



The Royal College of Radiologists
RCR-Cyclotron Trust Visiting Fellowships 2016/17 (Clinical Oncology)

POST-VISIT REPORT

PLEASE NOTE: This report must be completed and emailed to the RCR within 2 months of the end of your visit.

1. Name of Visiting Fellow	Charles Fong (clinical)	
2. Name of joint Visiting Fellow (if applicable)	Andrew Dumbill (physics)	
3. Institution(s) of Visiting Fellow(s)	Queen Elizabeth Hospital Birmingham	
4. Name of Host(s)	Cristina Bono (administrative); Dr Barbara Vischioni (clinical); Dr Mario Ciocca (medical physics)	
5. Institution(s) of host(s)	CNAO, Pavia, Italy	
6. Expenses claimed	£1794	
7. Visit Dates (ACTUAL)	a. Start Date 22.05.2017	b. End Date 01.06.2017
8. 2nd visit dates (if applicable)	a. Start date	b. End Date
9. Aims of the visit		
Dosimetry		
<ul style="list-style-type: none">• Gain knowledge of the principles and practical implementation of carbon ion dosimetry• Experience the day to day working practices of a physicist in a carbon ion facility• Appreciation of the technology transfer process that enabled this innovative carbon ion facility• Appreciation of methods of absolute dosimetry: traceability and measurement equipment• Experience operation, and maintenance, of equipment: synchrotron , beam line and scanning magnets• Understand dose monitoring systems used during treatment delivery• Experience patient specific QA process and use of appropriate measurement equipment		
Treatment planning		
<ul style="list-style-type: none">• Rationale for choice of carbon ions over protons / photons• Understand how the mixed ion field (fragmentation) and range uncertainties are managed in the dose calculation process• Gain an understanding of the LET/RBE issues associated with carbon ions• Improve knowledge of carbon ion treatment planning• Gain understanding of treatment planning systems, and algorithms, used for dose calculation		

- Observe the practices used to treat with fixed beam lines
- Observe the practices used to manage patient/organ motion during treatment
- Methods for coping with artefacts from metal implants / dental amalgam

Radiation Protection

- Review the shielding requirements for the facility for the protection of staff, patients and general public
- Understand the specific radiation protection requirements of operating a carbon ion facility

10. Activities undertaken

Treatment Planning

Throughout the 9 day period, I received many formal, and informal, tutorials on all aspects of carbon ion treatment planning at CNAO, which included:-

- Use of the planning system to create carbon ion plans for a variety of treatment sites, and practical experience using the planning system.
- Details about the algorithms used to calculate dose in the treatment planning system, and data required to commission the planning system.
- Radiobiology and explanation of the approach used to transfer prescription doses from one facility to another.

Dosimetry and Quality Assurance

- Attended several machine, and patient specific, quality assurance sessions.
- Tutorial and tour of the synchrotron and beam lines.

Patient Treatment

- Observed, on-set, many patient treatments for a wide variety of sites.
- Observed proton ocular treatments from initial patient training, CT, creation of patient specific immobilisation, treatment planning, and patient treatment.

Radiation protection

- Tutorial on the implementation of radiation protection for the facility.
- A tour of the facility, including the synchrotron vault, which allowed me to see the practical implementation of radiation protection and monitoring. This included being present at a bi-yearly validation of interlocks.

11. Benefits of the visit (short term)

- This experience allowed me to take my existing theoretical knowledge and add complementary practical experience. I have significantly improved my ability to understand the relative benefits of x-ray, proton and CIRT.
- Understanding of the issues of plan robustness with carbon ions, and the difficulty in transferring prescription dose from one facility to another.
- Understanding the benefits of CIRT vs. Proton vs. x-ray

12a Envisaged benefits of the visit longer term (your own practice)

- I hope to build on my experience at CNAO and undertake further work in this field of radiotherapy.

12b. Envisaged benefits to the wider group (dissemination to others in your centre/clinical oncology community/multiprofessional team)	
<ul style="list-style-type: none"> Expand the knowledge of my department by a series of presentations based upon my experience, and knowledge, acquired at CNAO. 	
13. Please outline any problems you encountered before, during or after your visit	
No formal programme of activities was in place for our visit. Therefore, it was important to regularly review our initial goals to ensure we covered most of the aims of our visit.	
14. Any additional comments	
I would like to take this opportunity to thank the RCR-Cyclotron fund and University Hospitals Birmingham for making this invaluable learning experience possible.	
I would also like to thank the staff at CNAO for their support during our visit. With special thanks (from a physics perspective) to Alfredo Mirandola, Mario Ciocca, Davide Mastri, Marco Pullia, Michele Ferraraini, Angelica Facchetti and Piero Fossati.	
I would also like to thank my visiting colleague Charles Fong, whose clinical explanations were invaluable.	
15. Do you have any 'top tips' that you would like to share with prospective visiting fellows?	
Visiting with an Oncologist was a wonderfully synergistic experience. We spent much of our evening meals mulling over our respective day's activities, and filling in the gaps in our understanding.	
Signed: Andrew Dumbill	Date: 20/8/17
Report approved by:	Clinical Oncology Professional Standards Board
Date	06.10.2017

Please return this form to Miss Irina Beleca, Professional Standards Administrator at:
 irina_beleca@rcr.ac.uk