

## Midwifery Immunization Practice Survey

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**Introduction.** Recent discussions between the British Columbia Center for Disease Control (BCCDC), the Midwifery Association of British Columbia (MABC) and the Midwifery Department of the University of British Columbia (MDUBC) have identified a need for immunization resources designed to meet the specific needs of midwifery clients. A 2010 survey of 39 British Columbia midwives identified that approximately 63% of midwives would be interested in taking a BCCDC online course on immunization to increase their knowledge base and comfort around immunizations (BCCDC, 2011).

Research has shown a number of advantages exist for internet based learning: an increase in knowledge (Casebeer, Kristofco, Strasser, Reilly, Krishnamoorthy, Rabin, Zheng, Karp, et al., 2004; Boren, & Balas, 2004; Langkamp, Darden, Kittredge, Gilbertson, Lancaster & Mauldin, 2004; Sullivan, Gitelman, Shapiro, & Rushakoff, 2010; Stamatikos, Alexis, Ratnapradifa, & Dhitinut, 2001; Carroll, Booth, Papaioannou, Sutton, & Wong, 2009; Cook et al., 2007), flexibility in time and location (Huckstadt & Hayes, 2005; Stamatikos et al., 2011; Cook, 2007; Cook et al., 2007; Harden, 2005; McKimm, Jolie & Cantillon, 2003), easier to maintain and disseminate than paper resources (Langkamp et al., 2004), provides a safe environment that allows participants to learn from their mistakes without risk to patients (Zary et al., 2006), and it is adaptable to a variety of learning approaches (Cook, 2007; Cook, Gelula, Lee, Bauer, Dupras, & Schwartz, 2007; Harden, 2005; McKimm, Jolie, & Cantillon, 2003). Studies by Atack and Rankin (2002) and Francis, Mauriello, Phillips, Englehardt & Grayden (2000) found that learners were satisfied with web learning, and would recommend on-line learning to professional colleagues.

As on-line learning has been shown to be an effective learning tool, the BCCDC, in collaboration with nursing students from the University of British Columbia (UBC), plans to create an online course on immunization for BC midwives. In creating this course, it is important to be cognizant of the attributes of a good on-line learning program. Over 60 articles were approached using the same question for analysis: "What are the attributes of an effective on-line learning program according to learner feedback and program performance outcomes." Of the 60 articles examined, 20 were included in this review. As the BCCDC learning tool will be module based, of brief duration, and lacking an instructor/facilitator, articles that referred to on-line learning in the context of distance based university education were excluded.

**Findings.** Results were categorized into the following sections: use of active learning techniques, with

a focus on the effectiveness of case-based learning; learner motivation; flexibility and individualization; ease of use and navigation; feedback; relevance to practice; and peer-to-peer learning.

**Use of Active Learning Techniques.** According to Bonwell & Eison (1991), active learning is “anything that involves students in doing things and thinking about the things they are doing” (p.91). It aims to have students control their learning (Bransford, Brown, & Cocking, 2000). Techniques include: leading questions, puzzles and games, brainstorming, concept mapping, case studies, simulations, role-playing, and debates (Office of Instructional Consulting, n.d.)

**User feedback.** The use of active learning techniques was well received by on-line module users (Kenny, 2002; Cook et al., 2007; Bryce, Choi, Landstrom, & LoChang, 2008). The use of self-assessment questions, review activities, and the inclusion of photographs, images and hyperlinks to additional online resources was well received by learners of an on-line introductory course on complementary and alternative medicine (Cook et al., 2007). Face-to-face interviews with users of the Department for Work and Pensions’ online learning module, “Sickness Certification Made Easy,” revealed that participants felt such modules need to be interactive (Larsen & Jenkins, 2005).

Several studies specifically addressed the effectiveness of case based learning (Jenkins, Cook, Edwards, Draycott, & Cahill, 2001; Cook, Thompson, Thomas, & Pankratz, 2006; Cook et al., 2007; Huckstadt & Hayes, 2005; Larsen & Jenkins, 2005). Case based learning activates prior knowledge and provides a context in which to situate the learning (Bransford, Brown & Cocking, 2000; Brown, Collins & Duguid, 1989), allowing for improved learner performance and knowledge retention. A pilot training program in reproductive medicine created by the Center for Reproductive Medicine in Bristol delivered one case study per month to participants. Overall satisfaction with the program was high (Jenkins et al., 2001). A study exploring the effectiveness of two interactive case-based online modules designed for Nurse Practitioner (NP) students as part of a grant-funded NP learning project found that the evaluation of the online modules and the enthusiasm of the participants support case-based online learning as a successful method of education (Huckstadt & Hayes, 2005). The use of real-life case studies and scenarios in the aforementioned “Sickness Certification Made Easy” module was well received by participants (Larsen & Jenkins, 2005).

**Results of Performance Outcomes.** Active learning techniques were not only well received by participants, but have been found to improve user performance outcomes (Cook et al., 2006; Allison et al., 2005). A recent study by Cook et al. (2006) found that case-based questions significantly improved test scores. A randomized controlled trial testing a multi-component internet continuing medical education (CME) intervention for increasing Chlamydia screening of at-risk women aged 16 to 26 years found that courses based on active learning techniques (participant interaction, decision making, problem-solving) resulted in positive changes in practice patterns as an outcome, as measured by an increase in Chlamydia screening rates of 60% (Allison et al., 2005).

**Learner Motivation.** Many studies found that learners require motivation to learn (Newton, Hase, & Ellis, 2002; Stamatikos & Ratnapradifa, 2011; Langkamp et al., 2004; Jenkins et al., 2001). A case study exploring the effective implementation of online learning in the Queensland mining industry found that factors important for effective online learning implementation included incentives for the learner's participation, and explicit motivations to learn (Newton, Hase, & Ellis, 2002).

People are most likely to complete online training because it is a requirement (Stamatikos & Ratnapradifa, 2011). Motivation is often provided in the form of continuing education credits (Langkamp et al., 2004) and a certificate of completion (Jenkins et al., 2001). Certificates of completion have been found to increase motivation, and increase module completion rates (Jenkins et al., 2001).

**Flexibility.** Module flexibility was a theme addressed by numerous sources (Billings & Rowles, 2001; Bryce et al., 2008; Larsen & Jenkins, 2005; Kenny 2002; Harden, 2005; Zary, Johnson, Boberg, & Fors, 2006; Canchihuaman, Garcia, Gloyd, & Holmes, 2011). It was felt that module formats should allow learners to enter and exit at any point in the course, and repeat sections as desired (Billings & Rowles, 2001; Bryce et al., 2008; Larsen & Jenkins, 2005).

Harden (2005) found that modules should incorporate "just in time learning," wherein learning resources are available to participants when they are required. This means having module content available at all hours of the day from a variety of locations. Home is the more frequent and preferred site for internet use (Cobb, 2004), and so the module needs to be available on home internet, not just on clinical intranet. Learners would also like to have the site available at their practice locations for reference (Huckstadt & Hayes, 2005). In light of this, modules should be designed for the lowest technological denominator so that they are compatible with all systems in all locations (Casebeer et al., 2003).

**Individualization.** Individualization, or "just for you learning" (Harden, 2005), allows learners to have some influence over what is learned and how it is learned, and adapt the program to their needs (Harden & Laidlaw, 1992). A qualitative study exploring physicians' perceptions of and experiences in participating in interactive on-line CME found that participants liked to be able to skip parts they felt versed in and go to parts they needed more education in (Sargeant, Curran, Jarvis-Selinger, Ferrier, Allen, Kirby, & Ho, 2004).

Part of individualization is having the ability to self-pace one's learning. Self-pacing allows learners to progress at their own rate, select content on a needs basis, and allows more experienced learners to skip content to finish the module more rapidly, and was seen to be a positive attribute of a learning module (Sargeant et al., 2004; Newton, Hase, & Ellis, 2002).

**Ease of Use and Navigation.** Modules should be easy to navigate (Phillips, 2005; Casebeer et al., 2003) and easy to use (Casebeer et al., 2003, Newton, Hase, & Ellis, 2002). Lessons need to be in a logical sequence (Billings & Rowles, 2001), and each module should have a clear purpose and objective and

defined beginning and end (Phillips, 2005). Instructions should be understandable, and easy to follow (Phillips, 2005). Vancouver Coastal Health created an online module consisting of basic infection control content, video clips, and information on antibiotic resistant organisms. 280 participants completed the module, and found it easy to begin, exit, re-enter, and move through the course, and felt that the content was clearly and logically presented (Bryce et al., 2008). Structured learning was highlighted as an attribute in several studies (Sargeant et al., 2004; Huckstadt & Hayes, 2005).

As a lack of technical skill was noted as a barrier to effective online learning in studies by Sargeant et al. (2004) and Cobb (2004), modules should be simple and appeal to those with limited computer competency.

**Feedback.** Another attribute of an effective on-line learning program is the provision of feedback on knowledge, comprehension, and performance (Sargeant et al., 2004; Billings & Rowles, 2001; Canchihuaman et al., 2011; Harden, 2005; Zary et al., 2006; Bryce et al., 2008; Larsen & Jenkins, 2005). Feedback on performance can support metacognition, as students evaluate their performance against an expert, a case author, or through analyzing expert reasoning on differential diagnoses or tests performed (Zary et al., 2006).

According to Billings & Rowles (2001), each module should have its own assessment and evaluation segment. Participants in the “Sickness Certification Made Easy” module enjoyed being tested on what they had learned, and found quizzes to be an effective teaching method (Larsen & Jenkins, 2005). In addition to being tested, participants want to be provided with answers to case scenarios, regardless of whether answers were right or wrong (Canchihuaman et al., 2011). A lack of feedback when questions were answered incorrectly in the post-test was seen as a negative attribute of the Vancouver Coastal Health online immunization module (Bryce et al., 2008).

**Relevance to Practice.** In order to be effective, the module should contain content that is directly relevant to practice (Harden & Laidlaw, 1992; Newton, Hase, & Ellis, 2002; Larsen & Jenkins, 2005). In the online learning module “Sickness Certification Made Easy,” information applicable to the health professionals’ jobs was well received. Information should also be quickly and continuously updated as content or standards change (Newton, Hase, & Ellis, 2002).

**Peer-to-Peer Learning.** One of the main barriers to effective online learning is the lack of an online community (Sargeant et al., 2004). An effective online module would create a community of learners, and allow for interaction with peers and facilitators (Harden, 2005; Newton, Hase, & Ellis, 2002; Stamatikos & Ratnapradifa, 2011). Learners would like to be able to share experiences with other learners (Sargeant et al., 2004), and feel a sense of belonging when engaged in discussions or other forms of peer-group interactions (Carroll et al., 2009).

**Limitations of Findings.** While it is clear that there is a growing body of literature to support the effectiveness of online learning and the attributes of effective online learning modules, further

research is required. Many of the studies have small sample sizes, and only a few were controlled trials. Only one study (Canchihuaman et al., 2011) addressed continuing education courses that were specifically aimed at midwives. The remainder of the studies focused either on other health professions (physicians, nurses, pharmacists, dentists) or other professions outside of health care. Specific research is needed to address the learning needs particular to midwives as a unique professional group. However, these studies do provide information and learner feedback on effective attributes of online learning that will prove useful in the development of an online learning module for midwives.

**Conclusions and Recommendations.** A review of the literature highlights that an effective online module should incorporate a number of attributes. It should make use of active learning techniques, with an emphasis on the use of case studies. The BCCDC module should use case studies specific to midwives' professional learning needs. An effective module should also motivate learners to participate, either by awarding continuing education credit or by providing a certificate upon completion. As midwives in British Columbia are not awarded continuing education credits (MABC, 2011), incentives for the BCCDC module would most likely be in the form of a certificate.

The module should be flexible, have exit-and entry points, and allow users to return to and repeat sections as desired. It should be available at any time of day and at any location, and should be created at a low technological denominator to ensure compatibility with all user systems. Individualization of content should be optimized by allowing users to self-pace their learning, and move past sections containing content in which they feel well-versed. Placing the module on the MABC website would allow participants to access the module from both work and home.

In addition, modules should be easy to use and navigate. Lessons should be in a logical sequence, and each module should have a clear purpose. Instructions should be understandable and easy to follow. The module should be simple, and appeal to those with limited computer competency.

Learners want feedback on their progress, knowledge, and competence. This can be provided in the form of quizzes and evaluations at the end of each module or section of a module. All evaluations should provide the correct answers upon test completion so that learners can compare their performance to that of the expert.

All module content should be directly relevant and applicable to professional practice, and content should be continuously updated to remain current with changes in knowledge and practice standards. The BCCDC and the MABC would be responsible for ensuring that content is constantly updated, and that, not only is the data up to date, but the technology is current and the format remains appealing to the audience. Lastly, modules should facilitate the creation of learner communities and peer-to-peer learning. As the BCCDC module will not have a facilitator or on-line moderator, the most likely form of learner interaction would be an online discussion forum attached to the module. The effectiveness of online discussion forums as they relate to module learning was

not addressed in the reviewed literature, and this is another area that needs to be further researched.

Just as the modules in the literature reviewed were assessed for user satisfaction and performance outcomes, the same needs to be done with the BCCDC module upon completion. The BCCDC plans to test a pilot module using a focus group of midwives, and make necessary changes based on participant feedback before the release of the module on the MABC website.

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