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In this issue

In the first article, Gayle Keenan and Denyse Hodgson, present their study into service user involvement in cancer professional's education. Service user involvement has been demonstrated as an important aspect of cancer professionals' education. There is some understanding of service users' incentive to be involved, but little insight into what motivates them. This study explores this concept more fully.

One-to-one interviews were conducted with service users who have been involved in education at the university. Thematic analysis was conducted. Five participants were asked about their motivations and experience of taking part in a variety of educational activities. This study has highlighted the importance of hearing the voice of the service users; a two-way engagement for which there are benefits for both the students and service users.

In the second article, Cher Kinamore explores attitudes and opinions of radiation therapists (RTs) in British Columbia towards advanced practice (AP). Although the notion of AP has been widely accepted and implemented in some countries, for example, the United Kingdom, in Canada it is has yet to be widely tested as a model of working. To date, in British Columbia (BC) there are no APs and no research has been conducted regarding the opinions and attitudes of RTs in BC towards the implementation of AP. The research objectives were to explore the attitudes and opinions of RTs and establish what the term AP means to BC RTs, and also to discover what they consider to be benefits, and barriers to implementing AP. A quantitative approach was utilised and an online questionnaire was sent to 266 RTs that currently practice in BC.

The author concludes that RTs believe there are obstacles to be overcome regarding the adoption and implementation of AP, but these are outweighed by the potential benefits such as enhanced patient care due to increased levels of professional knowledge and development that can lead to increased levels of job satisfaction. These are seen as important drivers for creating the AP role in BC.

The theme of AP continues in the next article by Grace Lee, Kieng Tan and Robert Dinniwell. The clinical specialist radiation therapist (CSRT) is a RT with advanced site-specific clinical skills and knowledge that can be utilised to enhance the education of RT students within an academic setting. The aim of this study is to assess the students' perception of the teaching provided by a CSRT within a case-based learning workshop tailored for breast cancer. A workshop that followed the patient's RT treatment pathway (consultation, CT simulation, treatment planning and delivery) was led by a breast-site CSRT to 16 third-year students. Following completion of the workshop, a four-point Likert-scale survey was distributed to explore the students' didactic and clinical experiences and their general perceptions of the CSRT's contribution to their breast-site module education. The researchers found that third-year RT students commencing their clinical practicum will have had a greater proportion of their learning from didactic teaching as opposed to clinical experience. In transitioning to their final year, the focus of the curriculum shifts to the application of theory into the clinical environment. The students perceived the CSRT to be a useful resource to enhance their understanding of the breast-site module and their feedback supports the instructional quality and effectiveness of the CSRT in this clinical teaching role.

Kitty Chan and Caroline Davey investigate patients' and staff's perspectives on the usefulness of a head and neck radiotherapy patient education booklet. Printed patient education material enhances verbal patient teaching. 'Starting

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Radiation Therapy: Helpful Tips for Patients with Head and Neck Cancer' is a booklet that facilitates head and neck (H&N) cancer patients' orientation to the study hospital. This study examined and compared patients' and staff's opinion on the distribution and usefulness of this booklet. Patients starting radiotherapy treatment to their H&N cancer and staff involved in their care were recruited. A survey was designed to collect responses from both cohorts. The researchers found that the booklet was useful as an orientation tool for the patients to navigate the hospital system. Patient and staff have similar opinion regarding the most useful sections in the booklet. Further studies needs to be conducted to validate the need of having this booklet available in other languages.

In the next paper, Morley, Cashell, Sperduti, McQuestion and Chow present an important practical paper on evaluating the relevance of dosimetric considerations to patient instructions regarding skin care during RT. Patient teaching in RT may include restrictions on applying skin products due to concerns that the presence of such materials may increase skin dose. These restrictions may create unnecessarily complicated and conflicting self-care instructions. The purpose of this study was to determine what thickness of skin product is necessary to produce a clinically meaningful dose increase to the skin, and provide recommendations for evidence-based patient instructions. Dosimetric measurements and Monte Carlo simulations were used to calculate skin dose under 0 to 1.5 mm thicknesses of two common classes of skin product for a variety of treatment geometries. The thickness of product required to produce a clinically significant dose increase to the skin was determined. The authors conclude that it seems unrealistic to anticipate patients using sufficiently large quantities of skin product to be of clinical concern and recommend that there are no dosimetric reasons to restrict the use of these types of skin products during RT for common treatment scenarios.

In the next article, Simon Goldsworthy and Stuart McGrail investigate the use of a training package for use with a prone belly board device (BBD). Patients having a course of radiotherapy must be appropriately immobilised for stability and accuracy. Having opened a new cancer service in June 2009 and commenced treating lower GI cancers in 2010, a prone BBD was introduced as the standard radiotherapy immobilisation. The training package was created to aid clinical skills retention of therapeutic radiographers and manage setup quality. Setup reproducibility using the BBD was retrospectively assessed with electronic portal image verified geometric displacements as the main outcome measure both before and after the introduction of training. The authors conclude that there is evidence that the use of the BBD is more reproducible when accompanied by a task-specific training package. Based on the results of this study, further work will be carried out on training standardisation for patient positioning with a BBD for reducing systematic and random geometric displacements.

In the next study, Cassiane Cardoso Bonato et al. present their research into assessing acute changes in thyroid function and volume in children and adolescents undergoing radiotherapy for a variety of non-thyroid cancers. Thirty-one children and adolescents underwent RT of various body areas in which the thyroid was not included. TSH, T4, fT4, T3, antithyroperoxidase antibodies and thyroglobulin were measured before, on the last day, 1 month and 3 months after the end of radiotherapy. Ultrasound scans were taken and 6 and 24-hour 131I uptake was measured before and after treatment. The scattered dose to the thyroid region was estimated with a treatment planning system or measured with thermoluminescent dosimeters. The authors conclude that more sensitive methods may be required to ascertain whether acute injury to the follicular epithelium occurs with lower radiation doses scattered to the thyroid.

In the next paper, Jonathan McLaughlin and Laure Marignol undertake a novel approach to radiotherapy scheduling using prime numbers. The optimal delivery of RT to achieve maximum tumour cell kill while limiting damage to normal tissues underlies any RT treatment protocol.

The biological effectiveness of RT is closely related to cellular reproductive activity. The scheduling of dose fraction to a time where

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actively dividing cells are at their most radiosensitive has potential to enhance therapeutic efficacy. A prime number is a natural number greater than one whose only divisors are one and the number itself. The authors propose that the use of prime numbers in the scheduling of radiotherapy treatments could maximise biological effectiveness by facilitating the irradiation of the greatest number of cells at their most radiosensitive stage, and ultimately improve the therapeutic ratio of RT. The theoretical and clinical implementation of this concept into the scheduling of radiation therapy is discussed.

David A. Wood, Laura Lane, William Gillespie, Sally Baker and Carl Rowbottom share their experiences of the implementation of a PDR 3D-Guided Gynaecological Brachytherapy Service in a UK Centre. Owing to the discontinuation of the widely used LDR Caesium units, many centres in the past 10 years have moved from low dose rate Selectron treatments to Iridium 192 afterloaders. While the majority of UK centres have opted for HDR units, The Christie have invested in two PDR afterloaders alongside a move to full 3D planned gynaecological brachytherapy.

The specific logistical and practical challenges of implementing a PDR service are discussed alongside the more general challenges of implementing 3D-guided MR-based brachytherapy. A multidisciplinary approach was undertaken to streamline the patient pathway and give all disciplines a forum to discuss service improvements and resolve problems. The lessons learned throughout this experience can inform the decisions of departments that may wish to implement a PDR service or indeed a 3D image-guided HDR brachytherapy service in the future. The focus on the utilisation of lean principles to the patient pathway, improved multidisciplinary working and enhancing service efficiency is of interest to all centres.

In the next article, Satya Bose, Sanjeev Bahri and Ron Lalonde undertake a comparison of dosimetric characterisation of high dose rate brachytherapy (HDR-BT) with external beam intensity modulated radiation therapy (EX-IMRT) as a means of delivering boost dose. Five HDR patients were selected for IMRT planning. Patients underwent ultrasound-guided catheter placement for HDR. CT images were obtained and imported into the Nucletron PLATO Brachytherapy system. The prostate, urethra, bladder and rectum were contoured on axial slices. The dose was calculated and optimised by graphical optimisation. The CT images of these structures were exported from the PLATO to Eclipse workstation for IMRT planning. For each patient, the DVH of HDR and IMRT plans were generated, drawn on the same scale and compared. From their results, the authors concluded that HDR brachytherapy may reduce normal tissue toxicities in prostate boost treatments, even though the dose homogeneity inside the PTV is far worse than in IMRT treatments. Another advantage of HDR over IMRT is that the organ motion is not a significant concern as in IMRT.

In the first of three literature reviews, Carina Feuz reviews several aspects of appointing keyworkers in palliative cancer care. Complex disease management demands the provision of a full spectrum of high quality care; requiring both specialist and generalist services. Appointed keyworkers are knowledgeable about patient preferences enabling effective coordination of care and promotes collaborative team working. The need for diversity in the provision of palliative care is recommended but can challenge effective interdisciplinary collaboration by creating tension and limiting the interdisciplinary team from reaching its full potential, resulting in adverse outcomes. The purpose of this paper is to review the literature available regarding how interdisciplinary teams and keyworkers influence high quality palliative care; evaluate how professional culture barriers can influence team collaboration; discuss the keyworker role in minimising these barriers and clinical implications. A review of the English literature from 2003 to 2013 was performed using the databases PubMed (NML), OVID Medline and Google Scholar.

The author concludes that keyworkers can help overcome professional culture barriers that result from ineffective team communication. Facilitating improved communication regarding professional roles fosters mutual understanding among team members. The dissemination of relevant and timely information minimises fragmentation, prompting

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team decision making and promotes continuity of high quality palliative care.

In the next article, Francesco Cosentino, Nigel John and Jaap Vaarkamp review augmented (AR) and virtual reality (VR) applications in radiotherapy, as found in the scientific literature, and highlight future developments enabled by the use of small mass-produced devices and portability of techniques developed in other fields to radiotherapy. The application of AR and VR within radiotherapy is still in its infancy, with the notable exception of training and teaching applications. The relatively high cost of equipment needed to generate a realistic 3D effect seems one factor that has slowed down its use, but also the sheer amount of image data is relatively recent, where radiotherapy professionals are only beginning to explore how to use this to its full potential. This increased availability of 3D data in radiotherapy will drive the application of AR and VR in radiotherapy to efficiently recognise and extract key features in the data to act on in clinical decision making. The development of small mass-produced tablet devices coming on the market will allow the user to interact with computer-generated information more easily, facilitating the application of AR and VR. The increased connectivity enabling virtual presence of remote multidisciplinary team meetings heralds significant changes to how radiotherapy professionals will work, to the benefit of our patients.

In the third literature review, Danielle Whitaker and David Green investigate the effects of the treatment of childhood leukaemia on the quality of life, the physical and the psychological well-being and general development of survivors. This article reviews current literature to examine existing gaps in knowledge and identify a potential focus of future research and clinical practice. The authors conclude that further research into the effect of treatment modality on the extent of chronic effects, along with investigations into the needs of the whole family unit, is required. Future practice must take into account long-term implications while ensuring effective holistic care.

The case report in this issue is a case of hyponatraemic seizures following prostate brachytherapy by Slevin, Rodda, Bosomworth and Bottomley.

To complete this issue there is a commentary by Syed Farroq Akber on the clinical efficacy of effective dose.

Professor Angela Duxbury

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