

GASOC VRiMS Advanced Airway and Regional Anaesthesia workshops: Experience from four African nations

GASOC (Global Anaesthesia, Surgery and Obstetric Collaboration) is a resident doctor-led organisation whose aims are advocacy for global health issues, partnerships with colleagues in resource poor settings with bi-directional training, research and education and collaboration with like-minded global surgical organisations



GASOC has partnered with VRiMS (Virtual Reality in Medicine and Surgery) since an initial hybrid pilot course was run between Brighton, UK and Kampala, Uganda in 2022. VRiMS specialises in creating resources for medical training through extended reality technologies [1].

This hybrid course had a surgical focus with the aim to use virtual reality (VR) as an innovative training platform in Uganda. The content was recorded in Brighton using 360-degree VR technology, and live-streamed to Kampala, where there were 79 individuals over the four-day course. This is freely available to view live, either on a low-cost VR headset (a smartphone and a cardboard headset), or in 2D via a normal computer screen. Recorded videos are available in the free VRiMS library, which contains over 300 multi-surgical specialty, anaesthetic procedures and simulations. Remote registrations included over 500 individuals, some over multiple days, showing appetite for ongoing work.

GASOC has since organised and run four anaesthetic workshops with VRiMS, the first in Uganda (in April 2023), Cameroon and Zambia (in January 2024) and most recently in Tanzania (October 2024). These focused on advanced airway skills and regional anaesthesia. They have all been organised alongside the local departments to address their specific learning needs. Content has been taught by expert all-African faculty, including ambassadors from AFSRA (African Society for Regional Anaesthesia) to ensure context-specific teaching. Surgical workshops, in conjunction with VRiMS, have also run simultaneously at all these locations.

Uganda workshop (April 2023)

This workshop was run with Kabale hospital in Western Uganda. Forty-seven anaesthetic officers from the Kigezi region, serving a population of 1.2 million, attended the teaching session. Plan A blocks, advanced airway skills (including video laryngoscopy and front-of-neck access) were demonstrated, recorded, and live-streamed using 360° VR technology. These videos were recorded in both French and English and are freely available on the global VRiMS library. Simulation sessions were also trialled on eFONA (emergency front of neck access) and LAST (Local Anaesthetic Systemic Toxicity).

Qualitative and quantitative data were collected from both candidates and faculty to allow feedback, analysis and improvement for future courses. Feedback has been very positive, and learners have reported positive changes in knowledge, procedural skills and behaviours.

Following this course, we were invited by the faculty to run workshops in their home countries (Zambia and Cameroon), which happened in January 2024.

Cameroon workshop (January 2024)

This was a partnership with two of the previous workshop faculty from Cameroon and their local initiative ASCOVIME (Association des competences pour une vie meilleure) [2]. ASCOVIME is an NGO (Non-Governmental Organisation) based in Yaounde, Cameroon, founded in 2008 by Georges Bwelle. They aim to provide free healthcare and surgery to patients in rural areas, alongside capacity building for healthcare workers throughout Cameroon with workshops and courses. They built a simulation centre in Yaounde, where the GASOC VRiMS workshop was run.

Over three days in January 2024, 12 essential airway and regional anaesthesia skills were taught to 59 physician and non-physician anaesthetists with medical students volunteering at scanning stations. The content was delivered as requested and added specific topics of ultrasound guided vascular access, E-FAST (Extended Focused Assessment with Sonography in Trauma) and thoracic ultrasound.

Immediate feedback showed that there was retention of knowledge, skills and behavioural changes. The most mentioned 'take home' points included comments on airway management with video laryngoscopy, cricothyroidotomy and the difficult airway algorithm which participants said would allow them to manage airways more safely. Faculty feedback emphasised the benefit of the simulation sessions alongside suggested changes, including addition of further topics (obstetrics, ALS and safety in anaesthesia), case-based discussions and further multi-disciplinary theatre team simulation sessions.



Further feedback following the course was also gathered, which highlighted retained knowledge and skills with airway management and regional anaesthesia. Some procedures had been attempted more frequently and with more distant supervision. However, there were ongoing difficulties with lack of equipment in some hospitals. Cameroonian surgeons also started writing a surgical VR curriculum.

Zambia workshop (January 2024)

The anaesthetic workshop in Lusaka was run with the University of Zambia, also over three days, and 46 participants attended (some on multiple days). Candidates were mainly from Zambia and the Democratic Republic of Congo (DRC). The focus of these three days was advanced airway skills and regional anaesthesia. Feedback from candidates showed increased confidence in performing procedures, and comments for future courses were to have more time for practice, as well as holding the courses more regularly over time.

A Butterfly Ultrasound™ was donated to Zambia and local faculty have reported using the ultrasound daily for vascular access and ultrasound guided regional blocks. Ultrasounds were also donated to Uganda and Cameroon and the process is ongoing for one to go to Tanzania.

Virtual reality headsets were also given to Cameroon and Zambia following the courses and are being used by surgeons

to help them learn new surgical techniques. The future vision is to have 10 VR hubs across the African continent to aid with medical training and skills.

Following on from these workshops, both the Cameroonian and Zambian local faculty (also AFSRA ambassadors) held further ultrasound guided regional anaesthesia workshops for local participants at the end of January.

Tanzania workshop (October 2024)

The most recent workshop was run at the end of October in Mbeya, Tanzania following opportune conversations at the 18th World Congress of Anaesthesiologists in Singapore. Thirty candidates over three days attended, and the 12-core advanced airway and regional skills were taught. This time three local faculty were embedded alongside the international faculty members. They also funded the local faculty to stay and teach on clinical cases in theatre after the workshop.

We also tested two videos utilising VR technology on the Virti [3]. Virti is an immersive training platform which leverages VR and artificial intelligence (AI) to allow an interactive interface. These include 'stop' moments within the videos to allow teaching on anatomy, questions for the user to answer and specific safety points. The two videos used were regional anaesthesia videos (ultrasound guided axillary nerve and fascia iliaca nerve blocks), with original content filmed from the Uganda course.

In Tanzania there was also collaboration with SWIFTSS (Surgical teams Working in aFrica Together for Safer Surgery) [4]. SWIFTSS is a UK based charitable trust, established in 2019, with the goal to help improve surgical care in Africa through collaboration, education and training. The first main workstream was the Tanzania National Mesh Hernia Project (TNMHP). Following the anaesthetic workshop in Tanzania SWIFTSS ran a surgical camp with ongoing mentorship and teaching.

Challenges

Over the last 18 months of organising these courses we have learnt huge amounts. There have been changes to learning points and focus, both between courses but also as the planning process developed and the programmes took shape. We have often had last-minute changes and needed to be flexible. Internet connectivity issues have been significant at times, not allowing live streaming of the content to more global VR hubs and rural healthcare professionals. This has been resolved by utilising a local modem (this occurred in Zambia).

Language barriers have been present in countries where we had French-speaking audiences (Cameroon, Zambia with candidates coming from the Democratic Republic of Congo) and we have been able to use the language expertise of our Cameroonian colleagues to facilitate this teaching.



Conclusions and future ideas

Looking ahead: the key aims are sustainability, collaboration, expertise and innovation. We want to ensure we act on local demand and context as well as using local expertise and maximising the use of virtual reality within our teaching programme.

Virtual reality is being increasingly used in anaesthetic and surgical education [5, 6, 7] and offers opportunities for skill acquisition with complex interventions being practised prior to direct patient care. We would like to see more integration of interactive VR videos within our workshops and an analysis of how best to use this exciting, evolving and innovative technology is underway.

This has been a bidirectional learning partnership across all the courses, and we have really enjoyed learning from local partners and their expertise. We would like to highlight their work and continue to maximise their impact both locally and internationally.

Another key aim is sustainability. The past four courses have all been in new countries, but as our feedback has indicated the previous candidates see value in these courses being repeated regularly in the host country to continue to build knowledge, skills and aid in staff development and ultimately patient safety. We hope to be able to return to countries and sites to enhance teaching, continue building relationships with local health care professionals and ultimately develop teaching so it becomes self-sustaining in the future.

Fiona Linton

GASOC UK Anaesthetic representative, ST5 Anaesthetics, Wessex

Jan Man Wong

GASOC UK Anaesthetic representative, ST7 Anaesthetics, London
X: @wongjanman

Pei Jean Ong

GASOC President, ST5 Anaesthetics, Yorkshire
X: @twjeanny

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