

solving, and knowledge translation into practice. Second, learning must be highly relevant to the local context to be effective. The content of each CEMO session is tailored to each group's perceived and ascribed learning needs. CEMO is informed by sociocultural, transformative, experiential and cognitivist learning theories. Teaching strategies include interactive discussion of locally encountered clinical cases, and simulation. Third, it is more effective to integrate new technologies into a larger curriculum than to offer them as stand-alone modules. CEMO incorporates innovative presentation software, screencasts, procedural videos, and online audience response systems to engage participants. Fourth, learning effectiveness is best measured using multiple sources of assessment, and multiple assessments over time. CEMO's learner assessment strategies include self-reflection at sessions, and months later. Participants consider CEMO's effects on their practice, including reactions of co-workers and patients to their new skills, knowledge and behaviours. Finally, program evaluation may take many forms, and begins with defining evaluation goals and questions. We have developed a program logic model for CEMO, and a combined process and outcome evaluation is in progress. **Conclusion:** The application of important educational concepts promotes the design of effective continuing education in emergency medicine for rural health professionals. **Keywords:** education innovation, continuing professional development, rural

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International scope of emergency ultrasound: barriers to utilizing ultrasound to guide central venous catheter placement by providers in Kenya

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Introduction: While ultrasound (U/S) use for internal jugular central venous catheter (CVC) placement is standard of care in many

institutions in North America, most developing countries have not adopted this practice. Previous surveys of American physicians who are not currently using U/S to place CVCs have identified lack of training and equipment availability as the most important barriers to the use of U/S. We sought to identify Kenyan physicians' perceived barriers to the use of U/S to guide CVC insertion in a resource-constrained environment. **Methods:** The study was conducted at the Aga Khan University Hospital in Nairobi, Kenya. Physicians participating in a one-hour course teaching U/S guided CVC placement were asked to complete a survey before beginning training, which was used to assess previous experience with U/S, and evaluate perceived barriers to U/S. Survey responses were analyzed using summary statistics and the Rank-Sum test to compare the difference between participants' responses based on different specialty, gender and previous history of using U/S. **Results:** There were 23 physicians who completed the course and the survey. They included 6 internal medicine, 5 critical care, 5 anesthesia, 2 emergency medicine and 5 physicians from other specialties. The mean length of practice was 5 years. 52% (95% CI: 0.30-0.73) had put in >20 CVCs. 21.7% (95% CI: 0.08-0.44) of participants had previous U/S training, but none have received any training on the use of U/S for CVC insertion. The respondents expressed agreement on the ease of the use, improved success rate, and decreased failure rate with U/S guidance. However, less agreement was found regarding the perceived superior convenience and cost effectiveness of U/S CVC placement (see Figure). The lack of training or comfort with the U/S and the availability of U/S and equipment to maintain sterility were reported as the main barriers for use. Neither previous U/S experience nor specialty of the respondent significantly affected responses. **Conclusion:** Barriers to the use of U/S guidance for the placement of CVCs in Nairobi, Kenya are similar to those found among American physicians. These include training and comfort level with U/S in placement of CVCs, as well as resources required for U/S equipment and to keep the field sterile.

Keywords: ultrasound, international, central venous access