

An Approach to Design and Development of an Accredited Continuing Professional Development (CPD) E-learning Module on Virtual Care

Vernon Curran, Robert Glynn, Cindy Whitton, Ann Hollett

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An Approach to Design and Development of an Accredited Continuing Professional Development (CPD) E-learning Module on Virtual Care

Vernon Curran¹ PhD, MEd, BA; Robert Glynn¹; Cindy Whitton¹; Ann Hollett¹

¹Memorial University of Newfoundland St. John's CA

Corresponding Author:

Vernon Curran PhD, MEd, BA
Memorial University of Newfoundland
Faculty of Medicine
Memorial University
St. John's
CA

Abstract

Virtual care appointments expanded rapidly during COVID-19 out of necessity and to enable access and continuity of care for many patients. While previous work has explored healthcare providers' experiences with telehealth usage on small-scale projects, the broad level adoption of virtual care during the pandemic has expounded opportunities for better understanding how to enhance integration of telehealth as a regular mode of healthcare services delivery. Training and education for healthcare providers on effective use of virtual care technologies is one factor that can help facilitate improved adoption and use. We describe our approach to designing and developing an accredited continuing professional development (CPD) program using e-learning technologies to foster better knowledge and comfort amongst healthcare providers with the use of virtual care technologies. First, we discuss our approach in undertaking a systematic needs assessment study using a survey-questionnaire of providers, key informant interviews and a patient focus group. Next, we describe our steps in consulting with key stakeholder groups in the health system and arranging committees to inform the design of the program and address accreditation requirements. The instructional design features and aspects of the e-learning module are then described in-depth and our plan for evaluating the program is shared as well. As a CPD modality, e-learning offers the opportunity to enhance access to timely continuing professional education for healthcare providers who may be geographically dispersed across rural and remote communities, and at times convenient for them to learn.

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Original Manuscript

An Approach to Design and Development of an Accredited Continuing Professional Development (CPD) E-learning Module on Virtual Care

Vernon Curran, PhD
Associate Dean of Educational Development
Office of Professional & Educational Development
Professor of Medical Education
Division of Community Health and Humanities
Faculty of Medicine
Memorial University of Newfoundland

Robert Glynn, MEd
Senior Instructional Designer
Office of Professional & Educational Development
Faculty of Medicine
Memorial University of Newfoundland

Cindy Whitton, MEd
Operations Manager
Office of Professional & Educational Development
Faculty of Medicine
Memorial University of Newfoundland

Ann Hollett, MA
Research Associate
Office of Professional & Educational Development
Faculty of Medicine
Memorial University of Newfoundland

Corresponding Author:

Vernon Curran, PhD
Associate Dean of Educational Development
Office of Professional & Educational Development
Faculty of Medicine
Memorial University of Newfoundland
Health Sciences Centre, Room H2982
St. John's, Newfoundland
A1B 3V6
Email: vcurran@mun.ca

Abstract

Virtual care appointments expanded rapidly during COVID-19 out of necessity and to enable access and continuity of care for many patients. While previous work has explored healthcare providers' experiences with telehealth usage on small-scale projects, the broad level adoption of virtual care during the pandemic has expounded opportunities for better understanding how to enhance integration of telehealth as a regular mode of healthcare services delivery. Training and education for healthcare providers on effective use of virtual care technologies is one factor that can help facilitate improved adoption and use. We describe our approach to designing and developing an accredited continuing professional development (CPD) program using e-learning technologies to foster better knowledge and comfort amongst healthcare providers with the use of virtual care technologies. First, we discuss our approach in undertaking a systematic needs assessment study using a survey-questionnaire of providers, key informant interviews and a patient focus group. Next, we describe our steps in consulting with key stakeholder groups in the health system and arranging committees to inform the design of the program and address accreditation requirements. The instructional design features and aspects of the e-learning module are then described in-depth and our plan for evaluating the program is shared as well. As a CPD modality, e-learning offers the opportunity to enhance access to timely continuing professional education for healthcare providers who may be geographically dispersed across rural and remote communities, and at times convenient for them to learn.

Keywords: virtual care; continuing professional development; needs assessment; e-learning

Introduction

Most provincial healthcare systems across Canada responded to the COVID-19 pandemic with a rapid adoption of digital tools and technologies, including virtual care appointments. The Canadian Institute for Health Information (CIHI) reported that between March to September 2020, the percentage of patients availing of virtual care services increased from 6% to 56% [1]. Virtual care refers to the delivery of healthcare services digitally or at a distance using Information and Communications Technology [2,3,4]. During COVID-19 a variety of virtual care types were used with synchronous and asynchronous appointments being the most common [3,4]. Synchronous virtual care refers to communication between healthcare provider and patient that occurs in real time and can include use of telephone and/or videoconferencing. Asynchronous communication does not occur live and may include the use of e-mail messaging, messages left for patients in a portal site, and e-consultations [3,4,5]. Considering the goal of reducing COVID-19 exposure during the recent global pandemic, virtual care proved to be most effective in that it minimized exposure and risk to healthcare providers by reducing movement of people [2–7]. In addition, virtual care helped patients stay home who may have otherwise traveled to a healthcare site and incurred risk of unnecessary exposure [3,4,6,7]. Virtual care was also used for control and triage during COVID-19, remote monitoring of patients, treatment and management, and provision of online health services [3,4].

In Canada, considerable work during and post-pandemic was undertaken to develop guidelines to inform physicians, healthcare providers, and patients on how they could best use virtual care. The Canadian Medical Association (CMA) and Royal College of Physicians and Surgeons of Canada (RCPSC) developed resources for both physicians and healthcare providers, as well as patients. The ‘Virtual Care Playbook’ provided virtual care guidance for providers and connected patients to the ‘Virtual Care Guidelines for Patients’ [8,9]. Canada Health Infoway has also undertaken significant work regarding virtual care support for physicians and healthcare providers. In particular, Infoway’s ‘Clinician Change Management’ project provided support in the form of virtual care tools and training [10]. The Canadian Medical Protective Association (CMPA) has also supported providers by disseminating virtual care informational resources for physicians and healthcare providers through their website [11].

With the rapid introduction of virtual care across many jurisdictions during the COVID-19 pandemic, both healthcare providers and patients alike were not always adequately trained on how to utilize virtual care appropriately. Previous research has suggested that a lack of training around virtual care tools and software was a challenge for providers. A lack of understanding and training may have contributed to lower confidence levels amongst providers, and a reluctance to use virtual care, thereby negatively influencing virtual care adoption [3,4,12-15]. Adjusting clinical approaches to caring for patients remotely can also be challenging, including how to virtually examine patients by videoconferencing or telephony systems [3,4,16-17]. The use of new digital health systems like virtual care also requires knowledge and competence in how to incorporate the technology within a provider’s practice workflow. This includes understanding how to use the technology effectively, as well as the privacy and security issues surrounding use of the technology. Providers also need to be able to adapt their techniques and clinical acumen to build rapport with their patients while using virtual care technologies. Given this, consideration of the potential continuing professional development (CPD) needs of healthcare providers is critical to ensuring that proper support systems and training are available to enable and empower providers to adopt and use virtual care most effectively and efficiently.

E-learning has been defined as any educational intervention mediated electronically via the Internet [18] and has become a popular modality for providing CPD in the health professions with offerings

across a diverse array of topic and subject areas [18,19]. The advantages and benefits of e-learning have been described as including: lower costs, widespread distribution, increased accessibility to information, frequent content updates and personalized instruction in terms of content and pace of learning [18]. Several systematic reviews of e-learning effectiveness in health professions education, including CPD, have been published. Key findings of these reviews suggest that: e-learning is associated with large positive effects when compared with no interventions [20]; e-learning can be as effective as traditional methods of teaching and instruction [20-22]; e-learning and traditional educational interventions take similar time to participate in or complete [23]; and interactivity, practice exercises, repetition and feedback are important design features of effective e-learning approaches and appear to be associated with improved learning outcomes [23].

Continuing professional development encompasses the multiple educational and developmental activities pursued by healthcare providers to maintain and enhance their knowledge, skills, performance, and relationships in the provision of healthcare [4,24]. For many regulated healthcare providers around the world, CPD participation is often mandated and required throughout the extensive post-licensure phase of the provider's career. It is viewed as a key means for providers to stay current and up to date with evidence-based practices in their professional field. The evidence for CPD participation suggests that healthcare providers who participate in formal CPD activities are more likely to provide better care than their peers who do not participate [4,25]. CPD that is designed to be interactive, practice-based, and longitudinal in nature is also believed to yield better outcomes [4,25]. A needs assessment-driven approach to the development of CPD is more likely to lead to a change in practice, largely as a result of the learning being directly linked to personal and practice needs [4,26].

Edirippulige and Armfield [4,27] reviewed a number of studies describing the delivery and evaluation of education and training in telehealth. They identified nine ($n=9$) peer-reviewed studies describing education and training in telehealth that included several CPD-level courses on telehealth. Online learning was the most common delivery format described across the studies with course duration ranging from one week to six months [4]. More recently, several studies conducted during the COVID-19 pandemic have reported on CPD on virtual care also using online delivery formats [28-31]. Both synchronous and asynchronous modalities were used in providing CPD on virtual care/telehealth, however the most common delivery format was the use of web conferencing (e.g., Zoom, Skype). Topics covered across these programs included: introduction to virtual care, advantages and disadvantages of virtual care, types of virtual care, ensuring privacy during appointments, legal and technological requirements for virtual care. One interesting method described by Hayden et al. [30] was the use of web conferencing to facilitate simulated telehealth appointments with standardized patients (SPs). Participants found the use of SPs to simulate a virtual care appointment enhanced their confidence in focused telehealth skills. The use of online learning formats was perceived favorably by participants across the studies and was found to be particularly useful in accommodating the busy schedules of providers [28].

The purpose of this paper is to describe our efforts to design and develop an accredited e-learning CPD module on virtual care for physicians and healthcare providers. First, we discuss our approach to systematically exploring the needs of healthcare providers in learning to use virtual care effectively and efficiently in their practices. We describe results from a survey-questionnaire we administered to a sample of healthcare providers in Newfoundland and Labrador, Canada, findings from key informant interviews with several experts in virtual care, and key themes emerging from a focus group with patient representatives. We then describe our approach in designing and developing this e-learning module, including key interactivity and design features to foster effective learning. Finally, we describe our approach and plan to evaluate the effectiveness and impact of this e-learning module on healthcare providers' adoption and use of virtual care. The work described in the paper was undertaken by our team with the Office of Professional and Educational Development, Faculty

of Medicine, Memorial University of Newfoundland. The Faculty of Medicine at Memorial University has long been a pioneer in research and development in the fields of telemedicine, tele-education and digital learning for physicians and rural healthcare providers. Our Professional Development office was one of the first CPD units in North America to introduce accredited e-learning programming for physicians through our MDCme.ca learning management platform [32].

Methods

Needs Assessment Study

We undertook a needs assessment study initially as a first phase of our project to design and develop an e-learning CPD module on virtual care. The needs assessment encompassed a web-based survey, key informant interviews with experts in virtual care, and a focus group with patient representatives [3,4,33]. The goal of the web-based survey was to explore the experiences, perceptions, and satisfaction of healthcare providers with adoption and use of virtual care during COVID-19. We developed and distributed this survey to physicians, nurses and allied health professionals across the Province of Newfoundland and Labrador, Canada to explore their CPD needs and preferences as well.

Fifty-one percent of respondents (n=432) to our survey indicated they were currently offering virtual care and a majority (68.9%) reported it had improved their work experience [3]. Telephone was the most used method and respondents reported most comfort and satisfaction with telephone appointments [3]. The most challenging aspects of telephone appointments were the inability to conduct physical exams to the degree required, assess physical health status, and patient's/client's cell phone service being unreliable [3]. Respondents rated the importance of a variety of CPD topics on effective use of virtual care and the highest rated topics included: comply with regulatory standards/rules for virtual care, understand boundaries (e.g., personal telephone numbers used to call patients/clients), and develop and maintain competency and professionalism along continuum while engaging in virtual care [3]. Other important topics for virtual care CPD included: CPD on how to use the technology, the best/easiest platforms for providing virtual care and how to use them effectively, and assessment skills and aids for doing assessments virtually. Ethical issues and legalities of virtual care were also identified by respondents as valuable as well [3].

The second component of our needs assessment was a qualitative study to explore experts' ascribed opinions on healthcare providers' CPD needs in virtual care [4]. We conducted semi-structured interviews with a purposive sample of key informants representing Canadian provincial and national organizations with expertise in virtual care delivery. According to the key informant respondents, lack of training specific to virtual care tools and software was a challenge for healthcare providers, particularly videoconferencing appointments. All key informants identified technology as a main barrier or challenge, not only for healthcare providers but also for administrative staff. Three main areas of knowledge, skills, and abilities deemed most important for healthcare providers in adopting and using virtual care identified by the key informants included: effective use of technology, knowledge of how to integrate technology and virtual care in the practice workflow, privacy and security aspects of the technology, and adaptation of examination skills to virtual care and how to build effective rapport with patients [4].

A focus group study was also conducted with a purposive sample of patient representatives to explore patients' experiences and perspectives with the adoption and use of virtual care during COVID-19, and identify the education and informational needs of patients [33]. The findings from the patient focus group were useful in informing the types of topics to include in CPD on virtual care. Patient respondents felt that virtual care was beneficial and enabled greater convenience,

flexibility and access to health care services. Key barriers and challenges in adopting and using virtual care appeared to primarily arise from patients' lack of knowledge, understanding, and familiarity with it. Cost, technological access, connectivity, and low digital literacy were challenges for some patients, particularly in rural communities and amongst older patients. Patient education and support were critical and needed to be inclusive, easy to understand, and include information regarding privacy, security, consent, and the technology itself.

Approach to MainPro+© and MainCert© Accreditation for CPD Credit

The Office of Professional & Educational Development (OPED), Faculty of Medicine at Memorial University (Memorial) is an accredited provider of continuing professional development that targets the needs and competency development of healthcare providers within Newfoundland and Labrador and beyond. OPED is an accredited provider of university CPD by the Committee on Accreditation of Continuing Medical Education (CACME) and the Association of Faculties of Medicine of Canada (AFMC). As an accredited CPD provider, OPED is permitted to accredit CPD activities that meet the administrative, educational and ethical standards of the College of Family Physicians of Canada (CFPC) Mainpro+ Certification program [34] and the Royal College of Physicians and Surgeons of Canada (RCPSC) Maintenance of Certification (MOC) program [35]. Key requirements for accrediting CPD activities include a needs assessment and formation of a scientific planning committee (SPC) to oversee and advise on the development of the accredited CPD activity. A SPC is a group of target audience representatives responsible for: identifying the educational needs of the intended target audience; developing educational objectives; selecting educational methods; selecting speakers, moderators, facilitators and/or authors; developing and delivering content; and evaluating the outcomes of an accredited CPD activity. Requirements for accredited e-learning activities also include: a means for participants to interact with the material, with each other, and with faculty members or a facilitator; the ability for participants to track their progress, provide evaluation feedback, register and receive a record of registration; and such programs must be offered within a definitive period of time communicated prior to the start of the program.

E-learning Module Design

We ensured our e-learning module met the requirements of Newfoundland and Labrador's primary healthcare providers by establishing two guiding committees during its design and development. The first, an advisory committee, ensured alignment with policy and practices within the provincial health care system. This committee included representation from the Newfoundland and Labrador Centre for Health Information, the provincial government's department of health, Memorial University's Faculty of Medicine, the College of Physicians and Surgeons of Newfoundland and Labrador, the College of Registered Nurses of Newfoundland and Labrador, and the Newfoundland and Labrador Medical Association. The second committee structure, a scientific planning committee (SPC), oversaw the design and development of the module and was responsible for ensuring that the learning experience reflected the needs of primary healthcare providers [34]. This committee included a family physician, registered nurse, nurse practitioner, specialist physician, and an emergency medicine physician.

We provided the advisory committee with the information collected through our needs assessment process and asked members to offer feedback in terms of system level needs. We then engaged with the SPC to review the needs assessment findings and advisory committee feedback, and to develop a set of learning objectives we would use to guide the development of the module. Next, we engaged with several subject matter experts in virtual care to draft instructional materials and activities that would enable us to meet our stated objectives. This instructional material was used to develop a prototype of the e-learning module which we shared with the SPC and advisory committee for review and feedback. We compiled the feedback received and adjusted the prototype accordingly. We then proceeded to launch the prototype on the MDcme.ca learning platform – a proprietary learning management system developed by OPED to house our accredited CPD activities. The

MDcme.ca environment provides user registration, asynchronous communications, technical support, and transcript/certificate issuance. The module is developed as a series of web pages using PHP scripting and leverages responsive design to adapt its presentation based on the device used to access. The module will undergo an annual review process during which the assessment and evaluation data is reviewed, and any requisite modifications will be made, including updates and modifications to content and approach.

Van Hecke et al. [36] developed the Criteria for Reporting on Development and Evaluation of Professional Training interventions in Healthcare (CRe-DEPTH) as a way to systematically report on the development and evaluation of training interventions for healthcare professionals. These criteria consist of 12 items representing four categories: development of the training, characteristics of the training, characteristics of the providers, and assessment of the training outcomes. The following description of the e-learning module on virtual care outlines aspects of the development and evaluation of this educational program according to these criteria (Appendix A).

In developing the e-learning module, we followed the phases of the ADDIE model of instructional design. The ADDIE model is a systematic instructional design framework widely used in the creation and development of educational and training programs. The acronym 'ADDIE' stands for five sequential key stages in the instructional design process: Analysis, Design, Development, Implementation, and Evaluation [37]. While sometimes criticized as being too linear in its approach, we have found that this framework delivers a consistent approach to educational development and aligns well with the requirements of the Mainpro+ and MOC accreditation programs. Gagne's 'Nine Events of Instruction' model was also followed as an overarching approach in development of content for the module [38].

We adopted an asynchronous e-learning design for this module. The asynchronous model assumes that learners taking the program will access the content at different times and from different locations. This approach allows primary care providers across the province to access the instructional material at their convenience, thereby providing the flexibility needed to balance professional learning with varied work hours, family, and other personal or professional commitments [39-41]. Results from our needs assessment survey of potential participants indicated that a large proportion of survey respondents preferred "E-Modules (self-paced / online learning)" as the delivery format [3].

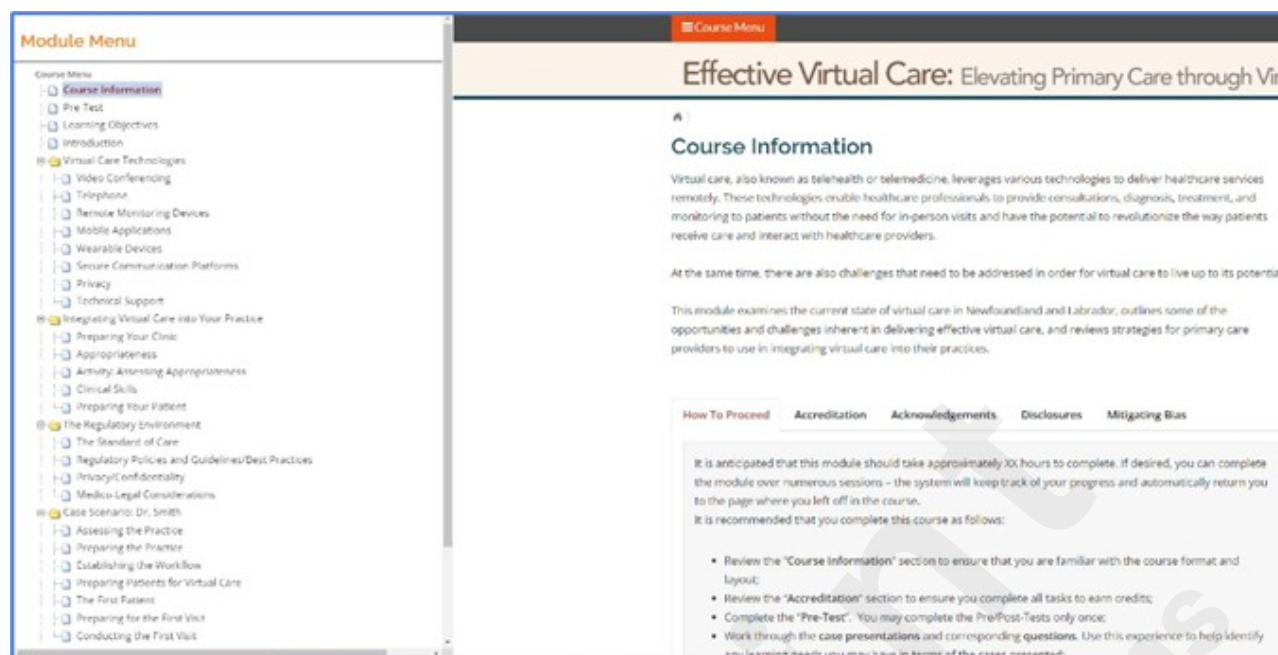
Learners access the module by creating an account on the MDcme.ca platform. The e-learning module provides a 90-minute introduction to the delivery of virtual care in a primary care setting and addresses the following learning objectives:

- Describe the benefits and key considerations of conducting virtual care appointments;
- Identify the technological requirements and setup required to conduct optimal virtual care;
- Recognize how to integrate virtual care delivery into your existing practice workflows;
- Discuss the clinical implications for delivering optimal virtual care encounters;
- Explain how to prepare patients for virtual care sessions;
- Summarize the key regulatory and legal considerations in providing virtual care in Newfoundland and Labrador;

Our experience has been that a 60 to 90-minute duration for online CPD modules is an appropriate length in increasing completion rates and reducing participant attrition.

The module is organized into three primary sections: virtual care technologies, the incorporation of virtual care into one's practice, and the regulatory landscape. While the content is structured in a sequential fashion for learners to progress through, a comprehensive course menu tree is available, enabling learners to access any section of the module whenever they wish (Figure 1).

Figure 1 Menu Interface



The module design utilizes several strategies to enhance learner engagement and support multimodal learning [42-44]. Firstly, a variety of media are used in the presentation of module content, including text, images/graphics, and short video clips (Figure 2). Secondly, user interface design elements such as clickable tabs and dropdowns/flyouts are used where appropriate to encourage the learner to physically interact with the module. Finally, several interactive instructional design components are included, such as pre and post-test assessments and interactive case scenarios. A number of accessibility standards are also included in module design, including the use of descriptive alt tags for all graphical elements and the inclusion of closed captions for all audio/video elements for people with hearing impediments.

Figure 2 Example of video tutorial



The pre and post-test assessments are interactive quizzes that present a number of multiple choice

questions (MCQs) designed to evaluate learner knowledge of the subject matter and enable self-assessment and reflection, as well as several Likert scale measures of learner confidence in performing the learning objectives (Figure 3). The assessment is presented once at the beginning of the module and then again at the end of the learning experience. The learner receives immediate feedback after submitting each assessment: correct/incorrect data is presented as feedback to the pretest, and correct/incorrect data along with a brief rationale for the correct response is presented as feedback to the posttest.

Figure 3 Learning assessment

Course Menu MyMDcme Logout

Effective Virtual Care: Elevating Primary Care through Virtual Practice

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Pre-Test

Please read the following questions and select the most appropriate response for each one. At the end of the quiz, click the Submit button to complete the Pre-Test.

1. Which of the following options best describes the benefits and key considerations of conducting virtual care appointments?

- ☐ A. Increased convenience and flexibility for both patients and healthcare providers.
- ☐ B. Improved accuracy of diagnosis and treatment outcomes compared to in-person visits.
- ☐ C. Limited accessibility

2. Which of the following options best identifies the technological requirements and setup required to conduct optimal virtual care?

- ☐ A. High-speed internet connection

3. Which of the following options best recognizes how to integrate virtual care delivery into existing practice workflows?

- ☐ A. Continuing with the same workflows and processes without any modifications.
- ☐ B. Designating a separate team solely responsible for virtual care delivery.
- ☐ C. Assessing current workflows and adapting them to incorporate virtual care components.
- ☐ D. Implementing virtual care as a standalone service independent of existing workflows

Ask The Expert Need Help?

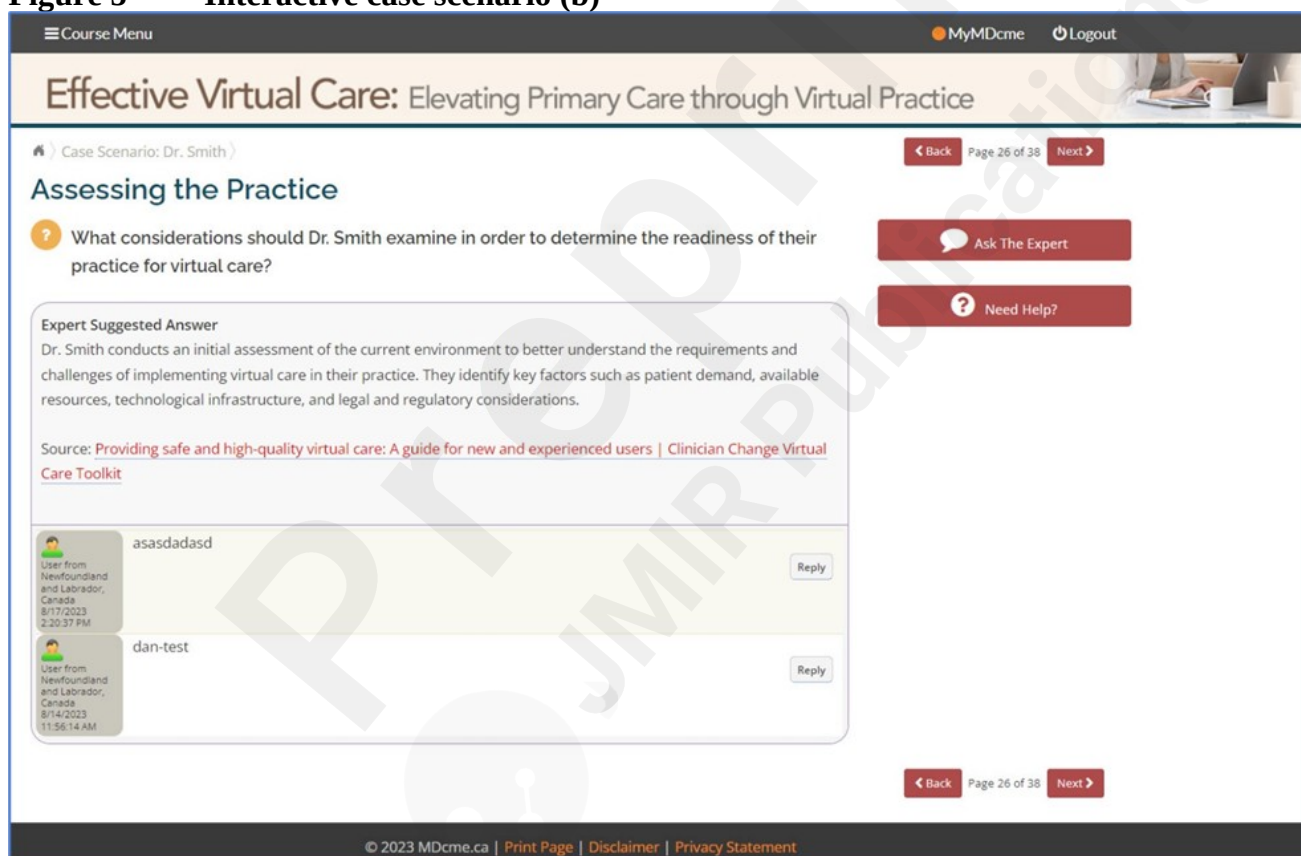
An interactive case scenario is presented as a final learning activity in the module. The case scenario models the application of module content to the primary care practice context. The learner is first presented with an overall scenario and then asked a series of “*What would you do?*” questions designed to prompt reflection. The learner enters their response and is presented with immediate feedback including the response of peer learners in the system as well as a model answer summarizing how the concepts covered in the module could be applied to the given situation.

Given the asynchronous approach used in the module design, learners are able to view peer responses to the interactive case scenario but are not able to engage in a dialog with other learners taking the course. Learners can interact with subject matter experts if they have questions related to the content presented in the module. In that case, a learner can enter a question or comment through the “Ask the Expert” feature in the module and will receive a response via email within 48 hours.

Figure 4 Interactive case scenario (a)



Figure 5 Interactive case scenario (b)



Evaluation Approach

An evaluation approach has been designed around Curran and Fleet's [45] use of Kirkpatrick's levels of evaluation. The levels comprising the evaluation approach of the e-learning module include: Pre/Post Knowledge and Confidence Assessments; Satisfaction Surveys; Post-Module Outcomes Survey.

Pre/Post Knowledge and Confidence Assessments:

A pre and post-test assessment is embedded directly into the e-learning module. The assessment includes measures of both learner knowledge of the content covered and learner confidence in the ability to achieve the stated learning objectives. The knowledge items were developed by content experts and consist of a bank of one-best answer multiple-choice questions. The confidence items

consist of several statements related to the learning objectives for the online module.

Satisfaction Surveys:

An online satisfaction survey is provided to the learner at the end of the module. A combination of closed and open-ended questions related to the module content and overall impressions are utilized to gauge satisfaction and to allow for continuous improvement of subsequent deliveries of the program. The survey enables participants to provide feedback on the module related to: relevancy, appropriateness, practicality of the content, and whether they would recommend the module to others.

Post-Module Outcomes Survey:

An online survey will be distributed to participants six-eight months following completion of the module. The purpose of this survey will be to further explore the impact of participation in the module on participants' adoption and use of virtual care in their practice.

Discussion

Though our systematic needs assessment study, we were able to specify several areas of knowledge, skills and/or abilities that would be most helpful for physicians and healthcare providers as they sought to adopt and use virtual care in their practices and patient care. Respondents' highlighted three main areas. First, the use of technology necessitates knowledge of how to integrate technology and virtual care into the practice workflow. This includes knowing how to use technology and knowledge relating to privacy and security of the systems being used. There is an increased emphasis for providers to ensure they are meeting the standard of care, adequately obtaining consent, and embracing values of equity and fairness. Next, respondents identified the importance of being able to adapt clinical skills to virtual care, and building a rapport through good communication with patients. Finally, providers need to be able to adapt their examination skills for virtual care environments.

According to Edirippulige and Armfield [4,27] because using telehealth implies a change in practice, it should be supported by an appropriate level of evidence-based education for healthcare providers. An appropriate way to do this should start with educating and training future healthcare providers by incorporating telehealth education as a standard component in the pre-licensure curriculum. At a CPD level, online education may be particularly attractive for busy practitioners who choose to participate in short CPD courses for developing knowledge and skills. However, it also seems that the practice of virtual care requires certain hands-on skills. Practical sessions can be helpful in developing such skills, as well as the observation of real-life or simulated virtual care appointments to gain exposure to the modality [22]. Our approach involves the development and provision of an accredited CPD e-learning module, designed to enhance the confidence and competencies of primary healthcare providers in virtual care adoption and use in their practices. An ongoing evaluation will be conducted with the findings used to improve e-learning approaches to teaching of this important area for healthcare providers and healthcare delivery systems around the world.

The current evidence surrounding the most effective e-learning modalities is limited by the fact that the reported program designs differ with variation in the types of modalities used to deliver virtual care CPD. There are also limited studies on the effectiveness of asynchronous approaches like that described in this paper. This variation makes it difficult to draw conclusions around the most effective approach, although future comparative type studies could contribute to our understanding of the most effective approaches, or combinations of modalities. Another notable observation of the existing literature is the general lack of evaluation at a 'knowledge' level'. Most evaluation studies have not reported assessment of knowledge as a key evaluative outcome from virtual care CPD, whether online or in-person. Calleja et al. [46] suggests this lack of standardized knowledge evaluation is common among virtual care training programs. The field would benefit from more

consistent application of systematic evaluation frameworks, such as Kirkpatrick's [47] or Moore's [48] models of evaluation.

The need for virtual care is greater than ever and healthcare providers must receive appropriate and meaningful education and training to understand the best ways to conduct virtual care appointments. The current evidence suggests online CPD approaches have been a more common approach, particularly during and following the COVID-19 pandemic. Online CPD on virtual care appears to have been well received by participants, however there is a lack of evidence surrounding the effectiveness of interactive asynchronous online learning designs like that described in this paper. Asynchronous designs afford greater convenience and flexibility for providers in accessing CPD at times that are best for them. An adaptation of Kirkpatrick's [45] levels of evaluation model is being applied to understand the effectiveness of our asynchronous design and this will offer further evidence around this online learning modality for CPD on virtual care.

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We would like to acknowledge the many different healthcare provider representatives and stakeholders from key governmental and professional association organizations advising on the needs assessment study, design and development of the e-learning module. Ms. Megan Clemens also contributed to the literature review cited in the paper.

Data Availability

The data generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

Authors' Contributions

VC and AH were responsible for conception and design of needs assessment study and reporting of results. VC, RG and CW were responsible for project conceptualization and overseeing design and development of the e-learning module. VC and RG were responsible for manuscript writing as well as final approval of the manuscript. AH and CW reviewed and approved final version of manuscript.

Conflicts of Interest

None declared.

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Supplementary Files

Figures

Menu Interface.

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Effective Virtual Care: Elevating Primary Care through Virtual Care

Course Information

Virtual care, also known as telehealth or telemedicine, leverages various technologies to deliver healthcare services remotely. These technologies enable healthcare professionals to provide consultations, diagnosis, treatment, and monitoring to patients without the need for in-person visits and have the potential to revolutionize the way patients receive care and interact with healthcare providers.

At the same time, there are also challenges that need to be addressed in order for virtual care to live up to its potential.

This module examines the current state of virtual care in Newfoundland and Labrador, outlines some of the opportunities and challenges inherent in delivering effective virtual care, and reviews strategies for primary care providers to use in integrating virtual care into their practices.

How To Proceed **Accreditation** **Acknowledgements** **Disclosures** **Mitigating Bias**

It is anticipated that this module should take approximately XX hours to complete. If desired, you can complete the module over numerous sessions - the system will keep track of your progress and automatically return you to the page where you left off in the course.

It is recommended that you complete this course as follows:

- Review the "Course Information" section to ensure that you are familiar with the course format and layout;
- Review the "Accreditation" section to ensure you complete all tasks to earn credits;
- Complete the "Pre-Test". You may complete the Pre/Post Tests only once;
- Work through the case presentations and corresponding questions. Use this experience to help identify any learning needs you may have in terms of the cases presented.

Example of video tutorial.

The screenshot shows a web-based video tutorial interface. At the top, there is a dark navigation bar with a 'Course Menu' icon, a 'MyMDcme' logo, and a 'Logout' button. Below this is a light-colored header with the title 'Effective Virtual Care: Elevating Primary Care through Virtual Practice' and a small image of a person at a desk. The main content area has a white background. On the left, under a small icon, is the section 'Introduction'. The text reads: 'Virtual care is on the rise as a growing number of providers use technology to deliver healthcare. The pandemic highlighted many benefits of offering patients care in their home or community, from increased efficiency to improved access. But, as more care is delivered via video, telephone, email and secure messaging, there's an increasing need to ensure it's done appropriately and safely.' To the right of the text are two red buttons: 'Ask The Expert' and 'Need Help?'. Above these buttons are navigation links: '< Back', 'Page 4 of 28', and 'Next >'. Below the text is a large video player showing a man with glasses and a beard speaking. A large, diagonal watermark 'Preprint JMIR Publications' is overlaid across the entire page.

Learning assessment.

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Effective Virtual Care: Elevating Primary Care through Virtual Practice

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Pre-Test

Please read the following questions and select the most appropriate response for each one. At the end of the quiz, click the Submit button to complete the Pre-Test.

1. Which of the following options best describes the benefits and key considerations of conducting virtual care appointments?

- ☐ A. Increased convenience and flexibility for both patients and healthcare providers.
- ☐ B. Improved accuracy of diagnosis and treatment outcomes compared to in-person visits.
- ☐ C. Limited accessibility

2. Which of the following options best identifies the technological requirements and setup required to conduct optimal virtual care?

- ☐ A. High-speed internet connection

3. Which of the following options best recognizes how to integrate virtual care delivery into existing practice workflows?

- ☐ A. Continuing with the same workflows and processes without any modifications.
- ☐ B. Designating a separate team solely responsible for virtual care delivery.
- ☐ C. Assessing current workflows and adapting them to incorporate virtual care components.
- ☐ D. Implementing virtual care as a stand-alone service independent of existing workflows.

[Ask The Expert](#)[Need Help?](#)

Interactive case scenario (a).

Course Menu MyMDome Logout

Effective Virtual Care: Elevating Primary Care through Virtual Practice

Case Scenario: Dr. Smith

Assessing the Practice

What considerations should Dr. Smith examine in order to determine the readiness of their practice for virtual care?

Submit

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Ask The Expert

Need Help?

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Interactive case scenario (b).

The screenshot displays a web interface for a course titled "Effective Virtual Care: Elevating Primary Care through Virtual Practice". The page is part of a case scenario for Dr. Smith, specifically "Assessing the Practice".

Question: What considerations should Dr. Smith examine in order to determine the readiness of their practice for virtual care?

Expert Suggested Answer: Dr. Smith conducts an initial assessment of the current environment to better understand the requirements and challenges of implementing virtual care in their practice. They identify key factors such as patient demand, available resources, technological infrastructure, and legal and regulatory considerations.

Source: [Providing safe and high-quality virtual care: A guide for new and experienced users | Clinician Change Virtual Care Toolkit](#)

User Comments:

- User from Newfoundland and Labrador, Canada (8/13/2023 2:20:37 PM) commented: asascadasd
- User from Newfoundland and Labrador, Canada (8/14/2023 11:58:14 AM) commented: dan-test

The page includes navigation links for "Back", "Page 26 of 38", and "Next". It also features buttons for "Ask The Expert" and "Need Help?". The footer contains copyright information: "© 2023 MDcme.ca | [Print Page](#) | [Disclaimer](#) | [Privacy Statement](#)".

Multimedia Appendixes

Criteria for Reporting on Development and Evaluation of Professional Training interventions in Healthcare (CRe-DEPTH) (Van Hecke A, Duprez V, Pype P, Beeckman D, Verhaeghe S. Criteria for describing and evaluating training interventions in healthcare professions–CRe-DEPTH. Nurse education today. 2020 Jan 1;84:104254).

URL: <http://asset.jmir.pub/assets/8f4dbc8c280cd994ba1d78d0f834c64f.docx>

