

Are you ready for an office code blue?

Online video to prepare for office emergencies

Simon Moore MD CCFP

Abstract

Problem being addressed Medical emergencies occur commonly in offices of family physicians, yet many offices are poorly prepared for emergencies. An Internet-based educational video discussing office emergencies might improve the responses of physicians and their staff to emergencies, yet such a tool has not been previously described.

Objective of program To use evidence-based practices to develop an educational video detailing preparation for emergencies in medical offices, disseminate the video online, and evaluate the attitudes of physicians and their staff toward the video.

Program description A 6-minute video was created using a review of recent literature and Canadian regulatory body policies. The video describes recommended emergency equipment, emergency response improvement, and office staff training. Physicians and their staff were invited to view the video online at www.OfficeEmergencies.ca. Viewers' opinions of the video format and content were assessed by survey (n=275).

Conclusion Survey findings indicated the video was well presented and relevant, and the Web-based format was considered convenient and satisfactory. Participants would take other courses using this technology, and agreed this program would enhance patient care.

EDITOR'S KEY POINTS

- This program found that an online video was a convenient and effective way to train physicians and their staff to handle medical office emergencies.
- Survey respondents found this particular video to be well presented and relevant, and believed it would enhance patient care.
- There is potential for the use of online medical training videos to be expanded to other medical education topics, as the format was well received.



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Medical emergencies occur frequently in offices of primary care physicians worldwide.¹⁻¹² A Chicago study showed that 62% of primary care physicians encountered at least 1 patient per week requiring emergency care,⁵ and a similar study in Australia showed 95% had encountered at least 1 emergency in the preceding year.¹³

Nevertheless, decades of research show that offices continue to be poorly prepared for emergencies.¹⁻⁷ Physicians incorrectly perceive that equipment is costly, and underestimate the incidence of emergencies.¹⁴ Consequently, many offices lack basic resuscitation supplies such as oxygen, epinephrine, and intravenous equipment,¹⁵ even where an emergency has recently occurred.¹⁶ Areas of deficiency include skills education, equipment availability, and planning to sustain emergency preparedness efforts.¹⁷

Contradictory guidance exists regarding what equipment is necessary.¹⁸⁻²² Only 2 Canadian articles^{14,23} were located, and only in the areas of pediatrics²⁴ and dentistry²⁵ do guidelines exist. Of all Canadian provinces and territories, only 3 regulatory authorities have policies on emergency equipment,²⁶⁻²⁸ and the Canadian Medical Protective Association is not mandated to provide such guidelines.¹⁴

However, although outcomes data are limited, ill-preparedness can be overcome by obtaining equipment⁶ and undergoing training^{3,17} relevant to an office's geographic location and practice scope. Nonetheless, encouraging physicians to change behaviour can be challenging; attempts to effect physician change by solely disseminating print information are generally ineffective.^{29,30} The area of office emergency preparedness is no exception—in an American study,³¹ mail distribution of pediatric emergency guidelines yielded minimal improvement in preparedness. More elaborate interventions including programs to provide in-office training and equipment can be beneficial^{3,17,24} but are costly and difficult to sustain and disseminate broadly.³

Web-based learning has been widely evaluated in health education and found to be at least equivalent to other methods in terms of provider satisfaction, knowledge, and skill, and patient effects.³² Advantages include increased convenience, accessibility, cost, and ease of use over other learning formats.³³ Well designed Web-based tools are effective,^{33,34} and effectiveness increases if tools are multifaceted, contain multimedia,^{29,35,36} and implement other evidence-based strategies.³⁷ Additionally, such tools can be disseminated broadly with ease.

As emergencies occur commonly in the offices of busy physicians and many offices are unprepared, physicians and their staff might benefit from an evidence-informed, Web-based educational video to help prepare for office emergencies. However, such a tool has not been described in the literature.

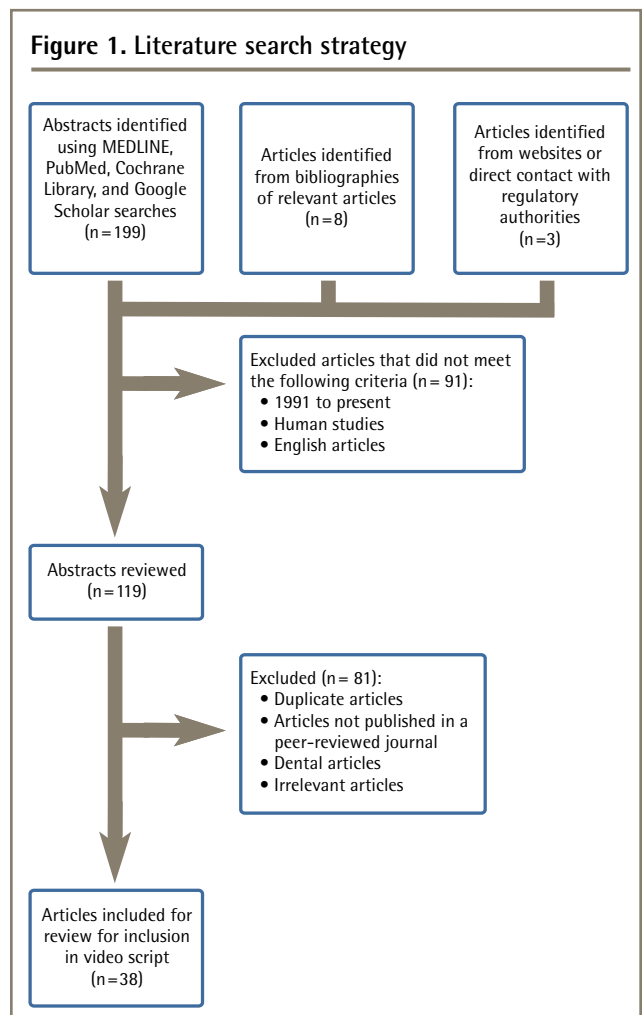
Objectives of program

The objectives of this program included the following:

- Develop an online educational tool, based on recent literature, to help physician offices prepare for office emergencies.
- Maximize the effectiveness of the video as an educational tool by using scholarly, evidence-based medical education practices.³⁷ Such practices include use of a needs assessment, a multifaceted intervention strategy, sequencing, interaction, and a commitment to change, as well as multimedia.^{29,35}
- Evaluate the attitudes of physicians and their staff toward the content, format, and effectiveness of the video.

Program description

Literature search. Ovid MEDLINE, PubMed, the Cochrane Library, Google Scholar, and the Canadian Medical Protective Association website were searched for articles published between 1991 and 2012 using the key words *office emergency* and *office emergencies* (Figure 1). Results were limited to human studies in English. References



of pertinent papers were also searched. Policies from Canadian regulatory authorities were obtained online or by direct contact. Relevant articles, guidelines, and college policies were selected and reviewed. Guidelines were also appraised for quality using AGREE (Appraisal of Guidelines, Research and Evaluation), a validated appraisal tool for assessment of rigour and transparency of guidelines³⁸; evidence quality on this topic is mainly level II and III, with a single level I article.³

Video creation. The primary goal was to train physicians and staff to prepare for the most common office emergencies, while keeping the video engaging, concise, and relevant. The literature review informed the script's key messages:

- having emergency equipment available,
- providing techniques for streamlining an emergency response, and
- providing training for office emergencies.

From the script, a video was filmed, edited, and uploaded to **YouTube.com**.

Website creation. A program website (**www.OfficeEmergencies.ca**), created using Google Sites and tracked using Google Analytics, provided additional information and multifaceted resources to viewers, and allowed for online evaluation of the video. Two strategies were employed to improve the response rate and to meet the ethics requirement for informed consent: the video was locked for viewing exclusively on the program website (despite being hosted by YouTube), and the survey was placed directly below the embedded video.

Incorporation of evidence-based educational techniques. Recommendations were compiled from peer-reviewed articles and conference presentations, which were cited throughout the video. Evidence-based techniques were incorporated into the design of the program video and website in order to maximize the effect of the program (**Table 1**).^{1-7,14-17,36,37}

Recruitment. The video was publicized to family physicians, other specialist physicians, residents, and medical clinic office staff by means of posters, flyers, word of mouth, and e-mail list servers. Following a media release, the program was announced in medical blogs,³⁹⁻⁴¹ newspapers,^{42,43} and medical journals.^{44,45}

Evaluation

Design: A retrospective survey administered after watching the video was used to evaluate the program. Ethics approval was received from the University of British Columbia Research Ethics Board. The video was accessible only to participants who provided informed consent.

Survey: No directly relevant validated questionnaires have been published. Instead, a survey about technology-based education was located⁴⁶ and used with permission (e-mail communication with A.B. Bynum, September 2011). The survey, composed of 15 demographic questions and 5-point Likert scale questions (1=strongly disagree, 5=strongly agree), was hosted by Google Docs and was anonymously self-administered on the program website after the video was viewed. The data collection period was from February 15 to May 14, 2012. One survey question was excluded ("The presenter made time for questions") as it was not relevant to this program.

Sample-size calculation and statistical analysis: There was no upper limit set on the number of respondents. The survey was expected to receive at least 100 responses from the targeted populations, which would provide a margin of error (half-width of a 95% CI) of less than 10% in the percentage of individuals who respond agree or strongly agree to a survey question. The 5-point Likert scale responses were aggregated into 3 groups: strongly disagree and disagree; undecided; and agree and strongly agree. The percentage of responses and 95% CIs were calculated for each of 5 professional groups: family physicians, other specialists, residents, nurses, and medical office staff. Overall percentages are

Table 1. Incorporation of evidence-based educational techniques into the program

EVIDENCE-BASED EDUCATIONAL TECHNIQUE	DESCRIPTION	HOW TECHNIQUE WAS INCORPORATED INTO THE PROGRAM
Needs assessment	Conduct a needs assessment to maximize relevance ³⁷	Video was created in response to previously published needs assessments that demonstrated the necessity of improvement in this area ^{1-7,14-17}
Commitment to change	Emphasizing opportunity for change and soliciting commitment predicts actual change in practice ³⁷	Video was concluded by highlighting changes that could be implemented in a clinic immediately
Multimedia and multifaceted	Multimedia and multifaceted educational components have been shown to be more effective than a single educational component such as a video by itself ^{36,37}	Additional resources mentioned in the video (posters, checklists, practice audit forms, and articles) were published on the program website
Interaction	Interaction takes many forms, including active reflection on gaps in performance or skills practice ³⁷	Video strongly encouraged active reflection on gaps in performance (practice audit) and skills practice (mock codes)

reported without 95% CIs, as the mix of professionals in the sample is not representative of any relevant population of health professionals. Statistical analysis was conducted using SAS software for Windows, version 9.3.

Results. During the data collection period 1256 unique visitors viewed the website and 806 viewed the consent form. The survey and video page was viewed by 768 unique visitors; of these, 275 completed the survey (response rate of 35.8%). Most respondents (94.2%) self-reported Canada as their geographic location; respondents varied in terms of reported occupation, and respondents outside the target audience of this program were excluded from further analysis (Table 2). Quantitative survey responses by profession, with 95% CIs, are presented in Table 3. Responses for the agree and strongly agree group are graphed by profession in Figure 2 (responses pertaining to video content) and Figure 3 (responses pertaining to video format). Box 1 lists representative respondent comments.

Perceptions of video content and format. The video met the expectations of 90.9% of all participants, and 90.2% agreed or strongly agreed the video was relevant to their needs. The online video technology was considered satisfactory by 96.7% of participants, and the video length was considered appropriate by 93.1%. Only 4.8% of respondents perceived the video to be less effective than traditional

methods, and 95.3% stated the technology did not detract from the presentation. This technology was the most convenient way for 81.8% to take this training, and 84.7% would take other courses that use this technology.

Quality and effect of video. The material was deemed by 95.3% of respondents to be well presented. The video presentation was perceived by 86.2% to have increased their knowledge, and 94.5% of respondents agreed the presenter was knowledgeable. Almost all respondents (90.2%) agreed this video would enhance patient care; out of 268 respondents, only 4 (1.5%) disagreed.

Discussion

Before this video, there were no documented evidence-based online instructional tools to prepare physician offices for emergencies. The only identified comparable intervention was a mail-out of pediatric guidelines, which has the disadvantage of increased expense, difficulty of distribution, and minimal effectiveness in improving equipment availability and training.³¹ Programs that distribute emergency equipment and stage in-office mock codes free of charge for physicians^{7,17,47} are likely more effective than this video, but have the disadvantage of increased cost to replicate and disseminate compared with an online video.

The evaluation indicated that physicians of several specialties, medical clinic staff, nurses, and residents strongly supported this program as a well presented and effective tool to prepare for office emergencies. Respondents indicated that this video has the potential to not only increase health provider knowledge, but also improve patient care.

In addition to the positive feedback for the video content, the Internet-based format of the video was strongly supported as a satisfactory and convenient way to take this training. The online video format was considered valuable, well received, and useful. These findings are consistent with previous publications on Web-based learning³²⁻³⁴ and suggest this program might be an effective alternative to guideline mail-outs.

An ideal educational program results in participant change,⁴⁸ and use of a multifaceted strategy, as used by this program, can increase effectiveness.³⁶ Further improvement could therefore include expansion into a formal educational program containing additional components such as small group longitudinal workshops; learner assessment; and follow-up to ensure adoption of knowledge and acquisition of equipment. Because the program was so well received, learners might benefit from similar videos depicting specific individual emergency situations. There is also a need for relevant Canadian guidelines; in combination with this program, these could play a role in improving awareness, training, and patient outcomes.

Table 2. Self-reported demographic characteristics of all survey respondents: N = 275.

CHARACTERISTIC	N (%)
Physicians	
• FPs	136 (49.5)
• Other specialists	20 (7.3)
• Total	156 (56.7)
Residents	
• FP residents	71 (25.8)
• Other residents	5 (1.8)
Medical clinic staff	20 (7.3)
Nurses	16 (5.8)
Other*	7 (2.5)
Location	
• Canada	259 (94.2)
• United States	2 (0.7)
• Elsewhere [†]	3 (1.1)
• Not given	11 (4.0)

*Staff categorized as "other" were excluded from further analysis: 2 medical students, 2 chiropractors, 1 medical school administrator, 1 athletic therapist, and 1 nursing student.

[†]Those categorized as being from "elsewhere" included 2 respondents from Ireland and 1 from Australia.

Table 3. Results of the survey conducted after watching the video assessing attitudes toward video content and format, by self-reported occupation: N = 268.

QUESTION	FPS, % (95% CI), N = 136	OTHER SPECIALISTS, % (95% CI), N = 20	RESIDENTS, % (95% CI), N = 76	NURSES, % (95% CI), N = 16	MEDICAL CLINIC STAFF, % (95% CI), N = 20
Presentation related to my needs					
• Disagree or strongly disagree	2.2 (0.0 to 4.7)	30.0 (8.0 to 52.0)	1.3 (0.0 to 3.9)	0.0 (0.0 to 0.0)	0.0 (0.0 to 0.0)
• Undecided	5.1 (1.4 to 8.9)	0.0 (0.0 to 0.0)	9.2 (2.6 to 15.9)	0.0 (0.0 to 0.0)	5.0 (0.0 to 15.5)
• Agree or strongly agree	92.6 (88.2 to 97.1)	70.0 (48.0 to 92.0)	89.5 (82.4 to 96.5)	100 (100.0 to 100.0)	95.0 (84.5 to 100.0)
Presentation increased my knowledge					
• Disagree or strongly disagree	6.6 (2.4 to 10.8)	5.0 (0.0 to 15.5)	2.6 (0.0 to 6.3)	0.0 (0.0 to 0.0)	0.0 (0.0 to 0.0)
• Undecided	8.8 (4.0 to 13.7)	15.0 (0.0 to 32.1)	9.2 (2.6 to 15.9)	0.0 (0.0 to 0.0)	10.0 (0.0 to 24.4)
• Agree or strongly agree	84.6 (78.4 to 90.7)	80.0 (60.8 to 99.2)	88.2 (80.7 to 95.6)	100 (100.0 to 100.0)	90.0 (75.6 to 100.0)
Presentation met my expectations					
• Disagree or strongly disagree	5.1 (1.4 to 8.9)	0.0 (0.0 to 0.0)	0.0 (0.0 to 0.0)	0.0 (0.0 to 0.0)	0.0 (0.0 to 0.0)
• Undecided	6.6 (2.4 to 10.9)	0.0 (0.0 to 0.0)	9.2 (2.6 to 15.9)	6.3 (0.0 to 19.6)	0.0 (0.0 to 0.0)
• Agree or strongly agree	84.6 (78.4 to 90.7)	100 (100.0 to 100.0)	90.8 (84.1 to 97.4)	93.8 (80.4 to 100.0)	100 (100.0 to 100.0)
Length of the presentation was appropriate					
• Disagree or strongly disagree	2.9 (0.1 to 5.8)	5.0 (0.0 to 15.5)	2.6 (0.0 to 6.3)	0.0 (0.0 to 0.0)	0.0 (0.0 to 0.0)
• Undecided	5.9 (1.9 to 9.9)	0.0 (0.0 to 0.0)	3.9 (0.0 to 8.4)	0.0 (0.0 to 0.0)	0.0 (0.0 to 0.0)
• Agree or strongly agree	91.2 (86.3 to 96.0)	95.0 (84.5 to 100.0)	93.4 (87.7 to 99.1)	100 (100.0 to 100.0)	100 (100.0 to 100.0)
Material was well presented					
• Disagree or strongly disagree	2.2 (0.0 to 4.7)	0.0 (0.0 to 0.0)	0.0 (0.0 to 0.0)	0.0 (0.0 to 0.0)	5.0 (0.0 to 15.5)
• Undecided	3.7 (0.5 to 6.9)	0.0 (0.0 to 0.0)	3.9 (0.0 to 8.4)	0.0 (0.0 to 0.0)	0.0 (0.0 to 0.0)
• Agree or strongly agree	94.1 (90.1 to 98.1)	100 (100.0 to 100.0)	96.1 (91.6 to 100.0)	100 (100.0 to 100.0)	95.0 (84.5 to 100.0)
Presenter was knowledgeable					
• Disagree or strongly disagree	2.2 (0.0 to 4.7)	0.0 (0.0 to 0.0)	1.3 (0.0 to 3.9)	0.0 (0.0 to 0.0)	0.0 (0.0 to 0.0)
• Undecided	4.4 (0.9 to 7.9)	0.0 (0.0 to 0.0)	2.6 (0.0 to 6.3)	0.0 (0.0 to 0.0)	5.0 (0.0 to 15.5)
• Agree or strongly agree	93.4 (89.2 to 97.6)	100 (100.0 to 100.0)	96.1 (91.6 to 100.0)	100 (100.0 to 100.0)	95.0 (84.5 to 100.0)
This technology was satisfactory					
• Disagree or strongly disagree	2.9 (0.1 to 5.8)	0.0 (0.0 to 0.0)	0.0 (0.0 to 0.0)	0.0 (0.0 to 0.0)	0.0 (0.0 to 0.0)
• Undecided	0.0 (0.0 to 0.0)	0.0 (0.0 to 0.0)	3.9 (0.0 to 8.4)	0.0 (0.0 to 0.0)	5.0 (0.0 to 15.5)
• Agree or strongly agree	97.1 (94.2 to 99.9)	100 (100.0 to 100.0)	96.1 (91.6 to 100.0)	100 (100.0 to 100.0)	95.0 (84.5 to 100.0)
Technology did not detract from the presentation					
• Disagree or strongly disagree	2.2 (0.0 to 4.7)	0.0 (0.0 to 0.0)	0.0 (0.0 to 0.0)	0.0 (0.0 to 0.0)	0.0 (0.0 to 0.0)
• Undecided	2.2 (0.0 to 4.7)	5.0 (0.0 to 15.5)	5.3 (0.1 to 10.4)	0.0 (0.0 to 0.0)	5.0 (0.0 to 15.5)
• Agree or strongly agree	95.6 (92.1 to 99.1)	95.0 (84.5 to 100.0)	94.7 (89.6 to 99.9)	100 (100.0 to 100.0)	95.0 (84.5 to 100.0)
This technology was as effective as traditional methods					
• Disagree or strongly disagree	3.7 (0.5 to 6.9)	5.0 (0.0 to 15.5)	6.6 (0.9 to 12.3)	0.0 (0.0 to 0.0)	10.0 (0.0 to 24.4)
• Undecided	7.4 (2.9 to 11.8)	0.0 (0.0 to 0.0)	11.8 (4.4 to 19.3)	6.3 (0.0 to 19.6)	15.0 (0.0 to 32.1)
• Agree or strongly agree	88.9 (83.6 to 94.3)	95.0 (84.5 to 100.0)	81.6 (72.7 to 90.5)	93.8 (80.4 to 100.0)	75.0 (54.2 to 95.8)
I would take other courses that use this technology					
• Disagree or strongly disagree	2.9 (0.1 to 5.8)	5.0 (0.0 to 15.5)	0.0 (0.0 to 0.0)	0.0 (0.0 to 0.0)	0.0 (0.0 to 0.0)
• Undecided	13.9 (8.1 to 19.9)	5.0 (0.0 to 15.5)	14.5 (6.4 to 22.6)	0.0 (0.0 to 0.0)	20.0 (0.8 to 39.2)
• Agree or strongly agree	83.1 (76.7 to 89.5)	90.0 (75.6 to 100.0)	85.5 (77.4 to 93.6)	100 (100.0 to 100.0)	80.0 (60.8 to 99.2)
This technology is the most convenient way for me to take this training					
• Disagree or strongly disagree	5.1 (1.4 to 8.9)	0.0 (0.0 to 0.0)	2.6 (0.0 to 6.3)	0.0 (0.0 to 0.0)	0.0 (0.0 to 0.0)
• Undecided	14.7 (8.7 to 20.7)	20.0 (0.8 to 39.2)	14.5 (6.4 to 22.6)	6.3 (0.0 to 19.6)	15.0 (0.0 to 32.1)
• Agree or strongly agree	80.1 (73.4 to 86.9)	80.0 (60.8 to 99.2)	82.9 (74.2 to 91.6)	93.8 (80.4 to 100.0)	85.0 (67.9 to 100.0)
Information will enhance patient care					
• Disagree or strongly disagree	2.9 (0.1 to 5.8)	0.0 (0.0 to 0.0)	0.0 (0.0 to 0.0)	0.0 (0.0 to 0.0)	0.0 (0.0 to 0.0)
• Undecided	8.1 (3.4 to 12.7)	10.0 (0.0 to 24.4)	7.9 (1.7 to 14.1)	0.0 (0.0 to 0.0)	10.0 (0.0 to 24.4)
• Agree or strongly agree	88.9 (83.6 to 94.3)	90.0 (75.6 to 100.0)	92.1 (85.9 to 98.3)	100 (100.0 to 100.0)	90.0 (75.6 to 100.0)

Figure 2. Responses to the evaluation survey: *Perceptions of video content.*

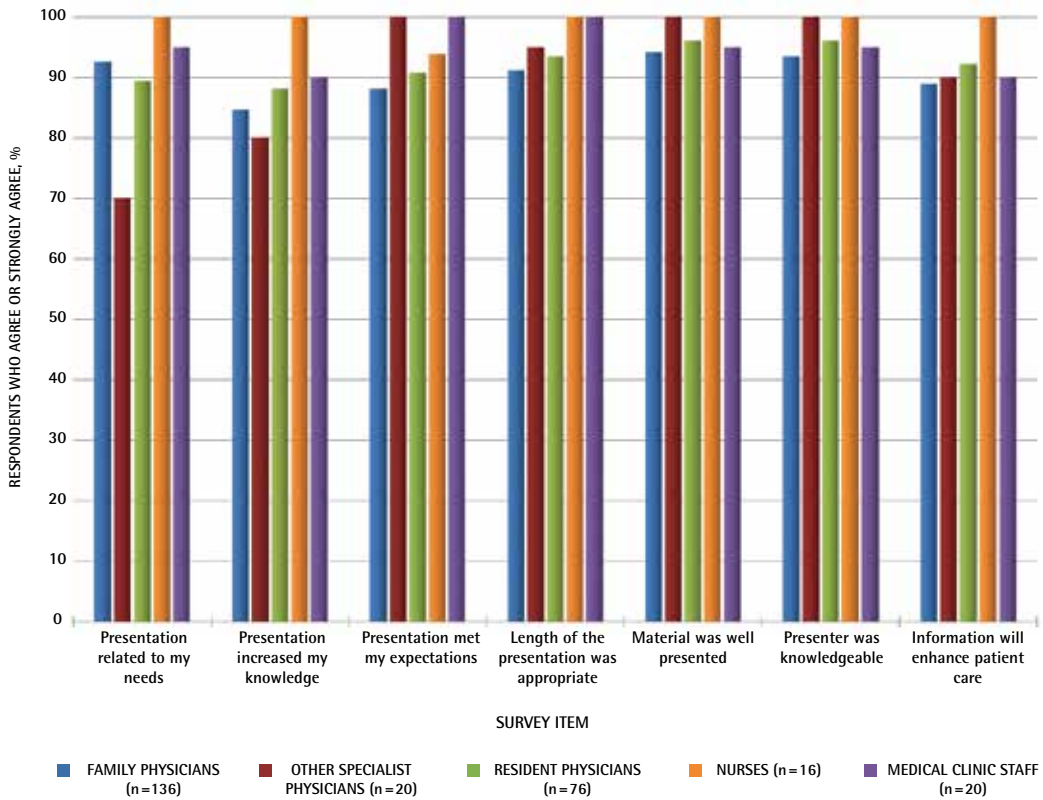
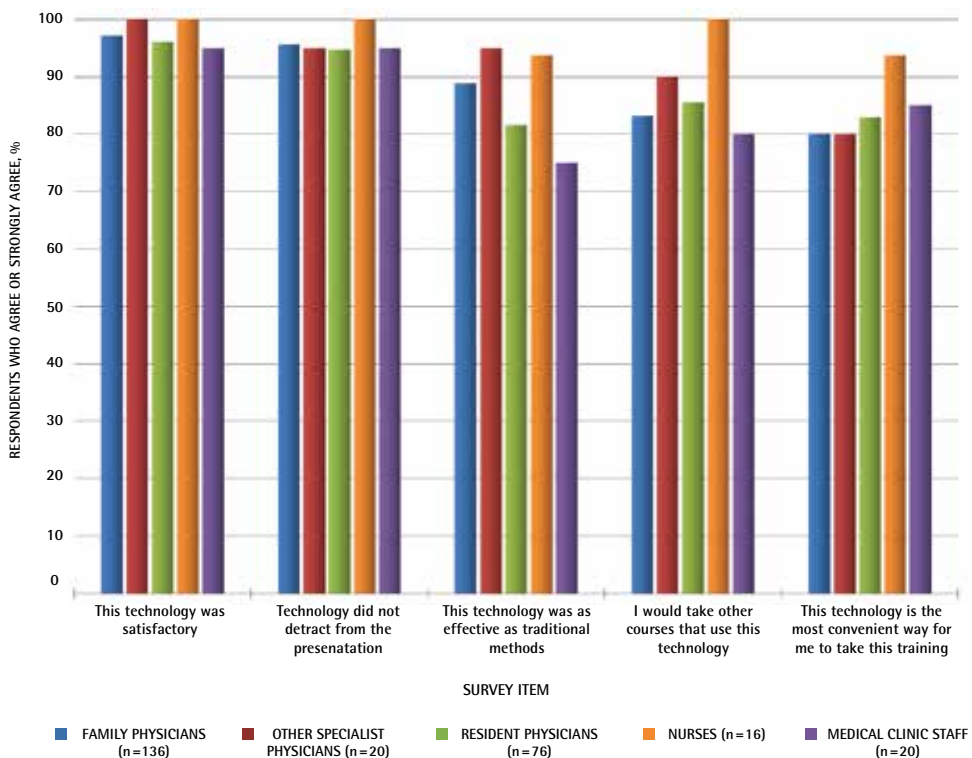


Figure 3. Responses to the evaluation survey: *Perceptions of video format.*



Box 1. Representative survey feedback comments:

There were 89 comments in total; 10 quotations believed to be representative of the original 89 were chosen by the editors. Similar statements were grouped together, with the number of duplicates in brackets. Quotations were corrected for spelling.

- This video introduced and was a reminder for the importance [of] being ready for office emergencies and provided good resources, but did not provide me with any valuable information for actually dealing with an office emergency effectively. (3)
- Excellent website to back up the video. (3)
- Would love to see individual videos for all the common emergencies that we are all kind of worry[ing] about facing in an unplanned way. (3)
- I will definitely be using the resources on the website to better [equip] my clinic practice for medical emergencies. (3)
- Telling a story or a case may be more interesting, illustrating the important points about having equipment available and trained staff who know what to do in case of emergency. (3)
- Thanks so much, gives a model to compare to what we have in place and what we need to implement. (3)
- I know I should have more equipment in the office ... but which ones are "must[s]" and which ones are "nice to have[s]," etc? (3)
- Any CME [continuing medical education] that can be done at home at a time that suits me (and my family) is beneficial. (3)
- Very appropriate and innovative. This should set a standard for similar presentations. (3)
- I had to pause occasionally to process both the auditory narration with the visual message (words and written details). (3)

On a broader scale, this research suggests that the YouTube video was a welcome, convenient, and effective learning method that could be considered for future medical education topics.


Limitations. Because the program was designed as a resident project, its scope was limited by the project requirements. For example, the residency program mandated use of a previously published survey; as no similar program had been published, the questionnaire used was not entirely suitable and could not fully evaluate this program. As well, the duration of the project was constrained, so respondents could not be randomized or controlled; a longer data collection period could also have resulted in an increased number of respondents.

Furthermore, despite its multidimensional design, this program is only rated at level 1 on the Kirkpatrick model of effectiveness of medical learning.⁴⁸ Higher levels of effectiveness, such as objective short- or long-term improvement in participant knowledge, behaviour,

training, equipment acquisition, or patient outcomes resulting from the video, were not assessed.

Although 81.8% of respondents agreed the online format was the most convenient way to learn about this topic, these results are likely biased toward individuals who are comfortable accessing information online. As well, given the emphasis on Web-based methods of recruitment, participants who use the Internet less often were less likely to be recruited; this bias might have been reduced by using both print and online recruitment methods.

Conclusion

An online video was created to educate physicians and their staff regarding medical office emergencies. Evidence-based continuing medical education strategies were incorporated into the creation of the program, which included information from a recent evidence review and all existing policies from Canadian regional regulatory bodies. An evaluation of the program indicated that the participants believed the video was well presented and relevant, and would enhance patient care. The Web-based format of this program was considered a convenient and satisfactory means of learning about office emergencies, and respondents expressed interest in learning about other topics in a similar manner. 

Dr Moore is a locum family physician in British Columbia, the Northwest Territories, and Ontario who has completed a fellowship in global health.

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Competing interests

None declared

Correspondence

Dr Simon Moore, 350-507 Broadway W, Vancouver, BC V5Z 1E6; telephone 604 568-7229; e-mail simon@officeemergencies.ca

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