# HIGHLIGHT REPORT FROM THE CHAIR OF THE MOONDANCE PROGRAMME BOARD

**Meeting Date:** 6th December 2017  
**Author:** Jenny Stock, Programme Manager & Libby Crumpton, Programme PA  
**Sponsoring Executive Director:** Mark Osland, Director Finance, VNHST  
**Report Presented by:** Dr Jacinta Abraham, Medical Director and Consultant Oncologist, VNHST

## Trust Resolution to: (please tick) ✓
- **Approve:**  
- **Endorse:**  
- **Discuss:**  
- **Note:** ✓  

**Recommendation:** The CFC are asked to note the set up and progress of the Moondance Programme Board

## This report supports the following Trust objectives as set out in the Integrated Medium Term Plan: (please tick) ✓
- Equitable and timely services ✓  
- Providing evidence based care and research which is clinically effective ✓  
- Supporting our staff to excel ✓  
- Safe and reliable services ✓  
- First class patient /donor experience ✓  
- Spending every pound well ✓
1. INTRODUCTION / BACKGROUND:

1.1. This paper had been prepared to provide the R&D Committee with details of the key issues considered by the Moondance Programme Board (MDP) at its meeting on the 25th October 2017.

1.2. As noted in previous highlight reports, the Moondance Programme has an overall budget of £3m equally donated by the Moondance Foundation and Velindre Charitable Funds Committee (CFC).

1.3. The purpose of the funding is to create an infrastructure which accelerates the introduction of stereotactic and advanced radiotherapy treatment for patients and supports active participation in research and service developments.

1.4. The MDP Board is Chaired by a Trust Board Independent Member (IM), Jan Pickles. There is also an Executive / Trustee Member, Mark Osland, VHNST Finance Director, who advises on CFC T&Cs. The remaining membership comprises of: Dr Tom Crosby, Programme Clinical Lead and Consultant Oncologist, Andrea Hague, Director of Cancer Services; Dr Jaz Abraham, Consultant Oncologist and Jenny Stock, Project Manager.

1.5. The MDP is advised and guided on applications by comments and queries provided by an Operational Group. The membership of the Moondance Operational Group (MOG) includes clinical and operational representatives; expertise from R&D, Nursing and Finance: Bernadette McCarthy, Radiotherapy Service Manager; Prof Geraint Lewis, Head of Medical Physics; Dr John Staffurth, Consultant Oncologist; Dr Mererid Evans, Consultant Oncologist; Jayne Elias, Assistant Director of Nursing and Service Improvement; and Nicola Hughes, Finance Manager. Medical Director and R&D Lead Peter Barrett-Lee has provided R&D input in lieu of a permanent representative but due to his recent retirement a replacement will be sought.

1.6. The MDP meets four times per annum (or every three months). Its remit is to review applications taking into account the comments and advice from the MOG. With the support of the Moondance Exec PA, RT Project Manager and the newly appointed R&D Clin Lead the Board are provided assurance of project delivery; financial clarity; as well as receiving annual progress reports.

1.7. The MDP is accountable to the CFC and provides annual evaluation reports on progress of the programme. The MDP also ensures the Moondance Foundation are kept up to date on funded projects.

2. TIMING

2.1. The MDP Board met on 25th October 2017 as part of its normal cycle of meetings. This was the eighth formal meeting of the MDP.

3. CONSIDERATIONS FOR BOARD / COMMITTEE

3.1. At the meeting in October the MPB considered three applications for funding: one application for two fixed term Advanced Radiotherapy Clinical Fellows to support service improvement and provide clinical support; provision of clinical and administrative support for the Radiotherapy Research Group (RRG); and expansion of radiotherapy’s radiographer research capability. The first was approved and with the Board supportive of
the remaining two in principle, but requesting further information and a wider MDT approach, including joint working with R&D and Dr Mererid Evans and Dr John Staffurth.

3.2. To date the Board has funded 16 applications and committed £2.3m over the four years. A description and financial breakdown of awards can be found in Appendix A. Two externally peer reviewed research projects (PEARL and the Neuro-Cognitive function study) have been funded, together with a number of posts and service/educational developments. Project leads are required to complete six month and annual review reports detailing progress which are submitted to the Programme Board and CFC.

3.3. The October Board meeting was a condensed session which followed a Project Lead meeting. Each funded project was represented with a presentation highlighting their work, progress and ambitions. This was attended by the MDPB and advisory group, a representative from the Moondance Foundation, Trust Board Independent Member Jane Hopkinson and VCC fundraising staff.

3.4. Project leads have completed annual or end of project reports where appropriate, these have been submitted to R&D for review. A high level summary of Programme activity over the past year includes:

- Dr Catherine Pembroke has completed the Stereotactic Fellowship at McGill University in Canada and returned to SpR rotation, currently at Singleton Hospital. An end of project report is being compiled.
- Dr Ceri Powell, Consultant Oncologist South West Wales Cancer Centre, has recruited and treated 13 patients, as part of the ‘optimising SABR access for South West Wales patients’.
- The Neuro-Cognitive Function study led by Dr James Powell, Consultant Oncologist Velindre Cancer Centre, has commenced participant recruitment with two patients entering the study and commencing MRI scanning at Cardiff University Brain Imaging Centre (CUBRIC). Dr Sahar Iqbal, Research Fellow Velindre Cancer Centre has also attended several conferences with abstracts on the study submitted.
- The drug-RT clinical trials project led by Dr Paul Shaw, Consultant Oncologist Velindre Cancer Centre have successfully opened their first study, PARADIGM 2 with the first patient recruited. There was media interest around this with articles featured in the local print media and the study lead investigator Professor Anthony Chalmers also visited VCC. There are a further two trials in set up stage, ORCA and PLUMB.
- Under the leadership of Dr Tom Rackley, Consultant Oncologist Velindre Cancer Centre, the SABR service has expanded to include further areas of treatment; hepatocellular carcinoma (liver HCC) and oligometastatic sites such as bone; spine; adrenal gland; lung lymph nodes and reiradiation to pelvis and spine. 125 patients were treated in 2016 and 55 to May 2017.
- As part of the aRENA education/training programme Dr Elin Evans, Research Fellow Velindre Cancer Centre, has commenced study for a PG Certificate in Medical Education.
- The PEARL study, formerly OPERA received media attention in both the local printed press and televised programming, with Dr Mererid Evans being interviewed for BBC Wales Today.
- There are currently six staff members funded by the programme and attached to projects and four consultants with funded sessions, with a further two due to commence pending their existing sessions being backfilled. Recruitment is pending for other funded posts.
3.5. The Programme has funded two radiotherapy conferences; 1) South Wales Radiotherapy Conference in December 2016 and 2) SABR Wales Conference in July 2017. They featured guest speakers from the Royal Marsden; Mount Vernon Cancer Centre; Oxford University, VCC and Singleton Hospital (ABMU). Both were very well attended by staff across different disciplines from both VCC and ABMU including physics; nursing staff; radiotherapy; SpR’s and consultants.

Whilst visiting VCC for the SABR Wales Conference the guest speakers also conducted a peer review of the SABR service. The review panel was led by Dr Nick Van As, Medical Director at the Royal Marsden and included Dr Fiona McDonald, Consultant Oncologist also from the Royal Marsden; Jonny Lee, Lead CT Physicist and Yatman Tsang, Consultant Radiographer both from Mount Vernon. A report is currently being finalised with the recommendations of the review panel for submission to Velindre’s Senior Management Team (SMT) and to the Trust Board via the Quality and Safety Committee (Q&S).

3.6. Through Programme support over the last year clinical staff have been able to attend a number of industry leading conferences both in the UK and abroad, including submission of presentations and abstracts on programme funded projects. Staff have attended the CRUK International Symposium on Oesophageal Cancer; the European Society for Radiotherapy and Oncology (ESTRO); the National Cancer Research Institute (NCRI); SRS Symposium; Proton Therapy Congress; British Neuro-Oncology Society (BNOS) and the UK Radiological and Radiation Oncology Congress (UKRCO).

4. NEXT STEPS

4.1. R&D is requested to **NOTE** the contents of the report and actions being taken.

4.2. The next meeting of the Programme Board will take place on 24th January 2018.

4.3. Confirm R&D representation in the Programme advisory group, in lieu of Prof Barrett-Lee’s retirement.

4.4. Extend invite to IM for R&D Jane Hopkinson to sit on the MDPB.
# APPENDIX A

## MOONDANCE FUNDED APPLICATIONS

<table>
<thead>
<tr>
<th>Date Approved</th>
<th>Application</th>
<th>Description</th>
<th>Amount Awarded</th>
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<tbody>
<tr>
<td>17/02/16</td>
<td>Consultant Clinical Lead for Stereotactic Radiotherapy</td>
<td>Consultant post to lead the clinical implementation of SBRT at VCC: expand, audit &amp; evaluate services (inc long term outcomes); coordinate a MDT; education and training; clinical trials for SABR</td>
<td>£140,000</td>
</tr>
<tr>
<td>17/02/16</td>
<td>McGill University Stereotactic Ablative Fellowship</td>
<td>Training opportunity to learn and experience SABR where it is well established in North America (currently no UK centres that have extensive experience of SABR provision).</td>
<td>£35,000</td>
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<tr>
<td>29/04/16</td>
<td>Executive PA Moondance Support</td>
<td>Support the Moondance Programme Board and Clinical Lead in developing and maintaining the application processes.</td>
<td>£88,300</td>
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<tr>
<td>29/04/16</td>
<td>Extension of RTTQA</td>
<td>Fund key posts (medical physicist/computer scientist; clinical fellow; and part consultant time) to develop an educational framework around RTTQA to enhance established training and CPD, improving patient care locally, and with the potential to be expanded nationally.</td>
<td>£292,200</td>
</tr>
<tr>
<td>29/04/16</td>
<td>Optimisation of access to Stereotactic Radiotherapy SW Wales</td>
<td>Fund a clinical session of consultant oncologist and 6 months of physics/radiographer training to improve access to stereotactic ablative radiotherapy (SABR) for medically inoperable early stage lung cancer in patients living in South West Wales.</td>
<td>£32,642</td>
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<tr>
<td>29/04/16</td>
<td>Consultant Sessions for Radiotherapy Research in Neuro-oncology</td>
<td>Consultant sessions with protected research time; supervision of a MD student; and develop a prospective clinical study in collaboration with medical physics and the Cardiff University Brain Research Imaging Centre (CUBRIC) within the next 12 months.</td>
<td>£11,300</td>
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<tr>
<td>29/04/16</td>
<td>VCC-CRW PET Research Grant</td>
<td>Fund keys posts to support and implement the interventional clinical study: PET-based Adaptive Radiotherapy Clinical Trial (PEARL), some aspects of which have been funded by CRW.</td>
<td>£448,400</td>
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<tr>
<td>29/04/16</td>
<td>Stereotactic Radiotherapy Development Physicist</td>
<td>Fund a Stereotactic Radiotherapy Development Physicist to support the development and implementation of new techniques in intra-cranial stereotactic</td>
<td>£190,000</td>
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<tr>
<td>Date</td>
<td>Title</td>
<td>Description</td>
<td>Amount</td>
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<tr>
<td>07/07/16</td>
<td>Q-fix MRI compatible immobilisation system</td>
<td>Equipment, used for H&amp;N immobilisation, which is MRI compatible. This will meet new guidance; open up treatment for a particular cohort of H&amp;N patients; and greater access to trials.</td>
<td>£6,905</td>
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<tr>
<td>07/07/16</td>
<td>Moondance Radiotherapy R&amp;D Clinical Lead</td>
<td>Oversee the R&amp;D investments made by the Programme Board to ensure they deliver their full potential in terms of investment for Velindre and radiotherapy services in South Wales. Key clinical and research link across projects outside of Moondance.</td>
<td>£84,000</td>
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<tr>
<td>07/07/16</td>
<td>Moondance Programme Manager</td>
<td>Programme management support for funded projects; oversight of the programme of work; and support for the board.</td>
<td>£165,237</td>
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<tr>
<td>13/09/16</td>
<td>An observational study of neurocognitive function in patients undergoing Stereotactic Radiosurgery</td>
<td>Fund clinical psychologists and associated clinical expenses (scans) to conduct detailed assessments of patient’s memory before and after their SRS treatment.</td>
<td>£126,181</td>
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<tr>
<td>07/10/16</td>
<td>Early Phase Novel Drug Radiation Combinations</td>
<td>Fund keys posts to expand the current Velindre Clinical Trials Portfolio by increasing early phase clinical trial activity that will support the combination of novel agents with radiation. The initial pilot will be CHARIOT, a trial in oesophageal cancer.</td>
<td>£171,650</td>
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<tr>
<td>24/01/17</td>
<td>Neurocognitive Function Study</td>
<td>Additional grant to cover reimbursement of travel costs for patients to CUBRIC.</td>
<td>£3,000</td>
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<tr>
<td>20/03/17</td>
<td>Consultant Sessions for Radiotherapy Research in Neuro-oncology</td>
<td>Extension to bid approved 29/04/2016; Consultant sessions with protected research time; supervision of a MD student; and run clinical study working in conjunction with CUBRIC.</td>
<td>£45,050</td>
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<tr>
<td>12/05/17</td>
<td>Extension of RTTQA Funding</td>
<td>Non staffing costs and PGCert costs</td>
<td>£10,500</td>
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<tr>
<td>20/7/17</td>
<td>Role extension of Lead MRI Radiographer</td>
<td>Staffing costs to undertake reporting of MRI planning scans for stereotactic brain RT, and development of new protocols for MRI planning scans.</td>
<td>£30,600</td>
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<tr>
<td>25/8/17</td>
<td>Automated Planning</td>
<td>Automated computer planning programme for IMRT / VMAT patients.</td>
<td>£337,090</td>
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<tr>
<td>25/10/17</td>
<td>Advanced Radiotherapy Clinical Fellowship x2</td>
<td>Fixed term positions to support advanced RT, service improvement and provide clinical support.</td>
<td>£106,970</td>
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</table>

**TOTAL COMMITTED**  
£2,390,427
APPENDIX B

Moondance Programme Board

Strategic Proposal

Background

The Moondance Programme is a programme of work to develop new, innovative radiotherapy technology centred around stereotactic ablative radiotherapy (SBRT). It is jointly funded by the Moondance Foundation and Velindre Charitable Funds Committee (CFC) with a budget of £3m over a four year period.

Acknowledging the recent strategic and planning developments across Velindre NHS Trust and the Cancer Centre (VCC), it is appropriate to determine what role Moondance has in supporting and complimenting the stereotactic radiotherapy service, particularly in relation to the radiotherapy research strategic goals.

The objectives set out in the Moondance Programme are to:

- Establish a multi-disciplinary team who can drive forward this cutting edge radiotherapy research
- Provide staff, equipment and infrastructure to enable patients to receive Stereotactic Ablative Body Radiotherapy (SABR) routinely, and
- Participate in clinical trials involving SABT

These are an important guide for the Programme Board when making funding decisions. However, linking the Moondance objectives with pieces of work across the radiotherapy service will, not only strengthen individual bids, but also ensure Moondance underpins the Trusts ambitious radiotherapy plans.

The Moondance programme will therefore benefit from establishing a more strategic proposal which sets out some key achievements and the long term legacy of Moondance. This in turn would provide some additional guidance for the Board when making decisions about applications over the coming years.

Strategic context

Radiotherapy Strategy

Shaping the Future of Radiotherapy: A Strategy 2016-2026 has a clear mission ‘To become a Centre of Excellence for Radiotherapy’. Ensuring the Board are aware of, and can enable some aspects of the strategy will help realise some important areas of stereotactic and advanced radiotherapy research.

The strategy identified seven aims to support its mission, all of which have relevance to promoting the objectives of the Moondance programme:
Every patient has access to the best treatment appropriate for them, which is timely and delivered in the most efficient and effective way possible

The radiotherapy service will be at the forefront of technological advances through its continual assessment and adoption, for the benefit of all patients

An appropriately skilled, flexible and empowered workforce that is motivated, values driven and innovative

A service that is maintained and future proofed with effective and appropriate funding to enable clinical, technological and research developments

To expand radiotherapy research through effective leadership, resources and investment

A high quality service which utilises comprehensive data, evidence based practice and research to drive forward innovation

A culture of collaborative working and partnership that reflects and prioritises the values of the organisation

The implementation of the strategy is under way and as part of this process, a Radiotherapy Research Group (RRG) will be responsible for taking forward the Centre of Excellence in Academic Oncology. The priorities that the RRG identify will be relevant to the focus of the funding for Moondance going forward and there will need to be close collaboration between the two.

**R&D Strategy and InVigorate**

In the R&D Committee’s five year strategy (2015-2020) one of the six strategic aims was to “Support areas of research excellence”. Developing the Radiotherapy Research Institute was a key objective of this, alongside continuing the development of the national leadership position of the Radiotherapy Trials Quality Assurance (RTTQA) group. Moondance has an opportunity to take forward some of the key aims in the R&D strategy.

InVigorate is a strategy for innovation, education and life sciences research and development which intends to expand on the initial proposals set out in the R&D strategy. This is under development now and will closely link in with the radiotherapy research agenda.

**Moondance**

Ensuring the Moondance programme is faithful to its original objectives, while also working to support the research strategic objectives across VCC will ensure this programme of work best meets the needs of patients, the workforce and the service.
Moondance strategic proposal

Moondance mission
To establish VCC as a Centre of Excellence for stereotactic radiotherapy and advanced radiotherapy

Moondance vision
To accelerate the introduction of stereotactic and advanced radiotherapy for patients through effective research and development within an efficient and high quality radiotherapy service

Moondance Strategic Aims

Create a research infrastructure which supports stereotactic and advanced radiotherapy

Create a service development infrastructure which supports stereotactic and advanced radiotherapy

Support the Trusts ambition to become an internationally recognised Centre of Excellence for Radiotherapy

Support the Trusts ambition to become an accredited Centre of Excellence for Academic Radiation Oncology

Moondance Strategic Recommendations

How these strategic aims will be achieved is set out in the original Moondance bid and radiotherapy strategy.

Create a research infrastructure which supports stereotactic and advanced radiotherapy
• Establish a multi-disciplinary team who can drive forward cutting edge radiotherapy research

• Support the infrastructure to apply for research grants and awards such as the Cancer Research Wales (CRW) grant

• Report on research grants, awards and publications against treatment

• Participate in clinical trials involving SABT

• Invest in research, staff training and equipment to maintain and attract a workforce that has the ambition, interest and ability to drive radiotherapy research forward

• There should be appropriate and effective support to translate and implement research into clinical practice

• Funding and time should be made available for individuals to plan, capture and write up work for publication and presentation

Create a service development infrastructure which supports stereotactic and advanced radiotherapy

• Accelerate the introduction of stereotactic treatment for patients within funded indications and the Commissioning through Evaluation scheme

• Provide staff, equipment and infrastructure to enable patients to receive Stereotactic Ablative Body Radiotherapy (SABR) routinely

• There are sufficient and appropriate opportunities for staff from each profession to engage in service development; be innovative; and supported in their ambitions to develop and drive the service forward

Support the Trusts ambition to become an internationally recognised Centre of Excellence for Radiotherapy

• Every patient will have the right to access to the best treatment appropriate for them, which is timely and delivered in the most efficient and effective way possible

• The radiotherapy service will be at the forefront of technological advances through its continual assessment and adoption, for the benefit of all patients

• An appropriately skilled, flexible and empowered workforce that is motivated, values driven and innovative
• A service that is maintained and future proofed with effective and appropriate funding to enable clinical, technological and research developments

• To expand radiotherapy research through effective leadership, resources and investment

• A high quality service which utilises comprehensive data, evidence and research to inform best practice and drive forward innovation

• A culture of collaborative working and partnership that reflects and prioritises the values of the organisation

Support the Trusts ambition to become an accredited Centre of Excellence for Academic Radiation Oncology

• Establish a multidisciplinary radiotherapy research group to assess and make recommendations on research and development; taking responsibility for advancing the development of a Centre of Excellence in Academic Radiation Oncology

• Clearly defined leadership that effectively develops, guides and promotes radiotherapy research within and beyond Velindre

• Promote and foster collaboration and partnerships external to Velindre and the NHS

**Conclusion**

The Moondance Programme has received a fixed amount of funding over a four year period to support work in the development of stereotactic and advanced radiotherapy. Identifying a shared ambition for the Programme will ensure funding is most appropriately awarded.

The Moondance strategic aims specifically support the ambitions of the radiotherapy strategy as well as the original objectives set out in the bid, thereby ensuring they meet the Moondance mission to become a Centre of Excellence in stereotactic radiotherapy.

The Programme has an unique opportunity to support radiotherapy services and research, and in doing so, create a lasting legacy for Moondance.
Moondance Programme – Annual Project Report

<table>
<thead>
<tr>
<th>Project Name:</th>
<th>Consultant Clinical Oncology Lead for Stereotactic Radiotherapy</th>
<th>Project Lead:</th>
<th>Dr Tom Rackley/Dr Jacinta Abraham</th>
<th>Funding Approval Date:</th>
<th>14th February 2016</th>
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</thead>
<tbody>
<tr>
<td>Project Term:</td>
<td>Four Years</td>
<td>Financial Award:</td>
<td>£140,000</td>
<td>Next Review Date:</td>
<td>October 2017</td>
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</tbody>
</table>

Project Brief:
Consultant post to lead the clinical implementation of SBRT at VCC: expand, audit & evaluate services (including long term outcomes); coordinate a MDT; education and training; clinical trials for SABR.

2 days a week, 4 sessions

Main Outputs

- Over the last 12 months implemented SABR to all oligometastatic sites in a structured and safe manner. Sites include: liver, lung, lymph node, bone, spine and adrenal gland and pelvic reirradiation.
- Initiated and manage the Stereotactic MDT which provides a well-established clear route of referral and a platform for a multidisciplinary team discussion regarding all aspects of SABR delivery.
- Wrote a SABR intranet website to provide referrers with information on service updates, referral criteria and referral pathway.
- Wrote a Velindre SABR internet web page to provide information for patients.
- Treated a total of 22 patients with oligometastatic disease with SABR. Referral numbers are expected to continue to rise as awareness increases and our capabilities improve.
- Established telephone consultation clinic run by review radiographers to record late toxicities. Data recorded in secure database and utilised for future research/audit.
- Created a database of all treated patients with oligometastatic disease treated with SABR. I manage and input baseline data and record long term outcomes such as local control and overall survival so that data can be presented/published once patient numbers reach a level worthy of presenting.
- Implemented our first SABR promotional/educational study day “SABR Wales” which took place in July 2017. The day included talks from invited guest speakers who are leading experts in SABR delivery and local clinicians with a specialist interest, including myself who delivered a talk on our oligometastatic SABR service. Feedback from the event was excellent e.g. “Brilliant, one of the best meetings I have been to for a while.”
- SABR Peer review – External SABR experts from the Royal Marsden and Mount Vernon Hospital evaluated our service and concluded that our implementation progress has been safe and that we have made excellent progress. They have also provided us with some key recommendations for the future to further improve and develop the service.
- Become local PI for CORE trial which is set to be the next radiotherapy based trial to be opened in VCC.
- Received interest from other SABR trials to open in Velindre.
- Abstract submitted to SABR consortium annual meeting Glasgow.
- Introduced liver fiducial service to aid liver SABR delivery.
- Opened the service to south west Wales to ensure equipoise across the region. Work in collaboration with Swansea oncologist Dr Ceri Powell (Moondance funded) to help promote the service in West Wales.
Moondance Programme – Annual Project Report

- Attend the SABR consortium annual meeting to ensure I remain up to date with new SABR developments.

### Progress vs Milestones

**Has the project followed the proposed timeline?**

**Examples of delays or revisions to timeline and reasons**

The project has followed proposed timelines. The priority for year one was to get the service up and running for all sites and have a smooth process of referral. This has been achieved and now the priority is to increase patient numbers by continuing to promote the service to colleagues. As patient numbers increase, outcome data will also increase which can be evaluated and lead to academic presentations, publications, abstracts, etc. I am optimistic that once our data has matured it has the potential to lead to multiple outputs in the next few years.

Opening CORE trial has been a priority for me however staffing levels in the radiotherapy trials department has led to delays in opening. However I have been reassured that the process of opening the trial has now begun.

Apart from the “SABR Wales” educational day in July at this early stage of SABR development there has been little focus on formal education sessions mainly as the service is so new and I am currently still gaining experience and learning the skills required to deliver SABR myself. However with my current experience level I do feel at a stage to start delivering teaching sessions to registrars and provide informal guidance/education to consultant colleagues. Currently any new referral received I offer the referring consultant the opportunity to deliver the treatment themselves with close guidance and supervision from myself so that they too can learn the process of safe SABR delivery.

We had hoped to of treated more patients in our first year based our population size and feedback from our peer review team. It is likely that patient numbers are low due poor identifications of true oligometastatic states in patients as there is a lack of follow up imaging such as PET scans (Not WHSCC funded for follow up). We are also faced with some lack of awareness among colleagues and some degree of skepticism. Both Dr Powell and I will continue to promote the service raising its profile by attending local MDTs and arranging further “SABR Wales” promotion days. I have already experience an increase in patient referrals since previous promotional day.

### Expenditure

The only associated cost is monthly salary costs to cover the associated sessions, which is on track.
Moondance End of Placement Report

I would like to thank the Moondance foundation for giving me the opportunity to pursue this exciting fellowship at McGill University, Canada. The experience has enabled me to develop technical skills required to deliver stereotactic radiotherapy (SBRT) as well as to develop advanced breast radiotherapy techniques. I aim to incorporate these skills into my practice as a newly appointed breast consultant at Velindre Cancer Centre.

Breast Radiation Oncology
I became fully integrated into the breast oncology team, regularly attending the multidisciplinary tumour boards and participating in clinical and academic discussions. I attended weekly breast radiation oncology clinics and became confident at forming management plans for a wide range of complex cases including bilateral disease, relapsing regional nodal disease, re-treatments and malignant phylloides. I contoured many axillary, supraclavicular and internal mammary volumes as well as becoming familiar with intensity-modulated radiotherapy for boosts and partial breast treatment. The weekly Breast Quality Assurance meeting provided an excellent learning environment allowing constructive and academic discussion for all regional and complex cases. The fellowship has also allowed me to develop a greater understanding of the management of breast cancer outside our own sub-specialty. I spent time assisting surgeons in theatre, reporting mammograms and MRIs with radiologists and specimens with pathologists. Appreciating the role of our colleagues in the management of breast cancer has enabled me to work and communicate more effectively within our multi-disciplinary team. I was involved in the recruitment of several breast-related trials such as LUMINA, OPAR and NSABP B-51.

Stereotactic Body Radiotherapy (SBRT) and Stereotactic Radiosurgery (SRS)
I saw all the primary and oligometastatic patients referred for ablative radiotherapy at McGill. I became familiar with the clinical and technical challenges of offering SBRT/SRS to various anatomical sites (lung, liver, bone, adrenal, brain and spine). I became confident in assessing new patients, formulating treatment plans and reviewing toxicities. I developed skills in treating patients in all stages including simulation, contouring, plan review, QA and treatment verification. I prepared and led the weekly SBRT QA rounds, critically reviewing all plans prior to treatment. I became familiar with different methods of motion management including breath hold, abdominal compression, body fix and fiducial marker placement. I became accustomed to different methods of SBRT delivery such as cyberknife, volumetric arc or multi-field IMRT. I spent one-week as an observer contouring and evaluating spinal SBRT plans with Dr Arjun Sahgal at Sunnybrooke Hospital, Toronto, who is an international pioneer in this technique.

Research
I led the SPORT trial (Single Pre-operative Radiation Therapy) which evaluated the tolerability and feasibility of offering a single 20Gy pre-operative fraction of partial breast irradiation using stereotactic techniques 48 hours prior to surgery. I wrote the grant, protocol, formed a team, recruited patients, contoured and evaluated radiotherapy
plans, approved treatment verification, assisted surgery and followed up patients, managing toxicities. I was involved in establishing a SBRT database and reviewing outcomes of all the oligometastatic and oligoprogressive patients treated at McGill. I am also completing a dosimetric project looking at chest wall dose and volumetric parameters correlating with pain. All manuscripts are in preparation for submission for publication.

**Quality Improvement (QI)**
I created a QI Curriculum and led a teaching program for radiation oncology residents and consultants. I taught and arranged expert speakers during two academic half days, consisting of didactic lectures and practical workshops, and six-weekly tutorials. I mentored the intermediate year residents, enabling them to successfully complete individual QI projects. I organised a QI Academic day, consisting of QI project presentations and a workshop run by national and international experts.
McGill University Breast and SBRT Fellowship

1) Clinical work
   - Extracranial oligometastatic/ oligoprogression new and follow-up clinics with supervising consultant Dr Kopek every week.
   - Weekly brain metastases clinic at the Montreal Neurological Institute where I became familiar with indications and follow-up for stereotactic radiosurgery (5 months) with Drs Kopek and Panet-Raymond.
   - Weekly breast new and follow-up radiation-oncology clinics with supervising consultant Dr Lambert
   - Observerships
     - Dr Arjun Sahgal (1 week) Sunnybrooke Hospital, Toronto
       I spent a week shadowing Dr Sahgal who is an international lead in spinal SBRT. I saw how he ran his practice. He taught me his techniques for simulation, spinal contouring, dosimetric considerations and delivery of SBRT.
     - SBRT (2 weeks) Centre Hospitalier de l’Universite de Montreal (CHUM)
       I spent 2 weeks observing the SBRT practice at this University Hospital in Montreal.
   - Multi-disciplinary approach to breast practice
     - Breast radiology, I shadowed radiologists and reviewed ultrasounds, MRIs, mammograms and stereotactic biopsies
     - Breast pathology, I had teaching sessions with the pathologist specialising in breast
     - Breast surgery, observed partial mastectomies, an axillary node dissection and sentinel node biopsies
   - I attended hepatobiliary and breast tumour board every week

2) Radiotherapy planning
   - I contoured and evaluated plans for SBRT/SRS patients. Examples include,
     - pulmonary metastases
     - stage 1 NSCLC
     - liver metastases
     - primary HCC
     - bone and spinal metastases
     - cerebral metastases and tumour bed boosts using SRS techniques
     - adrenal metastases
   - Breast radiotherapy planning
     Locoregional/ partial breast and internal mammary outlining
   - Quality Assurance (QA) SBRT weekly rounds where indications for treatment and dosimetry were reviewed in weekly meeting attended by physicists and consultants. I led and prepared each session
   - QA Breast weekly rounds where locoregional/ complicated plans and dosimetry was reviewed.

3) Research
   - SPORT-CK trial: phase 1 trial, neoadjuvant single stereotactic 20Gy partial breast irradiation for early, low risk breast cancer. I led the trial with the supervision of Dr Hijal.
     - Grant application through Royal College of Radiologists
- Writing protocol revisions with the chief physicist, Dr Parker
- Contouring and reviewing plans, image verification prior to treatment.
- Attending the subsequent surgery
- Recruiting and reviewing each patient at set time points using formalised cosmetic scoring.
- Writing up and presenting the work
  - I created a SBRT oligometastatic database at the McGill University Health Centre (MUHC). I performed a retrospective review of survival outcomes for 169 patients (209 lesions) with a multivariate analysis of prognostic variables to help guide patient selection. Manuscript in preparation.
  - I performed a dosimetric review of chest wall doses/volumes and correlation with toxicity. Manuscript in preparation

4) Academic activity and Presentations
- Oral presentation; Review of Oligometastases and Oligoprogression treated with SBRT at McGill University, plenary session at Canadian Association of Radiation Oncologists Toronto, September 2017
- Oral presentation: Association Radiation Oncologists Quebec - May 2017 (in French)
  - la Qualité ‘AQ’ pour les Résidents en Radio-oncologie
  - L’essai SPORT
  - Review of Oligometastases and Oligoprogression treated with SBRT at McGill University

- Poster presentation: Creating an Educational Quality Improvement Program for Radiation Oncology Residents, Canadian Partnership Against Cancer- Toronto April 2017
- Poster presentation: Creating an Educational Quality Improvement Program for Radiation Oncology Residents, ASCO Quality- Orlando March 2017
- ASTRO 2016- Boston attendance at this academic meeting in September 2016
- Weekly patient management rounds
- Fortnightly attendance at the journal club. I presented ‘A Randomised Phase 2 Study Comparing 2 Stereotactic Body Radiation Therapy Schedules for Medically Inoperable Patients with Stage 1 Peripheral NSCLC’

5) Teaching and Quality Improvement (QI)
- I created a QI educational program for radiation oncology residents and oversaw initiatives at the MUHC. This involved
  - creating a QI curriculum developed with input from content (QI) experts, McGill University curriculum and evaluation experts.
  - Devising and teaching in didactic lectures and practical workshops during two academic half days.
  - Supervising and mentoring each resident as they completed their QI projects
  - Organising a QI Academic Day where residents presented their work and international QI experts will delivered an interactive workshop for the department
  - Formally evaluating the program with quantitative and qualitative validated methods.
  - Manuscript written and under review at Practical Radiation Oncology
Moondance Programme – Annual Project Report

<table>
<thead>
<tr>
<th>Project Name:</th>
<th>Executive PA</th>
<th>Project Lead:</th>
<th>Tom Crosby/Jenny Stock</th>
<th>Funding Approval Date:</th>
<th>29th April 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Term:</td>
<td>1.5 years fixed term (3 year funding)</td>
<td>Financial Award:</td>
<td>£103,400</td>
<td>Next Review Date:</td>
<td>September 2017</td>
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</table>

Project Brief:

Provide a comprehensive service to support the Moondance Programme Board Clinical Lead/Moondance Board Member(s) as appropriate, in the organisation and planning of duties and workload which supports service delivery of the Moondance Stereotactic and Advanced Radiotherapy Programme.

Main Outputs

- Continued support of the Moondance Programme Board, supporting quarterly meetings and offline working and communication.
- Point of contact and support for applicants compiling business cases for the Board which are subsequently circulated to the Programme Advisory group for comment in order to provide expert opinion to the Board.
- Inform finance of all approved funding and under £5000 applications and work with them to ensure all Moondance costs are correctly identified and assigned to the appropriate project.
- Managing associated paperwork with under £5000 funding applications submitted outside of Board meetings (for audit and governance purposes) including liaising with finance if staff are claiming a reimbursement.
- Support of project leads (more so those without designated support within their project) in administrative tasks: meeting room booking (physical and virtual); creation of meeting agenda’s; travel and accommodation booking; conference registration; recruitment to project posts.
- Drafting JDs and scrutiny panel business cases for Programme associated jobs and subsequent job descriptions (H&N Fellow, PEARL Clinical Fellow, Data and Project Support Officer).
- Act as recruiting manager on TRAC including, loading approved jobs into the TRAC system; and support recruitment of the position.
- Arrange workstation, IT equipment and relevant HR paperwork ahead of new starters joining (including TRAC process completed).
- Arranging external conferences: South Wales RT Conference and SABR Wales Conference and RCR Upper GI Conference in 2018 including: booking and arrangement of facilities; travel and accommodation of external speakers; agendas and presentation preparation; arranging travel for international speaker at the GP conference.
- Support an external peer review of the SABR service at VCC, liaising with the external panel, creation and collation of documents submitted to the panel prior to their VCC visit and support of the subsequent peer review meeting. Drafting the peer review report, then submitted to clinical colleagues.
- Research around international recruitment and any requirements for x2 Radiotherapy Clinical Fellow positions including: GMC registration; 28 Day Resident Labour Market Test; and PLAB test. Drafting subsequent business case for the Programme Board.
- Drafting a business application for CFC requesting a legacy donation be subsumed in the Moondance Programme remit for the support of R&D infrastructure and support.
### Moondance Programme – Annual Project Report

- Creation and maintenance of a Moondance Programme intranet page - [http://nww.velindrecc.wales.nhs.uk/moondance-programme](http://nww.velindrecc.wales.nhs.uk/moondance-programme)
- Support interview of the PA to the Therapies Manager.
- Arrange the Oncology Update for Primary Care Conference: sourcing a venue; identify external funding sources and required approval from the Trust secretary; agenda creation; extending conference invite to GP’s across South Wales.
- Continued support of the Velindre Transformation Forum (VTF): arranging VTF and Steering Group dates, agendas, liaising with speakers, support in creation of presentations, suggested changing feedback forms and tailor them to the topics presented within VTF, creation of Terms of Reference.
- Adhoc support of Cancer Services staff including meeting arrangement, diary management, telephone calls including from patients and complaints, minute taking (Divisional Review), drafting correspondence, access to CANISC and cover of the General Managers PA.
- Provide full and effective personal assistance to the Centre Director to ensure comprehensive support in the execution of their duties, in lieu of a permanent PA.
- Use or Oracle for both Moondance purposes and other adhoc CSMO needs.

### Progress vs Milestones

Whilst there is no timeline as such for this position, the Programme PA has been in post since August 2016. During which time Programme Board meetings have been supported and held on a regular three month basis. The October 17 meeting will be followed by a wider project lead meeting, with invites extended to VCC senior management including the chief executive, R&D and Moondance Foundation representation.

Associated projects are supported where required with their meetings and project support needs.

An initial project lead meeting was held in April, with a second planned for May 2018.

### Expenditure

The only associated expenditure related to this position/project is the monthly salary cost. Currently the position is 13 months into a fixed term 18 month position.
## Moondance Programme – Annual Project Report

<table>
<thead>
<tr>
<th>Project Name:</th>
<th>ARENa</th>
<th>Project Lead:</th>
<th>Dr John Staffurth/ Dr Sarah Gwynne</th>
<th>Funding Approval Date:</th>
<th>29th April</th>
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<tr>
<td>Project Term:</td>
<td>March 2017 for 3 years</td>
<td>Financial Award:</td>
<td>£281,688</td>
<td>Next Review Date:</td>
<td>September 2017</td>
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<tr>
<td>Project Brief:</td>
<td>Facilitate high quality and standardised clinical oncology training in target volume delineation using a series of educational packages and advanced software developed by the Cardiff RTTQA group and School of Engineering, Cardiff University. Pilot sites for this project are Cardiff and Swansea, with existing links to Leeds and/or Manchester. Plan to perform qualitative assessment of the educational benefit of the interventions used.</td>
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### Main Outputs

- Editorial in Clinical Oncology published January 2017
- Oesophagus identified as 1st tumour site for ARENa - 10 oesophagus cases identified and sent to outliners
- RCR Imaging for Oncology Module on oesophagus completed and sent to RCR (will form 1st module of ARENa oesophagus package)
- Template for Target Volume Delineation module created – oesophagus module in progress
- Currently available software for outlining and assessment road-tested by trainees in S Wales, July 2017 – now have 1st draft of a specification for any platform we use
- Funding agreed for ARENa clinical fellow (EE) to complete PGCert in medical education, started Sept 2017
- ARENa Computer scientist took up post July 2017
- ARENa part of presentation (Tackling outlining variation – training, peer review and RTTQA) being given by SG at RCR UGI day in Feb 2018 ([https://www.rcr.ac.uk/clinical-oncology/event/upper-gi-cancer-study-day](https://www.rcr.ac.uk/clinical-oncology/event/upper-gi-cancer-study-day))
- SG co-authored recent RCR guidance on peer review of outlining ([https://www.rcr.ac.uk/system/files/publication/field_publication_files/bfco172_peer_review_outlining.pdf](https://www.rcr.ac.uk/system/files/publication/field_publication_files/bfco172_peer_review_outlining.pdf))
Moondance Programme – Annual Project Report

Progress vs Milestones

There have been some delays (see detail below) but much of this was anticipated and many aspects of the project are able to run in parallel, so we have moved on with one area while waiting for another.

Previous report in April 2017 stated the following as next steps:

1. Identify 10 prostate and oesophagus cases
   Send for outlining by expert groups
   
   Oesophagus cases sent, prostate in progress

2. Work on TVD modules

   Generic template for Target Volume Delineation module created
   Oesophagus module in progress

3. Work on platform/method of feedback

   Had originally planned to use same platform as the RCR, expected decision on their chosen provider due by Spring 2017. This has been delayed and no date given for when they expect to decide. We have therefore decided to proceed with pilot of building our own system as cannot continue to wait.
   Have specification list after meeting with trainees to road-test systems

   Survey to all UK clinical oncology trainees to scope needs/preferences for how ARENa should be set up – sent to RCR pre-Summer, delays internally within RCR as wanting to link in with other internal projects. Emails to Head of Training has led to resolution.

4. Med ed input to look at how to evaluate the interventions

   as previously discussed, we lack any formal medical educational input as part of the group. Clinical fellow has now started PGCERT in Medical Education but needed expert input. Delay in setting up meeting with medical educationalist at Cardiff University due to communication issues, but meeting being held on 27.9.17. this is essential 1st step in developing methods for assessing the benefit of the intervention

5. EE considering PGCert to enable her to have greater medical educational input to the project

   Started September 2017

Expenditure
The original funding application for ARENa was for 3 years funding of a clinical fellow, allowing that individual to undertake an MD for 2 years. EE has indicated her intention to undertake an MD as part of the ARENa fellowship. However, after discussion with Cardiff University it has become clear that a MD based entirely on ARENa will not be acceptable and we are currently scoping out appropriate MD projects that will link imaging, outlining and radiotherapy.
Moondance Programme – Annual Project Report

<table>
<thead>
<tr>
<th>Project Name:</th>
<th>Optimisation of SBRT for lung patients across SW Wales</th>
<th>Project Lead:</th>
<th>Dr Ceri Powell</th>
<th>Funding Approval Date:</th>
<th>29th April 2016</th>
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<tr>
<td>Project Term:</td>
<td>3 years</td>
<td>Financial Award:</td>
<td>£32,642.56</td>
<td>Next Review Date:</td>
<td>TBC July 2017</td>
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</table>

**Project Brief:**

Funding for one clinical session of consultant oncologist time and six months of physics/radiographer training to improve access to Stereotactic Ablative Radiotherapy (SABR) for medically inoperable, early stage lung cancer in patients living in South West Wales.

Phase One: optimise patient selection, increase uptake rates, plan and deliver this treatment (by a Swansea-based consultant).

Phase Two: SABR service would be developed within the South West Wales cancer network (SWWCN), aiming to deliver the treatment locally once technical capabilities.

**Main Outputs**

- **New referral pathway established**
  - WHSSC CP76 amended
- Attending weekly ABMU and Hdda lung cancer MDTs
- Attending the monthly oligometastatic meeting
- Attending weekly lung planning meeting in Velindre
  - Similar meeting established in Singleton
- 23 patients referred for consideration of SABR
  - 20 primary 3 metastatic
- 10 patients completed treatment within first year (July’16-June ’17)
  - 9 primary 1 metastatic
  - All lesions currently controlled following SABR
  - Acceptable toxicity. No grade 3 or grade 4 toxicity. 1 symptomatic rib fracture confirmed on CT
- Patient satisfaction survey completed with high satisfaction of new service
- Active participant of peer review of Velindre SABR service
- Co-organised SABR Wales symposium with positive feedback
- Group established in Singleton to review technical requirements for local delivery of SABR
- Attended the SABR Consortium meeting in 2016 and will be attending again in autumn 2017.
- Accepted as member of UK SABR consortium QA sub-group
  - Regular teleconference meetings
- Currently updating national peripheral lung SABR guidelines
## Progress vs Milestones

- 3 more patients treated than in proceeding years

## Expenditure

- **Consultant salary for 1 session per week for 12 months**
## Project Brief:

The proposed clinical study (PEARL) will build on foundations established by the Velindre POSITIVE study (2011-2014) of Positron Emission Tomography (PET)-CT guided RT treatment planning in Head and Neck Squamous Cell Carcinoma (HNSCC).

PEARL is an interventional clinical study, aiming to recruit approximately 50 patients with Stage III/IV histologically proven HNSCC [including high-risk cancers of the oropharynx, hypopharynx and larynx].

The objectives of the study are:

- To investigate whether FDG-PET guided ‘dose painting’ of residual, metabolically active disease 2 weeks into a course of chemo-radiotherapy, can deliver an increased dose with acceptable toxicity.

- To determine the feasibility of serial PET scanning and an automated system of FDG-PET guided dose-painting (based on ATLAAS – see below) in patients with HNSCC.

## Main Outputs

**Academic presentations:**
PEARL was presented (by ME) to the NCRI CTRad Proposals Guidance Meeting June 2016 (it was highly rated)
PEARL was presented (by ME) to the Moondance Project Leads meeting April 2017

**Publications/Media attention:**
PEARL received media attention in the printed press (Western Mail/Wales On Line) and television (Dr M Evans was interviewed for BBC Wales).

**Meetings:**
Contractual meetings held between Velindre R&D, Cardiff University R&D representatives and CRW;
22<sup>nd</sup> March 2017
5<sup>th</sup> May 2017
15<sup>th</sup> September 2017 – this is the first monthly project meeting following the appointment of clinical leads to the project.

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<table>
<thead>
<tr>
<th>Project Name:</th>
<th>PEARL</th>
<th>Project Lead:</th>
<th>Dr Mererid Evans/Dr John Staffurth</th>
<th>Funding Approval Date:</th>
<th>29&lt;sup&gt;th&lt;/sup&gt; April 2016</th>
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<tr>
<td>Project Term:</td>
<td>4 years</td>
<td>Financial Award:</td>
<td>£448,400</td>
<td>Next Review Date:</td>
<td>September 2017</td>
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</table>
New Posts Recruited:
PEARL Clinical Research Fellow appointed (Dr Sarah Hargreaves, to start in post from 1st Nov 2017)
Consultant Leads for PEARL study identified (Dr Thomas Rackley, Dr Russell Banner: 1 session/week from Sept 2017)
Trial Manager: Martina Svobodova (0.5 WTE from Sept 2017 – based at CTR [Cardiff University] and at VCC)
Data and Project Manager (Band 5 0.5 WTE) post approved in September scrutiny panel. The post will be advertised by the end of September for interview in October. This post has been combined with the Moondance funded Novel Drug Fund 0.5 Data Manager to create a 1 WTE post to improve applicant choice.

Progress vs Milestones

Has the project followed the proposed timeline?
Examples of delays or revisions to timeline and reasons
The project’s start date (projected 1.10.2016) is approximately 12 months behind. This is partly due to recruitment and partly contractual. The key recruitment was assessed to be the clinical research fellow. The outstanding candidate, Sarah Hargreaves, was on maternity leave and was unable to start before 1st November 2017. The project team decided to delay start date of other initial posts (Trial manager) to fit with Sarah’s start date. Consultant leadership has also taken several months to address, partly due to complexity with arranging backfill. This has also been addressed.
Contractual arrangements between Velindre, Cardiff University and CRW have been delayed. This is not the direct responsibility of the investigators. We have set up meetings to address issues and think that a solution has been found to allow recruitment within Cardiff University of a key member of the team to work with Dr Spezi. Further contractual arrangements will be needed once the protocol is finalized. This is expected to take 3 months from 1.11.2017.
It is too early to assess the project against other milestones

Expenditure
To date expenditure within the PEARL project has been minimal as funding primarily covers staffing costs. From September 2017 funding has started to be drawn (staff costs as above) and this will continue to increase into the New Year as more posts are recruited to.
Moondance Programme – Annual Project Report

<table>
<thead>
<tr>
<th>Project Name:</th>
<th>Stereotactic Radiotherapy Development Physicist</th>
<th>Project Lead:</th>
<th>Prof Geraint Lewis/Dr Tony Millin/Dr Maeve Smyth</th>
<th>Funding Approval Date:</th>
<th>April 2016</th>
</tr>
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<tr>
<td>Project Term:</td>
<td>Two years</td>
<td>Financial Award:</td>
<td>£190,000</td>
<td>Next Review Date:</td>
<td>September 2017</td>
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</table>

**Project Brief:**

Fund a Stereotactic Radiotherapy Development Physicist to support the development and implementation of new techniques in intra-cranial stereotactic radiosurgery and extra-cranial stereotactic ablative radiotherapy.

Provide support with the physics elements of funded Moondance projects i.e. James Powell’s Neuro-Cognitive Function study.

**Main Outputs**

I have presented a poster entitled ‘Assessing plan quality and delivery verification of stereotactic ablative body radiotherapy to spinal metastases across different provider landscapes’ at the UK Radiology and Radiation Oncology Congress June 2017. I also presented this poster at the All Wales Medical Physics and Clinical Engineering Annual Meeting 2017.

I gave an oral presentation entitled ‘Development of a MRI protocol for an observational study of neurocognitive function in patients undergoing stereotactic radiosurgery’ at the All Wales Medical Physics and Clinical Engineering Annual Meeting 2017. This presentation won ‘Best Medical Physics Presentation’ award.

Two further abstracts have been submitted to the SABR consortium meeting in Glasgow, November 2017.

**Service improvement: new RT development, tumor site treated, patients treated, trials accessed, audits of outcome data**

We treated our first Stereotactic Ablative Body Radiotherapy to a spinal metastasis in June 2017. My involvement included the development of the new technique for this treatment site, and planning and verification of the clinical case.

I am currently working on implementing a new delivery technique called ‘Flattening Filter Free (FFF)’, which has the potential to decrease treatment delivery times, particularly for high dose per fraction treatment. This is important for stereotactic delivery as it could help reduce intra-fraction motion. I am working on this for intra-cranial radiosurgery using iPlan treatment planning system.

I have also planned several patients for extra cranial radiotherapy and I am currently extending the planning solution implemented on Elekta linacs to the Varian TrueBEAMs.

**Trial activity: trials opened, patients recruited, trials designed**

The study investigating neuro-cognitive function after stereotactic radiosurgery to brain metastases (CI Dr James Powell) has opened for recruitment in May 2017. We have so far recruited four patients to the study.

I am also involved in the assessment of treatment planning technique for planning SRS to brain metastases. I am facilitating the retrospective re-planning of ten clinical cases across three treatment planning systems which each
have a different approach to creating clinical treatment plans. This will also involve the development of analysis scripts to automate plan quality assessment across different planning systems. We are currently preparing an abstract on this work for submission to ESTRO 2018 in Barcelona.

## Progress vs Milestones

The license for the Brainlab treatment planning system Elements is currently under negotiation (see below).

## Expenditure

An estimated cost of £100k was earmarked for purchase of the BrainLAB elements software. Following negotiations with the manufacturer this has been reduced to £10k per annum based on a 3 year commitment. This software could offer significant benefits to the clinical workload but the current offer from BrainLAB would extend beyond the length of this project, but would be £70k less than originally anticipated. It will also require agreement from VCC finance to continue to support the use of this leased software beyond this date. We have yet to speak to VCC finance about this but will do over the coming weeks.