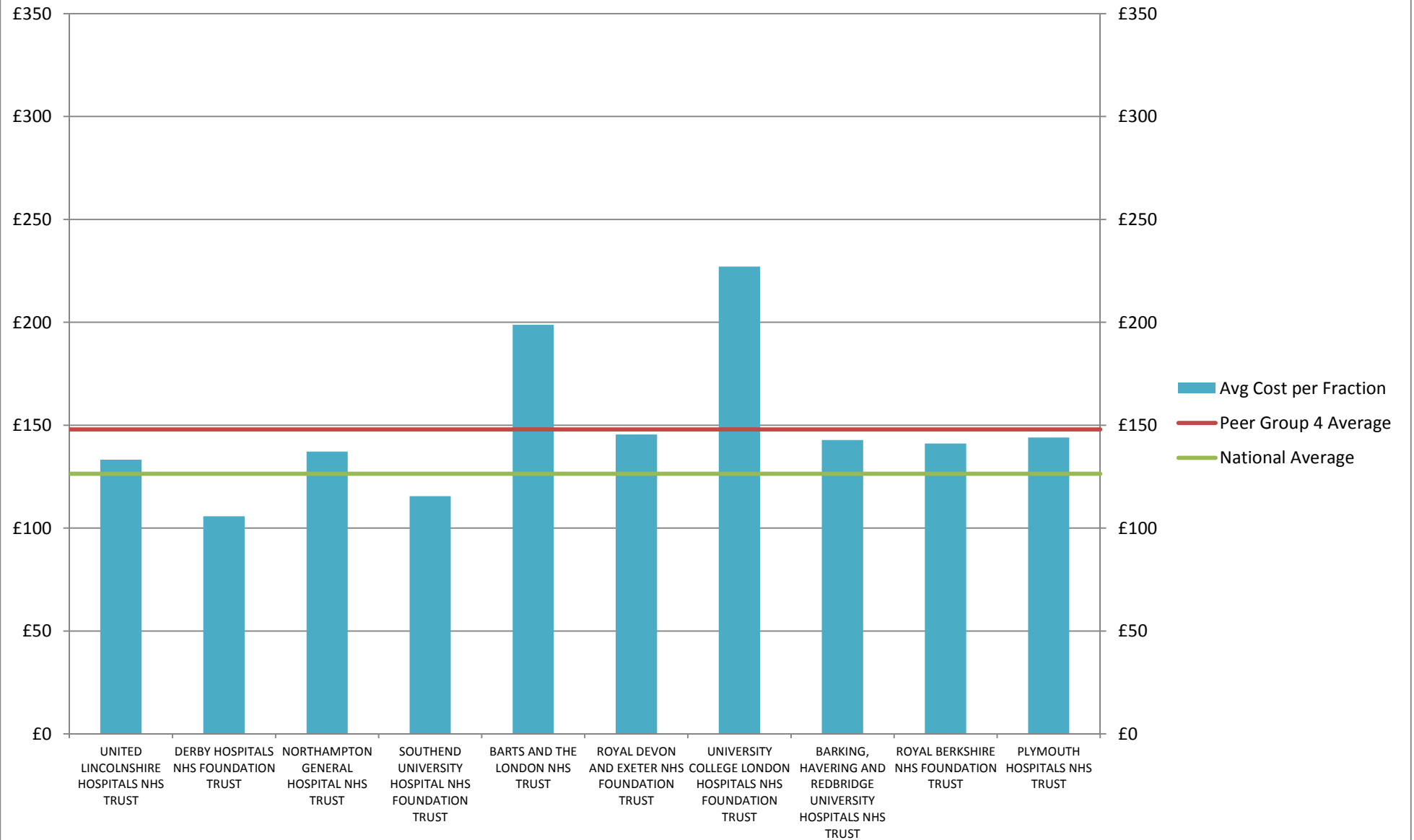
### Cost Quantum per Linac - Peer Group 3



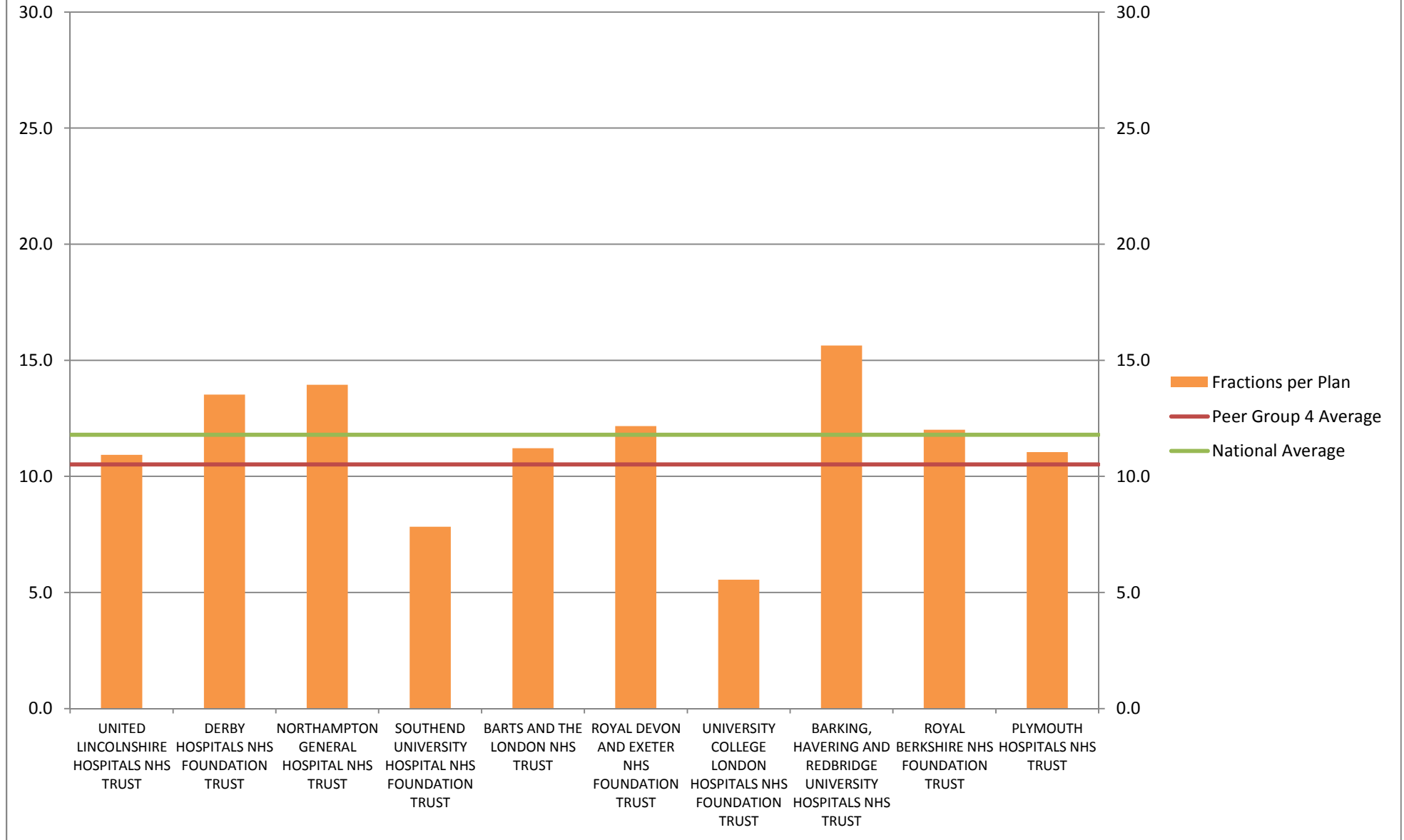
## Average Cost per Planning Event - Peer Group 4



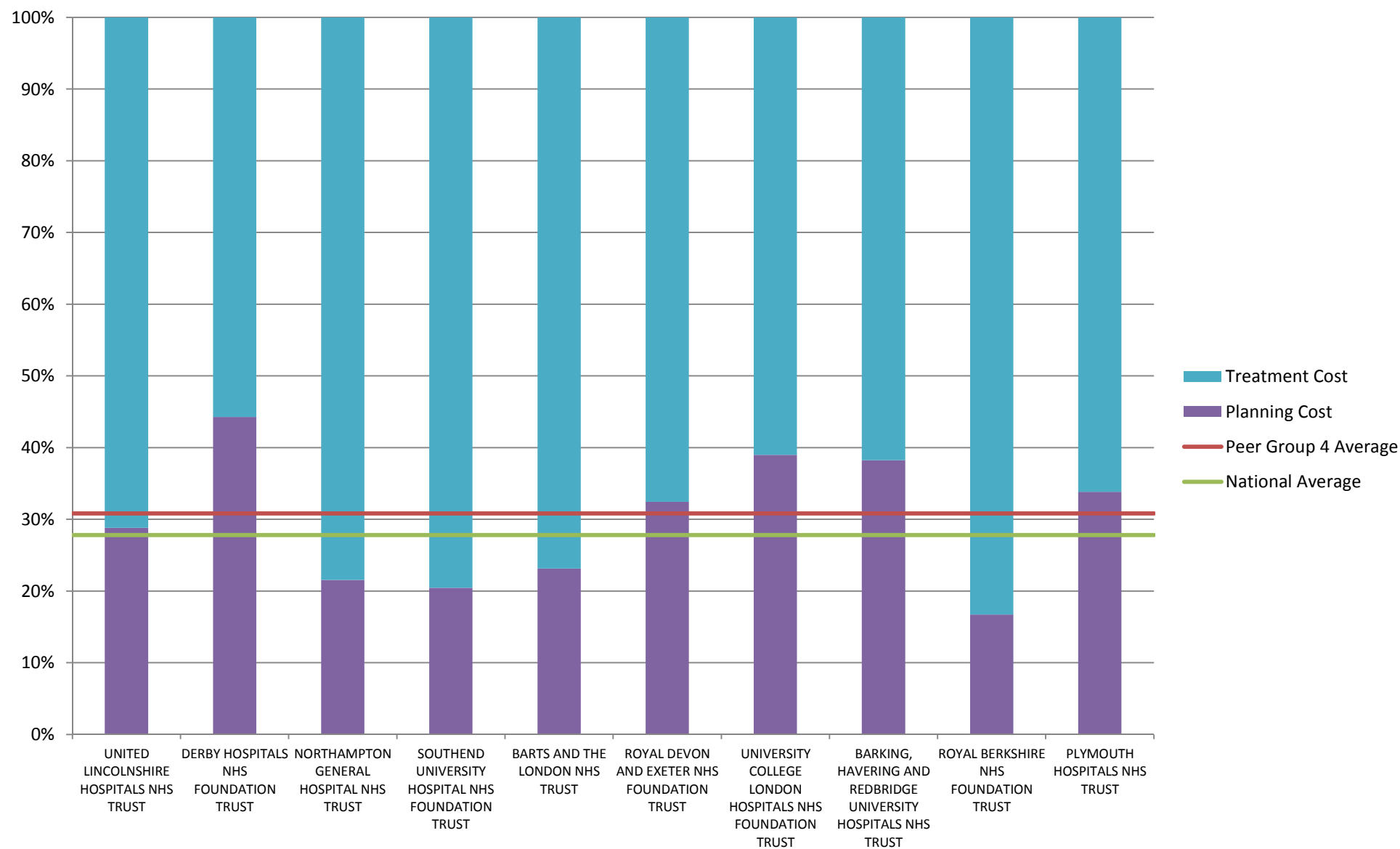
## Average Cost per Fraction of Treatment - Peer Group 4



## Fractions per Planning Event - Peer Group 4

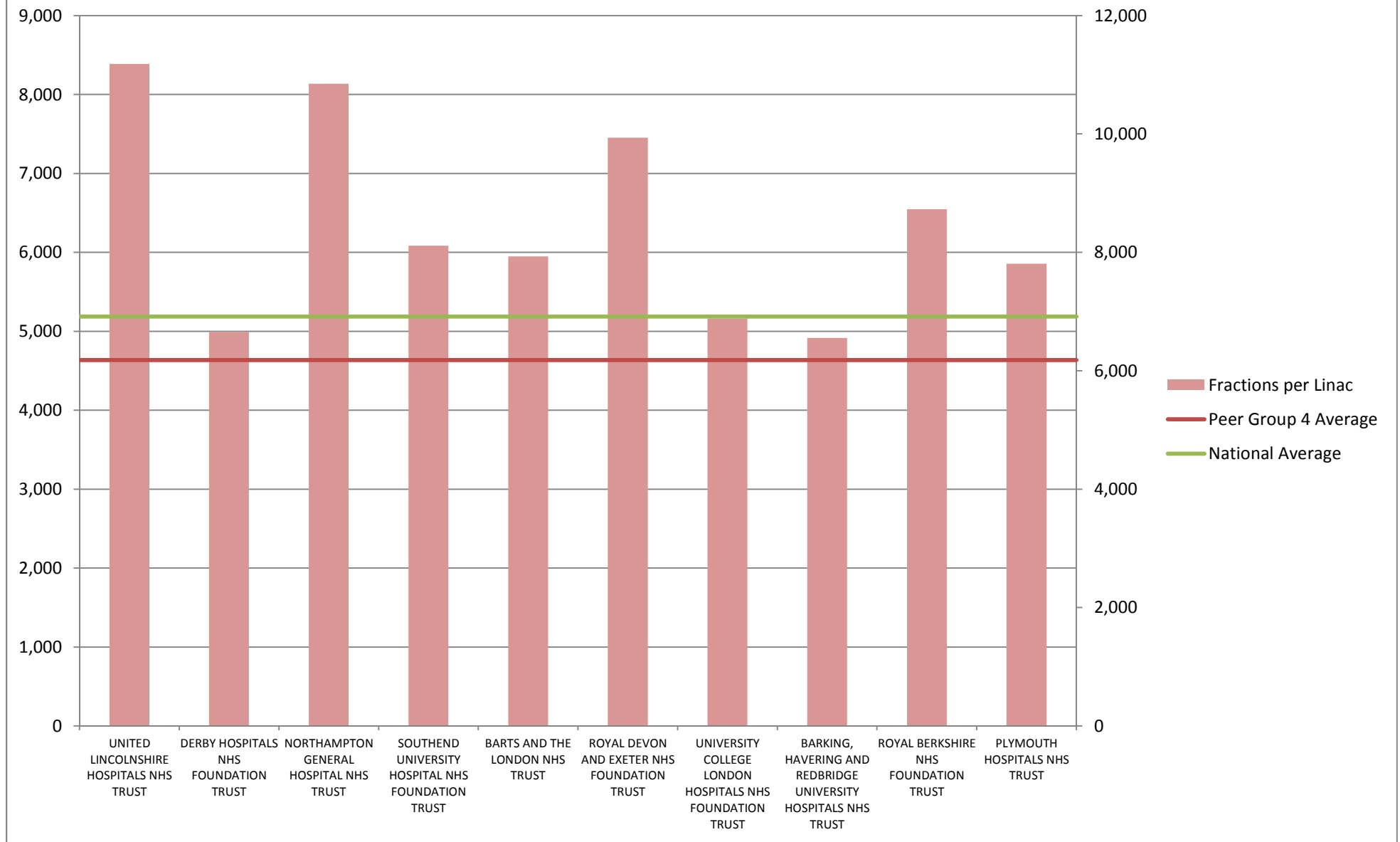


## Split of Planning Cost to Treatment Cost - Peer Group 4

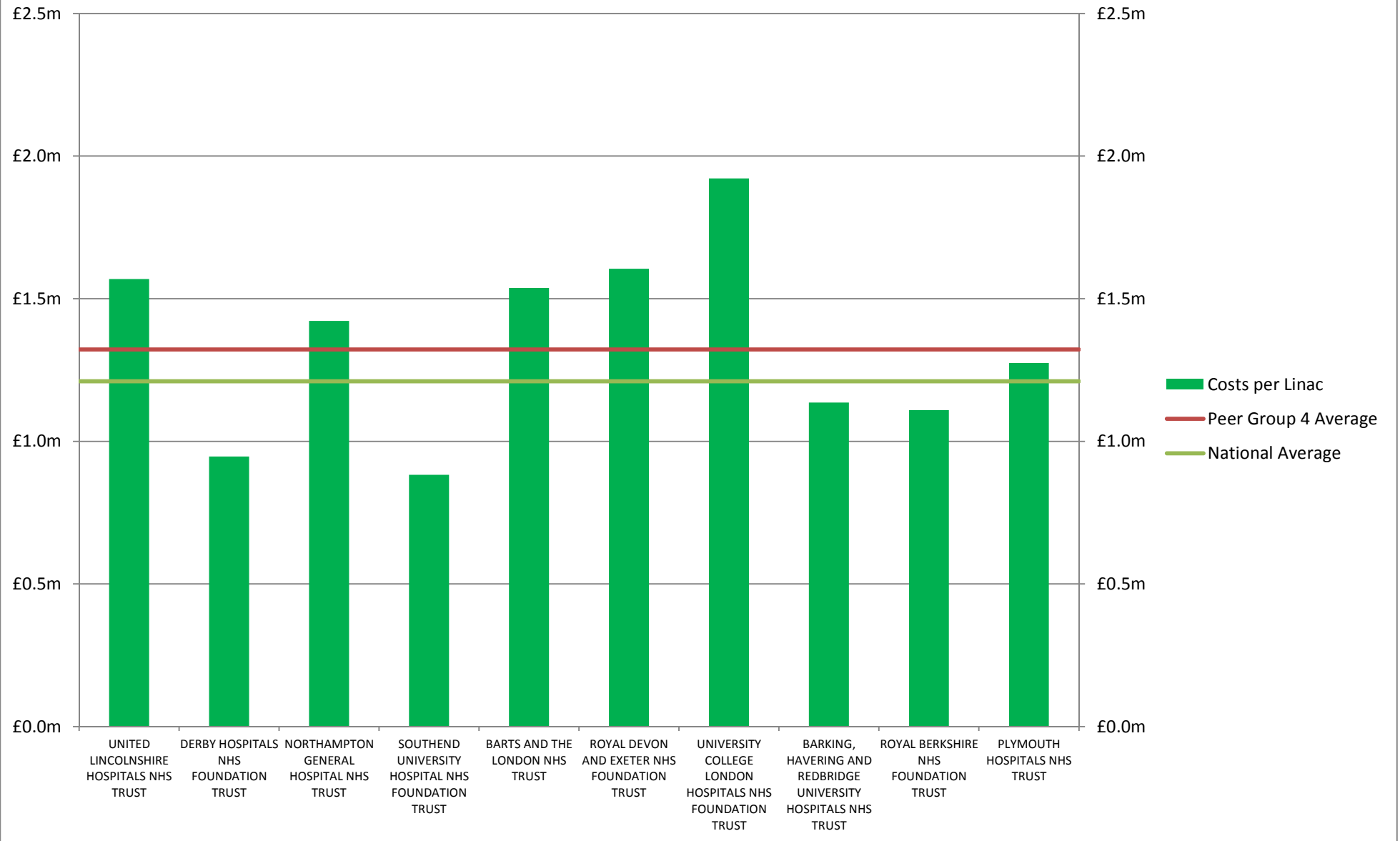




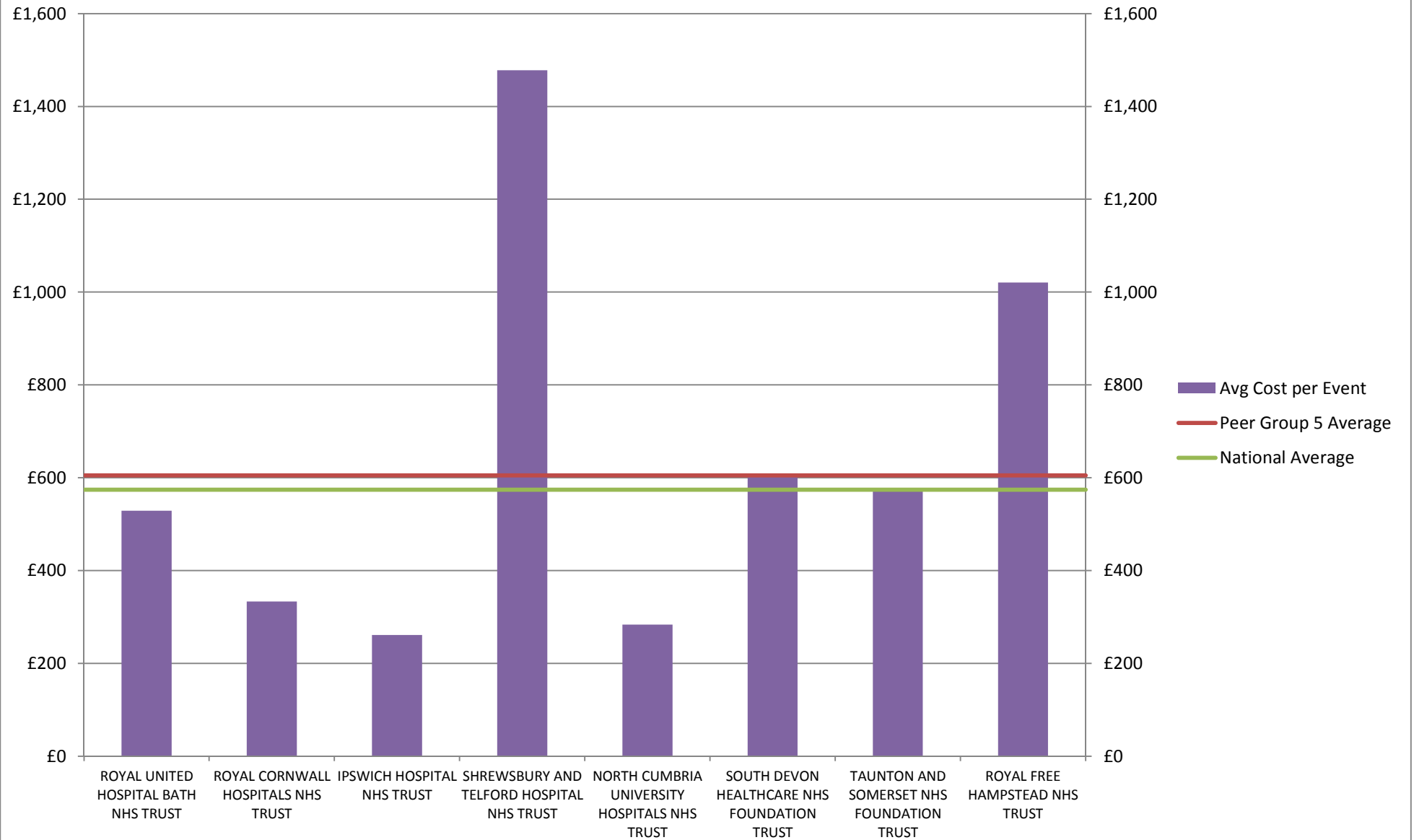
## Fractions per Linac - Peer Group 4



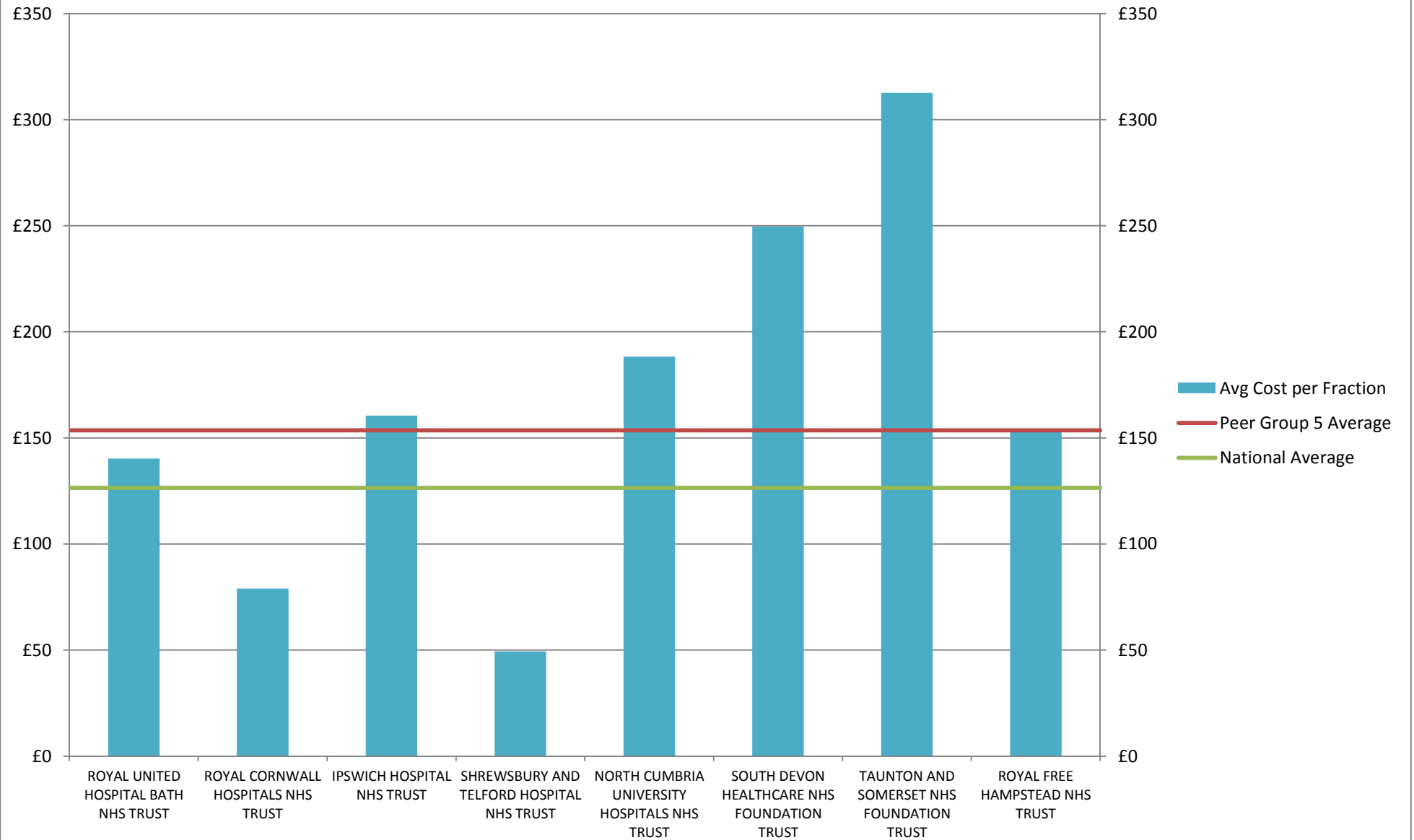
## Cost Quantum per Linac - Peer Group 4



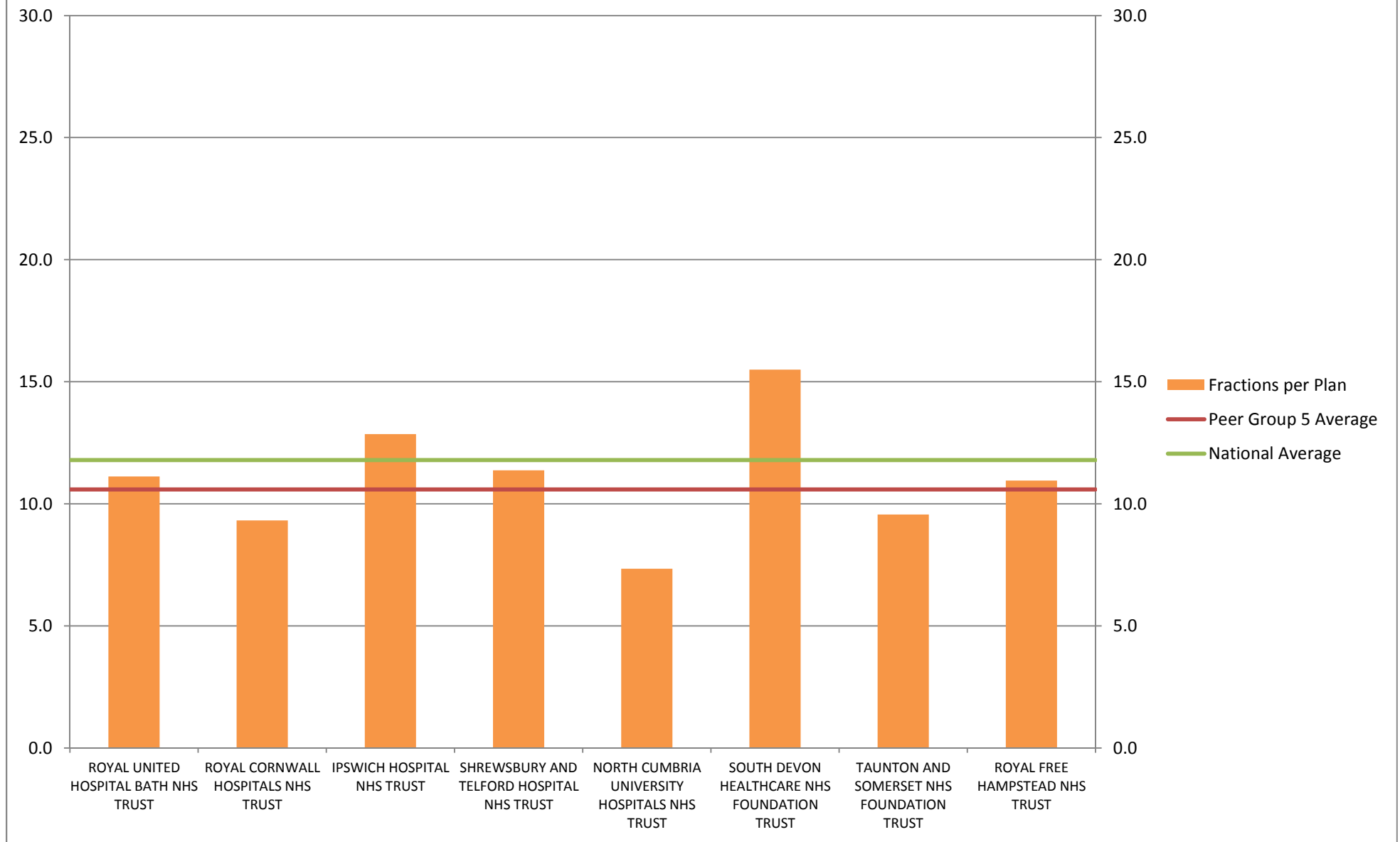
## Average Cost per Planning Event - Peer Group 5



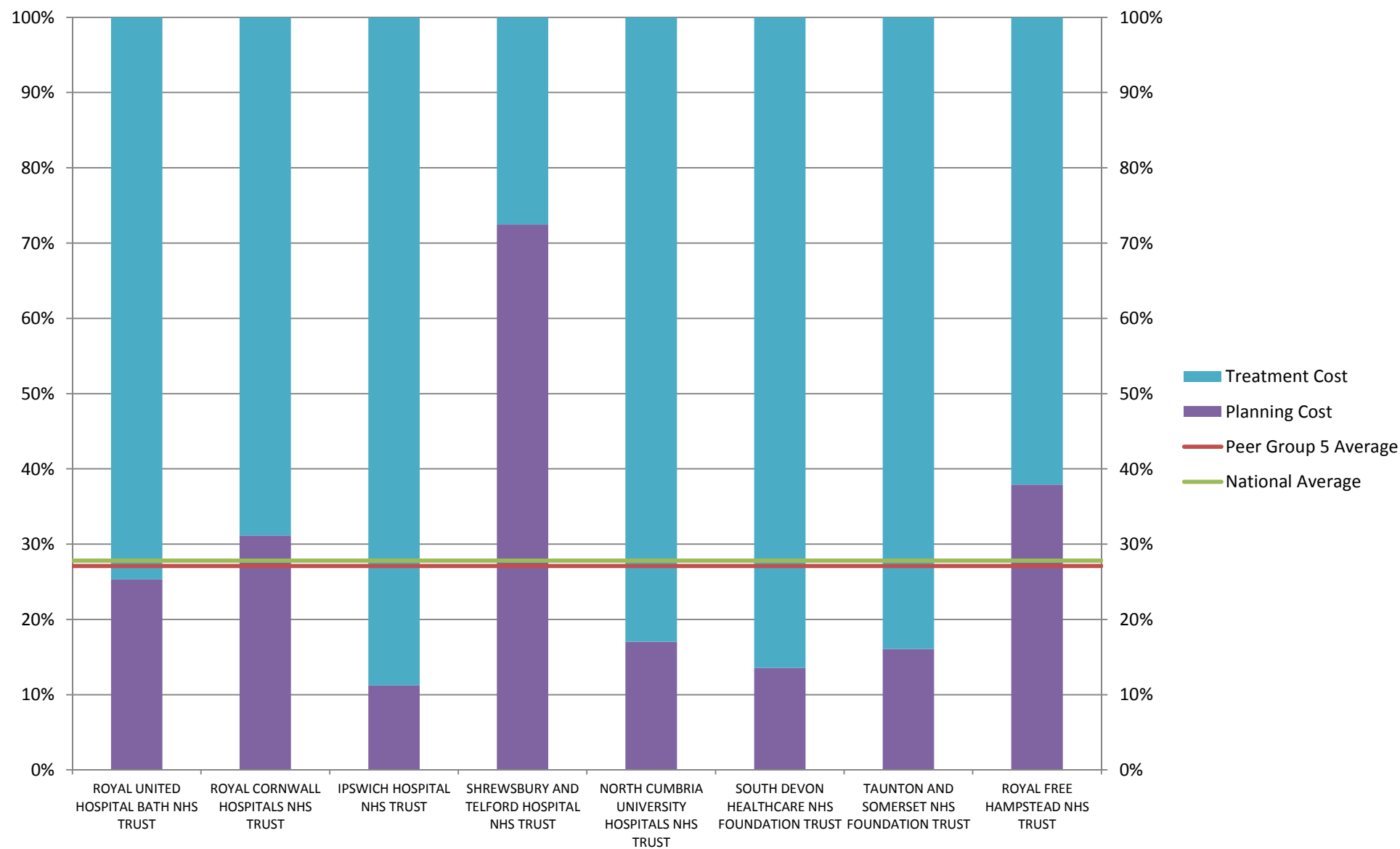
## Average Cost per Fraction of Treatment - Peer Group 5



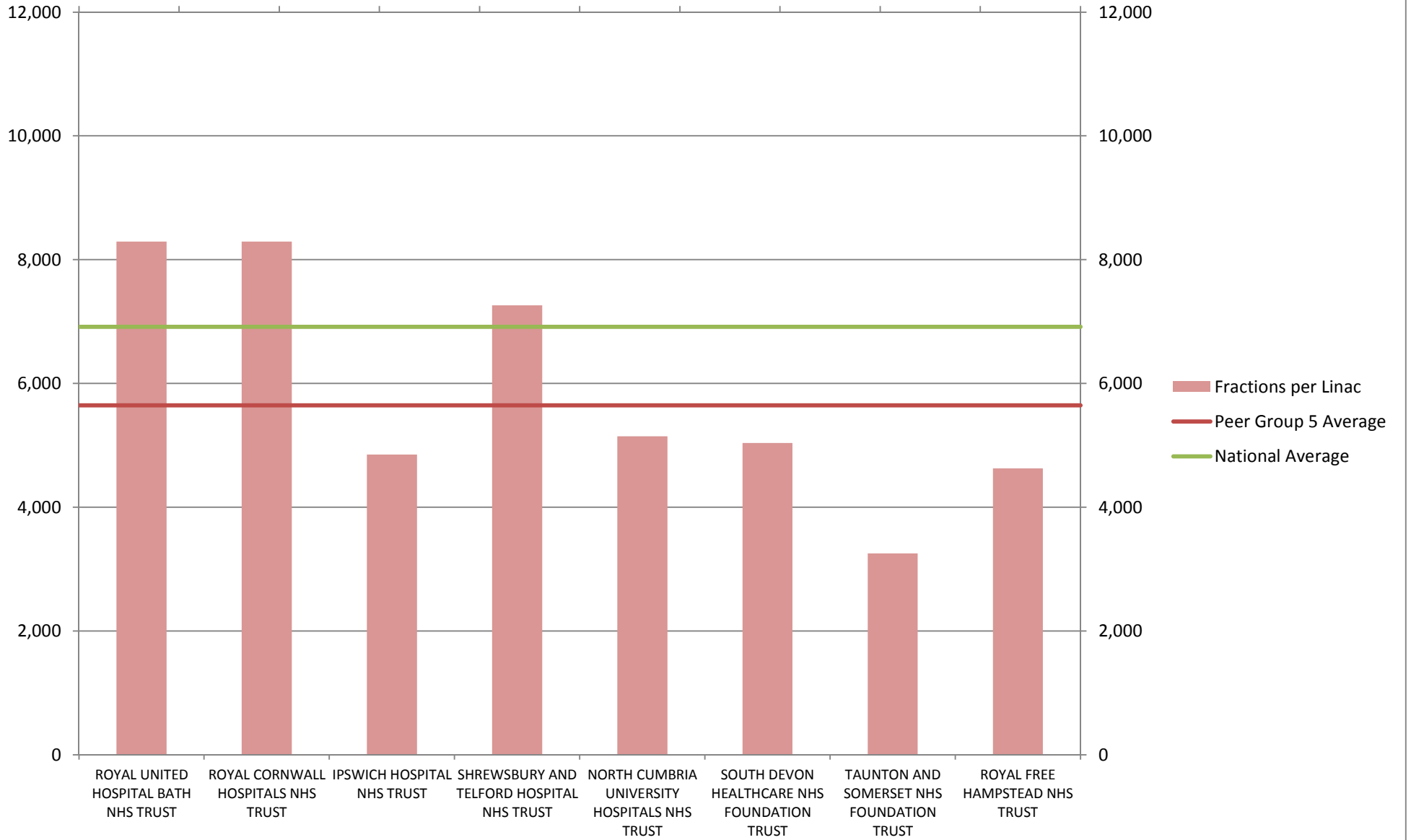
## Fractions per Planning Event - Peer Group 5



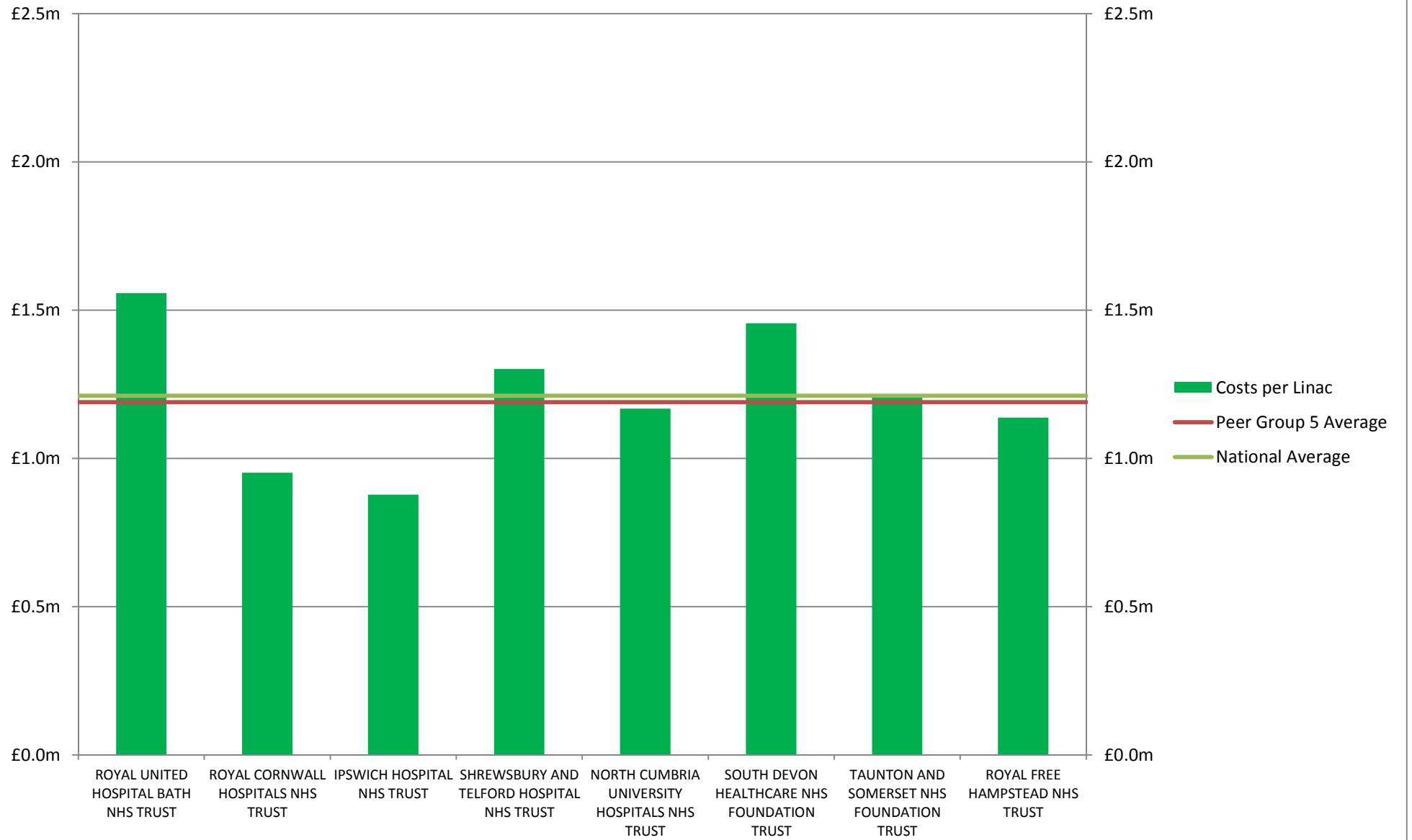
## Split of Planning Cost to Treatment Cost - Peer Group 5



### Fractions per Linac - Peer Group 5



# Cost Quantum per Linac - Peer Group 5





## Indicative Tariff for Radiotherapy based on 2009/10 Reference Costs

|  | Indicative<br>Tariff |
|--|----------------------|
| <b>Planning</b>  |                      |
| SC40Z Preparation for intensity modulated radiation therapy  | £989                 |
| SC41Z Preparation for intensity modulated radiation therapy-With Technical Support                   | £550                 |
| SC42Z Preparation for Total Body Irradiation   | £515                 |
| SC43Z Preparation for Total Body Irradiation-With Technical Support                                  | £863                 |
| SC44Z Preparation for hemi body irradiation  | £722                 |
| SC45Z Preparation for simple radiotherapy with imaging and dosimetry                                 | £409                 |
| SC46Z Preparation for simple radiotherapy with imaging and dosimetry-With Technical Support          | £672                 |
| SC47Z Preparation for simple radiotherapy with imaging and simple calculation                        | £335                 |
| SC48Z Preparation for simple radiotherapy with imaging and simple calculation-With Technical Support | £561                 |
| SC49Z Preparation for superficial radiotherapy with simple calculation                               | £273                 |
| SC50Z Preparation for superficial radiotherapy with simple calculation-With Technical Support        | £349                 |
| SC51Z Preparation for complex conformal radiotherapy   | £727                 |
| SC52Z Preparation for complex conformal radiotherapy-With Technical Support                          | £867                 |
| SC53Z Preparation for intraluminal brachytherapy   | £314                 |
| SC54Z Preparation for intracavitary brachytherapy  | £618                 |
| SC55Z Preparation for interstitial brachytherapy   | £546                 |
| SC56Z Other external beam radiotherapy preparation   | £656                 |
| SC57Z Other brachytherapy preparation  | £443                 |
| <b>Treatment</b>   |                      |
| SC21Z Deliver a fraction of treatment on a superficial or orthovoltage machine                       | £86                  |
| SC22Z Deliver a fraction of treatment on a megavoltage machine                                       | £101                 |
| SC23Z Deliver a fraction of complex treatment on a megavoltage machine                               | £121                 |
| SC24Z Deliver a fraction of Radiotherapy on a megavoltage machine using General Anaesthetic          | £200                 |
| SC25Z Deliver a fraction of Total Body Irradiation   | £222                 |
| SC26Z Deliver a fraction of Intracavitary Radiotherapy without General Anaesthetic                   | £414                 |
| SC27Z Deliver a fraction of Intracavitary Radiotherapy with General Anaesthetic                      | £380                 |
| SC28Z Deliver a fraction of Interstitial Radiotherapy  | £374                 |
| SC29Z Other Radiotherapy Treatment   | £215                 |
| SC30Z Deliver of a fraction of intraluminal brachytherapy  | £116                 |
| SC31Z Deliver a fraction of adaptive Radiotherapy on a megavoltage machine                           | £180                 |

Potential Impact of Indicative Tariff for Radiotherapy based on 2009/10 Reference Costs

| Organisation  | Peer Group | Planning          |                   |                             |                  | Treatment         |                   |                             |                  | TOTAL             |                             |                  |           |
|---|------------|-------------------|-------------------|-----------------------------|------------------|-------------------|-------------------|-----------------------------|------------------|-------------------|-----------------------------|------------------|-----------|
|   |            | Ref Costs 2009/10 | Ref Costs 2009/10 | Potential Income (incl MFF) | Surplus/ Deficit | Ref Costs 2009/10 | Ref Costs 2009/10 | Potential Income (incl MFF) | Surplus/ Deficit | Ref Costs 2009/10 | Potential Income (incl MFF) | Surplus/ Deficit |           |
|   |            | Activity          | Cost              |                             |                  | Activity          | Cost              |                             |                  | Cost              |                             |                  |           |
| CLATTERBRIDGE CENTRE FOR ONCOLOGY NHS FOUNDATION TRUST        | 1          | 6,937             | £1.5m             | £3.5m                       | £2.0m            | 88,784            | £13.9m            | £9.6m                       | £-4.3m           | £15.4m            | £13.0m                      | £-2.4m           | -15%      |
| THE CHRISTIE NHS FOUNDATION TRUST                             | 1          | 7,721             | £5.7m             | £4.4m                       | £-1.3m           | 85,442            | £9.9m             | £10.6m                      | £0.7m            | £15.6m            | £15.0m                      | £-0.6m           | -4%       |
| LEEDS TEACHING HOSPITALS NHS TRUST                            | 1          | 5,438             | £2.0m             | £2.7m                       | £0.7m            | 70,238            | £11.6m            | £8.0m                       | £-3.5m           | £13.5m            | £10.7m                      | £-2.8m           | -21%      |
| MAIDSTONE AND TUNBRIDGE WELLS NHS TRUST                       | 1          | 7,455             | £1.9m             | £6.3m                       | £4.4m            | 59,901            | £8.3m             | £12.4m                      | £4.1m            | £10.2m            | £18.7m                      | £8.5m            | 84%       |
| THE NEWCASTLE UPON TYNE HOSPITALS NHS FOUNDATION TRUST        | 1          | 4,066             | £1.8m             | £2.2m                       | £0.4m            | 58,817            | £7.8m             | £7.5m                       | £-0.3m           | £9.6m             | £9.7m                       | £0.1m            | 1%        |
| THE ROYAL MARSDEN NHS FOUNDATION TRUST                        | 1          | 4,626             | £3.6m             | £2.9m                       | £-0.7m           | 57,859            | £8.9m             | £9.0m                       | £0.1m            | £12.5m            | £11.9m                      | £-0.6m           | -5%       |
| SHEFFIELD TEACHING HOSPITALS NHS FOUNDATION TRUST             | 1          | 2,217             | £2.0m             | £1.7m                       | £-0.3m           | 56,103            | £4.2m             | £5.9m                       | £1.7m            | £6.2m             | £7.6m                       | £1.4m            | 23%       |
| UNIVERSITY HOSPITAL BIRMINGHAM NHS FOUNDATION TRUST           | 1          | 3,256             | £1.1m             | £1.1m                       | £-0.0m           | 55,547            | £4.9m             | £6.7m                       | £1.8m            | £6.0m             | £7.8m                       | £1.8m            | 30%       |
| CAMBRIDGE UNIVERSITY HOSPITALS NHS FOUNDATION TRUST           | 1          | 5,229             | £2.4m             | £3.0m                       | £0.6m            | 54,314            | £4.4m             | £7.3m                       | £2.9m            | £6.8m             | £10.3m                      | £3.6m            | 53%       |
| GUY'S AND ST THOMAS' NHS FOUNDATION TRUST                     | 1          | 4,335             | £6.2m             | £2.9m                       | £-3.3m           | 46,931            | £6.0m             | £6.2m                       | £0.2m            | £12.2m            | £9.1m                       | £-3.1m           | -25%      |
| <b>Total, Peer Group 1</b>                                    |            | <b>51,280</b>     | <b>£28.1m</b>     | <b>£30.5m</b>               | <b>£2.4m</b>     | <b>633,936</b>    | <b>£79.8m</b>     | <b>£83.4m</b>               | <b>£3.6m</b>     | <b>£107.9m</b>    | <b>£113.9m</b>              | <b>£6.1m</b>     | <b>6%</b> |
| LANCASHIRE TEACHING HOSPITALS NHS FOUNDATION TRUST            | 2          | 3,276             | £2.3m             | £1.8m                       | £-0.5m           | 45,325            | £4.1m             | £5.6m                       | £1.5m            | £6.3m             | £7.4m                       | £1.0m            | 17%       |
| UNIVERSITY HOSPITALS BRISTOL NHS FOUNDATION TRUST             | 2          | 3,007             | £1.6m             | £1.8m                       | £0.2m            | 43,206            | £5.1m             | £5.5m                       | £0.4m            | £6.7m             | £7.3m                       | £0.6m            | 9%        |
| EAST AND NORTH HERTFORDSHIRE NHS TRUST                        | 2          | 3,626             | £4.2m             | £2.5m                       | £-1.8m           | 42,019            | £5.7m             | £5.7m                       | £0.0m            | £10.0m            | £8.2m                       | £-1.7m           | -18%      |
| GLOUCESTERSHIRE HOSPITALS NHS FOUNDATION TRUST                | 2          | 4,432             | £0.5m             | £2.1m                       | £1.6m            | 40,209            | £5.0m             | £5.1m                       | £0.1m            | £5.5m             | £7.2m                       | £1.7m            | 31%       |
| UNIVERSITY HOSPITALS COVENTRY AND WARWICKSHIRE NHS TRUST      | 2          | 3,744             | £1.7m             | £1.8m                       | £0.0m            | 39,162            | £3.0m             | £4.7m                       | £1.8m            | £4.7m             | £6.5m                       | £1.8m            | 38%       |
| SOUTH TEES HOSPITALS NHS FOUNDATION TRUST                     | 2          | 3,205             | £1.4m             | £1.5m                       | £0.1m            | 38,385            | £3.9m             | £4.8m                       | £0.9m            | £5.3m             | £6.3m                       | £1.1m            | 20%       |
| OXFORD RADCLIFFE HOSPITALS NHS TRUST                          | 2          | 2,877             | £3.1m             | £1.7m                       | £-1.4m           | 38,131            | £5.4m             | £4.9m                       | £-0.5m           | £8.5m             | £6.7m                       | £-1.9m           | -22%      |
| SOUTHAMPTON UNIVERSITY HOSPITALS NHS TRUST                    | 2          | 3,605             | £0.3m             | £2.0m                       | £1.7m            | 37,052            | £3.6m             | £4.5m                       | £0.9m            | £3.9m             | £6.5m                       | £2.6m            | 67%       |
| NOTTINGHAM UNIVERSITY HOSPITALS NHS TRUST                     | 2          | 2,499             | £1.1m             | £1.3m                       | £0.2m            | 36,651            | £4.8m             | £4.3m                       | £-0.4m           | £5.9m             | £5.7m                       | £-0.2m           | -3%       |
| ROYAL SURREY COUNTY NHS FOUNDATION TRUST                      | 2          | 1,886             | £2.1m             | £1.3m                       | £-0.8m           | 36,169            | £3.5m             | £4.7m                       | £1.2m            | £5.5m             | £6.0m                       | £0.4m            | 7%        |
| <b>Total, Peer Group 2</b>                                    |            | <b>32,157</b>     | <b>£18.3m</b>     | <b>£17.8m</b>               | <b>£-0.5m</b>    | <b>396,309</b>    | <b>£43.9m</b>     | <b>£49.9m</b>               | <b>£5.9m</b>     | <b>£62.3m</b>     | <b>£67.6m</b>               | <b>£5.4m</b>     | <b>9%</b> |
| HULL AND EAST YORKSHIRE HOSPITALS NHS TRUST                   | 3          | 2,835             | £2.3m             | £1.7m                       | £-0.6m           | 35,877            | £5.2m             | £4.4m                       | £-0.9m           | £7.5m             | £6.1m                       | £-1.5m           | -19%      |
| BRIGHTON AND SUSSEX UNIVERSITY HOSPITALS NHS TRUST            | 3          | 1,611             | £1.6m             | £1.2m                       | £-0.4m           | 33,017            | £2.9m             | £3.7m                       | £0.8m            | £4.5m             | £4.9m                       | £0.4m            | 9%        |
| UNIVERSITY HOSPITALS OF LEICESTER NHS TRUST                   | 3          | 2,358             | £0.5m             | £1.1m                       | £0.6m            | 32,920            | £4.9m             | £3.9m                       | £-1.0m           | £5.4m             | £4.9m                       | £-0.4m           | -8%       |
| POOLE HOSPITAL NHS FOUNDATION TRUST                           | 3          | 2,554             | £1.2m             | £1.5m                       | £0.2m            | 32,773            | £3.2m             | £4.8m                       | £1.6m            | £4.4m             | £6.2m                       | £1.8m            | 41%       |
| THE ROYAL WOLVERHAMPTON HOSPITALS NHS TRUST                   | 3          | 4,009             | £1.1m             | £1.9m                       | £0.7m            | 30,110            | £3.3m             | £3.3m                       | £0.0m            | £4.4m             | £5.2m                       | £0.8m            | 17%       |
| NORFOLK AND NORWICH UNIVERSITY HOSPITALS NHS FOUNDATION TRUST | 3          | 2,959             | £1.4m             | £1.6m                       | £0.2m            | 28,611            | £3.2m             | £3.4m                       | £0.2m            | £4.6m             | £5.0m                       | £0.4m            | 9%        |
| NORTH MIDDLESEX UNIVERSITY HOSPITAL NHS TRUST                 | 3          | 2,607             | £1.3m             | £1.6m                       | £0.3m            | 27,624            | £1.8m             | £3.8m                       | £2.0m            | £3.1m             | £5.3m                       | £2.2m            | 73%       |
| PORTSMOUTH HOSPITALS NHS TRUST                                | 3          | 2,676             | £1.7m             | £1.7m                       | £-0.1m           | 26,737            | £3.8m             | £3.5m                       | £-0.4m           | £5.6m             | £5.1m                       | £-0.4m           | -8%       |
| UNIVERSITY HOSPITAL OF NORTH STAFFORDSHIRE NHS TRUST          | 3          | 1,826             | £2.2m             | £1.3m                       | £-0.9m           | 25,526            | £4.2m             | £3.1m                       | £-1.0m           | £6.4m             | £4.4m                       | £-1.9m           | -30%      |
| COLCHESTER HOSPITAL UNIVERSITY NHS FOUNDATION TRUST           | 3          | 2,535             | £0.8m             | £1.4m                       | £0.6m            | 25,329            | £2.8m             | £5.1m                       | £2.2m            | £3.6m             | £6.4m                       | £2.8m            | 78%       |
| <b>Total, Peer Group 3</b>                                    |            | <b>25,970</b>     | <b>£14.2m</b>     | <b>£14.8m</b>               | <b>£0.7m</b>     | <b>298,524</b>    | <b>£35.4m</b>     | <b>£38.9m</b>               | <b>£3.5m</b>     | <b>£49.5m</b>     | <b>£53.7m</b>               | <b>£4.2m</b>     | <b>8%</b> |

Potential Impact of Indicative Tariff for Radiotherapy based on 2009/10 Reference Costs

| Organisation   | Peer Group | Planning          |                   |                             |                  | Treatment         |                   |                             |                  | TOTAL             |                             |                  |             |
|--|------------|-------------------|-------------------|-----------------------------|------------------|-------------------|-------------------|-----------------------------|------------------|-------------------|-----------------------------|------------------|-------------|
|  |            | Ref Costs 2009/10 | Ref Costs 2009/10 | Potential Income (incl MFF) | Surplus/ Deficit | Ref Costs 2009/10 | Ref Costs 2009/10 | Potential Income (incl MFF) | Surplus/ Deficit | Ref Costs 2009/10 | Potential Income (incl MFF) | Surplus/ Deficit |             |
|  |            | Activity          | Cost              |                             |                  | Activity          | Cost              |                             |                  | Cost              |                             |                  |             |
| UNITED LINCOLNSHIRE HOSPITALS NHS TRUST                        | 4          | 2,303             | £1.3m             | £1.3m                       | -£0.0m           | 25,158            | £3.1m             | £3.1m                       | -£0.1m           | £4.4m             | £4.3m                       | -£0.1m           | -2%         |
| DERBY HOSPITALS NHS FOUNDATION TRUST                           | 4          | 1,845             | £2.0m             | £1.1m                       | -£0.9m           | 24,955            | £2.5m             | £3.1m                       | £0.6m            | £4.5m             | £4.1m                       | -£0.4m           | -9%         |
| NORTHAMPTON GENERAL HOSPITAL NHS TRUST                         | 4          | 1,750             | £0.9m             | £1.0m                       | £0.1m            | 24,405            | £3.3m             | £3.0m                       | -£0.3m           | £4.2m             | £3.9m                       | -£0.2m           | -6%         |
| SOUTHEND UNIVERSITY HOSPITAL NHS FOUNDATION TRUST              | 4          | 3,108             | £0.7m             | £1.9m                       | £1.2m            | 24,336            | £2.8m             | £2.8m                       | £0.0m            | £3.5m             | £4.8m                       | £1.3m            | 36%         |
| BARTS AND THE LONDON NHS TRUST                                 | 4          | 2,122             | £1.6m             | £1.4m                       | -£0.2m           | 23,789            | £5.3m             | £3.4m                       | -£2.0m           | £7.0m             | £4.8m                       | -£2.1m           | -31%        |
| ROYAL DEVON AND EXETER NHS FOUNDATION TRUST                    | 4          | 1,838             | £1.5m             | £0.9m                       | -£0.5m           | 22,359            | £3.1m             | £2.8m                       | -£0.3m           | £4.5m             | £3.7m                       | -£0.8m           | -18%        |
| UNIVERSITY COLLEGE LONDON HOSPITALS NHS FOUNDATION TRUST       | 4          | 3,721             | £3.6m             | £3.1m                       | -£0.5m           | 20,643            | £5.6m             | £3.4m                       | -£2.2m           | £9.2m             | £6.6m                       | -£2.6m           | -29%        |
| BARKING, HAVERING AND REDBRIDGE UNIVERSITY HOSPITALS NHS TRUST | 4          | 1,257             | £1.9m             | £0.7m                       | -£1.2m           | 19,656            | £3.0m             | £2.8m                       | -£0.2m           | £4.9m             | £3.5m                       | -£1.4m           | -29%        |
| ROYAL BERKSHIRE NHS FOUNDATION TRUST                           | 4          | 1,635             | £0.6m             | £0.8m                       | £0.2m            | 19,639            | £2.9m             | £2.6m                       | -£0.3m           | £3.5m             | £3.4m                       | -£0.1m           | -4%         |
| PLYMOUTH HOSPITALS NHS TRUST                                   | 4          | 1,590             | £1.2m             | £0.8m                       | -£0.4m           | 17,568            | £2.4m             | £2.1m                       | -£0.3m           | £3.6m             | £2.9m                       | -£0.7m           | -20%        |
| <b>Total, Peer Group 4</b>                                     |            | <b>21,169</b>     | <b>£15.2m</b>     | <b>£13.0m</b>               | <b>-£2.2m</b>    | <b>222,508</b>    | <b>£34.1m</b>     | <b>£29.0m</b>               | <b>-£5.1m</b>    | <b>£49.3m</b>     | <b>£42.0m</b>               | <b>-£7.3m</b>    | <b>-15%</b> |
| ROYAL UNITED HOSPITAL BATH NHS TRUST                           | 5          | 1,491             | £0.8m             | £0.8m                       | £0.0m            | 16,585            | £2.3m             | £2.0m                       | -£0.3m           | £3.1m             | £2.8m                       | -£0.3m           | -10%        |
| ROYAL CORNWALL HOSPITALS NHS TRUST                             | 5          | 1,779             | £0.5m             | £1.0m                       | £0.5m            | 16,582            | £1.2m             | £1.9m                       | £0.7m            | £1.8m             | £2.9m                       | £1.2m            | 67%         |
| IPSWICH HOSPITAL NHS TRUST                                     | 5          | 1,132             | £0.3m             | £0.7m                       | £0.4m            | 14,552            | £2.3m             | £2.3m                       | £0.0m            | £2.5m             | £3.0m                       | £0.5m            | 18%         |
| SHREWSBURY AND TELFORD HOSPITAL NHS TRUST                      | 5          | 1,277             | £1.8m             | £0.6m                       | -£1.2m           | 14,521            | £0.7m             | £2.6m                       | £1.9m            | £2.5m             | £3.2m                       | £0.8m            | 31%         |
| NORTH CUMBRIA UNIVERSITY HOSPITALS NHS TRUST                   | 5          | 1,401             | £0.4m             | £0.6m                       | £0.2m            | 10,288            | £1.8m             | £1.3m                       | -£0.6m           | £2.2m             | £1.9m                       | -£0.3m           | -16%        |
| SOUTH DEVON HEALTHCARE NHS FOUNDATION TRUST                    | 5          | 650               | £0.4m             | £0.4m                       | £0.0m            | 10,075            | £2.3m             | £1.8m                       | -£0.6m           | £2.7m             | £2.1m                       | -£0.6m           | -21%        |
| TAUNTON AND SOMERSET NHS FOUNDATION TRUST                      | 5          | 1,021             | £0.6m             | £0.4m                       | -£0.1m           | 9,764             | £2.9m             | £1.2m                       | -£1.7m           | £3.5m             | £1.6m                       | -£1.8m           | -53%        |
| ROYAL FREE HAMPSTEAD NHS TRUST                                 | 5          | 845               | £1.0m             | £0.6m                       | -£0.4m           | 9,253             | £1.6m             | £1.3m                       | -£0.3m           | £2.6m             | £1.9m                       | -£0.7m           | -28%        |
| IMPERIAL COLLEGE HEALTHCARE NHS TRUST                          | 5          | 0                 | £0.0m             | £0.0m                       | £0.0m            | 2,926             | £7.6m             | £0.8m                       | -£6.9m           | £7.6m             | £0.8m                       | -£6.9m           | -90%        |
| PETERBOROUGH AND STAMFORD HOSPITALS NHS FOUNDATION TRUST       | 5          | 135               | £0.0m             | £0.0m                       | £0.0m            | 789               | £0.2m             | £0.1m                       | -£0.1m           | £0.2m             | £0.1m                       | -£0.1m           | -45%        |
| <b>Total, Peer Group 5</b>                                     |            | <b>9,731</b>      | <b>£5.7m</b>      | <b>£5.2m</b>                | <b>-£0.6m</b>    | <b>105,335</b>    | <b>£23.0m</b>     | <b>£15.2m</b>               | <b>-£7.8m</b>    | <b>£28.7m</b>     | <b>£20.4m</b>               | <b>-£8.4m</b>    | <b>-29%</b> |
| <b>TOTAL</b>   |            | <b>140,307</b>    | <b>£81.6m</b>     | <b>£81.4m</b>               | <b>-£0.2m</b>    | <b>1,656,612</b>  | <b>£216.2m</b>    | <b>£216.4m</b>              | <b>£0.2m</b>     | <b>£297.7m</b>    | <b>£297.7m</b>              | <b>-£0.0m</b>    | <b>-0%</b>  |

### Summary of findings of July 2010 report

#### Counting and Recording Activity

The introduction of RTDS has greatly improved both the data and management's understanding of data quality issues. Extracting volumes of fractions delivered appears to be relatively straightforward from computerised radiotherapy systems.

Recording planning events was more problematic for the following reasons:

- There is no simple definition of the term in the NHS Data Dictionary
- Connecting for Health and Reference Costs guidance on coding and RTDS guidance on coding are inconsistent
- Trusts need to extract the data from their own recording systems in such a way that records (or calculates) one event per treatment course

Most Trusts had developed a methodology for extracting this data or via proxy measures. However, by calculating the ratio of treatment fractions to planning events against peer group and national averages (see graphs included in **Appendix 4**), a significant number of Trusts remain as outliers, suggesting problems in this area. There are, therefore, several difficulties that Trusts need to overcome when counting planning events for Reference Costs:

#### Allocating Costs to Radiotherapy

Many Trusts reported well-developed costing processes in place, however, this was not always evidenced by the results of the benchmarking of reference costs. There were also a number of Trusts whose processes were rudimentary. The variation in the quality and robustness of costing appeared to be largely dependent on the level of resources that Trusts put into costing.

There is evidently a risk that fundamental errors in costing methodology will occur if the principles of the NHS Costing Manual are not followed carefully and if the issues raised in the July report are not dealt with appropriately by Trusts. In addition, important details, such as the split of costs between planning and treatment, can be materially distorted if costing methodology is incorrectly applied.

Additional costing guidance for Trusts is attached at **Appendix 10**.

#### Cost Variations

The expensive equipment used to deliver a radiotherapy service has the potential to significantly vary costs between individual Trusts, as well as between financial years. The combination of the factors set out in this section will be one of the major determinants of a Trust's average radiotherapy unit costs. Important factors that affect Trust costs are summarised at **Appendix 11**.

These factors mean that radiotherapy Reference Costs will suffer from a relatively high degree of volatility compared to other hospital services. This should be borne in mind when benchmarking radiotherapy costs and drawing conclusions from costing data. This degree of variation in cost also has significant implications for the development of a national tariff for radiotherapy.

### Recommendations for Radiotherapy Services

#### Trusts should count activity accurately

A more sophisticated level of commissioning (i.e. where Trusts are moving away from block contracts) will need to be supported by a greater degree of accuracy and detail in recording activity. Payment will be based on validated activity data recorded in accordance with the national standards and if systems are not in place to deliver the RTDS, Trusts may lose income.

The pace of technological development will also reinforce the need for a good understanding of current and future work. Planning for developments and capacity will need to be based on accurate activity data and projections, especially if the Trust needs to make a case for further funding.

If Commissioner and Trusts are to have a productive and successful dialogue about future planning of radiotherapy services, both parties need to have confidence in the activity data recorded.

#### Trusts should have a robust costing process

Trusts need to ensure that adequate resources are deployed to provide reliable costing information for radiotherapy services. To achieve this, different parts of the organisation (radiotherapy management, management accounts, costing leads, informatics) need to work effectively together.

Trusts will need to ensure that the financial contribution made by radiotherapy is understood (i.e. how the costs compare to the income currently received in SLAs). This is often achieved through the introduction of Service Line Reporting/ Patient Level Costing.

Processes should also include ensuring the reference costs submissions are reconciled to these costs, to support the compilation of any national tariff which is likely to be based on a national average of reference costs.

#### Trusts should understand key cost drivers

Trusts will need to ensure they understand the key components of their costs and the factors that drive their costs. In many cases, the predominant factor will be the capital investment underlying the service. However, other important factors, such as skill mix employed, will also need to be analysed.

Trusts need to understand how their costs may vary both from year to year and compared to other Trusts within its peer group. This will enable them to benchmark the costs of their services, then identify and maximise potential efficiencies. If they work to reduce variations caused by counting and costing issues, this will expose the real issues driving their cost base.

As funding is stretched, Commissioners will be looking for further efficiencies and cost improvements to be delivered. Benchmarking also provides a tool to identify where the cost structure can be altered so as to deliver the service in a more cost efficient way.

### Commissioning arrangements must be fit for purpose

There are a variety of arrangements in place for the commissioning of radiotherapy across Trusts. Some areas have progressed to sophisticated cost and volume contracts, defined by HRG and reimbursed at a locally-agreed tariff. Others remain on fixed block contracts which are historically determined and rolled forward each year with nothing more than a standard inflationary uplift.

Moving to a national tariff system means that commissioning will need to move uniformly on to cost and volume contracts. Arrangements under block contract should be urgently reviewed, perhaps using shadow contracts at locally agreed prices to understand the potential impact of a tariff system.

While this will provide Trusts with opportunities in terms of attracting additional funding if activity or casemix increases, the onus will be on them to record activities consistently and accurately. They will also need to understand their own costs and whether the tariff covers them sufficiently at differing levels of activity.

Trusts will also need to bear in mind likely future settlements for health budgets. Despite rising activity and technological developments, commissioners will not have unlimited funding. Trusts and Commissioners will both be exposed to risk and will need to work collaboratively to address the future needs of the radiotherapy service.

### Feedback from the project should be shared with the PbR Team

There is an opportunity to share feedback from this exercise to inform the setting of any future tariff. This could include a summary of the particular issues affecting radiotherapy services and recommendations, such as the following:

| Issue                                   | Recommendation   |
|---|--|
| Cost variations between trusts          | Trusts to manage within tariff.  |
| Volatility of costs – capital costs     | The volatile nature of costs of RT services could be mitigated by allowing local top-up payments, for example to allow Trusts to invest in new technology by supporting revenue costs of significant capital investment. |
| Speed of growth in technology           | As above   |
| Speed of introduction of new treatments | New treatments and regimes could be covered by specific exclusions to the tariff and covered by a locally agreed price until the tariff “catches up” and they become more widespread.                                    |
| Complexities (e.g. Paeds)               | Tariffs for complex treatment if material, such as for children, could be addressed by an adjustment to the existing HRGs, for example by splitting according to age or co-morbidities                                   |
| Incentivising quality                   | “Best Practice” tariff could be introduced.  |

### Next steps

#### To continue to improve coding and recording of activity

Trusts will continue to improve their performance in delivering the RTDS, with the target for data quality and completeness being introduced by the end of the year.

Further guidance is needed to address the lack of clarity re counting, and inconsistencies.

- Draft further guidance where need was identified in meetings e.g., re planning events.
- Identify where guidance is inconsistent
- Set out the issues, make further recommendations to Connecting for Health and continue to pursue

#### To ensure all Trusts have a robust costing methodology and that the variance in reference costs is reduced

Extreme outliers on the analysis of 2009/10 reference costs were mainly due to anomalies in costing and counting.

- The graphs at **Appendix 4** indicate those Trusts which are outliers and where a review of methodology would be advisable.
- The trend of narrowing the gap between upper and lower quartiles should continue by employing all means available to disseminate good costing practice and benchmarking data. Additional costing guidance for Trusts is attached at **Appendix 10**.

#### Provide feedback from meetings to attendees

- Send out 2009/10 Reference Cost comparison spreadsheet to all attendees
- Consider putting this report onto a Reference Costs Forum for information.
- Send out attendees lists (geographically and in peer groups) to promote networking.
- Feedback sessions to be arranged placing Trusts into peer groups and facilitating discussion of the issues arising from the report

#### Provide feedback to PbR team

Key issues, along with recommendations should continue to be sent to the PbR team. This would detail how any tariff structure could be adapted so that the issues raised in the report do not adversely affect provision of the service.

To provide additional feedback, a small group of pilot sites, selected from across all peer groups, could be formed to “road test” an indicative tariff. This would be based on national average reference costs and should model its effect over 10 years, the capital life cycle of a Linac.

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## **1. INTRODUCTION**

The purpose of the paper is to provide guidance on allocating costs to the unbundled radiotherapy cost pool and, within that pool, to individual delivery and planning activities / HRGs.

It is based on a paper produced by Susan Gibbin, with the assistance of the Radiotherapy finance leads, in April 2009. It has been revised in the light of discussions with all Radiotherapy providers during the course of May and June 2010.

## **2. CONTEXT**

It is recognised nationally that the quality of radiotherapy data collection and associated reference costing may not be robust enough to develop a national tariff at this stage. Therefore supplementary advice has been provided to assist organisations in improving their costing processes. A key part of this was a costing template developed by the National Cancer Action Team, which many Trusts have already started to use during the course of 2007/08 and 2008/09.

Following our discussions with radiotherapy providers, a number of key themes emerged where providers indicated that extra guidance may be helpful. This paper provides assistance to trusts seeking to complete the template but is also intended to provide general guidance to all trusts when costing radiotherapy services.

## **3. THE TEMPLATE**

The radiotherapy template is optional. However, Trusts are asked to complete the “cost summary” worksheet, which summarises the total cost pool for radiotherapy across various categories. This will allow trusts’ costs to be benchmarked and the results will be shared with trusts.

The remaining worksheets are designed to capture activities based on each organisation’s local descriptions as defined within their radiotherapy department. Capturing activity and costs at this granular level provides sufficient flexibility to allow costs to be mapped to both the existing and any future OPCS / HRG data definitions. Alternatively, Trusts may have their own systems and spreadsheets for capturing this detail.

It is assumed that organisations will follow national costing guidance in calculating the radiotherapy cost pool. This guidance should therefore be used in conjunction with the following national standards:

- Reference Cost Guidance for 2009/10 collection:  
[http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH\\_112590](http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_112590)
- NHS Costing Manual 2009/10 edition:  
[http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH\\_112597](http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_112597)
- Acute Health Clinical Costing Standards 2009/10:  
[http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH\\_095359](http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_095359)



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#### **4. RECORDING AND COUNTING ACTIVITY**

Activity is likely to be held on radiotherapy systems rather than on PAS. Therefore it is unlikely to be in a suitable format for running through the HRG grouper software and OPCS codes will have to be assigned manually to local descriptions of activity. From these codes, HRGs can be derived.

Useful guidance on what type of activities map to each HRG can be found at: <http://www.ic.nhs.uk/webfiles/Services/casemix/Prep%20HRG4/Radiotherapy%20HRG%20Definitions.pdf>

This should be read in conjunction with the relevant HRG grouping documentation for the year in question. The 2009/10 files are at: <http://www.ic.nhs.uk/services/the-casemix-service/using-this-service/reference/downloads/costing/hrg4-2009-10-reference-costs-grouper-documentation>

Some additional guidance documents have been provided for OPCS coding on the Radiotherapy Data Set (RTDS) web site at: <http://www.canceruk.net/rtservices/rtds>

In respect of Planning HRGs, it is important to remember that Reference Costs guidance allows only one planning event to be recorded per course of treatment. Therefore, if multiple planning attendances relating to the same course of treatment are being recorded, only the first attendance should be counted and any subsequent attendances should be excluded. An alternative approach, used by several Trusts, is simply to count courses of treatment and use this as a proxy for planning events.

The RTDS guidance mentioned above allows for planning events to be recorded for every prescription rather than one per course of treatment. It is therefore imperative that organisations are clear how they are recording this activity and can reconcile between the different conventions.

Treatment HRGs are measured in fractions and this should be more straightforward to collect from radiotherapy systems. However, it is important to remember to exclude the following types of activity which may be present in the data:

- Multiple fractions in a single visit – the HRG design means these should be recorded as a single fraction except in exceptional circumstances such as hyper-fractionated radiotherapy
- Non-NHS treatment (e.g. private patients)
- Non-treatment exposures (e.g. planning activity which should be included as part of the planning event for that course of treatment, equipment quality assurance, etc)

#### **5. ALLOCATION TO THE COST POOL**

A key objective is to ensure that only appropriate costs end up in the unbundled radiotherapy cost pool. As noted above, the expectation is that organisations follow national guidance and costing standards in determining which costs should be allocated and apportioned to radiotherapy.

However, to minimise any confusion and ambiguity guidance has been developed in line with the NCAT template. This guidance provides more detail than that available nationally to improve, where possible, consistency of approach. The table below offers advice on a number of areas, based on the issues Trusts highlighted during the course of our discussions.

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| Area  | Comment   |
|---|---|
| <p><b>Medical Staffing (Consultants and Junior Doctors)</b></p> | <p>Clinical Oncology medical staff often provide services to Radiotherapy as well as other departments, so costs need to be separated initially to take account of the time they spend on Radiotherapy specifically.</p> <p>This needs to be done on the basis of their agreed job plans, if available. This information can be supplemented with further knowledge about how their time is organised.</p> <p>In the case of junior medical staff, the allocation of their time will often be on the basis of best estimate. However, the net cost of their time, after netting off central funding for training and education, is unlikely to be significant.</p> <p>Some of their Radiotherapy time will be associated with planning and delivery, and some with radiotherapy care delivered in other settings, e.g. outpatient clinics. Therefore their radiotherapy time needs to be further sub-divided into that spent on planning, treatment and other activities not part of the unbundled radiotherapy cost pool.</p> <p>Activities to be <u>excluded</u> from the radiotherapy cost pool:</p> <ul style="list-style-type: none"> <li>▪ Ward rounds (cost should be allocated to the core HRG for the patient spell)</li> <li>▪ Outpatient consultation clinics (cost should be allocated to Clinical Oncology outpatients)</li> <li>▪ Radiotherapy Treatment Review / Floor Clinics (outpatient activity as above)</li> <li>▪ Multi-Disciplinary Team Meetings (reported separately for reference cost purposes)</li> </ul> <p>The costs of R&amp;D, postgraduate education and nationally funded Clinical Excellence awards should not be allocated to patient care. This can be achieved by both identifying the time and excluding it or, more crudely, by netting off the income received for such activities from the total cost pool.</p> <p>Time spent on non-clinical duties (e.g. SPAs) needs to be allocated across clinical time as an indirect cost on an appropriate basis (usually evenly across clinical PAs unless another basis is specifically preferred).</p> <p>The activities remaining in the radiotherapy cost pool should only include those that contribute directly to the planning and delivery of radiotherapy. It is expected that the majority of medical time will be spent in planning rather than treatment.</p> <p>It is advisable to maintain a clear distinction between external beam radiotherapy and brachytherapy, as these treatments tend to be organised quite differently. Furthermore, the NCAT template only analyses the cost of external beam radiotherapy. Brachytherapy will be the subject of a separate review in the future.</p> |

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| Area   | Comment   |
|--|---|
| <b>Radiographers</b>   | <p>The job plan templates can be modified for local use to identify the time spent by Therapeutic Radiographers in their key activities. As an alternative, local job planning systems or spreadsheets can be used.</p> <p>Once complete, this time allocation can be used to allocate their costs to those activities, some of which will be planning and treatment. Again, it is advisable to separate out, where possible, brachytherapy from external beam.</p> <p>The activity templates ask trusts to identify the time spent by groups of staff spent either directly planning the treatments, or in direct contact with patients having radiotherapy delivered. Time spent by staff supporting but not directly undertaking planning or delivery (e.g. supervisory staff) should also be allocated to those activities as an indirect cost on an appropriate basis.</p> |
| <b>Medical/Radiation Physics, Equipment Maintenance, etc</b> | <p>Organisations have different arrangements for testing and maintaining their equipment. Some trusts use in house Physics staff, where the costs and job plans should be relatively easy to identify. Ideally their time spent on their activities should be identified using a similar method to Radiographers wherever possible so as to maintain consistency.</p> <p>This area may be more difficult where these services are procured from an external body (another trust or a PFI/MES contractor) and reasonable estimates will have to be made in such cases.</p>   |
| <b>Nursing Staff</b>   | <p>With the exception of specialist nursing staff involved in a limited range of radiotherapy treatments (e.g. brachytherapy), it is unlikely that nursing costs will be a significant part of the radiotherapy cost pool.</p> <p>As with medical staff time, the following are to be <u>excluded</u> from unbundled radiotherapy cost pool:</p> <ul style="list-style-type: none"> <li>▪ Ward nursing (cost should be allocated to the core HRG for the patient spell)</li> <li>▪ Input into outpatient clinics (cost should be allocated to Clinical Oncology outpatients)</li> <li>▪ Radiotherapy Treatment Review / Floor Clinics (outpatient activity as above)</li> </ul>   |
| <b>Other Supporting Staff</b>                                | <p>There will be a range of other staff, e.g. administrative staff on reception, that will support planning and treatment although not directly involved.</p>   |

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| Area                                  | Comment  |
|---------------------------------------|--|
|                                       | <p>These indirect costs need to be allocated to planning and treatment on an appropriate basis, e.g. reception staff on the basis of patient attendances.</p>  |
| <b>Diagnostic Imaging</b>             | <p>Diagnostic Imaging (e.g. MRI, CT, etc) provided as part of the diagnosis and staging of cancer should not be included in the radiotherapy cost pool. These costs form part of the unbundled cost pool for diagnostic imaging.</p> <p>Only scans performed as part of the radiotherapy planning and treatment process (i.e. after the decision to treat with radiotherapy has been made) should be included within the pool. It is likely that this activity will be performed within the radiotherapy department rather than the imaging department.</p>  |
| <b>Fixed Assets</b>                   | <p>The depreciation and capital charges associated with the equipment used to deliver radiotherapy are likely to form a significant part of the cost pool. It is therefore imperative that the revenue costs relating to fixed assets are calculated with the utmost care. This implies having an accurate and up-to-date asset register wherever possible, covering both the equipment and the buildings used in radiotherapy.</p> <p>Particular attention should be paid to the following:</p> <ul style="list-style-type: none"> <li>▪ Source of funding for assets needs to be recorded and documented – donated or government granted (e.g. NOF) assets attract no capital charges and depreciation is offset by a transfer from reserves</li> <li>▪ Age profile of equipment and remaining life of assets under the organisation’s accounting policies – this will have a significant impact on the calculation of depreciation and capital charges</li> <li>▪ Recognising in full the correct accounting treatment of leased assets being brought on balance sheet, whether under conventional finance leases or longer-term PFI/MES arrangements</li> <li>▪ Being aware of which activities individual assets are used for so that costs can be allocated accurately between the various planning and treatment HRGs, e.g. Linacs will be predominantly used in treatment and as such their cost should not be spread evenly across all activities</li> <li>▪ Buildings – depreciation and capital charges based on a known book value wherever possible, rather than, for example, a total for a building apportioned by floor area.</li> </ul> |
| <b>Provider to Provider recharges</b> | <p>Where providers supply radiotherapy services on behalf of other providers (e.g. planning services provided by a larger trust), care needs to be taken that the activity and associated costs are counted against only one organisation.</p>   |

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| Area                                    | Comment  |
|---|--|
|   | <p>The NHS Costing Manual suggests the following default treatment:</p> <ul style="list-style-type: none"> <li>▪ “The receiving NHS organisation should record both the costs and activity. Such costs should be added to the cost of the Finished Consultant Episode/Spell/attendance/client if necessary;</li> <li>▪ “The providing NHS organisation should match the income and expenditure as with support services, but any resultant activity (FCEs/Spells/attendances etc) should be excluded and reconciled through the appropriate statement detailed in Chapter 11. Thus, the matching principle of activity and cost is maintained as the costs are offset by the income and the activity is not double counted across the NHS as a whole.”</li> </ul>  |
| <p><b>Contributions from Income</b></p> | <p>Significant sources of income, predominantly from private patient activity, were indicated by some trusts.</p> <p>Such income needs to be netted off the cost pool, preferably by excluding private patient activity together with the associated cost. If this is not possible, total income for radiotherapy should be netted off the total cost pool.</p> <p>Similar principles should apply to contributions from other income sources, such as research and teaching income, although these are expected to be relatively immaterial.</p>  |
| <p><b>Corporate Overheads</b></p>       | <p>In addition to the direct and indirect costs described above, there will be a range of organisation-wide overhead costs to be apportioned to radiotherapy. These apportionments will normally be calculated across the whole trust by trusts’ costing systems.</p> <p>Suggested bases of apportionment can be found in the NHS Costing Manual (Appendix 2) and Acute Health Clinical Costing Standards.</p> <p>The issue of utilities (energy, water, etc) may warrant some additional attention, as radiotherapy is thought to be a disproportionate user of these services and a standard apportionment across the trust (usually floor area or building volume) may understate the true cost. Experts in facilities, estates, etc. may be able to suggest a suitable weighting if this issue is thought to be material.</p> <p>Once a share of overheads has been apportioned to the radiotherapy cost pool, wherever possible, a reasonable method should be used to allocate these between the various activities/HRGs relating to planning and treatment. This may be a continuation of the apportionment basis used by the costing system or an alternative method may be required. For example, the main driver of the individual HRGs is time and this may be the most appropriate basis upon which to allocate the overheads across activities.</p> |

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## **6. SUMMARY**

The radiotherapy cost pool needs to be built up carefully using the approach described above. In particular, costs relating to inpatient and outpatient care need to be identified and excluded.

Allocating the cost pool further between individual activities and/or HRGs requires a great deal of local knowledge and close co-operation between radiotherapy service managers, business accountants for the service and Reference Costs leads.

However, Trusts should always be aware of the materiality of the issues they are attempting to resolve – e.g. junior doctor time was identified by many trusts as a problematic issue yet allocating their net cost (after netting off income for training and education) on different bases is unlikely to affect the cost pool significantly.

An effective “sense check” that an organisation can apply to verify its cost pool and the associated activity is to benchmark itself with other similar organisations. The template summary worksheet is designed to facilitate this by analysing the cost pool over key staff groups, non pay, capital, etc. Collating this data nationally and feeding back the results to trusts should provide a vital aid to improving the quality of radiotherapy costing.

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July 2010

Thanks to the authors of the original paper:

- Susan Gibbin, Project Lead
- Jeremy Brinley-Codd (G&St T)
- Carolyn Crossland (Christie)
- John Andrews (Clatterbridge)
- Cynthia Cardozo (Royal Marsden)

**Factors driving costs variations**

| Cost                                  | Note   | Increases costs   | Decreases costs   |
|---------------------------------------|--|---|---|
| <b>Capital funding</b>                |  |   |   |
| Availability of capital funding       | Particularly for smaller units, where cost of 1 linac may be more than annual capital budget.  | PFI/MES/leasing - may be more expensive to run in the short term but may mean less “down time” and protection from future price increases | Raise funds through charitable donations, run machines beyond expected life |
| Donated vs. funded                    | Significant numbers of linacs were funded from NOF monies and other donations. These are now being replaced with Trusts bearing the costs.                 | Replacing donated linacs by purchasing or leasing new machines  | Purchasing linacs from newly donated funds                                  |
| <b>Capital profile</b>                |  |   |   |
| No of Linacs                          | Fractions delivered per linac - some Trusts keep a standby machine for service efficiency or where linacs not used full time due to, say, staff shortages  | Cost per fraction higher where assets are not fully utilised  | Trusts “sweat” the assets.  |
| Age of Linacs                         | Using older linacs for longer or replacing them  | Higher prices and costs of new technology mean the cost of capital is higher.   | Where fully depreciated, usually >10 yrs, there is no cost of capital.      |
| Replacement profile                   | A phased programme of replacement will even out stepped increases in capital costs   | Replacing more than one machine in a year   | Phasing replacements over a number of years                                 |
| <b>Staffing</b>                       |  |   |   |
| Skill mix                             | Different staffing models for services. Varies due to clinical judgement on service delivery as well as from necessity, e.g. availability of staff locally | Higher skill mix levels – e.g. Physics staff calculate dosage   | Lower skill mix – e.g. use dosimetrists                                     |
| Numbers and rotas                     | Establishment used for service delivery plus how rotas are used, e.g. structured to minimise overtime  | Higher staff numbers, use of overtime – but may mean extra income   | Lower staff numbers, overtime   |
| Availability of Junior docs/ students | Teaching hospitals will have access to student staff to carry out some roles – but increased training hours.   | Additional costs of training students   | Students used for delivering services                                       |
| <b>Service delivery</b>               |  |   |   |
| Complexity of activity                | Complexity of work – may be outside HRG bands  | More time required per patient  | More time required per patient  |
| New technology                        | Required to deliver new techniques/treatments  | Updating assets   | Better health outcomes  |
| Model of service delivery             | Use SLAs with other Trusts<br>How planning is delivered e.g. CTs etc   | Decisions on how service is delivered may bring prices above or below the average.  |   |
| No. of sites, Double-running costs    | Where service is delivered over more than one site   | Losing economies by duplication across > one site   | Single site, sharing staff across one site.                                 |