
# CAS 2023 Annual Meeting

## Education and Simulation in Anesthesia Abstracts

# Contents

# A Cross-Sectional Study on Peer-Assisted Learning, Social Media, and Mobile Device Usage Among Canadian Anesthesia Residents and Fellows


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## INTRODUCTION

As social media has become increasingly integrated into healthcare, it is becoming an essential tool for healthcare professionals, researchers, and patients to communicate, share information, and stay up-to-date (1). Peer-assisted learning (PAL) using social media can be a highly effective method of supporting medical trainees (2, 3). Mobile device applications and social media may play a role in facilitating anesthesia trainee-led online education (4). However, there are still many challenges facing anesthesia trainees when it comes to incorporating social media or PAL effectively (5). The primary objective of this study was to assess the proportion of trainees that use social media. The secondary objectives were to identify the perceptions by trainees on the use of social media for educational purposes including PAL.

## METHODS

Ethics approval was obtained for this study. This cross-sectional study was conducted through a survey administered via email at a single large academic center. The survey tool collected data on the following: demographic data (year of study/ field of specialty), use of technology and online resources for medicine, use of social media platforms for anesthesia or training, benefits and barriers to future uses of social media for training, and ideas for trainee-led websites. We used standard descriptive statistics which are reported as n (%).

## RESULTS

80 trainees responded (anesthesia residents = 51, anesthesia fellows = 29) to the survey. The highest perceived benefits of PAL according to residents were that the most valuable information is available on-demand (52.9%), it saves time (52.9%), and it improves their overall learning experience within anesthesia (47.1%). In comparison, fellows thought that PAL was beneficial because it provides multiple perspectives of a single topic (44.8%) and serves as an additional platform to discuss ideas with peers (44.8%). Most medical trainees accessed medical resources with the help of their mobile devices multiple times each day (76.3%). The most popular platforms used by both residents and fellows is Facebook (86.0% and 89.3%, respectively) followed by LinkedIn (42.0% and 28.6%, respectively). Even though most anesthesia trainees use social media, only 26.3% reported to have used peer-led resident/fellow-driven online resources. Examples of PALs trainees used included anesthesia groups and a resident Dropbox resource folder.

## DISCUSSION

Trainees all have access to devices to use regularly for medical knowledge and there is generally an acceptance to using PAL for learning if they address concepts that are individualized to a trainee's level of education. PAL has the potential to garner an increased sense of community and sharing within learning experiences throughout all levels of training. The information gained from this survey will help inform the basis for developing an anesthesia trainee-led e-learning platform. Therefore, the opinions and information shared by participants within trainee programs could help directly influence the content developed on a pilot platform.

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# A Facilitated Peer Discussion Program for Improving Anesthesia Resident Wellness: A Pre- and Post-Intervention Survey


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## INTRODUCTION

In a recent provincial survey of anesthesia residents, half reported experiencing a second victim response following near-miss perioperative events during their pediatric rotation [1]. Despite an established need to support residents [2], few studies have explored interventions to improve resident wellness [3]. To address this gap, a pilot program, Better REsident Wellness (BREW) Rounds, was implemented at our tertiary pediatric centre. Anesthesia residents gather weekly for a 1-hour facilitated peer discussion. The purpose of this quality improvement initiative was to evaluate BREW Rounds with a pre- and post-intervention survey.

## METHODS

This is a quality improvement study, which the local research ethics board deemed exempt from review under TCPS2 article 2.5. All anesthesia residents were invited to participate in this evaluation, via an individualized REDCap survey sent by e-mail at the start of their pediatric rotation. Consent is implied by acceptance/completion of this preliminary survey. The survey collects background information, as well as responses to the Second Victim Experience and Support Tool (SVEST) [4] and Pro Quality of Life (ProQOL) [5] questionnaires. During their pediatric anesthesia rotation, residents are excused from clinical duties to participate in a weekly 1-hour peer discussion, facilitated by a registered clinical psychologist. At the end of their rotation, they are invited to complete a follow-up survey with repeat SVEST and ProQOL questionnaires and have the opportunity to give feedback regarding the ongoing BREW program (Figure 1).

## RESULTS

The BREW program has been running for 18 months; 31/46 (67%) invited residents have completed both pre- and post-intervention surveys. All respondents had attended one or more BREW sessions in each 4-week rotation. In follow-up feedback, 30/31 (97%) respondents considered BREW rounds helpful, felt safe during the sessions, and would recommend to future residents; 28/31 (90%) agreed their morale had improved; and 22/31 (73%) considered their clinical care had benefitted. All respondents supported permanent implementation of BREW in the pediatric anesthesia residency curriculum, and wished to see this initiative expanded to other hospital sites. SVEST and ProQOL outcomes were mostly not different between pre- and post-surveys, although there was evidence of significantly reduced concerns about professional self-efficacy at the end of the rotation. A second victim

response was indicated by 16/30 (53%) in their pre-survey, similar to our previous study [1], and by only 7/30 (23%) in their post-survey.

## DISCUSSION

Preliminary results indicate that the BREW pilot program is both a desirable and beneficial support resource for anesthesia residents at our institution. Other residency programs should consider integrating similar facilitated peer discussion into their curriculum and expanding its availability. Future work will involve a series of qualitative semi-structured interviews to gain a deeper understanding of the potential benefits, which will help determine guidance on setting up and maintaining the program.

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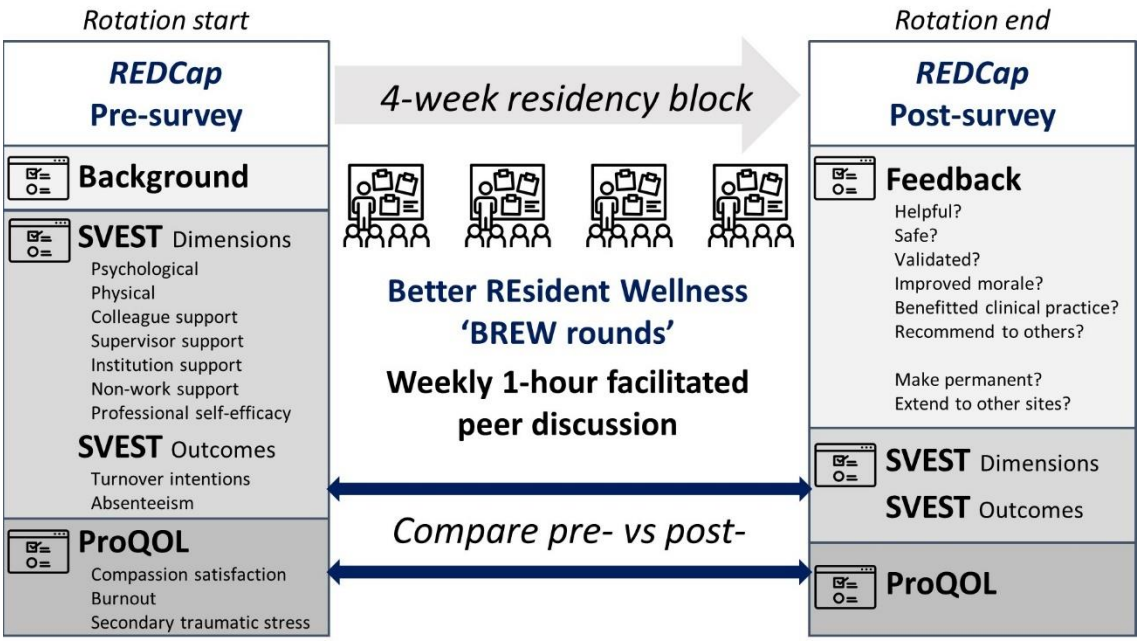


**Figure 1:** Evaluation of Better Resident Wellness (BREW) rounds with pre-/post-rotation surveys, including the Second Victim Experience & Support Tool (SVEST) and Professional Quality of Life (ProQOL) questionnaires.

# AVA: Anesthesia Virtual Assistant for Automated and Scalable Anesthesia Applications


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## INTRODUCTION

Virtual assistants (VAs) are conversational agents that provide cognitive aid [1–3]. VAs in healthcare environments are typically in the form of voice-enabled devices that act as e-coaching assistants, providing step-by-step instruction using intelligent digital platforms, a conversational user interface, and sophisticated artificial intelligence technologies that utilize advanced natural language processing and deep learning tools. There is significant opportunity for the successful implementation of virtual electronics and smart technology in anesthesiology. VAs have the potential to assist anesthesiologists in the management of life-threatening or complex clinical situations, improve the safety and efficiency of perioperative care, and alleviate the burden on healthcare resources by automating functions that previously necessitated face-to-face interaction. As such, we developed a VA device for donning and doffing personal protective equipment (PPE) procedures and compared it to live human coaching in order to further explore the feasibility of using VAs in the anesthesiology setting.

## METHODS

After institutional research ethics board approval and informed consent, a total of 70 anesthesiologists, anesthesia assistants, respiratory therapists, and operating room nurses participated in this study. The effectiveness of VA in aiding adherence to PPE protocols was compared to traditional human coaching in a randomized, controlled, single-blinded crossover design. The automated, scalable, voice-enabled VA was built using the Amazon Alexa device and Alexa Skills application. The device utilized voice recognition technology to allow a touch-free interactive user experience. Audio and video step-by-step instructions for proper donning and doffing of PPE were programmed and displayed on an Echo Show device. Each participant performed both donning and doffing procedures, once under step-by-step VA instructional guidance and once by a human coach. The order of VA or human coaching was randomized. Healthcare worker performance and adherence to safety procedures was assessed by an independent investigator using an objective performance evaluation checklist containing 11 items for donning and 15 items for doffing PPE checklists. The performance score was totaled and compared. Errors and missteps that occurred during donning and doffing were documented. Frequency data from individual checklist items and total scores were compared between groups using $\chi^2$ tests and independent-sample $t$ tests, respectively.

## RESULTS

Seventy healthcare providers were included in the present study. Thirty five participants were allocated into each of the two allocation possibilities. Compared to the human coaching group, significantly more participants in the VA group correctly performed the step of “Wash hands for 20 seconds” during both the donning and doffing tests ($\chi^2$ range=16.97 to 26.52, p<0.001). In contrast, significantly less participants in the VA group correctly performed the steps of “Put cap on and ensure covers hair and ears” (VA: 69%, human coach: 94%, $\chi^2$=7.65, p=0.006) and “Tie gown on back and around neck” (VA: 86%, human coach: 100%, $\chi^2$=5.38, p=0.020). The mean doffing total score was higher in the VA group (VA: 13.63, human coach: 11.17, t=4.98, p<0.001); however, the donning score was similar in both study groups.

## DISCUSSION

Our study demonstrates that it is feasible to use commercially available technology to create a voice-enabled VA that provides effective step-by-step instructions to healthcare professionals to aid in performing PPE procedures. There are numerous potential applications of such e-coaching within anesthesiology, including assisting clinicians with managing rare or complex clinical situations, or in making a diagnosis when real-time expert consultation is not possible. This technology could also be applied towards developing a smart operating room, using VA to guide the clinical team through relevant algorithms. Going forward, the feasibility of implementing this technology in various clinical settings should be explored.

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Table 1. Performance on donning and doffing PPE procedures

| | HC Group (n=35) | VA Group (n=35) | Chi-Square, P value |
|---|---|---|---|
| **Donning accuracy** | | | |
| Remove jewelry | 28 (80%) | 21 (60%) | $\chi2$=3.33, p=0.068 |
| Wash hands for 20 seconds | 16 (46%) | 35 (100%) | $\chi2$=26.08, p<0.001* |
| Put cap on and ensure covers hair and ears | 33 (94%) | 24 (69%) | $\chi2$=7.65, p=0.006* |
| Put gown on | 35 (100%) | 35 (100%) | - |
| Tie gown on back and around neck | 35 (100%) | 30 (86%) | $\chi2$=5.38, p=0.020* |
| Put N95 mask on | 35 (100%) | 35 (100%) | - |
| Pinch mask around nose | 34 (97%) | 35 (100%) | $\chi2$=1.01, p=0.314 |
| Position face shield over cap above eyebrow | 35 (100%) | 35 (100%) | - |
| Put gloves on | 35 (100%) | 35 (100%) | - |
| Ensure cuffs of glove over the gown | 35 (100%) | 34 (97%) | $\chi2$=1.01, p=0.314 |
| Mean donning total score (SD) | 9.17 (0.62) | 9.11 (0.80) | t=0.34, p=0.738 |
| **Doffing accuracy** | | | |
| Ensure garbage bin and hand sanitizer are readily available | 35 (100%) | 35 (100%) | - |
| Take off the first glove and discard without contamination | 23 (66%) | 21 (60%) | $\chi2$=0.24, p=0.621 |
| Take off the second glove and discard without contamination | 27 (77%) | 27 (77%) | - |
| Wash hands for 20 seconds | 16 (46%) | 33 (94%) | $\chi2$=19.66, p<0.001* |
| Untie gown | 31 (89%) | 27 (77%) | $\chi2$=1.61, p=0.205 |
| Roll gown away from body inside out and discard | 27 (77%) | 29 (83%) | $\chi2$=0.36, p=0.550 |
| Wash hands for 20 seconds | 16 (46%) | 32 (91%) | $\chi2$=16.97, p<0.001* |
| Remove face shield | 35 (100%) | 35 (100%) | - |
| Wash hands for 20 seconds | 16 (46%) | 33 (94%) | $\chi2$=19.66, p<0.001* |
| Leave the contaminated room | 35 (100%) | 35 (100%) | - |
| Remove N95 mask last outside the contaminated room | 34 (97%) | 34 (97%) | - |
| Remove mask without contamination | 32 (91%) | 34 (97%) | $\chi2$=1.06, p=0.303 |
| Wash hands for 20 seconds | 14 (40%) | 34 (97%) | $\chi2$=26.52, p<0.001* |
| Remove cap | 35 (100%) | 34 (97%) | $\chi2$=1.01, p=0.314 |
| Wash hands for 20 seconds | 15 (43%) | 34 (97%) | $\chi2$=24.56, p<0.001* |
| Mean doffing total score (SD) | 11.17 (2.64) | 13.63 (1.24) | t=4.98, p<0.001* |

Data reported as n (%). Statistical method: $\chi2$ tests or independent-sample t test. *Denotes p<0.05
HC: human coaching; SD, standard deviation; VA, virtual assistant

# Breaking the Silo and Learning from our Colleagues - Evaluation of Peer Observation and Feedback for Continuous Professional Development for Staff Anesthesiologists– A Mixed Method Study.


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## INTRODUCTION

Physicians who have completed their training usually work alone or with a trainee. The clinical practices of different staff anesthesiologists may differ widely. To maintain and improve clinical skills it is important to reflect on one's own practice and to discuss with and learn from other staff physicians. However, in reality, opportunities for clinical collaboration between staff anesthesiologists are limited to clinical situations where more than one staff physician is needed, or to academic meetings, where information is verbally discussed. Peer observation and feedback is a validated tool for self-reflection. The literature almost exclusively describes peer observation in teaching situations and peer observation by trainees. While some staff physicians might consider this a "waste" of resources, the value generated from this process might outweigh the invested time and cost. This study's aim was to evaluate peer observation and feedback for staff physicians in the operating room.

## METHODS

After ethics board approval and informed consent, this mixed method study invited all staff anesthesiologists at a university-level hospital to participate in the peer observation and feedback process. For each peer observation and feedback encounter two staff anesthesiologists (one observing/one performing) were paired and randomized to either high-turnover or high-complexity surgical lists. There was no trainee or study personnel present at the time of the encounter, to ensure a private and confidential experience. Both staff anesthesiologists were encouraged to discuss similarities and differences in practice throughout the approximately two-hour-long observation period. Both were advised to treat the peer observation and feedback process as a bilateral learning experience, to ensure open communication and benefit for both sides.
After each peer observation and feedback encounter, all participants individually answered a structured questionnaire and an open-ended interview facilitated by a researcher. The primary outcome parameter was predefined as the percentage of staff participants who would either consider making any changes to their future practice and/or consider gathering more knowledge in an identified topic. Descriptive statistics were used to analyze quantitative data. A thematic analysis approach was used to analyze qualitative data.

## RESULTS

Twenty-one staff anesthesiologists (aged 44±9 years, 33% female, with 11±9 years of experience) participated in 26 encounters (64% high complexity, 36% high turnover lists). In

24 (92%) encounters, at least one of the two staff anesthesiologists reported that they would consider making changes and/or acquiring more knowledge. Fifteen (71%) of all staff anesthesiologists agreed to that statement. There was a significant difference between high-complexity and high turnover list, in favour of high-complexity lists (p=0.022). All staff anesthesiologists recommended the use of peer observation and feedback to other health care professionals and as a tool for continuous professional development. Some anesthesiologists (43%) voiced concerns about the cost of such a project. The analysis of the qualitative data revealed several themes: psychological safety, time constraints and staffing issues, changes in behaviour due to the experience, team-building opportunity, opportunity for self-reflection, and the importance of continuous professional development.

## DISCUSSION

Ninety-two percent of feedback encounters resulted in at least one staff anesthesiologist either considering making changes to their practice and/or acquiring more knowledge, which we believe is a surrogate parameter for continued learning. This supports the usefulness of this process as a tool for continuous professional development. Continuous education and self-reflection while ensuring psychological safety are critical for healthcare professionals, may have an impact as a team-building exercise, and may also have the power to ultimately improve patient care. The next step is to evaluate this simple continuous professional development intervention for the clinical teaching of trainees.

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# Pivoting during the Pandemic: How we Successfully Flipped In-Person Simulation Based Undergraduate Anesthesia Education to Virtual Web-Based Simulation.


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**INTRODUCTION**

In-person simulation training is a critical component of undergraduate Anesthesia education. However, the Covid-19 pandemic caused a significant reduction in simulation teaching, putting the education of crisis resource management at risk.

To address this challenge, we developed a virtual reality hybrid to provide an immersive group simulation using homegrown tools such as avatars, monitors, and alarms.

**METHODS**

Learners participated in virtual scenarios via cloud-based video conferencing tools like Zoom. To optimize learning on this novel platform, we adapted the usual flow of an uninterrupted scenario and summative debrief to a segmented debriefing method, which required facilitator training. Additionally, all educators underwent technological training.

**RESULTS**

The feedback received from learners showed a high level of satisfaction with the acquisition of new knowledge, learning competencies, and the use of relevant educational tools. Comments included appreciation for the effort put into preparing the virtual simulation and the smooth transition to the virtual format.

**DISCUSSION**

Simulation-based learning is fragile during the extremes of a global pandemic. After successfully implementing a virtual simulation approach, we believe that this has potential application across all specialties, ensuring the delivery of learning competencies while maintaining engagement.

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# Resident-led Research in a Randomized Controlled Trial in Obstetrical Anesthesia


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## INTRODUCTION

Research improves clinical practices. Thus, introducing it early in the medical residency curriculum cultivates curiosity and creates an environment conducive to learning. However, even though clinical research is a requirement for post-doctoral accreditation programs, residents are rarely implicated in all stages of a randomized controlled trial (RCT). The objective of this study is to describe a resident-led approach in the course of an RCT.

## METHODS

This ongoing study is nested within the PIEB (programmed intermittent epidural boluses) study: an RCT measuring the effectiveness of programmed intermittent bolus compared to continuous perfusion on 235 active labor patients. To systematically document all interventions realized by residents, we collected data from direct observation, patients' files, and the randomization system. We report the implication of residents and we describe tangible examples of the resident's participation at each stage of the study.

## RESULTS

Full resident involvement occurred from initial protocol refinement to ethics board approval and implementation. Preparatory work included building and piloting case report forms, training to obtain valid research consent, and completing initiation visits to train clinical staff

on the unit. Over 27 months, resident-investigators randomized 90 of 130 (69%) patients, from whom 90% (81/90) were enrolled between 08:00 and 16:00. Out of the 130 patients, they proceeded to 112 epidurals, from which 90% (101/112) were done between 8:00 and 16:00. They also collected and entered a total of 10 064 patient-level data.

## DISCUSSION

Establishing resident-led research projects could contribute to facilitating the engagement of future anesthesiologists in research as well as solidifying their scholar role. The PIEB study provided a unique experiential research education and encouraged academic leadership.

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