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Vascular radiation safety education: don't stay passive but go massive.

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The past two decades of vascular surgery have been characterised by a huge shift from open surgical to minimally invasive, Xray-guided endovascular techniques for the treatment of patients with vascular disease across its whole spectrum. Consequently, many training programs and simulation courses have been developed to increase endovascular skills and learn advanced techniques. However, endovascular operators are not only responsible for the quality of their endovascular interventions but also for promoting radiation safety, maximally protecting the patient and all healthcare staff from radiation exposure. The European Society for Vascular Surgery (ESVS) 2023 Clinical Practice Guidelines on Radiation Safety, the first guidelines written under the auspices of a vascular surgical society, illustrated a lack of knowledge and training uniformity in radiation protection¹. In this issue of *EJVES*, Soenens et al. report the development of a Massive Open Online Course (MOOC) to improve radiation safety knowledge and behaviour of healthcare personnel in the hybrid operating room². The research group and main authors from the University of Ghent have longstanding experience in developing vascular simulation training programs^{3,4} and should be congratulated for this addition.

A MOOC is an online course open to anyone, anywhere, anytime. The authors' MOOC, entitled "Radiation Safety in the Hybrid Room: Do's and Don'ts", consisted sequentially of three e-learning chapters, educational videos, and a serious game relating to a simulated EVAR procedure. The accompanying video briefly explains the MOOC: [insert link to video]². It was first evaluated in a pilot study across seven international vascular centres with different sizes and academic backgrounds, and subsequently implemented in Ghent University Hospital. All staff working in the hybrid operating room were invited to complete the MOOC. Overall, with a mean invested time of 169 minutes, radiation knowledge improved by an average of 23%. However, there were significant differences between the staff groups. Nurses (a combination of scrub, circulating and anaesthesiology) had a significantly lower pre-course and post-course knowledge than anaesthesiologists and surgeons (in-training). Moreover, in contrast to other groups, retention test scores for nurses were not significantly different to pre-test scores. Only surgeons' retention test scores were not significantly different from the post-test score. The latter data should be interpreted with caution as only half of the participants that finished the MOOC completed the retention test after six months. However, this raises the question of whether the "one

size fits all” format of this MOOC is the most effective format for all specialties working within the hybrid operating room. Perhaps the MOOC could be tailored to meet the potentially different educational needs of the various clinical groups; nurses versus medical specialists and/or staff at the intervention table versus staff in supporting roles.

The current MOOC, which was aligned with the ESVS 2023 Clinical Practice Guidelines on Radiation Safety¹, was demonstrated as feasible and effective in increasing radiation safety knowledge, providing a vital first and structured approach. Next steps could be to measure actual improvements in radiation safety behaviour as well as in clinical outcomes, with further work to ensure benefits are sustained across all clinical groups. We are sure that the research group of the University of Ghent, working with the Vascular surgery in Europe radiation SafeTy Alliance (VESTA), will continue to lead the way in this important educational field, taking “massive” steps forward in radiation safety.

References

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