Medical Physics at Wellington Regional Hospital, New Zealand

The hospital and radiation oncology service
Wellington Regional Hospital is the specialist referral and university teaching hospital that serves the capital city of New Zealand and surrounding regions.

The radiation oncology service is part of an integrated blood and cancer centre that also includes medical oncology and clinical haematology services. This centre has an active clinical research unit and participates in many clinical trials. It is located in a modern, purpose designed building.

The radiation oncology service is equipped with a range of contemporary equipment:
- 3 Varian linacs (2 Truebeam and 1 Clinac) with VMAT, kV/ CBCT imaging, respiratory gating and 6-DoF couch capabilities. The Clinac will be replaced in the near future.
- Varian Varisource iX HDR brachytherapy system
- Varian Eclipse and Brachyvision treatment planning systems
- Varian Aria patient management system
- Siemens Confidence RT Pro 64 slice CT scanner
- Access to MRI and PET/CT scanning provided by the Radiology service
- Dosisoft EPIGray transit in-vivo dosimetry system
- Sun Nuclear Atlas system for management of equipment quality control
- Lifeline Radcalc software for independent MU checks
- Xstrahl 100kV superficial x-ray treatment unit

A full range of contemporary radiation treatments are provided - including SRT, SBRT, VMAT and TBI external beam treatment techniques as well as image guided HDR brachytherapy techniques for gynaecological, prostate and skin cancers. Radioactive iodine -131 therapy for thyroid cancer is also part of our service. We have an active multidisciplinary program of clinical practice developments and quality improvements, and regularly publish our results in peer reviewed journals and present our experience at national and international conferences. Current projects include implementation of in-vivo dosimetry using transit dosimetry, Eclipse Rapidplan, FFF beams and SBRT techniques for oligometastatic disease.
Medical physics

The medical physics service provides a complete range of services to radiation oncology. There are currently 14 members, organised as 1 chief physicist, 2 principal physicists, 7 medical physicists/senior physicists, 2 medical physics registrars, 1 associate physicist and 1 PhD student. Around half of the medical physicists have been trained in European hospitals.

The principal physicists oversee designated areas of practice and development projects. The medical physicists typically participate across multiple areas of routine work and development projects. The medical physicist registrars work under the supervision of qualified staff.

Our research has a strong clinical focus with the aim to improve treatments for patients, and is often a spin-off from the development and introduction of new treatment techniques. Current research topics include the improvement and characterisation of patient-specific quality assurance, the improvement of patient positioning and PTV margin optimisation in head-and-neck radiation oncology, and improvements in high-dose rate brachytherapy. A list of recent publications and presentations is included below.

The medical physics service is accredited by the Australasian College of Physical Scientists and Engineers in Medicine (ACPSEM) for postgraduate training of medical physicists. Medical physics registrars undertake a 5 year postgraduate training program which is overseen by the ACPSEM. Registrars spend the first year at the University of Canterbury in Christchurch doing the course work component of an MSc Medical Physics. They then complete an MSc thesis part time during the first two years while based at the hospital by doing research work. The last years of the training program focuses on acquiring skills in clinical practice. All medical physicists participate in training activities.

A full range of Medical Physics equipment is available including a PTW MP3 scanning water phantom system, PTW Unidos dosemeters and detectors, PTW Starcheck and Octavius arrays, radiochromic film dosimetry system, Harshaw 5500 TLD system and a range of CIRS plastic water slab and anthropomorphic phantoms. Technical support for radiation treatment equipment is supplied by Varian, Siemens and Xstrahl under service agreements. Biomedical engineering and IT departments within the hospital also provide technical support.

Salary and conditions are set according to a national Medical Physicists Collective Employment Agreement. Benefits include 25 days annual leave for staff with more than 5 years’ experience and 10 days study leave per year with expenses provided to attend conferences. Staff can expect to attend international conferences periodically. Local medical physics staff are members of the ACPSEM, which organises annual meetings and publishes a scientific journal. International staff members generally maintain their overseas affiliations.

New Zealand and Wellington

New Zealand exhibits a large variety of landscapes, is well known for its’ unique fauna and flora, and provides plenty opportunities for a wide range of outdoor activities. Wellington is New Zealand’s capital city. It combines the cosmopolitan outlook and global reach of a capital city with the personality of a village.
It is home to the government and is a cultural centre with national museums, galleries and theatres. A number of internationally renowned creative tech businesses are based in the city as are many of New Zealand’s key national research institutes. It also boasts vibrant cafés and restaurants, international sporting and cultural events, and a beautiful harbour.

Wellington city is surrounded by a 245 hectare green belt with extensive walking and biking trails, and most residents live within 3km of the sea. It is a great place to live and work, and was ranked number 1 in the world to live in the Deutsche Bank Quality of Life Survey 2017.

**Publications since 2015**


**Presentations since 2015**


R. Louwe, T. Satherley, A. Williams, and B. Scarlet; *Optimisation of TPS beam model parameters for stereotactic treatments using VMAT*, Oral presentation at the NZ SABR workshop Christchurch, 21 May 2016.


