Interactive virtual cases for emergency medicine physicians during the COVID-19 pandemic

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Abstract

Continuing professional development activities often involve interactive learning modalities, such as simulation. The COVID-19 pandemic limited many in-hospital activities, at a time when practicing high stress procedural scenarios and testing rapidly evolving processes was coveted. Thus, an interactive virtual case curriculum was conceptualized, piloted, and implemented to provide ongoing professional development for emergency medicine (EM) physicians. Each interactive virtual case consisted of: (1) an online scenario delivered in survey format with multiple pathways dependent on participant responses; (2) a facilitated 1-h online debrief 1 week later; and (3) a summary document detailing key learning points distributed to all EM physicians, regardless of participation. This reproducible interactive virtual learning model influenced EM physician practice and confidence, improved participation in continuing professional development activities, and identified departmental areas for improvement. Participants have expressed a desire for these interactive virtual cases to continue for beyond the COVID-19 pandemic.

Keywords Continuing professional development · Virtual · Simulation

RÉSUMÉ

Les activités de développement professionnel continu font souvent appel à des modalités d'apprentissage interactives telles que la simulation. La pandémie de COVID-19 a limité de nombreuses activités en milieu hospitalier, à une époque où la pratique de scénarios de procédures à haut niveau de stress et l'essai de processus en évolution rapide étaient convoités. Ainsi, un programme interactif de cas virtuels a été conceptualisé, piloté et mis en œuvre pour assurer le développement professionnel continu aux médecins de médecine d'urgence (MU). Chaque cas virtuel interactif consistait en: 1) un scénario en ligne présenté sous la forme d'une enquête avec plusieurs parcours en fonction des réponses des participants; 2) un débriefing en ligne d'une heure, une semaine plus tard; et 3) un document de synthèse détaillant les principaux points d'apprentissage distribué à tous les médecins de médecine d'urgence, quelle que soit leur participation. Ce modèle d'apprentissage virtuel interactif reproductible a influencé la pratique et la confiance de médecin urgentiste, a amélioré la participation aux activités de développement professionnel continu et a identifié les domaines d'amélioration du service. Les participants ont exprimé le souhait que ces cas virtuels interactifs se poursuivent au-delà de la pandémie COVID-19.

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Background

Continuing professional development is critical for physician maintenance of skills, adaptation to changes in clinical practice, and to the delivery of high quality and safe medical care [1]. Simulation is commonly used for professional development, but many institutions limited in-person learning during the COVID-19 pandemic to minimize risk of virus exposure. Simulation and professional development

activities, however, are arguably most valuable during times of high stress and rapidly evolving processes [2].

Rationale

A simulation needs assessment survey was distributed on April 16, 2020 to approximately 85 adult emergency medicine (EM) staff physicians at London Health Sciences Centre. Thirty-four responses were received and 79% of respondents expressed interest in participating in virtual learning during the pandemic as a simulation substitute. Accordingly, a pilot case was conceptualized.

To support EM best practices, faculty were engaged to apply protocols and guidelines to novel and challenging virtual cases. The cases are interactive, often with multiple pathways for case progression dependent on the participant's responses. Consistent with the theory of deep learning, these cases allow participants to immerse themselves in scenarios rather than completing a static list of case-based questions [3]. Furthermore, the debrief session consolidates learning via reflective practice [4].

Description of innovation

An interactive virtual case involves three components:

1. online scenario in survey format, with multiple pathways dependent on participant responses, to be completed independently by computer, tablet or smartphone;

2. 1-h virtual debrief session with 2 facilitators (with/without guest experts) held 1 week after case distribution; and
3. a summary document detailing resultant learning points, created by the facilitators, and distributed to all EM physicians regardless of case participation.

The pilot case was launched on May 4, 2020. REB exemption was obtained as a quality improvement initiative. Nineteen physicians participated in the interactive case and 7 joined the debrief session. With positive feedback from the pilot (case 1), a curriculum of 6 additional cases was created and delivered between August 2020 and January 2021 (Table 1).

Curriculum goals

1. Provide continuing professional development opportunities for EM physicians during the pandemic.
2. Engage a greater number of EM physicians in departmental continuing professional development activities.
3. Recommend improvements to address emergency department process limitations.

Participant objectives

1. Formulate a practical approach to rare, challenging, and/or high-risk EM cases.
2. Compare and discuss management strategies with colleagues.
3. Identify potential areas for improvement in emergency department processes.

Table 1 Interactive virtual cases—curriculum summary and participation

Case	Topic	Participants ^a		Time for online completion ^c
		Online	Debrief	
Case 1 (Pilot)	Emergency Department procedural sedation	19	9	8.53 (3.38, 14.78)
Case 2	Protected CODE BLUE in CT scanner	21	6	9.90 (6.10, 14.08)
Case 3	Massive upper gastrointestinal bleed	14	4	18.78 (11.72, 31.13)
Case 4	CODE SILVER, active shooter	27	13	10.03 (7.61, 18.03)
Case 5	Atrial fibrillation secondary to pulmonary embolism and perforated viscus	17	8	8.98 (5.82, 13.72)
Case 6	Human trafficking	38 ^b	24 ^b	11.93 (8.42, 17.33)
Case 7	COVID-19 Emergency Department workup and management	27	16	8.58 (6.98, 10.73)

^aOnline participation reflects EM staff physicians and may include guest expert responses as all online responses were collected anonymously. Debrief participant numbers include two facilitators who wrote the cases and guest experts. Two guest experts were present for Cases 4 & 7, and four for Case 6

^bDue to the nature of the topic, 22 pediatric EM staff were invited to participate in Case 6, in addition to adult EM staff physicians who were invited to all cases

^cParticipant response times reported in minutes as medians with interquartile range (Q1, Q3)

Interactive virtual cases were distributed via e-mail to all EM staff physicians on a near-monthly basis with 1 week to complete the online scenario in survey platform (Qualtrics or Survey Monkey). Cases were designed with multiple potential case progressions based on a participant's answer selections (see example case, Online Resource 1). Two faculty with simulation fellowship experience designed all cases, compiled anonymous responses, and prepared 1-h group debrief sessions via Zoom videoconference. Debrief participants engaged in facilitated discussions based on case objectives following the PEARLS framework [5]. Participants were encouraged to reflect upon their personal approach to managing these cases in a safe and practical manner.

For each case, facilitators generated a document summarizing key learning points for distribution to all EM physicians, regardless of participation. Areas for improvement in department processes identified in the debrief were addressed with administrators. For several cases, guest experts were invited to provide input and/or attend debriefs. Experts included emergency management staff (Case 4); forensic medicine consultants, social workers, and local police departments (Case 6); and specialists in cardiology (Case 5), internal medicine and respirology (Case 7).

Discussion

Curriculum successes

This interactive virtual curriculum allowed EM physicians to continue professional development activities while physically distancing and mitigating virus exposure during the COVID-19 pandemic. The curriculum was evaluated with a survey to all EM physicians, which received 27 responses. Physicians enjoyed the flexibility to complete cases on their own time and to attend debriefs from home. Respondents appreciated that summaries were distributed to all EM physicians regardless of participation, and 85% found them 'helpful'. Strategic collaboration with guest experts was well received, although some thought it may limit open discussion. In addition, 84% of respondents 'agreed' or 'strongly agreed' that knowledge gained would influence or enhance their practice, and 80% reported increased confidence regarding management of topics covered. Finally, 89% of respondents stated that interactive virtual cases should continue after pandemic restrictions are lifted.

Faculty engagement for local professional development activities has historically been challenging in our department, with a total of approximately 10 physicians participating in simulations annually. Comparatively, we estimate that our interactive virtual cases resulted in 40–50 distinct physicians completing online scenarios, and 15–25 participating in debriefs over a 9-month period, though exact numbers are

unknown due to anonymous response collection. Previous studies have identified time limitations as a barrier to physician participation in simulation for continuing professional development [6]. Factors that likely contributed to our success in engaging participants include the focus on short scenarios (10–20 min), the flexibility to complete online cases anytime pre-debrief (44% were completed outside business hours and 15% overnight), and strategic topic selection involving rare scenarios and new/controversial guidelines. Furthermore, each case resulted in at least one quality improvement initiative, including: stocking additional medications, re-designing procedure kits, and updating online reference documents.

Limitations

Though interactive virtual cases are beneficial, they cannot replace simulation cases involving procedural practise, team communication dynamics, and working in the physical environment. Our curriculum focused on EM physicians, but cases could be designed to include interdisciplinary staff. From an evaluative standpoint, participant reactions have been reviewed, but learning retention and impact on behaviours and results have not yet been determined [7].

Nevertheless, interactive virtual cases have been a successful platform for continuing professional development throughout the pandemic, with physicians voicing a desire for this modality to continue as an adjunct to our EM faculty simulation curriculum.

Summary

Interactive virtual cases are a feasible tool for continuing professional development during the COVID-19 pandemic. This reproducible model can result in improved physician confidence and participation in professional development activities. The convenience and ability to accommodate and engage more participants may make interactive virtual cases a useful continuing professional development tool as we anticipate heightened interest in virtual learning post-pandemic.

Supplementary Information The online version contains supplementary material available at <https://doi.org/10.1007/s43678-021-00155-2>.

Declarations

Conflict of interest The authors CF and JK received a Curriculum Development Fund from the Division of Emergency Medicine at London Health Science Centre to create the curriculum outlined in this manuscript. There are no other conflicts of interest to disclose.

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