University Hospitals Bristol NHS
NHS Foundation Trust

Annual Report

Radiotherapy Services

April 2011 – March 2012

Respecting everyone
Embracing change
Recognising success
Working together
Our hospitals.

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Review Date

Annual Report Review Date: 07.09.2012

Versions

Version	Date	Reason	Sign Off
1	07.09.2012	Final version agreed at the Radiotherapy Oncology Group	√

1 Annual Report Agreement

This Annual Report has been agreed by

Position	Radiotherapy Services Lead Doctor
Name	Dr Mathew Beasley
Organisation	University Hospitals Bristol NHS Foundation Trust
Signature	
Date Agreed	07/09/2012

Position	Chair of the Network Radiotherapy Group
Name	Dr Steve Falk
Organisation	University Hospitals Bristol NHS Foundation Trust
Signature	
Date Agreed	07/09/2012

Position	Radiotherapy Services Manager
Name	Kate Love
Organisation	University Hospitals Bristol NHS Foundation Trust
Signature	
Date Agreed	07/09/2012

2 Contents

3 Introduction

This Report relates to the operational period April 2011 – March 2012.

This is the third year for assessment of Radiotherapy Services using the revised Manual of Cancer Service measures.

Key Achievements

- Full business case for two new bunkers approved by the Trust Board
- Achieved the locally contracted numbers for inverse planned IMRT treatments
- Continued commitment to recruiting patients to clinical trials, with 35% of patients being recruited into clinical trials
- Commenced treatments for lung cancer patients with Active Breathing Control (ABC)
- Implementation plan for radiographer-led on-treatment review completed

Key Challenges

- Working towards implementation of VMAT.
- Increase the level of IGRT.
- Absence of Head of Radiotherapy Physics on long term sick leave.
- Review the implementation plan for radiographer-led on-treatment reviews.
- Need to work extended hours until 8pm with appropriate staffing cover to provide seamless extended service.
- To meet the criteria on the radiotherapy quality dashboard.

The Radiotherapy Annual Report was reviewed and approved at the Radiotherapy Oncology Group on the 7th September 2012 for which the minutes of the meeting are detailed in appendix 9.

4 Quality Management System

4.1 Documentation of Assessment

In accordance with requirements the Radiotherapy Services have in place a quality management system which was last reviewed in February 2012 for which the certification of assessment can be found below:

Certificate of Registration

QUALITY MANAGEMENT SYSTEM - ISO 9001:2008

This is to certify that:

Radiotherapy & Physics Department
Bristol Haematology & Oncology Centre
United Bristol Healthcare NHS Trust
Horfield Road
Bristol
BS2 8ED
United Kingdom

Holds Certificate No: **FS 37601**
and operates a Quality Management System which complies with the requirements of ISO 9001:2008 for the following scope:

The provision of a radiotherapy service including treatment prescription and planning, delivery and monitoring of care during treatment, dosimetry, computing support, radiation protection and commissioning.

For and on behalf of BSI:

Managing Director, BSI EMEA

Originally registered: **19/08/1997** Latest Issue: **05/03/2010** Expiry Date: **12/04/2013**

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4.2 Assessment Report

An external audit by BSI was carried out on 20th February 2012. The following areas were audited; Quality Management System, Stereotactic pathway and IMRT pathway.

The areas audited were generally found to be effective. There were no outstanding non-conformities to review from previous assessments and no new non-conformities were identified. It was noted that no internal audits had been completed for Radiotherapy.

4.3 Training in the Quality Management System

Training in the Quality Management System has been made available to staff members for which documentation can be found within the training records.

5 Radiotherapy Activity

5.1 Radiotherapy Activity

During April 2011 – March 2012 a total of 2785 new courses of external beam radiotherapy were administered. In the same time period a total of 41,115 fractions of radiotherapy were delivered.

5.2 HDR Brachytherapy Workload 11-3T-402

The following brachytherapy treatments have been delivered between April 2011- March 2012:

Total Number of Patients-

Prostate	28
Gynaecological – Total	155
Of which	
Ca Cervix	50
Ca womb	98
Other (vagina, ovary)	7

Number of Insertions / Implants

Prostate implants	28
Intrauterine insertions	123
Intravaginal insertions	307

Insertions by Clinicians:

Prostate implants		**Intrauterine**		**Intravaginal**	
Amit Bahl	28	Hoda Booz	47	Hoda Booz	10
		Paul Cornes	76	Paul Cornes	33
				Pauline Humphrey (Radiographer)	264

A total of 458 fractions were delivered (28 fractions to prostate patients and 430 for gynaecological patients)

5.3 ARSAC Certification 11-3T-414

CERTIFICATE

FOR THE

ADMINISTRATION OF RADIOACTIVE MEDICINAL PRODUCTS

Certificate Reference Number RPC 025-3467 (23604)

It is hereby certified for the purposes of the Medicines (Administration of Radioactive Substances) Regulations 1978, amended by the Medicines (Administration of Radioactive Substances) Amendment Regulations 1995, that

Amit Kumar BAHL
Bristol Royal Infirmary
Marlborough Street
Bristol
BS2 8HW

may administer until 30 Sep 2013 the radioactive medicinal products specified in the Schedule to this certificate for the purpose(s) there specified.

for The Secretary of State for Health

.....

Health Protection
Toxicology and Radiation
Department of Health

1-Oct-2008

Amit Kumar BAHL
Bristol Royal Infirmary
Marlborough Street
Bristol
BS2 8HW

Date of
Certificate 1.10.08

Schedule to Therapy Certificate Number RPC 025-3467 (23604)

Serial*	Date of Authorisation	Nuclide	Chemical Form	Treatment or Investigation
0C 2	1.10.08	131I	I	treatment of thyrotoxicosis
0C 4	1.10.08	131I	I	treatment of carcinoma of thyroid
0C 5	1.10.08	32P	PO4---	polycythemia vera and related disorders
0C 7	1.10.08	90Y	colloidal silicate in aqueous solution	treatment of malignant disease
0C 9	1.10.08	89Sr	chloride	bone metastases
0C38	1.10.08	153Sm	EDTMP	bone metastases
0C53	1.10.08	90Y	ibritumomab tiuxetan	non-hodgkin's lymphoma
0T23	1.10.08	137Cs	appliances	malignant disease
0T24	1.10.08	90Sr	appliances/sources	eye diseases
0T25	1.10.08	192Ir	wire/appliances	
0T26	1.10.08	198Au	grains	malignant disease

*As listed in Appendix I of the Notes for Guidance. Unlisted Serial numbers are included for ease of identification by the ARSAC Secretariat.

CERTIFICATE

FOR THE

ADMINISTRATION OF RADIOACTIVE MEDICINAL PRODUCTS

Certificate Reference Number RPC 25 / 3613 / 27545

It is hereby certified for the purposes of the Medicines (Administration of Radioactive Substances) Regulations 1978, amended by the Medicines (Administration of Radioactive Substances) Amendment Regulations 1995, that

Dr Paul CORNES
Bristol Royal Infirmary
Marlborough Street
Bristol
BS2 8HW

may administer until ***17-Jul-2016*** *the radioactive medicinal products specified in the Schedule to this certificate for the purpose(s) there specified.*

For The Secretary of State for Health

Health Protection
Toxicology and Radiation
Department of Health

18-July-2011

Dr Paul CORNES
Bristol Royal Infirmary
Marlborough Street
Bristol
BS2 8HW

Date of Certificate 18-July-2011

Schedule to Therapy Certificate Number RPC 25 / 3613 / 27545

Serial	Nuclide	Chemical Form	Treatment or Investigation	Date of Authorisation
0T25	192Ir	wire/appliances		18/07/2011

End of Certificate Schedule

CERTIFICATE

FOR THE

ADMINISTRATION OF RADIOACTIVE MEDICINAL PRODUCTS

Certificate Reference Number RPC 025-3729 (23000)

It is hereby certified for the purposes of the Medicines (Administration of Radioactive Substances) Regulations 1978, amended by the Medicines (Administration of Radioactive Substances) Amendment Regulations 1995, that

Hoda Mahmoud Kamel AL-BOOZ
Bristol Royal Infirmary
Marlborough Street
Bristol
BS2 8HW

may administer until 25 Feb 2013 the radioactive medicinal products specified in the Schedule to this certificate for the purpose(s) there specified.

for The Secretary of State for Health

.....

Health Protection
Toxicology and Radiation
Department of Health

26-Feb-2008

Hoda Mahmoud Kamel AL-BOOZ
Bristol Royal Infirmary
Marlborough Street
Bristol
BS2 8HW

Date of
Certificate 26.02.08

Schedule to Therapy Certificate Number RPC 025-3729 (23000)

Serial*	Date of Authorisation	Nuclide	Chemical Form	Treatment or Investigation
0T25	26.02.08	192Ir	wire/appliances	

*As listed in Appendix I of the Notes for Guidance. Unlisted Serial numbers are included for ease of identification by the ARSAC Secretariat.

6 Radiotherapy Data Submission

6.1 Radiotherapy Dataset Submission

Monthly submissions have been made since the dataset became mandatory in April 2009. Some resubmissions were undertaken due to toolkit upgrades. All submissions have passed the Quality Assurance checks.

The implementation team worked closely with representatives from NATCANSAT and Elekta to configure MOSAIQ for ease of data download to the RTDS.

7 The Radiotherapy Single Multi – Professional Group

7.1 The Radiation Oncology Group (ROG) 11-3T-103

The Radiation Oncology Group (ROG) is the single group which oversees the delivery of radiotherapy services within BHOC, its membership and terms of reference are outlined in the Radiotherapy Services Operational Policy. There have been 9 ROG meetings held to date during the last 12 months. The dates are as outlined below:

Example of minutes of the meeting can be found in Appendix 1

Date	Venue
15 April 2011	Aves Kilsby Meeting Room, Level 4, BHOC
3 June 2011	Aves Kilsby Meeting Room, Level 4, BHOC
15 July 2011	Aves Kilsby Meeting Room, Level 4, BHOC
8 September 2011	Aves Kilsby Meeting Room, Level 4, BHOC
7 October 2011	Aves Kilsby Meeting Room, Level 4, BHOC
18 November 2011	Aves Kilsby Meeting Room, Level 4, BHOC
12 January 2012	Aves Kilsby Meeting Room, Level 4, BHOC
10 February 2012	Aves Kilsby Meeting Room, Level 4, BHOC
23 March 2012	Aves Kilsby Meeting Room, Level 4, BHOC

7.2 Attendance at the Network Radiotherapy Group 11-3T-105

There is a recognised network site specific group for radiotherapy which is attended by members of the above local operational group. The group met on 3 occasions during the past year:

21 July 2011

18 November 2011

29 March 2012

Members of the group have observed the following attendance:

Core Member	% Attendance
Stephen Falk	100%
Kate Love / deputy	100%
Cathy Hall/ deputy	100%

8 Radiation Protection in Bristol 11-3T-120

8.1 Radiation Protection Assessment

ANNUAL REPORT ON RADIATION PROTECTION IN BRISTOL HAEMATOLOGY AND ONCOLOGY CENTRE – 1st April 2011 – 31st March 2012

The following summary is directed principally to Dr Peter Wilde, Head of the Division of Specialised Services. This summary forms a section of the annual report on the Service Level Agreement (SLA) between the Radiotherapy Physics Unit and Bristol Haematology and Oncology Centre, and the paragraph numbers correspond to the same sections in the SLA.

In addition, all of the Radiation Protection Supervisors in Bristol Oncology Centre receive a copy of this summary.

The period covered is the year 1 April 2011 – 31 March 2012 unless otherwise indicated.

5.1 (a) Local Rules and Contingency Plans in BHOC have been reviewed and revised as appropriate. Ward 61 local rules were revised and reissued in August 2011, and Isotope suite local rules in Jan 2012. The contingency plans were reissued in Jan 2012.

Consultation with RPS's happens formally at the BHOC Radiation Protection Sub-Committee. This met twice during the past year on 17th October 2011 and 19th March 2012.

5.1 (b) The effectiveness of the Local Rules has been monitored in accordance with Regulation 18 (3) of the Ionising Radiations Regulations 1999.

Whole-body doses: -

In the past calendar year (2011), whole-body doses for all doctors, radiographers, nurses, MEMO, physics and other staff working in BHOC have been equal to or less than 0.2 mSv in any quarter. The only staff to receive non-zero doses were radiographers working in radioisotopes.

Finger doses:-

These were satisfactorily low, the maximum dose being received by any person in any one month being 4.8 mSv.

5.1 (c) The consultant physicist with responsibility for Radiation Protection has worked with CODA architects to provide advice in the design of radiation protection for a two-linac bunker extension to BHOC being planned as a UHB Strategic Development project.

5.1 (d) No area surveys of radiation dose-rates have been performed in this period.

5.1 (e) 3 incidents have been reported to the IRMER inspectorate of the CQC in this period, one of which was also reported to the HSE under IRR99 reg 32 (see 5.1 (h). The other two were geographical misses occurring on a single fraction of a fractionated course of radiotherapy in each case.

5.1 (f) There have been no incidents involving contaminated casualties from the general public at this site.

5.1 (g) Radiation protection training has been delivered to staff on Ward 61 by Sue Cowley (RPS for Isotopes, acting RPS for Ward 61 staff).

5.1 (h) The Environment Agency inspected BHOC on 2nd June 2011. One category 3 (potentially minor environmental effect) and two category 4 (no potential environmental effect) non-compliances were noted: i) identification must be requested when deliveries or returns of HASS sources are made, ii) sealed source identification/labelling to be made clearer, and iii) compliance matrices are to be produced linking each permit condition to the related operating procedure.

All non-compliances have been addressed.

It was noted that the plan of the radioactive drainage system requested at the previous visit was still outstanding. The plan has still not been made available from the Estates department.

There has been no visit from the counter-terrorist security advisor during this period, but one is arranged for 11th April 2012.

An inspector from the Health and Safety Executive visited BHOC to investigate the circumstances of an exposure "much greater than intended" as a result of equipment malfunction (IRR99 Regulation 32 (6-8)). This was reported to the HSE January 2012, and was a result of a software problem in the Record and Verify system controlling the linear accelerator. The problem was subsequently found to have affected two patients. In each case the problem had occurred on one fraction only of a fractionated course of radiotherapy, and there was no clinically-significant effect for the patient. Corrective action was taken to reduce the risk of a repeat of the incident. The manufacturer has produced a new software version to fix the problem. Testing has been carried out on this version on our test server, and it is planned to install and test this software on the clinical system on 18 May 2012.

5.1 (i) Help has been given to consultants renewing their ARSAC certificates, or applying for the first time.

5.1 (j) No Safety Action Bulletins have been received with consequences for radiation protection.

5.1 (k) Purchase of unsealed sources for BHOC has been monitored throughout the year.

5.1(l) Temple White Watch of Avon Fire and Rescue service made a familiarisation visit on 17th Jan 2012 to observe where radioactive sources are stored and used in the BHOC building.

5.1(m) All sealed sources have passed leak tests during the year. Funds were secured through a successful Divisional capital bid to dispose of 4 BHOC sealed sources that are no longer in use. The sources were collected and removed on 27 March 2012. The sealed source inventory has been updated.

In summary, I am satisfied that the relevant radiation protection regulations and guidance are operating appropriately in BHOC and that the Centre continues to be a safe environment for staff, patients and the general public.

Helen Appleby
Consultant Physicist with responsibility for Radiation Protection,
BHOC March 2012

8.2 Meeting Minutes Where Assessment discussed

The above report was discussed at the Radiation Oncology Group on 27th July 2012

The minutes of that meeting can be found in Appendix 1

9 Departmental Staffing and Skill Mix Review

9.1 Skill Mix Review 11-3T-122, 123,124,125,126,127,128,129,130

Skill mix reviews for all staff have been undertaken for which the reports are noted below:

9.1.1 Radiotherapy Department Skill Mix Revision November 2011

Radiographer Staffing

(Taken from Report presented to Divisional Finance Committee November 2011)

In the last two months the radiotherapy workforce has had a number of changes due to age related retirements, ill health retirements, secondments translating into substantive appointments in partnership organisations (UWE) as well as routine resignations. Some of these posts have been filled by a bank radiographer (no longer available) and the existing staff have worked paid bank rate shifts to cover paperwork.

All the foreseeable changes are known so the opportunity has been taken to review the total establishment and skill mix of the workforce to identify CRES savings for 2012/13. This is in line with Divisional requirements and the trust wide AHP review.

The table below describes the proposed changes and identifies the CRES savings and vacancies to be appointed to.

Band	Funded Establish-ment	Current Establish-ment	Future Establish-ment	Vacancies	Plan	CRES
8A	2.9	2.9	2.54	0.36	Due to retirement march 2012 and not replacing 0.3	£20,643
7	15.7	13.7	14.7	2.0	Advertise one post and lose one post	£43,276
6	16.35	15	15	1.35	Lose 1.35 posts to cover Band 4 A&C and 0.7 Band 4 Rads	-£2,238
5	9.7	6.8	9.8	2.9	Advertise 3.0 WTE Band 5 posts	
4	3.9	2.6	4.6	-0.7	Covered from band 6 post.	
					TOTAL	**£61,681**

APPENDIX 1 to above mentioned report.

Department radiotherapy staffing The radiotherapy workforce is very closely aligned to radiotherapy activity by national agreement. The contracted activity converts into linac hours needed (e.g. 4 pts per hour, National Radiotherapy Advisory Group 1997) with a guideline of numbers of **CORE staff** per linac hour (1.33, Society of Radiographers).

NRAG Planning assumptions.

- Departments should work towards delivering 4 fractions per hour.
- Machines are operational 239 days of the year due to servicing, QA time, bank holidays.
- Services should plan their services such that capacity is equal to the activity required plus 13%.

Non-core staff are as follows that are in main radiotherapy budget.

Within the radiotherapy budget there are a number of staff employed in additional roles to those that are considered to be used for the CORE service.

Band 8	Band7	Band6	Band5	Band4
1 (brachy)	**2.5** (QA, OTR, 0.5 isotopes)	**1.6** (0.5 Stereo, 0.5 isotopes, 0.6 brachy)	**0.5** (stereo)	**0**

Therefore staff available daily on for treatment is:-

Band 7 14.7 – 2.5 – 23% = 9.4 WTE

Band 6 15 – 1.6 – 23% = 10.3 WTE

Band 5 9.8 – 0.5 – 23% = 7.2 WTE

Band 4 4.6 – 23% = 3.5 WTE

Total staff available for machine rota = 30.4

Placements

6A	22B	22C	22D	6E	22F
3	**3**	**2.3**	**4**	**3**	**2**
CT	**MRI**	**Sim**	**Mould Room**	**Calc Room**	**Planning office**
4	**0.2**	**3**	**1**	**4**	**1**

Including 23% for holidays and sickness, the number of the staff on a daily basis is

12.2 + 13.4 + 9.3 + 4.6 +4 (A & C) +3 (Nurses) + 3.04(managers) = 49.54

Hours of operation of linacs

5 X 8.25 + 4 hours = 45.25 hours

Staff per linac hour = 49.54/45.25 hours

= 1.09

The SOR recommendation is 1.33 staff per linac hour for a core service and therefore the department has not managed to achieve this.

Due to not achieving SOR recommendations and also being lower than the agreed UHBristol figure of 1.16 staff per linac hour there have been particular challenges with the preparation of patients' treatments as it was not possible to run a fully functioning calculation/prep room as envisaged.

Changes to Radiotherapy Skill Mix

Pre-treatment Area

For pre-treatment, there are two acuity simulators to be staffed, one CT scanner and an MRI Scanner. This is where all the preparation for the patients' treatment takes place. Patients will either have their treatment planned in the simulator or with the scanners. Those patients who have scans will also have a verification appointment in the simulators, prior to their treatment starting. During the last financial year the proportion of patients being planned in the simulators has decreased due to the availability of virtual simulation software (AcQsim). All radical patients were previously planned using CT except for breast patients, but now breast patients and palliative patients (except those with bone mets) are also planned using by AcQsim.

Medical Staffing

The numbers of medical staff are based on the number of new patients generated by their site specialties and an appropriate mix between specialties such that each consultant covers at least two site specific groups and allows cross cover. In addition, there will be a mix between clinical and medical oncologists.

In order to quantify the number of clinical oncologists required to deliver the number of fractions required a calculation was done based on average fractions per consultant using the number of consultants in post in July 2010 (10.6 WTE) and the number of fractions treated in 2009/10 (33,899 #s). This gave an average of 3,198 #s per WTE consultant.

The contract for 2011/12 required 41,340#s to be delivered. Based on the average calculated for 2010, that contract required 12.9 WTE clinical oncologists to deliver it. An additional 1.0 WTE consultant clinical oncologist was appointed and commenced in June 2011 bringing the total up to 11.6. Further posts are planned.

The RCR has recently published guidelines with recommended time allocated to radiotherapy planning by tumour site. These guidelines will be used to inform the next round of consultant job planning discussions in 2012/3.

9.1.2 Radiotherapy Physics Unit Staffing Needs Assessment and Skill Mix Review

Staffing Needs according to IPEM Guidelines[1] for current workload: Table 1 - Minimum staffing requirements for a routine Radiotherapy Physics service to Bristol Oncology Centre, April 2011 to March 2012

Unit	Item	WTE Clinical Scientists per unit item x no. of units	WTE Technologists per unit item x no. of units		**Total**
			Clinical physics	Engineering	
Equipment dependent factors					
4	Multi-mode accelerators	3.2	1.6	4	
2	Single-mode accelerators	1.2	0.6	1.6	
1	HDR unit	0.2	0.2	0.2	
1	Dedicated CT scanner	0.2	0.2	0.2	
1	Dedicated MRI scanner	0.2	0.2	0.2	
2	Simulators	0.4	0.4	0.4	
4	TPSs (OMP, Xknife, Brachyvision, AQSim)	0.8	0.8	0.8	
1	IGRT	0.1	0.1	0.1	
1	Stereotactic system	0.1	0.1	0.1	
1	Oncology Management System	0.2	0.2	0.2	
2	CT extension on simulator	0.2	0.2	0.2	
Patient dependent factors					
2790	New courses treated pa by external beam RT	2.2	2.8	0	
1680	New courses treated with 3D conformal planning	1.7	5.0	0	
130	IMRT	0.4	0.7	0	
62	Special techniques (HDR gynae brachytherapy)	0.2	0.3	0	
35	Special techniques (HDR prostate brachytherapy)	0.1	0.2	0	
30	Special techniques (TBI)	0.1	0.2	0	
80	Special techniques (stereotactic)	0.2	0.4	0	
Departmental factors					
	Radiation Protection Adviser	0.1	0	0	
	Established Quality System	0.5	0	0	
Additional Considerations (section 3)					
	IVD (0.15 WTE per linac)	0.9			
	Development of new techniques (VMAT, SBRT)	0.5			
	Clinical trials	0.5			
IPEM minimum staffing levels		**13.9**	**14.1**	**8.0**	**36.0**
Current staffing levels in BHOC		**17.8**	**8.9**	**7.0**	**33.7**
Note that:Clinical Technologists include 1.0 WTE trainee Clinical Scientists include 3.8 WTE Part 2 trainees, 1.0 WTE (HoD) on long-term sick leave Oct 2011 – Mar 2012					

Table 2

	Plans and actions	**Impact on workforce**
Radiotherapy Physics skill mixing	Restructuring Plan forwarded by CH to D and T Division July 2010; approval obtained and restructuring completed September 2011.	Approval obtained and recruitment completed to new structure.
Scientific and technological development in the following key areas of service development: • IGRT; • 4D/gated radiotherapy; • stereotactic radiotherapy; • Radiotherapy treatment planning; • Radiation dosimetry; • Technological and clinical developments in radiotherapy; • High Dose rate brachytherapy; • Oncology Management System; • AcQSim virtual simulation package	Additional training and development requirements for existing staff, at all grades.	Additional workload on all existing RPU staff, particularly on physicists involved in development activities.
IMRT development and treatment planning: NRIG national drive to increase IMRT patient numbers up to 33% radical attendances by 2012.	PCT agreed additional funding to support IMRT for Head and Neck and selected prostate patients. (130 patients in 2011-12) The additional funding requested for escalation to 200 patients in 2012 – 13 has not been agreed. Action: Continue to explore opportunities for additional funding to escalate numbers in future years.	Additional staff were recruited at Band 7 and 8B to develop the IMRT service and meet workload and complexity of IMRT planning. Further escalation of patient numbers requires additional staffing using a skill mix of Band 8B, 7 and 6

References:

1. *Guidelines for the Provision of a Physics Service to Radiotherapy*, York, IPEM, 2009

9.2 Risk Assessments

9.2.1 Radiotherapy

Risk Assessment Form Reference no……. Each Risk needs to be assessed and rated using the risk matrix below i.e. this refers to the likelihood of the risk occurring	**Site** BHOC **Division** Specialised Services **Department** Radiotherapy	**Date of completion of assessment** 11 May 2011 This form is designed as a tool for Assessors, to enable them to make a systematic assessment of tasks. Once completed and signed the form should be discussed with the Manager(s) responsible for the Department/ Division/ Location regarding action and review as appropriate

Hazard – Potential to cause harm:- • Trailing wires, uneven flooring • Work at height (e.g. from Mezzanine floors) • Chemicals/ reagents/ drugs • Moving parts of machinery • Fire • Pressure systems • Vehicles • Low temperature • Manual Handling • Noise • Electricity (e.g. portable equipment, frayed wiring etc) • Dust (e.g. from grinding) • Fumes (e.g. from welding) • Inadequate lighting • Visual display unit • Other	**Risk? –** The likelihood of the potential harm from that hazard being realised e.g. Outcome could be: • Slips, trips, falls • Falls • Burns • Amputation • Fatality • Explosion • Crushing injury • Cold working conditions • Back strain • Deafness • Shock • Respiratory problems • Toxicity • Bumps/bruises • Eye strain This is not an exhaustive list just examples	**Who may be affected/ harmed?** Staff groups i.e. • Office Staff • Maintenance personnel • Contractors • Patients • Cleaners • People sharing your workplace • Students • Members of the public • Pregnant Workers • Children • Lone workers • Inexperienced staff • Bank/ temporary staff Include numbers affected if relevant	**Is the risk adequately controlled?** Have precautions already been taken against the risks from the hazards you listed? For example: • Adequate & appropriate information, instruction, training & supervision • Adequate safe systems/ procedures in place • Is this reflected in work practice? Do the precautions:- • Reflect good practice? • Reduce risk as far as is reasonably practicable? • Comply with recognised standards? • Meet the standards set by a legal requirement? Inadequate controls also need to be listed with comment to that affect	**What further action is necessary to control the risk?** What more could be reasonably done for risks, which you found, was not adequately controlled? N.B. priority should be given to those, which affect large numbers of people and/ or could result in serious harm. • Remove the risk completely • Try a less risky option • Prevent access to the hazard e.g. by guarding • Organise work to reduce exposure to the hazard • Issue PPE • Provide welfare facilities e.g. First aid, decontamination areas • Information, instruction training & supervision Name person taking action and time scale e.g. 1, 3, 6. 12 months etc.

List hazards below	**List possible outcome**	**Risk category**	**List groups of people especially at risk**	**List existing controls or where information can be found**	**List the risks which are not adequately controlled and action**
Radiotherapy staffing levels do not meet the recommendations of the relevant professional bodies	Patients are treated in an unsafe clinical service Waiting times for treatment develop 31 day cancer target for subsequent radiotherapy treatments is not met. Staff accrue unpaid overtime which cannot be taken as time in lieu due to low staffing levels.	Low Low Low Low	Patients and their carers Therapy Radiographers Clinical Oncologists and SpRs Radiotherapy nursing staff Radiotherapy A&C staff (Radiotherapy Medical Physics Unit staff)	A minimum staffing level is in place to ensure patients receive a safe and appropriate clinical service. Non patient treatment activities can only be undertaken if the clinical service is covered first. Should staffing levels fall below the levels identified in the skill mix review, then clinical activity is reduced in the short term.	

	Staff motivation and morale becomes low .	Low		Some paperw ork can be done as a w aiting list initiative rather than pay overtime or take time in lieu.	

9.2.2 Radiotherapy Physics

Risk Assessment Form Reference no…….	**Site** BHOC	**Date of completion of assessment** July 2012
	Division Diagnostic and therapies	This form is designed as a tool for Assessors, to enable them to make a systematic assessment of tasks. Once completed and signed the form should be discussed with the Manager(s) responsible for the Department/ Division/ Location regarding action and review as appropriate
Each Risk needs to be assessed and rated using the risk matrix below i.e. this refers to the likelihood of the risk occurring	**Department** Radiotherapy Physics Unit	

Hazard – Potential to cause harm:-	**Risk? –** The likelihood of the potential harm from that hazard being realised e.g.	**Who may be affected/ harmed?**	**Is the risk adequately controlled?**	**What further action is necessary to control the risk?**
• Trailing w ires, uneven flooring • Work at height (e.g. from Mezzanine floors) • Chemicals/ reagents/ drugs • Moving parts of machinery • Fire • Pressure systems • Vehicles • Low temperature • Manual Handling • Noise • Electricity (e.g. portable equipment, frayed w iring etc) • Dust (e.g. from grinding) • Fumes (e.g. from w elding) • Inadequate lighting • Visual display unit • Other	Outcome could be: • Slips, trips, falls • Falls • Burns • Amputation • Fatality • Explosion • Crushing injury • Cold w orking conditions • Back strain • Deafness • Shock • Respiratory problems • Toxicity • Bumps/bruises • Eye strain This is not an exhaustive list just examples	Staff groups i.e. • Office Staff • Maintenance personnel • Contractors • Patients • Cleaners • People sharing your w orkplace • Students • Members of the public • Pregnant Workers • Children • Lone w orkers • Inexperienced staff • Bank/ temporary staff Include numbers affected if relevant	Have precautions already been taken against the risks from the hazards you listed? For example: • Adequate & appropriate information, instruction, training & supervision • Adequate safe systems/ procedures in place • Is this reflected in w ork practice? Do the precautions:- • Reflect good practice? • Reduce risk as far as is reasonably practicable? • Comply w ith recognised standards? • Meet the standards set by a legal requirement? Inadequate controls also need to be listed w ith comment to that affect	What more could be reasonably done for risks, w hich you found, was not adequately controlled? N.B. priority should be given to those, w hich affect large numbers of people and/ or could result in serious harm. • Remove the risk completely • Try a less risky option • Prevent access to the hazard e.g. by guarding • Organise w ork to reduce exposure to the hazard • Issue PPE • Provide w elfare facilities e.g. First aid, decontamination areas • Information, instruction training & supervision Name person taking action and time scale e.g. 1, 3, 6. 12 months etc.

List hazards below	**List possible outcome**	**Risk category**	**List groups of people especially at risk**	**List existing controls or where information can be found**	**List the risks which are not adequately controlled and action**
1. Radiotherapy Physics Unit staffing levels are currently slightly below the recommendations of the IPEM, (current shortfall of 2.3 WTE). How ever these numbers do not reflect the fact that 2.4 WTE staff have been on maternity leave for most or part of this period, and	Patients are treated in an unsafe clinical service Waiting times for treatment develop 31 day cancer target for subsequent radiotherapy treatments is not met.	Low Low Low	Patients UH Bristol Trust Radiotherapy Physics Unit staff	A minimum staffing level is in place to ensure patients receive a safe and appropriate clinical service. Development activities are delayed in order for staff to attend to essential clinical duties.	

the Head of RPU has been on long-term sick leave since Oct 2011. In addition, 4.8 WTE staff are trainees, and as such do not fully contribute to the workload of the department.	Staff accrue unpaid overtime which cannot be taken as time in lieu due to low staffing levels. Staff motivation and morale becomes low.	Low Low		Payment for overtime for radiotherapy physicists (staff below Band 8) has been introduced as a temporary measure since April 2012.	
2. Radiotherapy Physics unit staffing does not include staffing required to further develop and plan Intensity Modulated Radiotherapy (IMRT) treatments beyond the current limit of 130 per annum.	Numbers of IMRT treatments available remain at 130 per annum and the centre is unable to meet the National Radiotherapy Implementation Group's recommendation for IMRT. Risk to patients of suboptimal treatment leading to unnecessary morbidity following treatment, or lack of disease control. Risk to Trust as patients may choose to be treated elsewhere where IMRT is available, hence loss of income to Trust, along with potential bad publicity.	Moderate	Patients who would benefit from inverse-planned IMRT treatments (up to 24% of planned radiotherapy patients) UH Bristol Trust	PCT have not extended funding for IMRT at BHOC in 2012/13 to implement next stage of a phased increase above 130 patients, to meet NRIG recommendations.	

10 Education and Training Strategy

10.1 Access to Training

As detailed in the Operational Policy there is a departmental education and training strategy. The training requirements identified in the 2011/12 work plan have all been achieved with the proviso that some training has been commenced, but not completed due to various academic timetables. Training requirements for 2012/13 are tabled in the 2012/13 work plan and have been compiled being mindful that full compliance may not be achieved due to funding limitations.

Commitment to Education & Training – Radiography	
Radiographers	**Post graduate study/study days/conferences**
1	UWE- Men & Cancer Study Day July 2011
2	Elekta Users Meeting, Germany, July 2011
1	UWE - IV Cannulation module
1	UWE - Brachytherapy – Principles and Clinical Applications module
1	UWE - Issues in Caring for a TYA with Cancer study days/module
3	Kingston - Quality and Professional issues in Healthcare module
4	Kingston - Cancer Management module
1	Kingston - Management of People in the Workplace module
1	Kingston - Research methods module
1	Kingston - Radiotherapy Practice module
1	Sheffield Hallam - Image guided RT module
1	Sheffield Hallam - Clinical applications of radiobiology module
Commitment to Education & Training – Physics	
Physics	**Post graduate study/study days/conferences**
1	Elekta Users Meeting, Germany, July 2011
3	ESTRO, London , May 2011
4	UKRO, Manchester, April 2011
1	Varian Brachytherapy User Meeting, Malta, June 2011
2	SBRT Study day (lung), Leeds, October 2011
2	UK SBRT consortium meeting, London, November 2011
2	Elekta VMAT User meeting, Cardiff, March 2012

11 Audit and Service Reviews

11.1 Review of Clinical Target Volume to Planning Target Volume Margins

11-3T-206

A full review of CTV-PTV margins in use at BHOC was performed and documented in the 2010-11 Annual Report. As a result, the prostate protocol was revised. In 2011-12 margins within the Stereotactic protocol were reviewed following an in house analysis and calculation of margins for SRS/SRT. The review concluded that no change in practice was necessary. In 2012-13 it is planned to review current margins used in paediatric immobilisation prior to the introduction of new equipment. The audit will then be repeated and compared.

The full report on Stereotactic margins used at BHOC is shown in Appendix 2 and an extract of the Radiation Oncology Group minutes demonstrating discussion and shown in Appendix 9.

11.2 Treatment Interruptions Audit (EBRT) 11-3T-210

An audit was undertaken in August 2012 by Tracey Shorten and Georgia Welsh

Audit Findings

An audit has been completed for Category 1 patients who started their Radiotherapy at Bristol Haematology and Oncology Centre in the 6 month period from January to June 2012.

153 patients were identified and the patient's actual course length was compared to their expected course length for the number of fractions prescribed.

All of the 153 patients completed their course of radiotherapy with no prolongation of more than 2 days due to unscheduled interruptions.

11.2.1 Conclusion:

It can be seen that no patients in the audit had a prolongation of treatment of more than 2 days.

11.3 Dosimetry Audits Undertaken 11-3T-208

11.3.1 Photon Audit Summary- External Quality Control 11-3T-208

Visiting centre performing audit measurements: Swansea

Protocol followed: South West Radiotherapy Physics Audit Group interdepartmental audit protocol for megavoltage photons

Date: 12/12/2011

Results

IPSM phantom with lung inhomogeneity, treated isocentrically.

6 MV photon beam

Central axis point:

Beam	Ant	Rt lat	Lt lat	Total
% diff meas to expected	-1.7	-2.0	1.4	0.8
Tolerance	3%	3%	3%	5%
Pass/Fail	Pass	Pass	Pass	Pass

11.3.2 IMRT external audit

External audit of BHOC for the ArtDeco and Costar Clinical Trials was performed on 13th September 2011, and the centre was signed of as acceptable for both trials. No regional or national provision is yet available for regular annual external audit of IMRT, although the south west Regional Dosimetry Audit group discussed the need to establish such a provision at its meeting in July 2011.

Service Developments

11.4 IMRT

The IMRT Development Plan 2010-11 (Operational Policy 2009-10 section 14.1) was implemented in full.

Furthermore, PCT funding was agreed for 130 IMRT treatments for the year 2011-12, to include inverse planned IMRT for Head and Neck and some prostate patients, as detailed in the letter in appendix 3. During the period of this report, just over 130 patients received inverse planned IMRT for head and neck and prostate cancers. A small number of CNS patients were also treated, via exceptional funding.

Appendix 3 – IMRT funding letter

A development plan for further increasing numbers of IMRT patients during 2012 -2013 is included in the Work Plan 2012-13

11.4.1 External training for inverse planned IMRT 11-3T-303

Compliance with this measure has been previously demonstrated. The following personnel attended the Royal Marsden Hospital training course in IMRT & IGRT in Feb 2012.

- Serena Hilman- Consultant Oncologist
- Pippa Dunbar- Medical Physics
- Emma King – Therapeutic Radiographer

Certificates for Serena Hilman, Pippa Dunbar and Emma King in Appendix 4.

11.5 Outcome of IVD implementation programme 11-3T-231

Full compliance to this measure has been demonstrated previously, however during the period of this report IVD has also been introduced for thyroid eye treatments, which continues the roll out of IVD within the department. Appendix Six demonstrates the departmental protocol for IVD, which covers multifraction, megavoltage external beam photon therapy, which has been forward planned, or planned from tables. Appendix 5– IVD protocol

12 Patient and Carer Feedback and Involvement 11-3T-121

In 2010 the Trust participated in the National Cancer Patient Experience Survey and will continue to participate on an annual basis.

A paper outlining the results for UH Bristol is contained in a paper to the Trust Board which can be found in Appendix 6. An action plan forms part of the appendix.

With particular reference to radiotherapy, patients felt that the side effects of radiotherapy were dealt with poorly compared to result from other trusts. Although UH Bristol achieved 78% in this measure that result was in the lowest 20% in the country. This reflects the known sporadic access to on-treatment review and has identified a key area for improvement as described in the action plan and work plan.

During 2011/12, 90% of patient feedback received through local mechanisms was extremely positive, reflecting good levels of both patient care and patient experience at reception in the unit. All front line staff have been fast-tracked onto Living the Values training. Patients also commented on the lack of seating at peak times which is currently being addressed through minor capital funding.

The department has various mechanisms to obtain feedback of patient experience, in particular feedback cards are available which are monitored on a daily basis. All patients at BHOC would receive a permanent record of their consultation by way of a copy of every GP letter, although they may choose to opt out

The department benefits from the attendance of an active patient representative on the Radiation Oncology Group. She has attended 8 of the 9 meetings during this time period.

Consistent improvements have been made in the areas highlighted in the survey, and the department is no longer in the lower quartile, and continues to move forward, with plans to maintain the profile of the patient experience through regular agenda items within the Radiation Oncology Group.

Appendix 1 Minutes of the Radiation Operational Group 27 July 2012

Date:	**Friday 27th July 2012**	**Meeting:**	**Radiation Oncology Group**
Present:	Mandy Webster (chair), Alison Cameron, Chris Herbert, Nar Thanvi, Charles Comins, Wendy Davis, Laura Douglas, Sally Fletcher, Josie Green, Simon Smith, Catherine Roe, Helen Appleby, Andy Iles.		
Apologies:	Roger Parry, Steve Falk, Sue Cowley, Georgia Walsh, Matthew Beasley, Kate Love, Alison Stapleton.		

	Issue discussed	Action agreed	Name
2.	**Matters arising**	No matters arising, the minutes from the previous meeting were accepted as an accurate record. The group reviewed the action plan and the following points were noted for each issue discussed: • AOS SOPs Feedback: **Acute cerebral/CNS Oedema** – Alison Cameron has added comments. **Management of Acute Skin Reactions caused by Radiotherapy** – MXB and Sarah Griffiths reviewed SOPS and have sent comments to Tara Shine. • Georgia is to meet with representatives from Bath and Taunton on the 23rd August re Network Protocols. • Breast patients are now being treated on the Varian as well as Elekta machine. • Mosaiq update has been tested and has been completed. • Jancis and Karen have held weekly meetings to look at the images for the paediatric immobilisation study. • The fast Forward Trial was presented at the Research Forum and numbers have been increased to 30. • Two Linacs can be ordered. • Presentations for the new linacs happened Thursday 26th July with presentations by Varian, Elekta and Brain Lab. • Timescales for ordering the linacs stand as per previous minutes.	

3.	**Key Issues**	No Key Issues were raised.	
4.	**Items for Decision/Approval** **Annual Report on Radiation Protection**	Helen Appleby discussed the outcome of the report. Overall, Helen reported the BHOC continued to be a safe environment for staff, patient and the public. Radiation protection regulations and guidance were being appropriately implemented.	
5	**Items for Discussion** **ROG Terms of Reference** **Pelvis RT Prep**	The group agreed to the Terms of Reference, provided the 'Maintenance of training and competency' was changed to 'Monitoring'. A few members felt that maintenance of training fell under the remit of other groups. Cat Roe reported that all prostates within the last week had to be rescanned, either due to gas fill or the bladder not being visible. Therefore the department needs to do something different in order to ensure consistency of bladder/rectum preparation. NT felt that an easy, effective and reproducible method needed to be implemented. One of the main things is the patients have to be educated as to the importance of the bladder and rectum. The leaflet we have explains what to do but not why. The leaflet used by Taunton gives more explanation and Taunton also give dietary advice to patients prior to a scan and treatment. NT and CH agreed to meet with Cat and Simon to discuss the best way to proceed. In the mean time it was decided that we need to get the patients to drink more and wait longer for their scans. To provide consistency patients would also be asked to empty their bladders and drink again in between CT and MRI.	**NT/CH** **SS/ CR**

6	For Information Virtual Simulation item on Progress Form	MW informed the group that not all soft tissue treatment sites were being put through AcQSim. As an aide memoir for Doctors a "Virtual Sim" Box will need to be added to the progress form.	MW
7.1	Protocols	Currently, • Oral cavity larynx and Stereo procotols are ready for issue. • Breast buds have been added to the Prostate protocol but it is still waiting for IMRT / pelvic nodes to be added • Adult Brain and Pituitary have been sent out for review Sarah and Matt have met to look at assigning different protocols to different Oncologists so that the review process becomes slicker.	
7.2	AcQSim	Simon and the team were thanked for their work during the week when there was no Simulator available and all the planning was done on AcQSim, it was noted that they coped very well with the palliative work. Training and palliative treatments - AC felt AcQSim was better for the patient as it was quicker and more accurate. It was highlighted though that we need to be able to train more of the radiographers to use AcQSim but this is difficult without the patients being sent through. Therefore we need to ensure that all the soft tissue work goes through AcQSim. The radiotherapy team felt that although it was good to work towards the aim of working with AcQSim, work would have to be done regarding work flows and discussions take place as to how to get the images signed off by Doctors. There are already more staff in the AcQSim and CT section than SIM, it usually depends on the pre-treatment load.	

7.3	Verification Steering Group Committee	Work is continuing in using TumourLoc. Jancis and Karen are reviewing images for paediatric study. The indexable headrest is ready for testing.	
7.4	IMRT/VMAT	The Oncologists agreed to discuss the issues surrounding use of prostate seeds.	NT/SH
7.5	SBRT Group	• Meeting scheduled for next week. • A breathing phantom was borrowed from Portsmouth and work has gone on using it.	
8.	Any Other Business	Peer Review is approaching again, Sue Cowley is in the process of setting up meetings to take forward. It was thought that it would be good to review the Radiotherapy Work Plan in ROG.	
9.	Key Messages	❖ More AcQSim patients to be treated. – aim to plan all soft tissue sites. ❖ Bladder and bowel prep consistency needs to be looked at and reviewed. ❖ We have the go ahead to order two Linac machines.	
	Date of Next Meeting	Friday 7th September 2012, 11am, Aves Kilsby Meeting Room, Level 4, BHOC	

Appendix 2 Stereo margins report

Investigation of Margins in Frame-based Arcing Stereotactic Radiotherapy and Radiosurgery

Chalmers K, Hall C, John A, Evesham P

Introduction

Margins in Radiotherapy

The National Cancer Peer Review Programme[i] recommends that centres review their planning margins for a range of sites. Guidance on use of margins has developed from the original ICRU Report 50[ii] which recommended margins be applied to target volumes to account for uncertainties in the treatment process. ICRU Report 60[iii] recommended that the CTV-PTV margin be divided into 'Internal' and 'Setup' volumes, but gave no clear advice as to how this should be applied in practice. The BIR working party publication 'Geometric Uncertainties in Radiotherapy'[iv] suggests that the CTV-PTV margin should be calculated in two parts: firstly by creating a Systematic Target Volume (STV) to take into account systematic errors in treatment preparation, then expanding that to form a PTV by taking into account random errors in treatment execution.

The CTV-STV margin includes:

- Organ size, position and shape during planning CT, relative to mean.
- Delineation
- Phantom transfer
- TPS algorithm
- Systematic set-up error
- Breathing motion

These are all Gaussian in nature except for TPS algorithm and breathing, which are considered linear.

The STV-PTV margin refers to random errors in daily setup. This can be thought of as a blurring of the treatment beam i.e. increasing the width of the penumbra. The margin equation used in this study is as follows:

$$2.5\Sigma + a + b + \beta(\sigma - \sigma_p) \qquad \textbf{Equation 1}$$

where Σ = Combined systematic error

a = TPS beam algorithm error

b = Breathing positional error

β = Planning parameter

σ = Combined treatment execution error

σ_p = Unblurred beam penumbra width

The combined systematic error includes systematic setup errors, phantom transfer error (including geometric imaging TPS and linac geometry), delineation error, and organ position, size and shape. The combined treatment execution error includes daily (random) setup error, the unblurred beam penumbra width and organ position, size and shape.

Alternative equation by van Herk et al[v] considers breathing motion to also be Gaussian in nature and as such is included in the systematic sd. In this study breathing motion is not important as we are looking at intracranial treatments, therefore these two equations become identical.

Stereotactic Radiotherapy at BHOC

Intracranial stereotactic radiotherapy (SRT) and radiosurgery (SRS) is carried out at BHOC using the linac-based Radionics system which delivers arced beams via circular tertiary collimators ranging in diameter from 1.25 cm to 4.00 cm in 0.25 cm divisions. A mechanical isocentre stand is used to facilitate setup with greater accuracy than the standard tolerance on the room lasers.

Both fixed and relocatable BRW frames can be used, which attach to the treatment couch using a special mount which has micro-adjusters for fine setup control. A box system is used to set the isocentre position prior to the patient's arrival, and a metal hoop used to determine the off-axis laser positions, both using Vernier scales to set the isocentre co-ordinates to an accuracy of 0.1mm.

Treatments are planned using XKnife 4.0.1 (Radionics) from fused MR and CT scans (XKnife ImageFusion v3.0 Radionics) to allow contouring on either image. MR scans are carried out under a range of protocols, optimised for the particular type of lesion and range in size from small FoV scans with 0.6mm slices to whole head scans with 5mm slices. CT scans are acquired with 2mm slices including the whole frame from which the stereotactic co-ordinate system is generated. Typical treatments consist of 2-4 arcs with varying gantry and couch angles, which are not parallel or opposed. For collimators with diameter greater than 2cm the linac X and Y jaws can be brought into the field and the collimator angle adjusted to improve conformity, otherwise the jaws are maintained at a 6x6cm field.

Currently a 2mm CTV-PTV margin is routinely used for fractionated treatments (SRT) using a relocatable frame; with no margin applied to single fraction treatments (SRS) in a fixed frame. Some single fractions are delivered in relocatable frames where an adequate frame fit can be achieved. In these cases a margin of up to 2mm is applied according to the consultant's discretion. This project aims to investigate the validity of those margins via analysis of the sources of error in the planning and treatment processes, using published margin recipes.

Methods and Materials

Patients

Setup and prescription data was collected for 48 patients treated either with SRS in a fixed frame (24 patients) or SRT in a relocatable frame (24 patients) between August 2007 and June 2009, in order to investigate systematic and random setup errors in relocatable and fixed frames. Table 1 below shows the range of treatments sites and prescriptions used for patients included in this study:

Lesion type	SRS / SRT	No. of patients	Prescription	Cover with…
Acoustic neuroma / Vestibular schwannoma	SRT	16	54Gy to 100% in 30#	90%
	SRS	7	12Gy to 80%[vi]	80%
Brain metastases (1-2)	SRS	12	18Gy to 50%	50%
Meningioma (1-2)	SRT	3	54Gy to 100%, 25 or 30#	90%
	SRS	5	18Gy or 12Gy to 50%	50%
Craniopharyngioma	SRT	2	50 or 55Gy to 100% in 30#	90%

Pituitary adenoma	SRT	1	45Gy to 100% in 25#	90%
Medulloblastoma	SRT	1	50Gy to 100% in 30#	90%
Malignant neoplasm of orbit	SRT	1	54Gy to 100% in 30#	90%

Table 1: Details of prescription details for patients included in this study

Patients with different lesion types will be treated with different prescriptions, prescribed to and covered by different isodose levels. This analysis method allows us to calculate margins specifically for these different treatment types, and allowing extension of the model to look into other treatment types not represented here; for instance the treatment of SRS patients in relocatable frames.

Sources of uncertainty within the Stereotactic Radiotherapy treatment pathway

- Frame fit – this has several components and is assessed by depth helmet measurements:
  1. Systematic setup error introduced at CT
  2. Daily setup error
  3. Inter-observer variation
- Treatment Planning
  1. TPS algorithm error
  2. Image fusion error between CT and MR
  3. Target delineation. This is known to be the greatest source of uncertainty.
- Treatment delivery errors
  1. Field and mechanical isocentre coincidence
  2. Linac geometrical and dosimetric tolerances

Method for calculation of BIR margin

Systematic and random setup errors

These were analysed using the method described in Appendix 2c of Geometric Uncertainties in Radiotherapy Treatment Planning[iv], using depth helmet data as a surrogate for portal imaging data. The depth helmet fits over the patient frame and measurements are made through holes in the helmet to the patient's head. These measurements are made daily, at every fraction, with the patient in the treatment position, and a spreadsheet developed by Simon Thomas et al at Addenbrookes Hospital, Cambridge, used to calculate 3d vectors of the displacement of the frame from the baseline position. The mean displacement of the frame over the entire course of treatment provides information on the systematic error, while the day-to-day changes represented by the standard deviation of the measurements gives the random error.

Inter-observer variation has previously been estimated at 0.5mm by comparing depth helmet readings between two individuals for fixed frame patients where the frame can be assumed to have no movement.

Delineation error

An estimate of 1mm was used for this study, in line with that used in chapter 6 of 'Geometric Uncertainties in Radiotherapy': Geometric uncertainties in radiotherapy of the brain (M. Brada, M. Bidmead)[iv].

Phantom transfer error

The recommended procedure for measuring phantom transfer is via comparison of portal images and DRRs for a rigid phantom. Because of the small field sizes portal imaging is not used for stereotactic treatments, instead routine verification of mechanical isocentre and radiation field centre is carried out, by using radiochromic film

to image a ball bearing attached to the mechanical isocentre stand at gantry angles of 0, 90 and 270. This is carried out for each patient using their specific collimator and has a tolerance of 1.5mm.

In an extension to this to include linac and isocentre co-ordinate setup errors, film tests were carried out with a typical collimator size of 2cm, placing the ball bearing at the isocentre of the box and hoop system as the patient would be set up, and also with a couch twist of 90^{o}.

TPS algorithm error

This was calculated as the difference between the reference isodose width for a typical beam (2cm collimator at 5cm depth) between the TPS X Knife 4.1 and beam profile plots from commissioning.

Unblurred penumbra σ_p

The Unblurred beam penumbra is defined as the 10-90% penumbra width divided by 2.56. This was measured on the planning system for a typical collimator size of 2cm at a typical treatment depth of 5cm.

Planning parameter β

A typical treatment has 3 non-coplanar arcing beams. The planning parameter has a different value depending on the reference isodose, and is taken from tables of the inverse normal distribution[vii]. Typically in external beam radiotherapy the aim is to cover the PTV with the 95% isodose for which beta = 1.64 for a single beam. However, in this centre we aim to cover with a range of doses from 50 to 90%, and with 2-4 arcing beams. In this study we have ignored the arcing aspect of the beams and considered the treatments to have simply 3 beams, none of which are parallel or opposed:

The beta parameter is found by calculating the level of blurred dose (LBD):

Level of blurred dose (not parallel or opposed) = (100-(100-i)n)% **Equation 2**

where i = reference isodose

n = number of beams

McKenzie et al[vii] state that this approach does tend to underestimate beta at high beam numbers but do not discuss the effect of reference isodose. For a typical SRT treatment covering with the 90% isodose you get LBD=70% which corresponds to a beta of 0.52. However, the normal distribution is sigmoid about LBD=50% so the beta for an SRS treatment prescribed to 80% or 50% would be sub-zero as they would have LBD<50%. However, in practice, for SRS the daily setup error is by definition zero and the beta parameter becomes irrelevant as $\sigma = \sigma_p$, therefore the whole term becomes zero (see Equation 1).

Breathing error

This is assumed to be zero for intracranial lesions, as is the variation in *organ position, size and shape*.

Results

Table 2 and Table 3 below show the margin calculation steps for SRT and SRS respectively for treatments which aim to cover the PTV with the 90% isodose. The choice of isodose affects the planning parameter beta, however for SRS treatments, which in our centre cover with either 50% or 80%, the daily setup error is by definition zero, such that beta becomes irrelevant in the margin calculation.

BIR margin calculation for SRT to 90% isodose

Uncertainty	**LR**	**AP**	**SI**	**Comments**
Delineation	1	1	1	Estimate only
Target size, position, motion	0	0	0	Intracranial lesion
Phantom Transfer	0.87	0.87	0.87	SD of top hat function -1.5 to +1.5mm - Film tests using MIS, box and hoop, and including couch twist all within 1.5mm.
Systematic setup error	0.526	0.544	0.382	From relocatable frame SRT data
Combined systematic error	**1.426**	**1.433**	**1.380**	mm
TPS algorithm error	-0.26	-0.26	-0.26	TPS beam width is 0.26mm narrower than actual beam width so use negative to reduce margin required.
Daily setup error	0.367	0.370	0.412	From relocatable frame SRT data
Target size, position, motion	0	0	0	Intracranial lesion
SigmaP	2.06	2.06	2.06	from 2cm coll data at 5cm deep
Combined execution error	**2.092**	**2.093**	**2.101**	mm
Planning parameter Beta	0.52	0.52	0.52	Using values for 90% reference isodose
Semi-sides:				
s(systematic)	3.565	3.582	3.449	
s(execution)	1.088	1.088	1.092	
s(breathing)	0	0	0	
s(scalar)	1.331	-1.331	-1.331	
Total semi-side s	3.322	3.339	3.210	

Semi-diameter of combined ellipsoid	**3.322**	**3.339**	**3.210**	**mm**

Table 2: Summary of calculation of CTV-PTV margins for SRT to the 90% with a relocatable frame

BIR margin calculation for SRS to 90% isodose

Uncertainty	**LR**	**AP**	**SI**	**Comments**
Delineation	1	1	1	As above
Target size, position, motion	0	0	0	Intracranial lesion
Phantom Transfer	0.87	0.87	0.87	As above
Systematic setup error	0.547	0.579	0.525	from fixed frame SRS data
Combined systematic error	**1.434**	**1.446**	**1.426**	**mm**
TPS algorithm error	-0.26	-0.26	-0.26	As above
Daily setup error	0	0	0	No info as only 1 fraction…
Target size, position, motion	0	0	0	Intracranial lesion
SigmaP	2.06	2.06	2.06	As above
Combined execution error	**2.06**	**2.06**	**2.06**	**mm**
Planning parameter Beta	0.52	0.52	0.52	Currently with value for treating to 90%
Semi-sides:				
s(systematic)	3.585	3.616	3.564	
s(execution)	1.071	1.071	1.071	
s(breathing)	0	0	0	
s(scalar)	-1.331	-1.331	-1.331	

Total semi-sides	3.325	3.356	3.304	
Semi-diameter of combined ellipsoid	**3.325**	**3.356**	**3.304**	**mm**

Table 3: Summary of calculation of CTV-PTV margins for SRS to the 90% with a fixed frame

Discussion

The calculated margins are very similar for both fixed and relocatable frames. Intuitively we expected the relocatable frame to require a larger margin, however although individual patient measurements may vary, the systematic setup component is <0.6mm in any direction with both frame systems, and the random error component for the relocatable frame <0.5mm. This demonstrates that both types of frame provide good immobilisation and the main components to the required margin come from other sources such as delineation, phantom transfer and the unblurred beam penumbra.

Use of inverse normal distribution (or 'error function') tables provides values of β for protocols where the PTV is covered by a particular reference isodose, however these tables tend to zero at the 50% field edge for a single beam which is clearly a limitation of this model. In our centre the 90% isodose is most commonly used for SRT treatments as a compromise between coverage and normal tissue doses, which is reflected in tabulated values. For SRS treatments the reference isodose and prescription tend to vary more on an individual patient basis, but this doesn't matter as treatment execution term in the margin calculation becomes zero where no daily setup error term exists.

Doctors' delineation error is widely reported to have the largest effect on margin sizes. It is also a difficult parameter to measure effectively. Delineation error in this study has been estimated at 1mm using reports in the literature[iv] for delineation on fused CT and MR images. This single value has been used for all the sites included in this study, for which a variety of MR imaging protocols will have been used. To truly generate site-specific margins would require an extensive investigation of variation in delineation.

A previous investigation at this centre looked into setup errors for stereotactic patients using portal imaging[viii]. 13 patients had anterior and lateral images acquired on one fraction only. Portal imaging is the recommended method for assessing setup errors, and through assuming that the single images for each patient are representative of their mean shift we can use the standard deviation of these measured shifts as an approximate systematic setup error, for comparison with that obtained from the depth helmet data, calculating an approximate margin with no random component using:

$$2.5\sqrt{\text{SD}^2 + \text{delineation error}^2 + \text{phantom transfer error}^2} + \text{TPS algorithm error}$$

Equation 3

- For relocatable frames (11 patients) the standard deviations were 0.52mm LR, 0.84mm AP, 0.81mm SI and 0.53mm for the overall 3d vector. Calculating a margin using these figures along with the TPS algorithm error described above gives margins of 3.30mm LR, 3.66mm AP and 3.14mm SI, which are similar to the results of this study
- For fixed frames (2 patients) the standard deviations were 0.51mm LR, 0.31mm AP, 0.0mm SI and 0.54 for the overall 3d vector. These figures produce margins of 3.29mm LR, 3.14mm AP and 3.05mm SI, again similar to the results of this study.

This shows that using different methods to assess setup errors, and very different amounts of data produces a similar margin, indicating that the setup errors in general are very small with this technique and other factors have much greater contributions.

Margins calculated through this type of recipe should not be implemented literally, as they often produce margins that are larger than is practicable. They are useful to verify current margins and immobilisation methods, and for comparing different systems. The trend at the moment is to move away from frame-based systems such as this and towards frameless image-guided techniques which provide simpler setup but have a heavy dependence on imaging. The small setup errors found in this study are unlikely to be improved upon with a frameless, CBCT-guided system where the residual errors after position correction still have a standard deviation of around 0.5mm[ix]. Therefore it is important to consider the other factors when changing from one system to another.

In our centre we currently use a margin of 2mm in all directions for SRT treatments, no margin for SRS treatments for brain mets and variable margins of 1-2mm for other lesion types determined on an individual basis by looking at the reproducibility of frame fit and proximity of the lesion to critical structures. These figures are comparable to other centres (see Table 4 below).The aim of the therapy is also taken into account, with SRS for mets requiring that patients should have an expected survival of at least 6 months, whereas SRT treatments for benign lesions such as Acoustic Neuromas have a focus on long-term control. Although use of the margin formula indicates that SRT and SRS treatments require a similar margin, introduction of a 2mm margin for SRS to treat single brain mets has been found to increase complications without improving local control[x].

Centre	Treatment type	Prescription	CTV-PTV Margin
Heidelberg, Germany 2006[xi]	SRS with mask system for Vestibular Schwannoma	11-20Gy to 80%	1-2mm
Liege, Belgium 2007[vi]	SRS with fixed frame for Vestibular Schwannoma	10-14Gy to 80%	none
Montefore Medical Centre NT, USA 2009[xii]	SRS with fixed frame SRT with relocatable frame Daily kV imaging	Not specified	None with fixed frame 3mm with relocatable frame
Richmond VA, USA 2000[xiii]	Hypofractionated SRT for brain mets with relocatable frame	3# of 6-12Gy to 100%	2mm
Toronto, Canada 2007[xiv]	SRS/SRT with relocatable frame	Not specified	1.5mm decreasing to 0.45mm with daily CBCT

Table 4: CTV-PTV margins used in different centres for stereotactic radiotherapy and radiosurgery

Conclusions

Using the McKenzie margin recipe[iv] gives a CTV-PTV margin of 3.3mm in all directions for both fractionated SRT in a relocatable BRW frame and single fraction SRS in a fixed BRW frame. The systematic and random setup errors for both frames are very small (0.367-0.544mm). Doctor's delineation error is known to play a large part in margin calculations and was not investigated here. Use of differing MR protocols for different sites make a thorough investigation time-consuming.

This study highlights limitations of the margin recipe in terms of application to single fraction treatments and in terms of the planning parameter beta when using an arcing technique and covering with reference isodoses other than 95%

Implementation of margins is generally a compromise between ideal margin recipes and practical considerations, and recipes can be particularly useful for comparing different systems and techniques, rather than for literal implementation with a current system. Our current margin of 2mm for SRT treatments is similar to those used in other centres and supported by the calculation of an average margin of 3.3mm. The different aims, expectation and associated prescriptions for different sites mean that for many stereotactic patients the margin used is decided by the consultant on an individual basis.

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Appendix 3 IMRT Letter of agreement for IMRT funding

Janet Burrows

Head of Commissioning

University Hospitals Bristol NHS Foundation Trust

Trust Headquarters

Marlborough Street

Bristol

BS1 3NU

Date: 24th August 2011

Dear Janet,

I am writing to formally notify you that NHS Bristol accept the proposed list of indications for routine funding of IMRT, agreed on 18 May 2011, as follows:

1. Head and Neck Cancer
   Patients where IMRT offers a significant reduction in normal tissue toxicity (particularly parotid gland sparing where the dose to 50% of the contralateral parotid gland can be kept below 24Gy with IMRT).

2. Prostate Cancer
   Patients with bilateral hip replacements.

   Patients where there is a need to treat seminal vesicles or pelvic nodes *and* where IMRT would result in a clinically significant reduction in dose to bowel or rectum.

3. Clinical Trials of IMRT
   COSTAR Trial (at present this trial of cochlea sparing IMRT versus conventional radiotherapy following removal of a parotid gland tumour is the only NCRN trial open for inverse planned IMRT).

No other cases are considered eligible for routine funding at present although applications could be made for exceptional funding in individual cases.

Please contact me know if you have any queries on this matter.

Yours sincerely

Jo Bangoura (On behalf of Ellen Rule), Interim Cancer Commissioning Manager, NHS Bristol

Appendix 4 IMRT -external training certificates

The Royal Marsden NHS Trust

This is to certify that

Emma King

attended

"Image Guided & Intensity Modulated Radiotherapy in Clinical Practice"

A course on the practical implementation of IGRT & IMRT in a radiotherapy clinic

Endorsed by NRIG

This course has been accredited by EFOMP as a CPD event

For Medical Physicists with 17 credits

Awarded 19 RCR points Category I credits from the Royal College of Radiologist

Held 16th – 18th February 2012 at The Royal Marsden NHS Trust

A. M. Bidmead

Head of Radiotherapy Physics - The Royal Marsden Hospital

Course Director

Certificate no 080 1.

The Royal Marsden NHS Trust

This is to certify that

Dr Serena Hilman

attended

"Image Guided & Intensity Modulated Radiotherapy in Clinical Practice"

A course on the practical implementation of IGRT & IMRT in a radiotherapy clinic

Endorsed by NRIG

This course has been accredited by EFOMP as a CPD event

For Medical Physicists with 17 credits

Awarded 19 RCR points Category I credits from the Royal College of Radiologist

Held 16th – 18th February 2012 at The Royal Marsden NHS Trust

A. M. Bidmead
Head of Radiotherapy Physics - The Royal Marsden Hospital
Course Director
Certificate no 080 1.

Appendix 5 IVD protocol- extract to show criteria for use

BRISTOL HAEMATOLOGY & ONCOLOGY CENTRE
Radiotherapy Physics Unit

In vivo diodes are used for monitoring patient doses on the first fraction of External Beam treatment (photons). During the treatment planning process an expected range of dose is calculated, which is then to be measured at each first field. Radiographers position the diodes and make the dose measurements. Regular calibration, checks and fault finding of the diodes is carried out by physicists, as well as reconciling any doses that fall outside the expected range, as reported by the radiographers.

Appendix 6 Patient Experience

Paper to: **Public Meeting of the Trust Board 28th April 2011**

Subject: **National Cancer Patient Experience Survey 2010**

Authors: **Ruth Hendy, Lead Cancer Nurse**
Paul Lewis, Patient Involvement Coordinator

Date: **18th April 2011**

1. Executive summary

This report summarises the key findings for University Hospitals Bristol from the 2010 National Cancer Patient Experience Survey. A service improvement action plan in response to the results is also presented in Appendix B and this will be integral to the Cancer Services Board Work Plan in 2011/12.

Quality Health Ltd (on behalf of the Department of Health) undertook the survey and carried out the analysis (see accompanying report). Their analysis compared the 158 acute NHS Trusts who took part in the survey and classed scores as being in the bottom 20%, middle 60% and highest 20% of Trusts nationally. Of the 59 scores in the analysis, UH Bristol had:

- 2 scores in the top 20% of Trusts nationally:
    - giving patients a choice of different types of treatment
    - ensuring there were always / nearly always enough nurses on duty
- 39 scores in the middle 60% of Trusts nationally
- 16 scores classed as being in the bottom 20% of Trusts nationally (page 5)
- 2 scores that would have been among the worst 20% of Trusts nationally, but for a rounding effect that worked in our favour

Full details of the Trust scores that were classified in the lowest 20% nationally are given in Table 1 of this report, but they fall into the following broad themes:

- Compassion, dignity and respect
- Specialist Clinical Nurse Specialist support
- Communication and information

Further local analysis of the results has compared our scores against comparator Trusts (table 5), the national scores (appendix A), and the best Trust score nationally (table 4). We cannot compare our results against previous cancer surveys (in 2000 and 2004) as the methodology has changed significantly.

Whilst it is acknowledged that many aspects of these results are disappointing for the Trust, it should be noted that significant actions to address these areas have already been implemented around the Trust since the data was collected 12-14 months ago.

It is also noted that 8 of our 16 scores that fell in the 'lowest 20%' nationally, were actually over 85% and thus while there is clearly room for improvement, they are not entirely poor results in themselves.

An action plan (Appendix B) has been developed to address these areas of concern. These actions are being aligned with existing Trust and Divisional Patient and Public Experience processes and work streams where possible.

This paper and action plan was presented to the Trust Executive Group (TEG) on 13th April 2011. Whist disappointed in the results, TEG was in support of the action plan with the expectation that the following points be subsequently included:

- Consider and incorporate lay representation within the Cancer Services Board
- Specific performance measures to sit within the action plan and be monitored by the Cancer Services Board
- National Cancer Patient Experience Survey results to be reviewed alongside all the other Trust patient survey data (eg national inpatient survey, hand held surveys, comments cards) for cross-referencing and combined action planning

Although this report has focused on the quantitative percentage data from the survey results, in order that we could determine clear action planning, it should also be acknowledged that the 'patient comments' feedback that accompanied this report demonstrated that numerous patients have many positive experiences in Cancer Care at UH Bristol.

Future National Cancer Surveys will be fully integrated into the Trusts comprehensive survey programme.

2. Background

Cancer Reform Strategy published in 2007 set out a commitment to establish a new NHS Cancer Patient Experience Survey programme. The 2010 National Cancer Patient Experience Survey was designed to monitor national progress on cancer care; and to provide information that could be used to drive local quality improvements; and to help gather vital information on the *Transforming Inpatient Care* Programme, the *National Cancer Survivorship* Initiative and the *National Cancer Equality* Initiatives.

3. Methodology

The survey included all adult patients (aged 16 and over) with a primary diagnosis of cancer[1] who had been admitted to a hospital in our Trust as an inpatient or as a day case patient, and

had been discharged between 1st January 2010 and 31st March 2010. Trust samples were checked rigorously for deceased patients and duplicates. Patient lists were also duplicated nationally to ensure that patients did not receive multiple copies of the questionnaire.
Postal surveys were sent to the patient's home address following their discharge. Up to two reminders were sent to non-responders. 1234 eligible patients from this Trust were sent a survey, and 793 questionnaires were returned completed. This represents a response rate of 66%, once deceased patients and questionnaires returned undelivered had been accounted for.

A total of 109,477 patients were included in the national sample for the Cancer Patient Experience Survey. 158 acute hospital NHS Trusts providing cancer services took part in the survey. The national response rate was 67% (67,713 respondents).

4. Overview of the Trust's results in the 2010 National Cancer Survey Report

4a. Department of Health Analysis

Accompanying this analysis is a report compiled by Quality Health Ltd on behalf of the Department of Health that places each of our survey scores in the bottom 20% of Trusts nationally, the middle 60%, or the top (best) 20%.[2] Of the 59 questions in this comparative analysis:

- 39 of our scores were among the middle 60% of Trusts nationally
- 16 were among the worst 20% of Trust scores nationally
- 2 were among the best 20% of Trust scores nationally
- 2 scores that would have been among the worst 20% of Trusts nationally, but for a rounding effect that worked in our favour (in effect we feel these scores fell into the lowest 20% category)

In order to try and understand where we performed relatively poorly, Table 1 provides a thematic look at the scores where we were among the worst 20% nationally. Three broad issues emerge around compassion / dignity and respect; access to Cancer Clinical Nurse Specialists, and communication / information. An action plan is provided in Appendix B demonstrating how these relatively low scores will be improved.

Clearly we will not be satisfied with our results and it is the Quality Health analysis that we are most likely to be judged on by our patients. It should be noted however that even a bottom 20% score isn't necessarily poor in itself. For example, five of our eighteen "worst 20%" scores were above 90%, and eight of them are above 85% (see Table 1). Similarly though, a score isn't necessarily a good result in itself even if it is in the middle or top thresholds.

Patients eligible for the survey were taken from Trust patient administration systems; the inclusion criteria were that the patient had an International Classification of Disease (ICD10) code of C00-99 (excluding C44) or D05. The types of cancer patients included in the 2010 survey included, for the first time, significant numbers with rarer cancers as well as patients in the "Big 4" cancer groups – i.e. breast, prostate, lung, and colorectal/Lower GI. In total these patients fell into 13 different cancer groups.

[2] Please note that there are differences between the Quality Health analysis for this survey and the national patient survey reports that are produced by the CQC for the national inpatient, outpatient, emergency department and maternity surveys. The Quality Health report is based on the percentage result for each question – usually the percentage who ticked the "best" response option – rather than using a weighted score across all response options as the CQC do. It is arguable that the CQC is preferable in this respect as it gives a more rounded view of our performance. Unlike the CQC, Quality Health do not take into account margins of error when determining if a score is within the worst or best 20% of Trusts nationally. If they did, then none of our scores would be in the best or worst 20% nationally on the cancer survey. Although not strictly correct in a statistical sense, it is arguable that the Quality Health approach is preferable in this respect as the CQC analysis tends to get mired in statistical caveats. Quality Health also do not attempt to correct for differences in the demographics of Trust's patient populations, which can have a significant effect on the results (e.g. younger populations tend to be more dissatisfied with services).

Table 1: UH Bristol Trust scores that were among the worst 20% of scores nationally

	Question	Response Category	UH Bristol (%)
Compassion, dignity and respect	How do you feel about the way you were told you had cancer?	% who were told sensitively	81%
	Sometimes people with cancer feel they are treated as "a set of cancer symptoms", rather than a whole person. In your NHS care over the last year, did you feel like that?	% no	77%
	Were you given enough privacy when discussing your condition or treatment?	% always	79%
	Were you given enough privacy when being examined or treated?	% always	90%
	Did hospital staff do everything possible to control the side effects of radiotherapy?	% yes definitely	78%
	Did hospital staff do everything possible to control the side effects of chemotherapy?	% yes definitely	81%
	The last time you had an outpatients appointment with a cancer doctor, was the time you spent with them too long, too short or about right?	% about the right amount of time	92%
Specialist CNS Support	How easy is it for you to contact your Clinical Nurse Specialist?	% easy	68%
	The last time you spoke to your Clinical Nurse Specialist, did she/he listen carefully to you?	% yes definitely	89%
	When you have important questions to ask your Clinical Nurse Specialist, how often do you get answers you can understand?	% all or most of time	88%
	The last time you saw or spoke to your Clinical Nurse Specialist, do you feel that the time you spent with them was too long, too short or about right?	% about right	91%
Communication and information	Did hospital staff tell you that you could get free prescriptions?	% yes	60%
	As far as you know, was your GP given enough information about your condition and the treatment you had at the hospital?	% yes	91%
	After the operation, did a member of staff explain how it had gone in a way you could understand?	% yes	68%
	The last time you had an appointment with a cancer doctor, did they have the right documents, such as medical notes, x-rays and test results?	% doctor had the right notes with them	93%
	Were you given clear written information about what you should or should not do after leaving hospital? *	% yes	78%
	If your family or someone else close to you wanted to talk to a doctor, did they have enough opportunity to do so?	% Yes definitely	60%
	Patient given the right information about their condition and treatment *	% Yes definitely	86%

**These two questions were not officially classed as being in the worst 20% because of a rounding effect*

Table 2 looks at the five lowest survey scores for UH Bristol. Interestingly only one of these scores* is among the worst 20% nationally, suggesting that these are problems many Trusts face. Again though, themes around communication and information emerge as strong factors in need of improvement. In addition a further issue is raised around how well medical professionals both inside and outside of the Trust are working together.

Table 2: The five lowest UH Bristol survey scores

	Response Category	**UH Bristol**
Did hospital staff give you information about how to get financial help or benefits?	% yes	49%
Did the doctors or nurses give your family or someone close to you all the information they needed to help care for you at home?	% yes definitely	55%
After leaving hospital, were you given enough care and help from health or social services (For example, district nurses, home helps or physiotherapists)?	% yes	56%
Did the different people treating and caring for you (such as GP, hospital doctors, hospital nurses, specialist nurses, community nurses) work well together to give you the best possible care?	% yes always	59%
If your family or someone else close to you wanted to talk to a doctor, did they have enough opportunity to do so?*	% Yes definitely	60%

4b. Comparison of the Trust's results with Previous National Cancer Surveys

We do not believe a valid comparison can be made to the previous large-scale national cancer survey in 2000 because:

- The 2000 survey sample included only three cancer-types compared to thirteen in 2010.
- The 2000 survey did not specifically use the word "cancer" i.e. it didn't direct cancer patients specifically to their experience of cancer care in the NHS
- Trust-level data was not provided in 2000. Instead, the data was split by the three cancer types, but this was subject to large margins of error due to the relatively small sample sizes.

It is strongly anticipated (though not yet officially confirmed) that this Survey will be repeated annually as part of the National Programme and therefore the 2010 results will provide a benchmark against which we can assess our service improvement action plan. If this does not happen, UH Bristol has a commitment to repeating some local assessment of cancer patient experience to provide assurance that progress is being made.

4c. Results by Cancer Type

The results can be broken down by cancer type (see accompanying report from Quality Health), but caution is needed here as the relatively small sample sizes increase the unreliability of this data. Nevertheless, some potential issues to follow-up do emerge from this analysis:

- Following diagnosis, 60% of brain / Central Nervous System tumour respondents thought they were seen at our hospital "as soon as was necessary". This was markedly lower than the other areas and the Trust score (79%). It should be noted that a relatively higher proportion of brain / Central Nervous System tumour patients felt their condition got worse during their wait for an initial appointment.

- A relatively low proportion of respondents with Haematological cancer felt they had completely understood the explanation of their cancer (62% vs 74% for the Trust as a whole)

- There was a large variation in the proportion of patients saying they were given written information about their cancer (48% of brain / Central Nervous System cancer patients compared to 83% of prostate cancer patients, at the extremes)

- Patients with Urological cancers gave us relatively low scores on aspects of Clinical Nurse Specialist care, information provision, communication, and pain control

4d. Comparisons with other Trusts

Our Trust's three scores that were furthest away from the best Trust score nationally were all around the "information" topic area (Table 4).

Table 4: UH Bristol scores that were furthest away from the best Trust scores nationally

	UH Bristol %	Highest % Nationally	Percentage Point Difference
Beforehand, were you given written information about your operation?	64	91	-27
Did hospital staff give you information about how to get financial help or benefits?	49	74	-25
Did hospital staff tell you that you could get free prescriptions?	60	85	-25

Table 5 provides a brief summary of the performance of some selected comparator Acute Teaching Trusts, along with two specialist cancer care hospitals (Christie and the Royal Marsden). Table 6 shows our results against local hospitals in the Avon Somerset and Wiltshire Cancer Services Network.

Table 5: A comparison of UH Bristol's results with other selected Trusts

	No. of scores in highest 20% nationally	No. of scores in lowest (worst) 20% nationally	Difference (no. of highest – no. of lowest)
Christie NHS F.T.	24	6	18
Oxford Radcliffe	2	5	3
Southampton U.H.	3	6	3
Royal Marsden	10	11	-1
U.H. Birmingham	3	14	-11
UH Bristol	2	16	-14
Guy's & St. Thomas's	4	19	-15

Table 6: A comparison of UH Bristol scores with other local Trusts in the Avon Somerset and Wiltshire Cancer Services Network (sample size and extent of cancer services provision varies widely across this network, so difficult to draw comparison)

	No. of scores in lowest (worse) 20% nationally	No. of scores in highest 20% nationally	Difference (no. of highest – no. of lowest)
Taunton	3	26	+23
Yeovil	3	23	+20
RU Bath	4	21	+17
Weston	5	22	+17
UH Bristol	16	2	-14

5. Responding to the survey findings

Clearly these are not a good set of survey results for our Trust. Appendix B contains an action plan that will help us improve our scores in the survey, with a particular focus this year on scores that fell below the national average and scores where UH Bristol were furthest from the best Trust score nationally. This action plan has been agreed by the Cancer Services Board in response to the Quality Health report and the above analysis. These actions form part of an overall Cancer Services Work Plan (2011/2012). In addition, individual Multidisciplinary Teams (MDTs) and each clinical Division have been asked to review their own cancer site specific results and feed their actions into their Multidisciplinary / Divisional work plans and into the Cancer Advisory Group.

6. The anticipated impact of this action plan

Ultimately, it is the aim of UH Bristol to be amongst the highest scoring Trusts nationally for all areas covered in the Survey and to be considered a centre of excellence as good as specialist cancer Trusts like The Christie and The Royal Marsden.

Assuming the National Cancer Patient Experience Survey will form part of the future annual patient survey programme, UH Bristol will aim for the following measurable improvement in our next survey results:

- 2011/12 - greater than 10% increase in all results currently lower than 60%
- 2011/12 - to have more results in the 'highest 20%' than results in the 'lowest 20%'
- 2011/12 *stretch target* to have greater than 50% of results in the 'highest 20%' nationally

It is noted that whilst some of the actions outlined in Appendix B have already been completed, many are in the process of implementation. Should the survey be repeated nationally in the next 4 months the results will not reflect the impact of the full action plan.

In the unlikely event that the National Cancer Patient Experience Survey not be repeated by Quality Health Ltd. within the next 6 months, UH Bristol Patient and Public Involvement Leads have agreed to integrate a local review of these areas within UH Bristol's existing patient experience and survey programme, to measure the impact of the actions taken and monitor progress.

7. Assurance of improvement

Each action in this plan (Appendix B) is lead by a member of the Cancer Services Board who will link with the clinical lead as appropriate to ensure delivery and implementation of that specific action in line with the timescales identified.

As part of the Cancer Services Work Plan (2011/12) this work will be monitored on a monthly basis at the Cancer Services Board. It will also be monitored at the Patient and Public Involvement (PPI) Leads Group and at Divisional PPI Groups.

Throughout this year (as detailed in Appendix B) specific aspects of these results will be reassessed through hand-held surveys and postal surveys within the Trust to provide assurance of improvement, ahead of the anticipated repeat of the National Cancer Patient Experience Survey.

Appendix A: Full Table of Results (including national comparisons)

This table presents our Trust % score on each question. It is in rank order starting with the score furthest away from the best Trust nationally. The national percentage score (i.e. all of the data collected in the national survey) is also provided.

*Key: * = UH Bristol score is worse than the national score; ** UH Bristol score is better than the national score (based on a minimum required difference of four percentage points)*

Question	UH Bristol % score	Highest % score Nationally	Difference (UH Bristol – highest)	National % score
Beforehand, were you given written information about your operation?	64	91	-27	68*
Did hospital staff give you information about how to get financial help or benefits?	49	74	-25	50
Did hospital staff tell you that you could get free prescriptions?	60	85	-25	68*
How easy is it for you to contact your Clinical Nurse Specialist?	68	92	-24	75*
When you had important questions to ask a ward nurse, how often did you get answers you could understand?	71	95	-24	73
Did you have confidence and trust in the ward nurses treating you?	66	90	-24	66
After leaving hospital, were you given enough care and help from health or social services (For example, district nurses, home helps or physiotherapists)?	56	80	-24	60*
The last time you had an outpatients appointment with a cancer doctor at one of the hospitals named in the covering letter, how long after the stated appointment time did the appointment start?	64	88	-24	68*
Did the doctors or nurses give your family or someone close to you all the information they needed to help care for you at home?	55	77	-22	58
Did hospital staff do everything possible to control the side effects of radiotherapy?	78	100	-22	82*
Did you understand the explanation of what was wrong with you?	72	93	-21	74
After the operation, did a member of staff explain how it had gone in a way you could understand?	68	89	-21	73*
In your opinion, were there enough nurses on duty to care for you in hospital?	68	89	-21	62**

Question	UH Bristol % score	Highest % score Nationally	Difference (UH Bristol – highest)	National %
When you were told you had cancer, were you given written information about the type of cancer you had?	63	82	-19	66
If your family or someone else close to you wanted to talk to a doctor, did they have enough opportunity to do so?	60	79	-19	66*
Did you have confidence and trust in the doctors treating you?	82	100	-18	84
Were you given clear written information about what you should or should not do after leaving hospital?	78	95	-17	82*
Were the results of the test(s) explained in a way you could understand?	75	91	-16	76
Did hospital staff give you information about support or self-help groups for people with cancer?	78	94	-16	79
When you had important questions to ask a doctor, how often did you get answers that you could understand?	79	95	-16	81
Did doctors talk in front of you as if you weren't there?	84	100	-16	83
Did ward nurses talk in front of you as if you weren't there?	84	100	-16	83
Were you given enough privacy when discussing your condition or treatment?	79	95	-16	82
How do you feel about the length of time you had to wait before your first appointment with a hospital doctor?	79	94	-15	81
How do you feel about the way you were told you had cancer?	81	96	-15	83
While you were in hospital did you ever think that the doctors or nurses were deliberately not telling you certain things that you wanted to know?	85	100	-15	87
Were you treated with respect and dignity by the doctors and nurses and other hospital staff?	81	96	-15	82
While you were being treated as an outpatient or day case, were you given enough emotional support from hospital staff?	69	84	-15	71
Did the different people treating and caring for you (such as GP, hospital doctors, hospital nurses, specialist nurses, community nurses) work well together to give you the best possible care?	59	74	-15	61

Question	UH Bristol % score	Highest % score Nationally	Difference (UH Bristol – highest)	National %
Sometimes people with cancer feel they are treated as “a set of cancer symptoms”, rather than a whole person. In your NHS care over the last year, did you feel like that?	77	92	-15	80
Did your health get worse, get better or stay about the same while you were waiting for your first appointment with a hospital doctor?	78	92	-14	78
When you were first told that you had cancer, had you been told you could bring a family member or friend with you?	72	86	-14	71
Did hospital staff do everything possible to control the side effects of chemotherapy?	81	95	-14	85*
While you were in hospital, did it ever happen that one doctor or nurse said one thing about your condition or treatment, and another said something different?	79	92	-13	79
Beforehand, did a member of staff explain the purpose of the test(s)?	81	93	-12	81
Were the possible side effects of treatment(s) explained in a way you could understand?	73	85	-12	72
Before you started your treatment, were you given written information about the side effects of treatment(s)?	78	90	-12	79
Were you involved as much as you wanted to be in decisions about which treatment(s) you would have?	71	83	-12	71
Do you think the doctors treating you knew enough about how to treat your cancer?	88	100	-12	89
Beforehand, did a member of staff explain what would be done during the test procedure(s)?	84	95	-11	84
Were you given the name of a Clinical Nurse Specialist who would be in charge of your care?	86	97	-11	84
The last time you spoke to your Clinical Nurse Specialist, did she/he listen carefully to you?	89	100	-11	91
Before you had your operation, did a member of staff explain what would be done during the operation?	82	93	-11	85
Do you think the hospital staff did everything they could to help control your pain?	84	95	-11	85
The last time you went into hospital for a cancer operation, was your admission date changed to a later date by the hospital?	89	99	-10	89

Question	UH Bristol % score	Highest % score Nationally	Difference (UH Bristol – highest)	National %
Were you given enough privacy when being examined or treated?	90	100	-10	93
While you were being treated as an outpatient or day case, did hospital staff do everything they could to help control your pain?	82	92	-10	83
How much information were you given about your condition and treatment?	86	96	-10	88
When you have important questions to ask your Clinical Nurse Specialist, how often do you get answers you can understand?	88	97	-9	91
The last time you saw or spoke to your Clinical Nurse Specialist, do you feel that the time you spent with them was too long, too short or about right?	91	100	-9	95*
Did hospital staff tell you who to contact if you were worried about your condition or treatment after you left hospital?	91	100	-9	92
After your GP first told you that you would need to see a hospital doctor, how long did you have to wait before your first appointment with a hospital doctor?	91	99	-8	90
Beforehand, were you given written information about your test(s)?	86	94	-8	85
Before your cancer treatment started, were you given a choice of different types of treatment?	88	96	-8	83**
As far as you know, was your GP given enough information about your condition and the treatment you had at the hospital?	91	99	-8	93
The last time you had an appointment with a cancer doctor, did they have the right documents, such as medical notes, x-rays and test results?	93	100	-7	95
The last time you had an outpatients appointment with a cancer doctor, was the time you spent with them too long, too short or about right?	92	98	-6	94

1: Action Plan

Aim	Work strand	Action:	Lead(s):	When
To raise the profile of cancer care around the Trust and ensure cancer care priorities are integrated into all appropriate Divisional work streams and developments	Communication and Information	Appointment of Trust Lead Cancer Nurse to lead on Patient and Public Involvement agenda for cancer / cancer nursing and allied health professionals* approach to cancer care delivery	Ruth Hendy	January 2011
		Lead Cancer Nurse to join the Trust Patient Public Involvement (PPI) Leads group to link in with the Heads of Nursing (as Divisional PPI Leads) to ensure that the Cancer agenda is integral to all other Trust and Divisional Patient Experience and PPI processes. This meetings acts as the assurance committee for all PPI work to ensure the Trust monitors the action plan.	Ruth Hendy	March 2011
		Lead Cancer Nurse to meet with each Divisional PPI Lead (Head of Nursing) and discuss and agree their Divisional priorities (from the Survey results) and go to their Divisional PPI Meeting to discuss implementation of these Divisional actions	Ruth Hendy / Heads of Nursing	June 2011
		For these cancer survey results (and future results) to be reviewed and considered alongside all other Trust patient survey results (National Inpatient Survey, hand held surveys, patients comments cards) for cross-referencing and combined action-planning	Paul Lewis Mark Callaway Teresa Levy	May 2011
		For performance measures to be integrated into this action plan to enable the Cancer Services Board to monitor progress (detail to be added post Trust Board).	Ruth Hendy Mark Callaway	May 2011
		To include lay representatives in Cancer Services discussions, decision making and developments (as discussed and agreed at Cancer Services Board, 18/04/11) • For UHBristol to engage with the existing Avon Somerset and Wiltshire Cancer Services (ASWCS) network user groups and Site Specific User representatives (enabling open dialogue on issues in a timely way. eg Trust action in response to cancer survey results, Peer Review process changes) • Invite nominated representatives from these existing forums to sit on the Cancer Services Board.	Claire Bullock (ASWCS) Teresa Levy	June 2011 May 2011

		• In response to changes (April 2011) in the national Cancer Peer Review Programme (stating that site-specific teams, eg breast cancer, colo-rectal cancer etc, only need to self-assess their service against national measures, every other year now (instead of annually), UHBristol Cancer Services Board has agreed that all UHBristol teams will continue annual self assessment as a means of monitoring standards and progress.		
For hospital staff to inform patients that they can get free prescriptions and how they can get financial help or benefits	Communication & Information	To discuss with all cancer Clinical Nurse Specialists (CNS) and Allied Health Professional (AHP) groups at Cancer CNS / AHP Forum	Ruth Hendy	26th April 2011
		To check availability and obtain leaflets / posters for display in Outpatients Departments (Bristol Haematology and Oncology Centre, Bristol Royal Infirmary, St Michaels) To expand access to patient information by installing satellite 'Information pods' in the Bristol Royal Infirmary and St Michael's Outpatients Departments	Ruth Hendy (Matrons, BHOC, BRI and St Michaels)	July 2011
		To discuss availability and access to Macmillan Citizens Advice personnel within Trust and the Information Centre in Bristol Haematology and Oncology Centre at Cancer Clinical Nurse Specialist and Allied Health Professional Forum	Ruth Hendy	26th April 2011
To make it easy for patients to contact their clinical nurse specialist	Clinical Nurse Specialists	For Clinical Nurse Specialists to ensure all patients have accurate contact details and have clear process for responding to calls / messages in a timely way	Ruth Hendy	May 2011
		Discuss the development of a Clinical Nurse Specialist service model to include a supportive / coordination post to act as a single point of entry for teams of Clinical Nurse Specialists to triage calls and filter enquiries, releasing Clinical Nurse Specialist time for direct patient care. Prepare and propose service model.	Ruth Hendy	August 2011
To ensure patients are given written information about their operation, pre-operatively To ensure patients receive	Communication & Information	Individual Multidisciplinary Teams (MDTs) to review their own (cancer site specific) preoperative information and when and how it is given to patients. Feedback site specific actions into their MDT work plans and to the Cancer Advisory Group.	MDT Leads	June 2011

clear written information about what to do after leaving hospital		The Trust will enrol in the National Cancer Action Team (NCAT) NHS Information Prescription Service. This will ensure all patients are provided with standardised, reliable and accurate information.	Ruth Hendy	**Awaiting date from NCAT, as to which wave UHB can apply for. End of 2011 / Spring 2012?**
Post-operatively, ensure staff explain how the operation went in a way the patient can understand	Communication & Information	To ensure that all Multi-disciplinary team members with clinical contact attend the National Advanced Communication Skills Course, as per Peer Review recommendations (as guided by course availability)	Ruth Hendy Mark Callaway	Ongoing
To ensure patients feel they are treated as a whole person, rather than a set of symptoms. To ensure patients are given enough privacy when discussing their condition or treatment	Compassion, Dignity & Respect	As part of the Trust–wide ward based hand held survey schedule, Dec 2011 will be focused on asking patients if they are able to understand information / ask the questions they want to	Tony Watkin	December 2011
		Survey results to be cascaded and discussed with all Trust Cancer Clinical Nurse Specialists / Allied Health Professionals (in the newly formed Trust Cancer CNS and AHP Forum) and to Heads of Nursing for cascade to Matrons/ Sister's for all cancer related inpatient and outpatient areas	Ruth Hendy	April 26th 2011
For those close to the patient to feel they had an opportunity to talk to the doctor	Communication & Information	To discuss with all Multidisciplinary Team Leads via Cancer Advisory Group and for the Leads to cascade into teams.	Mark Callaway	11th April 2011
		Survey results to be feedback and discussed with all the Trust Cancer Clinical Nurse Specialists /Allied Health Professionals at the Cancer CNS / AHP Forum	Ruth Hendy	26th April 2011
		Monitor this question specifically for cancer patients in the monthly postal survey of discharged inpatients	Paul Lewis	TBC

To ensure patients and their supporters (carers get the information they need to continue care at home	Compassion, Dignity and Respect	To establish 'Living Well' clinics in Bristol Haematology and Oncology Centre (in collaboration with Penny Brohn Centre) for patients / supporters to attend at any time during or after treatment, to access support and signposting to additional resources available to them in the Community To establish 'Living Well' courses (weekly 2hr sessions, x6 weeks) for patients /supporters to attend to learn strategies for living with and after cancer To establish 'Moving Forward' days for Breast Cancer patients to attend at the end of treatment.	Ruth Hendy (Helen Cooper) (Helen Cooper) (Angie Nicholson)	Jan 2011 July 2011 November 2010
To ensure that hospital staff do everything possible to control the side effects of chemotherapy and radiotherapy	Compassion, Dignity & Respect	To discuss and raise awareness of these concerns specifically with clinical groups in Bristol Haematology and Oncology Centre (Chemotherapy group, Radiotherapy Group) for dissemination to all clinical staff	Kate Love Steve Falk	May 2011
		The implementation and full integration of Bristol Haematology and Oncology Centre Acute Care model. This will enable a specifically appointed Speciality Doctor to respond to the urgent needs of patients with chemotherapy / radiotherapy side effects. To audit the current process and standard of chemotherapy information giving in the Chemotherapy Day Unit and on the wards in Bristol Haematology and Oncology Centre. To enable the clear identification of the areas where targeted intervention is required to improve this aspect of the service. (Work is already underway to review the nurse / patient ratio on ward 61 to enable a consistent and appropriate level of care delivery in all areas). To audit compliance to the radiotherapy on-treatment review protocol. To increase the effectiveness of on-treatment review clinics by moving to a model of radiographer-led review. Assess at next survey.	Fiona Jones Fiona Jones (Jeremy Braybrooke and Hayley Long) Kate Love	April 2010 August 2011 August 2011
		A patient-held Chemotherapy alert card has been developed and will be piloted and evaluated. This will enable chemotherapy patients to show this card to any professional wherever they present for urgent / emergency treatment and it will identify what treatment they have had and where to contact for more information	Ruth Hendy (Hayley Long)	June 2011
Enable different professionals to work together more	Communication & Information	All Allied Health Professionals involved in Cancer care around the Trust (including therapeutic radiographers, physiotherapists, occupational	Ruth Hendy	26th April 2011 and

effectively		therapists, psychologists, dieticians, speech and language therapists) will join together with Clinical Nurse Specialists regularly to discuss collaborative approach to care delivery. Consider Primary Care representative joining this forum.		then bi-monthly
To improve the time that patients wait in Outpatients clinics	Compassion, Dignity and Respect	Following the Bristol Haematology and Oncology Centre Refresh programme, the Bristol Haematology and Oncology Centre Outpatients Department now has 12 consultations rooms (compared with 6 previously).	BHOC Team	Completed November 2010
		Monitor this through local Trust outpatient survey programme planned for 2011/12	Paul Lewis	TBC

*Allied health professionals (AHPs) include physiotherapists, occupational therapists, radiographers, dieticians, speech and language therapists

Appendix 7 Radiation Oncology Group -extract of minutes from 7 September 2012

Date:	**Friday 7th September 2012**	**Meeting:**	**Radiation Oncology Group**
Present:	Kate Love (Chair), Jancis Kinsman, Josie Green, Mandy Webster, Roger Parry, Sally Fletcher, Sarah Griffiths, Steve Falk, Matthew Beasley, Wendy Davis, Sue Cowley		
Apologies:	Alison Cameron, Andrew Iles, Charles Comins, Georgia Welsh, Helen Appleby,		

	Issue discussed	Action agreed	Name
2.	**Matters arising**	No matters arising, the minutes from the previous meeting were accepted as an accurate record. The group reviewed the action plan and the following points were noted for each issue discussed: • **Network Protocols** – Meeting has been held and agreement made on how to divide the Network protocols between the three sites. • **SLA Bath** – Primary aim on where patients will be treated and which patients should have shared care has been agreed. • **Pelvis RT Prep** – modified bladder filling to 3 cups in 30minutes, haven't had to rescan as many patients. Reviewing patient information. • **Virtual Simulation** – the progress form has been updated. SG will ask Denise Gibson, Tracy Zehtabi and the Dental Hospital to ensure that current versions of the progress form and pregnancy consent forms are being issues in Outpatient Departments.	**SG**
3.	**Key Issues**	Concern raised of the potential issue of treating heavy patients and treating all 10MV patients on the D while the C is out of use. MXB will discuss with consultants and emphasis that 10MV treatment is to only be used when clinically required. JK will look at the patients currently being treated on the C to then estimate the impact this could have on the D and feedback to KL and MXB. MXB will also discuss the issue in principle with Emma De Winton, to see if there would be a possibility of treating patients at Bath if	**MXB** **JK** **MXB**

		required.	
4. 4.1	Items for Decision/Approval Peer Review Documents	Documents will be added to the BHOC Radiotherapy Oncology Group Workspace today, for everyone to review and raise any concerns with SC or KL. Terms of reference for the group were agreed. This year we are required to undertake a self-assessment and this will be undertaken by Hannah Marder. The group discussed the following points: **Staffing and Skill Mix – Radiotherapy** Report submitted by MW. Highlighted that the Society of Radiographers recommendation is 1.33 per linac hour for a core service, the department is unable to achieve this and is currently 1.09 per linac hour. A risk assessment has been carried out and no concerns raised. Have increase A&C support in the planning office to free radiographer time. **Staffing and Skill Mix – Physics** From the IPEM recommendations the department are understaffed. A risk assessment has been carried out, and no risks were identified. **Staffing and Skill Mix – Medical Staff** MXB will review the Medical staff skill mix. **SRT &SRS Audit of Margins** – Current margin of 2mm for SRT treatment is similar to those used in other centres, is supported by the calculation of an average margin of 3.3. For many sterotactic patients margin used is decided by consultants according to prescription and site. **Patient Experience** – improvement has been made. The group felt that the comments cards and patient experience notice boards are not the best source of communication and the suggestion of giving every patient a questionnaire to complete was made. It was agreed that we should wait until the results from the National Radiotherapy Survey are through and we can action the main concerns from there and then look at developing further surveys from there. It was also agreed to add patient experience as a quarterly item to the ROG agenda, to allow feedback from comments cards.	

4.2	**Radiotherapy Work Plan**	The group reviewed the 2012/13 work plan and the following was noted: • Paperless documentation – needs an implementation date. MXB informed the group that he has started to trial the electronic progress form for Head and Neck patients. • QA checks in Mosaiq – complete and can be removed from work plan. • Paediatric immobilisation – equipment has arrived, can start using. • Developing Services – work is underway on next year's Divisional Operating Plan, the group supported putting forward oesophageal brachytherapy. KL will discuss with Pauline Humphrey.	**KL**
5 5.1	**Items for Discussion** **IMRT response to NRIG**	All Trusts need to declare their position on how many patients they are treating with IMRT, the current target is 24%. We are currently achieving 15%, this is due to commissioning blocks and licences for physics and physics staff. It was also noted that ability to undertake IMRT when only the D is available will prove challenging.	
6 6.1 6.2	**For Information** **Radiotherapy Quality Dashboard** **Linac Replacement – update**	As part of the Cancer Commissioning Toolkit a Radiotherapy Quality Dashboard has been designed. Trusts have to report back against 11 quality indicators. BHOC will need input from a data analyst to write reports before data can be submitted. IM&T are considering all requirements for funding. Procurement process is underway for replacement of 22C. Discussions taking place if Bristol should have a separate gamma knife to deliver intracranial SRS and SRT, rather than on a linac. A second linac (funded by the Friends) will be procured to replace 22F. Order for both linac replacements need to be placed by the end of October.	

7.1	**Protocols**	Gynae and Gynae HDR protocols have been approved.	
7.2	**AcQSim**	Meeting next week.	
7.3	**Verification Steering Group Committee**	Two new immobilisation studies have been agreed. New verification sheet is being trialled. New index for headrest and foot stops in progress. Looking at Tumour LOC.	
7.4	**IMRT**	Meeting taking place later this month. Have been invited to take part in a paediatric IMRT study, MXB will discuss requirements with the Commissioners.	**MXB**
7.5	**SBRT Group**	Establishing an audit for wing boards. First case to be started by the end of 2012, currently waiting for 4D CT. CC will write a proposal document and quality assurance for patient safety and present at ROG.	**CC**
8.	**Any Other Business**	BSI visit recently carried out, passed with an excellent report.	
9.	**Key Messages**	❖ On-going accreditation with BSI and an excellent Report. ❖ Improvement in Patient Experience Survey. ❖ Peer Review documents approved.	
	Date of Next Meeting	Friday 19th October 2012, 11am, Aves Kilsby Meeting Room, Level 4, BHOC	