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TOPICAL DEBATE

Should ACPSEM develop its own position papers or just adopt those of the AAPM?

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Introduction and overview: Clive Baldock, moderator

Position papers are regularly and generally published in academia, politics, law and many other areas including more specifically, the physical sciences and engineering in medicine. Position papers take many forms ranging from letters to editors where the writer is expressing a view regarding something that has been written in a publication through to academic position papers in which arguments and evidence are presented to support the writer's views regarding a particular issue. Position papers developed by expert working groups of professional bodies, such as the Australasian College of Physical Scientists and Engineers in Medicine (ACPSEM) and the American Association of Physics in Medicine (AAPM), aim to provide opinions and evidence-based, best-practice guidelines regarding topics and emerging issues relevant to the professional body and based on a critical analysis of current facts, data and research.

In this inaugural Topical Debate, the topic for discussion is whether ACPSEM develop its own position papers or just adopt those of the AAPM?

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Arguing for the Proposition is Professor Tomas Kron, Ph.D. Prof. Kron was born and educated in Germany. After completing his Ph.D., he migrated to Australia in 1989 where he commenced his career in radiotherapy physics. From 2001 to 2005, he lived in Canada where he worked at the London Regional Cancer Centre and commissioned one of the first tomotherapy units. In 2005, Prof. Kron became Principal Research Physicist at Peter MacCallum Cancer Centre in Melbourne, Australia where he now is Director of Physical Sciences. He serves on editorial boards of a number of journals including Radiotherapy & Oncology, Clinical Oncology and Radiation Measurements and holds academic appointments at Wollongong, RMIT and Melbourne Universities. Prof. Kron has an interest in education of medical physicists, dosimetry of ionizing radiation, image-guided radiotherapy, and clinical trials as a tool for introducing new technology. This is demonstrated by more than 80 invited conference presentations and 280 papers in refereed journals. In 2014, he was awarded an Order of Australia Medal (OAM) for services to medicine, research, and education.

Tomas Kron

Arguing Against the proposition is Senior Professor Peter Metcalfe, Ph.D. Prof. Metcalfe is the Post Graduate Program Director of Medical Physics Degrees at University of

Wollongong. In this role he strives to provide teaching and research leadership by focused vision on strategic goals and clear two-way communication to empower team success. Prof. Metcalfe was born in New Zealand and completed degrees at University of Waikato. He also received clinical medical physics training at Waikato Hospital. He migrated to Australia in 1990 and became Wollongong's first chief medical physicist. In the early 2000s he focused on helping introduce IMRT into Australia. Prof. Metcalfe has been a Chief Investigator on several grants and fellowships totalling $5.7 M (AUD) and has authored over 200 peer reviewed journal articles. He has 38 years medical physics experience and is a proud Fellow of the Australasian College of Physical Scientists and Engineers in Medicine (ACPSEM). His research focuses on enabling new technology to reduce toxicity and improve survival of cancer patients. Prof. Metcalfe is most excited by the use of MRI, robotics and artificial intelligence to aid in the fight against cancer.

Peter Metcalfe

For the proposition: Tomas Kron

Opening statement

There is no doubt that all over the world:

- Physics works the same,
- Medical Physics works sort of the same,
- Medical Physicists' practice is not quite the same, and
- Medical practice guidelines, regulations and laws, let alone resources, vary significantly.

If we accept that 'position papers' are addressing chiefly the last two points, there should be no debate as to the need for ACPSEM to develop our its documents.

However, there are also other arguments for the proposition, which can be distinguished into three main themes:

- Generation of knowledge and learning,
- Impact and change, and
- Public relations and professional pride.

Writing a position paper is not an easy task. It requires a thorough understanding of the field and its practice, extensive literature research and discussion with colleagues. It usually requires multidisciplinary input and presents a great opportunity for generation of knowledge, an opportunity that the local team should be able to contribute to. The choice of topic usually reflects a need identified by the profession and being able to raise an issue locally reduces the threshold for individuals to contribute to the selection of topics. In this way, a 'local' need generates knowledge that provides an opportunity to learn with the hope to influence 'local' practice.

One can also argue that local content has more chance to be used in local teaching and most certainly continuing professional development [1]; it is more likely that we know one of the authors or have heard them speak at conferences. More importantly, local position papers are more likely to influence local policies. The ACPSEM position paper *Recommendations for the safe use of external beams and sealed brachytherapy sources in radiation oncology* [2] is a case in point as it has been included into Radiation Oncology Practice Standards [3] as well as codes of practice of the Australian Radiation Protection and Nuclear Safety Agency [4]. However, this is not limited to radiation oncology as a more recent paper by Heggie et al.shows [5]. In this way, professional documents influence clinical practice and ensure Australian and New Zealand medical physicists are noted by their peers, clinicians, regulators and policy makers.

Position papers are also important in public relations. It is unlikely that members of the public will read our position papers. However, the public will note safety standards and practice guidelines that reference them. They may also notice the authors or the professional body overseeing their creation. Our medical colleagues and their colleges develop local guidelines [6]. Should we, just because our professional College, the ACPSEM, is smaller, defer to overseas work? I suggest no, our medical colleagues are looking for local content from medical physicists. It also forms the basis of joint documents that carry particular weight with administrators.

Finally, there is professional pride. We should be excited about the chance of contributing to position papers and using them for learning and practice. Australian and New Zealand papers are published in learned journals such as *Physical Sciences and Engineering in Medicine*, and given their impact, very likely welcomed by editors. The same applies to other countries and jurisdictions, who have access to our position papers in the same way we peruse position papers from overseas. Wherever you are in the world, medical physics and engineering practice will benefit from local content.

Against the proposition: Peter Metcalfe

Opening statement

It is an honour to be invited to contribute to the inaugural Topical Debate in *Physical and Engineering Sciences in Medicin*e to do some word jousting with my very good friend and colleague, Tomas Kron.

Position papers enable discussion on emerging topics. They assemble the current evidence from multiple up to date systematic review and interpretation of publications saving clinical medical physicists valuable time in providing advice about the best clinical practice to professional groups within our field.

It is an improbable idea that the ACPSEM can develop position papers that cover the wide range of topics required for practising medical physicists. In most cases historically and in the future, it remains a practical solution to read and adopt AAPM documents.

Hypothetically, if a randomised clinical trial were proposed to treat patients with severe viral pneumonia from Covid-19 with 1 Gy of Radiation [7], then which country would be best placed to run the trial? I suspect that the USA would be better placed than Australia to complete the trial more quickly because they have larger numbers of patients, clinics and professional staff.

My point using this analogy is it comes down to 'production capacity' i.e. the amount that someone or something can produce. There are approximately 8500 members of AAPM (aapm.org) compared with about 750 members of ACPSEM (https://www.acpsem.org.au/Membership). Hence AAPM has more than 11 times the production capacity of ACPSEM. Evidence of production capacity for AAPM includes 176 AAPM Task Group (TG) reports since 1977 [8]. They have also published 10 Medical Physics Practice Guidelines since 2013 [9]. In comparison, the ACPSEM web site Policy and Papers revealed 6 position papers [10].

The AAPM documents cover all disciplines within medical physics including Radiation Oncology (more than 90 TG reports) and Diagnostic Imaging Medical Physics (DIMP) (more than 50 TG reports). The AAPM reports focusing on the diagnostic imaging and nuclear medicine disciplines are particularly important as the current DIMP medical physicist production capacity is predominantly focused on growing the workforce in Australasia, rather than writing position papers. I contest that the production of in-house position papers is currently an even greater challenge for this group.

Historically AAPM has produced quality information that is followed by the international community. For example, AAPM TG-21—*A Protocol for the Determination of Absorbed Dose from High Energy Photon and Electron Beams* [11] was the 'granddaddy' of calibration protocols in the 1980s that introduced stopping powers and retired C_{λ}. Fast forward to a report highly relevant to our future practice in Radiotherapy. TG-76—*The Management of Respiratory Motion in Radiation Oncology Medical Physics* [12]. This particular document led by a member of ACPSEM has become the precursor guide to many current Australasian Trans Tasman Radiation Oncology Group (TROG) based motion management clinical trials [13].

I read with interest the most recent ACPSEM position paper, *COVID-19 pandemic planning: considerations for radiation oncology medical physics* [14]. My (tongue in cheek) point is it took something as urgent as a world pandemic for members of the ACPSEM to mobilise and produce this essential position paper. The ACPSEM surely does not have the medical physics numbers to back this up consistently with position papers on every topic required for guidance on all broad issues that need to be addressed by medical physicists. Given current clinical workloads, would or indeed should key members of the ACPSEM be reproducing information available in AAPM documents just slightly tweaked for our local environ. Health has become an important issue in the current climate, and I fear for the member numbers in the next ACPSEM fun run unless we work-smart instead of work-more. Work-life balance that should be our priority.

Rebuttal statement: Tomas Kron

My colleague and friend Peter Metcalfe is of course totally correct about the difference in "production capacity" between ACPSEM and AAPM. However, as Australia and New Zealand are not leading production capacity in a lot of areas—maybe coal and uranium excluded—this should not stop us actively engaging in local debate and developing our own guidelines. A good example would be workforce [15] where roles can differ substantially in different jurisdictions [16]. Professor Metcalfe suggests that the "DIMP production capacity is focused on growing the workforce in Australasia, rather than writing position papers". I would contend that a single well-argued position paper on the required number of diagnostic medical physicists in an Australasian context would go a lot further in creating the jobs that are needed than most other efforts.

This is not to say that we should not peruse American and indeed other national and international guidelines and position papers. ACPSEM's work will become easier if it can be built on other documents on similar issues. Collaboration also helps to standardise approaches and make recommendations more robust. It is correct that ACPSEM will not be able to publish as many position papers as European and American associations. This brings with it the need to prioritise. While there have been a few excellent examples where

ACPSEM has led the way [17, 18], prioritisation has become a matter of urgency and should also include stakeholders from outside our profession. Involving clinicians, administrators and consumers already at the outset may help to give the resulting documents more political impact. I would like to think that given the right initiatives and incentives we can produce three important and locally relevant position papers in the next five years.

I would like to sum up by suggesting that the best way forward is to read AAPM, European Federation of Organisations for Medical Physics (EFOMP) and Asia-Oceania Federation of Organizations for Medical Physics (AFOMP) position papers but then get to work and write our own (with the Royal Australian and New Zealand College of Radiologists (RANZCR), Australian Society of Medical Imaging and Radiation Therapy (ASMIRT) or Australasian Radiation Protection Society (ARPS) as it may be).

Rebuttal statement: Peter Metcalfe

I originally thought the proposal was rather "preposterous". However, it is important to listen to the other point of view; listening seems a rare commodity these days. Prof. Kron brings up some very important arguments. His arguments rival the quality of AAPM Point/Counterpoint publications that "gel" with me [19, 20]. He states, "Medical Physicists practice is not quite the same, and medical practice, guidelines, regulations and laws, let alone resources, vary significantly." He also importantly points out that local position papers are more likely to influence local policies.

Prof. Kron and I agree that position papers written by AAPM and ACPSEM are both extremely useful. It is only to the quantity that ACPSEM can commit to writing that we disagree on. He suggests a larger number of local position papers believing the glass is half full, while I am suggesting a smaller number of local position papers based on the glass is half empty. Who is the heavier drinker? As to the optimal quantitative number the answer my friend is blowing somewhere in between, "the answer is blowin' in the wind" [21].

My recommendation therefore is to adopt AAPM position papers in most cases and only write ACPSEM specific position papers when the uniqueness of our situation is sufficient to warrant diverging from the AAPM model. Australia's major strategic alliance partner may play a 'funny brand of football' and drive on the 'wrong side of the road' but the value of the AAPM Task Group documents to the history and future endeavour of medical physics in all developing and developed countries is unquestionable.

I guess I'm arguing "Embrace the difference" while Prof. Kron is arguing "Buy Australian made".

In the words attributed to Sir Francis Bacon "scientia est potentia" a latin aphorism for "knowledge is power" or in other words without knowledge one cannot be successful in life [22]. Reading position papers is probably a more efficient way of gaining knowledge than wading through all the literature. Hence the more position papers the better, then bring it on!

References

1. Kron T (2006) Computers, p53 and dosimetry: what does this spell? Australas Phys Eng Sci Med 29(3):xi–xii
2. ACPSEM (1997) ACPSEM position paper. Recommendations for the safe use of external beams and sealed brachytherapy sources in radiation oncology. Australasian College of Physical Scientists and Engineers in Medicine. Australas Phys Eng Sci Med 20(3 Suppl):1–35
3. Tripartite R (2011) Radiation oncology practice standards. RANZCR, Sydney
4. ARPANSA (2008) Radiation protection in radiotherapy. Australian Radiation Protection and Nuclear Safety Agency
5. Heggie JCP, Barnes P, Cartwright L, Diffey J, Tse J, Herley J et al (2017) Position paper: recommendations for a digital mammography quality assurance program V4.0. Australas Phys Eng Sci Med 40(3):491–543
6. Tiong A, Lao L, MacKean J, Goonetilleke M, Kron T (2016) Faculty of radiation oncology position paper on the use of image-guided radiation therapy. J Med Imaging Radiat Oncol 60(6):772–780
7. Kirby C, Mackenzie M (2020) Is low dose radiation therapy a potential treatment for COVID-19 pneumonia. Radiother Oncol 147:224–225
8. AAPM Reports. https://www.aapm.org/pubs/reports/
9. AAPM Practice Guidelines. https://www.aapm.org/pubs/MPPG/
10. ACPSEM Policy-and-Position-Papers. https://www.acpsem.org.au/Our-Work/Policy-and-Position-Papers
11. AAPM Task Group 21 (1983) A protocol for the determination of absorbed dose from high energy photon and electron beams. Med Phys 10(6):741–771
12. AAPM Task Group 76 (2006) The management of Respiratory Motion in radiation oncology. Med Phys 33(10):3874–3900
13. Keall P, Nguyen D, Obrien R, Booth J et al (2017) Stereotactic prostate adaptive radiotherapy utilising kilovoltage intrafraction monitoring: the TROG 15.01 SPARK trial. BMC Cancer 17:180
14. Whitaker M, Kron T, Sobolewski M, Dove R (2020) COVID-19 pandemic planning: considerations for radiation oncology medical physics. Phys Eng Sci Med 43:473–480
15. Oliver L, Fitchew R, Drew J (2001) Requirements for radiation oncology physics in Australia and New Zealand. Australas Phys Eng Sci Med 24(1):1–18
16. Round WH, Tay YK, Ng KH, Cheung KY, Fukuda S, Han Y et al (2010) AFOMP POLICY STATEMENT No. 2: recommended clinical radiation oncology medical physicist staffing levels in AFOMP countries. Australas Phys Eng Sci Med 33(1):7–10
17. Shakeshaft J, Perez M, Tremethick L, Ceylan A, Bailey M (2014) ACPSEM ROSG Oncology-PACS and OIS working group recommendations for quality assurance. Australas Phys Eng Sci Med 37(1):3–13
18. Nelligan R, Baldwin Z, Ostwald T, Tran T, Bailey M (2015) ACPSEM ROSG TBE working group recommendations for quality

assurance in total body electron irradiation. Australas Phys Eng Sci Med 38(3):479–492
19. Bayou JE, Low DA, Zaidi H (2019) MRI-linac systems will replace conventional IGRT systems within 15 years. Med Phys 46(9):3763–3767
20. Baldock C, Karger CP, Zaidi H (2020) Gel dosimetry provides optimal end-to-end quality assurance dosimetry for MR-linacs. Med Phys. https://doi.org/10.1002/mp.14239
21. Dylan B (1962) Lyrics by Bob Dylan. First recorded in 1962
22. Bacon F (1597) Although there is no known occurrence of this precise phrase in Bacon's English or Latin writings, the expression "ipsa scientia potestas est" ('knowledge itself is power') occurs in Bacon's Meditationes Sacrae