Drivers of change

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Look how far we have come

When you visit hospitals in developing countries you soon see the value in defining the roles and responsibilities of a qualified Medical Physicist, fighting for recognition by stakeholders and the need for lobbying for funding for training programs [1]. I was astounded by the waiting rooms crammed with patients waiting for treatment that day and hearing about the shortage of Medical Physicists from representatives of various developing countries. And there is no doubt this sight inspired some of the Medical Physicists who developed and implemented ACPSEM's Training, Education and Assessment Program (TEAP). Taking advantage of their experience

in Australasia, physicists went on to assist the IAEA develop and implement a structured, competency-based clinical training program for Radiation Oncology, Diagnostic Radiology and Nuclear Medicine [2–4], flexible enough for any country to adopt. Despite a number of our colleagues who thought “we’re all mad here” [5] and it was too hard, we chased the white rabbit down the rabbit hole in 2003/2004 and here we are, 15 years later. Look how far we have come!

A NSW perspective

In NSW, we are close to achieving that dream of a qualified Radiation Oncology Medical Physics (ROMP) workforce, with our workforce in-training largely in Registrar training positions. The expected benefits have been realised—shorter time to certification and a more versatile physicist with a solid knowledge base across the roles and responsibilities they would be expected to assume. The NSW Ministry of Health and Australian Government have supported the NSW public sector through each stage; from implementation, further development to consolidation. Significant funding was provided for Registrar positions, the NSW Clinical Program Coordinator (CPC) position (which I currently occupy) and other infrastructure. We were now able to “grow our own” and predict the workforce supply for our existing service and growth, if required. The need for slow overseas recruitment processes has significantly reduced. Other jurisdictions have struggled to secure sufficient funding for Registrar positions and supporting infrastructure, but I’m sure we can all agree the training of medical physicists in Australasia is in much better shape than we were in 2002, before TEAP was implemented in to clinical departments. Further development is on our door step with the clinical training guide about to evolve once again.

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TEAP is a driver of change

What we did not anticipate was more far reaching benefits of TEAP and Registrars to the workforce. Registrars challenge the status quo, reviewing current practices in departments as a natural part of achieving level 3. They assist or take on clinical implementation projects that qualified staff are too busy to tackle; driving change. Registrars write reports as evidence of completion of a learning outcome, which has had the flow on effect of improving local documentation practices. Also Registrars need documentation to train, so deficits in this area are felt more acutely. Relationships with our multidisciplinary colleagues have strengthened and training has become a reciprocal arrangement. This multidisciplinary collaboration has been a natural progression for some and an uphill battle for others. Registrars have a time limit and surge forward on projects that would otherwise have to squeeze in around other clinical duties for an extended period of time. They publish work that may otherwise stay buried in department records [6]. Registrars have been and are drivers of change. They are ambitious and seek a challenge, to be useful and involved. The rewards are best realised by those departments who provide the resources early, allocating staff who are willing and feel enriched by mentoring and training. These departments strategically place the Registrar around key work areas. Their Supervisors provide the opportunity and safety net for the Registrar to practice safe clinical decision making and problem solving in real world scenarios. Assessors take advantage of the linkages between learning outcomes across all modules to guide the Registrar to work efficiently through the TEAP assessment components. Their clinical service reaps the rewards of a Registrar who can work in all clinical areas of the department and assist and/or lead clinical projects (under supervision).

TEAP goals not yet realised

What has not been realised (yet) has been the goal of reducing the magnitude and stress of the final exam process; a goal that the Radiopharmaceutical Scientists may have already achieved with progressive assessment. Progressive assessment is difficult within a small workforce, particularly in areas of speciality such as Brachytherapy, where the workload on a limited number of clinical experts far outweighs the relative contribution of the module to the program as a whole. Assessors would need to be credentialed in some way and independent external audits of key learning outcomes would need to be organised, potentially

replacing annual progress reviews. For geographically-isolated departments, the costs of multiple occasions of travel for the independent Assessors would need to be paid out of TEAP fees. Registrars may also need to travel for Brachytherapy assessments when a service isn't available locally. Whilst there are benefits for ACPSEM in terms of reducing exam workload and benefits for Registrars to reduce the scope of what they have to study for each assessment, there is of course the dilemma of mutual recognition with our international counterparts. Other options to reduce the magnitude and stress of TEAP includes pre-requisite completion or streamlining of completion of level 1 learning outcomes, elective areas of speciality and removal of overlapping assessment elements. All these options should be considered moving forward.

Efficiencies can be found in having more checks and balances within ACPSEM's TEAP administrative processes. As TEAP is well established, I believe it is time for ACPSEM to make clinical departments, external training providers and Universities more accountable for meeting ACPSEM's expectations, as part of an organisation's re-accreditation process. Issues can transcend generations of Registrars. Stronger links need to be made between Registrar progress reviews, approving Supervisor allocations to new Registrars and organisation accreditation so that issues raised at one review, flow on to the others. All Supervisors should be required to acquire TEAP Continuing Professional Development (CPD) points in a re-accreditation period and demonstrate how they have disseminated that information to their colleagues. TEAP CPD may include attendance at a state-wide TEAP workshop or TEAP session at an Australasian conference, as well as local Supervisor meetings, periodic meetings with the CPC or Preceptor and Registrar annual progress reviews. This will hopefully lead to a more efficient and consistent approach to TEAP and minimise conflict and frustration. Efficiencies can also be found in removing common roadblocks. To cover all learning outcomes in the Clinical Training Guide (CTG), ACPSEM requires a letter of support from other professionals, internal and external, who will provide this training. The requirement can be anything from clinical experiences to training, both with or without assessment. Often professionals providing the training are not always fully aware of TEAP requirements. This can in part be due to the CTG changing over the years and/or the arrangement which was agreed to by management. Therefore instead of a general letter of support, I believe a *learning contract* or similar (such as a memorandum of understanding) should be signed by both the proposed trainer and management as part of ACPSEM's department accreditation, so expectations are clear and are agreed to. TEAP is well established and formal pathways should be in place so Registrars do not encounter avoidable delays.

Expectations of evidence of training have steadily increased, with a sharp upturn when records moved to the Moodle learning management system. Advice to Registrars often rocks back and forth between a limited sample of evidence of clinical practice for each module and “documentation gone mad”.

A further challenge has been the interpretation of Version 3.6 of the ROMP CTG. Whilst the goals of assessment consistency and a more robust educational structure based on Blooms Taxonomy [7] may have been realised, the question is “at what cost?”. Clinical practice is unpredictable and concepts are often introduced after their application, as is the case with problem-based learning. Whilst the guide is flexible enough to cope with this and problem based learning fits to the learning styles of many Registrars, it does clash in some way with the principles of scaffolding that the guide is based on. If a learning opportunity at a higher level is predictable, then the underlying knowledge should be covered first. Learning outcomes from a number of modules can interlink within every clinical scenario and should be trained and assessed as such. Efficient training and assessment pathways are needed to guide the TEAP novice. Detailed assessment criteria and so many individual learning outcomes to work through, particularly at level 1 (medical physics knowledge in the clinical context), has slowed progress and is less forgiving of periods of understaffing, intense periods of commissioning and other delays. Delays are also caused by misinterpretation of ACPSEM’s ROMP Progression Monitor Tool. If a Registrar tracks exactly to ACPSEM’s *expected* points, or below, they will only give themselves 1 year (or less) between the written and final exams to complete the remaining third of Progression Monitor Tool points. In my opinion, Registrars should be spending more time developing professional attributes of the higher levels of competence. Whilst the original intention of the spreadsheet was that Registrars should remain ahead of ACPSEM’s *expected* points, this interpretation seems to have been lost in translation. Therefore ACPSEM should review the wording “*expected*” and annual review action levels to ensure Registrars track through TEAP in a reasonable timeframe. Ideally Registrars should reflect on their own learning style and work with their colleagues to map out monthly goals to meet a written exam and final deadline that gives them sufficient time to complete all assessment components in a reasonable timeframe. If a Registrar needs more time to develop the higher level professional attributes then opportunities for them to practise these skills should be introduced earlier in their training program. Supervisors need to work closely with the Registrar to make these strategic decisions.

Future needs of training programs

In an era of fast implementation of new technology, ACPSEM will have the challenge of aligning TEAP to future needs [8]. AAPM has a list of areas of expected clinical growth areas, as part of their MedPhys3.0 initiative [9], which proves to be interesting food for thought. As our roles and responsibilities evolve, so will the learning outcomes that grow out from these. While the base knowledge required of a Medical Physicist remains relatively the same and, you can argue, forms the building blocks of more complex techniques, areas of speciality continue to evolve. Samei [10] noted new hard skills will be required such as process engineering, optimisation, bio-informatics and bio-statistics, amongst others. Economically, increasing the training time to include additional skills is an undesirable option. Therefore, can elements of the training program be reduced or converted to an elective, to make room for growth areas? Should more time be spent on practising innovation, safe decision making and leadership skills under supervision at level 3, as AAPM suggests? Training also needs to survive in an era of cost cutting, automation and service efficiency goals. Even though our role and economic climate may shift, we obviously need to keep in mind that safety is paramount.

Will the way we teach and train evolve as the generations change? As Eddie Woo’s rise to 2018 Australian local hero [11] and the changes to the RANZR Radiation Oncology Training Program curriculum [12] show, there is a driver of change towards collaborative and problem based learning rather than rote learning and dictatorial styles of teaching. As clinical physicists, we need to *drive change* towards a more interactive training approach. TEAP is not about coming in and assessing the final standard but mentoring and training as well. It is as much about the journey as it is the destination. You cannot recruit the best candidates and not engage, inspire and challenge them. As Perkins [8] noted, there was little formal training before TEAP was implemented. Therefore, for many physicists, training and assessing Registrars can be confronting. Nevertheless, we have to bare gaps in our own knowledge and learn with the Registrars. Whilst I say to Assessors not to feel threatened by the questions Registrars ask, I certainly don’t look forward to applying for jobs against them in the future!

Changing demographic of TEAP

For any Registrar, TEAP is an Everest to be climbed. Many Registrars climb this mountain with the competing demands of a young family. The NSW public ROMP

Registrar population is increasing in average age, due the increased intake of applicants with PhDs and is almost half women [13]. Despite many individuals and organisations encouraging more women into STEM careers [14], there is yet to be a significant change in the profession's view of part-time workers. Obviously we have come a long way since Beatrice Tinsley, a New Zealand physicist who sacrificed her marriage and raising her children to pursue her ground breaking research in Astronomy [15]. However, both men and women can face opposition for more flexible working conditions in order to raise a family. With the new generations seeking better work-life balance, we may need to adjust our expectations in order to continue to attract such outstanding scientists into our ranks.

Be a driver of change

To all the physicists who cemented a brick in the TEAP wall, a loud “thank you”! Each brick is an integral part of its overall structure. As there are so many people who lobbied for recognition and funding, developed the ground work, designed the infrastructure and drove the implementation, I would not dare to try and name them all. You were all drivers of change. As CPC, I would like to send out a thank you to those people who passionately took on a TEAP role and encouraged others to participate. One person driving change can make all the difference. The success of TEAP is because of you. An even bigger thank you goes to the drivers of change for the profession; the physicists who step out of the Medical Physics world and fight for recognition of the workforce, the role and qualifications of a “qualified” medical physicist, and appropriate remuneration and staffing levels, particularly in developing countries. All these changes will no doubt help the most important person of all - the patient.

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