

Understanding the Role of Communities of Practice in Evidence-Informed Decision Making in Public Health

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Abstract

In this article we report on qualitative findings that describe public health practitioners' practice-based definitions of evidence-informed decision making (EIDM) and communities of practice (CoP), and how CoP could be a mechanism to enhance their capacity to practice EIDM. Our findings emerged from a qualitative descriptive analysis of group discussions and participant concept maps from two consensus-building workshops that were conducted with public health practitioners ($N = 90$) in two provinces in eastern Canada. Participants recognized the importance of EIDM and the significance of integrating explicit and tacit evidence in the EIDM process, which was enhanced by CoP. Tacit knowledge, particularly from peers and personal experience, was the preferred source of knowledge, with informal peer interactions being the favored form of CoP to support EIDM. CoP helped practitioners build relationships and community capacity, share and create knowledge, and build professional confidence and critical inquiry. Participants described individual and organizational attributes that were needed to enable CoP and EIDM.

Keywords

community and public health; concept mapping; descriptive methods; evidence-based practice; knowledge transfer

In a number of high-profile reports on the Canadian public health system, and in the response of practitioners to public health crisis events such as avian flu and severe acute respiratory syndrome (SARS), challenges and opportunities for enhancing capacity in the public health system were identified (Kirby, 2003; Moloughney, 2006; Naylor, 2003; Romanow, 2002). These reports serve to bring attention to the underresourced and often ignored Canadian public health system and the subsequent limitations placed on health professionals to practice evidence-informed public health. Multiple structural and process-oriented strategies are required to enhance capacity for health professionals to practice evidence-informed decision making (EIDM) in public health. Examples of such strategies include establishing coordinated public health priorities for public health and enhancing training of public health staff in EIDM. The authors cited above acknowledged that increasing the capacity of public health staff to engage in EIDM could strengthen the public health system's ability to improve health outcomes.

Research as a form of “questioning how to connect what we know to what we do” is critical in understanding how and if the evidence that is generated becomes part of

our practice (Cheek, 2011, p. 700). In this article we report on a research project that explored public health practitioners' practice-based understanding of EIDM and communities of practice (CoP), and how CoP could be used to enhance their EIDM. CoP are “groups of people who share a concern, a set of problems, or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis” (Wenger, McDermott, & Snyder, 2002, p. 4). The motivation for our research initiative emanated from the collaborative efforts of our team of public health decision makers and academic researchers in the four Atlantic provinces in

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eastern Canada, who had been exploring research opportunities and integrated knowledge-to-action strategies in public health practice. This project was the first step in understanding how public health practitioners define the concepts of EIDM and CoP.

EIDM and Public Health Practice

In general, EIDM in public health occurs when practitioners integrate best research evidence with other dimensions of the decision-making process, such as practitioner expertise, community health issues and local context, community and political preferences and actions, and public health resources (DiCenso, Ciliska, & Guyatt, 2005). EIDM is beneficial to public health because it fosters decision making at the community level in day-to-day clinical decision making, in system-level decisions, and in creating healthy public policy that is based on high-quality evidence rather than tradition (DiCenso et al.; Public Health Agency of Canada, 2007). Many researchers, along with professional and government bodies, have called for the need to increase practitioners' competencies in providing evidence-informed care in the public health practice setting (Ciliska, Thomas, & Buffett, 2008; Community Health Nurses Association of Canada [CHNAC], 2008; Naylor, 2003; Public Health Agency of Canada, 2005).

In the public health arena, EIDM is a "complex, multidisciplinary process that occurs within dynamic and ever-changing communities and encompasses different sectors of society" (Ciliska et al., 2008, p. 6). EIDM involves the ability of public health practitioners to make complex clinical decisions by critically appraising the evidence, basing intervention options on the client's situation and available resources, and communicating culturally competent care (Ciliska et al., 2008; DiCenso et al., 2005). Critical appraisal of the research evidence by public health practitioners is an ongoing challenge. Some of these challenges are because of poor infrastructure support for EIDM, such as money, time, and support systems. Supportive infrastructure is critical to EIDM (Cullen, Greiner, Greiner, Bombei, & Comried, 2005; Estabrooks, 2003; Estabrooks, Chong, Brigidear, & Profetto-McGrath, 2005; Meagher-Stewart et al., 2010).

In addition to infrastructure support, there is a significant gap between dissemination of research evidence and change in clinical decision making and policy making (Ciliska, 2006; Hutchinson & Johnston, 2004). This occurred despite efforts to promote the use of research through knowledge-to-action strategies, consisting of interventions in real-world clinical practices, such as in the context of public health, which were designed to promote change and improve health outcomes (Norman & Huerta, 2006). Much of the evidence in public health comes from artificially controlled research that does not fit the realities of practice (Green, 2006). There are similar concerns in acute care settings, and this reliance on

evidence can even "suppress nursing knowledge" (James, Andershed, Gustavsson, & Ternstedt, 2010, p. 1515). Furthermore, rigorous efficacy studies on preventive and health-promotion activities are not readily available in public health (Asthana & Halliday, 2006), nor is the model of what counts as evidence in acute care necessarily the best fit outside of acute care settings (Cheek, 2011). A possible reason for the gap between research evidence and actual change in clinical decision making is that the complexity of the practitioner's practice context and the importance of tacit knowledge are underestimated (Thompson, Cullum, McCaughan, Sheldon, & Raynor, 2006). Understanding the process of EIDM and clinical practice includes knowing how explicit and tacit forms of knowledge interrelate, and their relative impact on the clinical decision-making process (Spenceley, O'Leary, Chizawsky, Ross, & Estabrooks, 2008).

Personal knowledge gained through clinical experience and awareness of client preferences and circumstances is often classified as tacit knowledge or "know how," in comparison to research evidence that is commonly classified as explicit knowledge, which is information that can be codified (Nonaka, 1994) and thought of as "book knowledge . . . ordering of data and information according to well-defined, formalized procedures or rules" (Dubois & Wilkerson, 2008, p. 11). In contrast, tacit knowledge is experiential knowledge, context specific, and based on capabilities and routines that are not amenable to formalization or codification (DiCenso et al., 2005; Nonaka). Because of its nature, tacit knowledge is difficult to convey and is susceptible to incomplete or inaccurate transfer (Berta & Baker, 2004). Tacit knowledge of people and situations, routinized actions, and tacit rules are said to underpin intuitive decision making (Eraut, 2000). Some authors have claimed that evidence-based health care has generally taken a narrow view on evidence, with the emphasis on only explicit scientific research, and that the literature is ignored that demonstrates that tacit knowledge or "knowledge in practice" is foundational to clinical decision making (Gabbay & le May, 2004; Gabbay et al., 2003). These authors emphasized that it is important to understand how explicit and tacit knowledge forms are accessed, negotiated, constructed, and internalized in clinicians' practice contexts.

Moreover, the relative impact of tacit and explicit evidence in clinical decision making is thought to depend on the complexity, ambiguity, and presentation of the task (Thompson, 1999; Thompson, et al., 2006). These authors also suggested that there are three elements of decision complexity that need to be considered: time-limited decision making activity, multiple and diverse decision goals, and conflicting decision elements. The model for EIDM in public health as proposed by DiCenso et al. (2005) recognizes that evidence can come from a variety of explicit and tacit sources.

Communities of Practice

Communities of practice (CoP) are likely an attractive mechanism for public health practitioners to share knowledge and improve EIDM, particularly because public health practitioners value working in collaboration with peers and other stakeholders within and external to their practice setting. CoP are based on principles of social learning in that people do not learn in isolation, but by acting and interacting with others (Estabrooks, 2003; Estabrooks, Rutakumwa et al., 2005; Lave & Wenger, 2002). Time, trust, and socialization in the work environment are reported to play a significant role in determining knowledge acquisition (Estabrooks; Estabrooks, Rutakumwa et al.; Sandars & Heller, 2006). Spenceley et al. (2008) concluded from their extensive literature review that informal, interactive sources of information from peers are the highest-ranked sources of support. Health professionals overwhelmingly rely on social interactions, particularly interactions with coworkers and clients, and personal experience as their primary sources of practice knowledge (Estabrooks, Chong, et al., 2005).

CoP are predominately informal, self-organizing (although they benefit from supportive environments and infrastructure support), and diverse, and include mutual engagement, a commitment to a joint enterprise, and a shared repertoire (Wenger et al., 2002; Wenger & Snyder, 2000). They combine tacit and explicit knowledge, and have been used to create and disseminate knowledge (Tagliaventi & Mattarelli, 2006; Wenger & Snyder). For example, a CoP could be used to enhance breastfeeding practices by creating a community of interest such as a group of public health practitioners who meet regularly outside their assigned team meetings to share experiences and talk about practice issues as well as research evidence. Explicit and tacit knowledge can be shared with others through storytelling and apprenticeship. Shared standards or approaches can be developed in the CoP and taken back to the individuals' respective organizations, so that scientific evidence can inform practice.

Successful attributes of CoP are leadership and appropriate membership, regularly scheduled events to bring members together, networking opportunities within and outside the community, and commitment to an issue about which members feel enthusiastic (Lathlean & le May, 2002; Sandars & Heller, 2006). The sustainability of CoP is influenced by group commitment and experience, local politics and economics, and perceived impact (Lathlean & le May). Additionally, infrastructure support is identified as crucial to CoP (Sandars & Heller; Wenger & Snyder, 2000). The practitioners' time, access to computers, perception that going online is not legitimate work, and the lack of a learning-at-work culture are identified as significant challenges for virtual CoP (Tolson, McAloon, Hotchkiss, & Schofield, 2005).

Initial research has revealed that CoP can improve the transfer of research evidence to practice by providing learning opportunities that facilitate interaction and information sharing among peers, so that the use of evidence can be timely and context relevant (Dobbins, Ciliska, Cockerill, Barnsley, & DiCenso, 2002; Estabrooks 2003; Lave & Wenger, 2002). Tolson et al. (2005) concluded from their study of CoP that using a link nurse (an online resource) as a knowledge-to-action strategy influenced gerontological nurses' evidence-based practice, sense of empowerment, professional identity, and status. According to some researchers, nurses are more likely to use human sources of information rather than text or online sources (McCaughan, Thompson, Cullum, Sheldon, & Raynor, 2005; Thompson et al., 2001). Nurses prefer to consult with colleagues who provide context-specific and clinically relevant information in a time-efficient way, necessitating minimal critical appraisal (Thompson et al., 2006). Gabbay et al. (2003) concluded from their case study of knowledge management in CoP that health professionals' uptake of knowledge was shaped by personal, professional, and political agendas. Of particular relevance to our study, most of the research on CoP and evidence-based practice was conducted in hospitals and in a European setting (Lathlean & le May, 2002; Prowse & Heath, 2005; Tolson et al.), and not in public health settings.

Our practice experience in public health supports the view that both formal and informal CoP exist in the public health work environment. Additionally, a study of public health nurses in eastern Canada concluded that the nurses desired ongoing professional development in EIDM and wanted more opportunities to network with other public health nurses and coworkers (Meagher-Stewart et al., 2004). The authors noted that the nurses wanted to go beyond their siloed roles and responsibilities, which resulted from specialized programs, to communicate and share information within and across district health authorities to avoid duplication of services and to communicate best practices. These findings are consistent with the CoP literature.

We submit that, if the public health system is to meet ongoing demands, it is vital that the link between CoP and EIDM for the public health practitioner be more thoroughly understood. To that end, we explored public health practitioners' perceptions of whether and how CoP provide a mechanism to support EIDM, thereby potentially facilitating innovative practice through producing, communicating, and using research evidence in clinical practice.

Methods

Design and Procedure

We used a qualitative descriptive approach (Sandelowski, 2000, 2010) to explore public health practitioners' shared

understanding and use of EIDM and CoP, particularly how CoP might facilitate the use of EIDM. A qualitative descriptive approach is appropriate when straight description of the phenomenon is desired, because the researcher stays close to the data as reported, or “data near” (Sandelowski, 2010, p. 78), with minimal interpretation and low-influence descriptions (Sandelowski, 2000). This approach was in keeping with our overall goal of obtaining an understanding of how health professionals in the field viewed EIDM and CoP rather than an abstract definition of these concepts. We developed and implemented two consensus-building workshops with a purposeful sample (Patton, 2002) of public health practitioners from one rural and one urban public health unit in two Atlantic provinces in eastern Canada. Public health by its nature is interdisciplinary, and practitioners value working collaboratively within and across organizations; therefore, we wanted to include a variety of public health practitioners in our sample.

Consensus building refers to a process by which participants come together in a facilitated group to engage in open discussion that results in an agreement or a shared understanding (Innes & Booher, 1999). Consensus-building exercises allow for participants with varying perspectives on a topic to identify diverse concepts or actions that can be collectively used to capture a particular experience in a more parsimonious way. The principles behind consensus building guided the workshop activities in that they were open and exploratory, with all members participating in the discussions.

The public health units were selected based on prior researcher–decision maker partnerships as part of our emergent research project, organizational readiness, and our intention to capture as much variation (Patton, 2002) as possible; hence the choice of different practice situations in two provinces. One public health unit served a rural population (96,000) with a generalist delivery of programs that were delivered across the life span. The second served a predominately urban population (395,000) where programs focused on specific population health targets, such as school health, family health, and communicable disease prevention and protection. Researchers have consistently concluded that the organizational context within the public health work setting has a significant influence on practitioners’ EIDM (Ciliska, Hayward, Dobbins, Brunton, & Underwood, 1999; DiCenso et al., 2005). It is important to note that both employers were collaborators in the research and viewed conducting the workshops during work time as a positive strategy to inform participants that the topic was relevant to their everyday practice. Having the workshops during work time also allowed for greater participant recruitment.

In consultation with the director of the university research ethics board of one of the principal investigators, and in keeping with the Tri-Council policy statement,

“Ethical Conduct for Research Involving Humans” (Canadian Institutes of Health Research, Natural Sciences and Engineering Research Council of Canada, and Social Sciences and Humanities Research Council of Canada, 2010), a full ethical review was not indicated given that this was a preliminary phase of an emergent design. All the principles of informed consent and voluntary participation were followed. All workshop participants were fully informed about the purpose of the workshop through promotional material for the workshop, and all signed a release consent form prior to the start of the workshop. The consent form stressed the voluntary nature of the workshop, how material would be used, and that no individual participants would be identified in any reports or papers. During the workshop participants were asked not to share information discussed within the group outside of the group sessions; participants were aware however, that we could not guarantee confidentiality.

To recruit participants we sent a promotional flyer to public health practitioners in the selected settings to inform them about the study. Participants who volunteered to participate in the project were asked to complete but not submit a reflective worksheet one week prior to the workshop. The worksheet included the main questions that would be asked in the workshops, and was designed to stimulate reflection and prepare the participants for group discussions.

Both workshops began with an overview of goals and activities. Participants were divided into groups that consisted of 7 to 9 participants, with each group having a facilitator and a recorder, who were either members of the research team or volunteers from one of the partner settings or a neighboring research institution. The facilitators and recorders received a face-to-face orientation as well as prior written materials. The group sessions were not audiotaped. Each recorder was asked to document ideas and concepts emerging from discussions, qualitative comments, points of clarification, and any unique aspects of the group interaction.

The small group participants were guided in how to arrive at consensus on meanings and strategies to enhance their use of evidence and COP. Participants were given project questions and definitions related to EIDM (DiCenso et al., 2005) and COP (Wenger et al., 2002) to guide group discussions and consensus building. The following questions, which functioned as seeding statements, were addressed in the workshop:

1. When you encounter a new challenge/situation with clients, or in the community, how do you recognize that information is needed, locate it, and appraise it to make a decision on how to address the issue?
2. What is your experience consulting with groups of peers (CoP informal and formal groups with

- public health colleagues and/or community partners) about a practice issue?
3. How do you use information from peer groups (CoP) to support practice decisions? Does it enable EIDM?
 4. What strategies would help enhance the peer group's (CoP) access to and use of evidence when engaged in collective problem solving around practice issues?

We chose concept mapping to create visual representations of ideas and how they connected to integrate and display information from the brainstorming sessions. Concept mapping is suggested as a participatory method of developing theory because it allows knowledgeable participants to collectively engage in collecting, analyzing, and interpreting pertinent data (Burke et al., 2005). Participants were initially given a brief overview of concept mapping and the steps involved in arriving at the final map. To illustrate, during the process of brainstorming and generating a concept map, participants were asked to reflect on a recent situation or challenge and how they made a decision about how to address the issue, and then to share this reflection with the group. At this point, we employed storytelling as a means for each participant to communicate the new challenge or situation to the group. Storytelling is a technique that is used in many collaborative activities because it helps to bring out what is meaningful about the topic under discussion and the insights that were gained along the way (Forester, 1993). Stories are also a powerful way to communicate experiences that capture the context, are rich in detail, and represent real-life activities and actions.

The workshop format provided uninterrupted time for the participants to reach consensus on each aspect of the group work. When each participant briefly told her story, the group deconstructed it and identified and recorded key concepts that could be used to form a concept map. All groups reached consensus on how to group ideas into concepts and identified relationships between and among the main concepts. The format of the two workshops varied slightly because of evaluation feedback. The first workshop (in the rural setting) began with participants brainstorming about EIDM and generating concept maps in their small groups. In the afternoon session, participants brainstormed and developed concept maps in their groups that integrated COP and EIDM. Participants indicated on their evaluations that the 1-day workshop expectations for developing two concept maps was demanding for the time available. Therefore, in the second workshop (the urban setting), participants were asked only to generate concept maps that integrated COP and EIDM.

We stayed at the individual group level for construction of the concept maps rather than with the workshop participants as a whole because we wanted to capture the

variation that would be present. Figures 1 and 2 depict the concept maps as meaningful ways for participants to clarify the connections between people and concepts, and to understand the role of various types of CoP in stimulating EIDM.

Thematic analysis (Braun & Clarke, 2006; Sandelowski, 2000, 2010) was completed on data from the groups, which included recorder notes, flip-chart notes, and concept maps. Consistent with the goal of qualitative descriptive studies to develop a comprehensive description of the phenomenon in everyday language, we completed qualitative content analysis by coding the data based on the core concepts of EIDM and COP and the research questions, and defining and naming emergent themes that were consistent with terms reported by the participants (Sandelowski, 2000). At the beginning of data analysis each research team member who had facilitated the group discussions individually examined the data and identified emergent codes, and then the codes were examined collectively by the research team. The coding structure and emergent themes were established by team consensus and then verified by two research assistants. Investigator triangulation was achieved by using more than one researcher to analyze the data, to reduce the possibility of biased interpretation, thus enhancing the credibility of the findings (Lincoln & Guba, 1985).

Results

A total of 90 public health professionals (all women) participated across the two settings, and 86 participants provided demographic data. Participants identified themselves as public health nurses ($n = 73$), a licensed practical nurse ($n = 1$), practice consultants ($n = 7$), nutritionists ($n = 2$), dental hygienists ($n = 4$), health promoters ($n = 2$), and an early child health consultant ($n = 1$). Most participants (93%) held a baccalaureate degree; 24% of participants in the urban workshop were prepared at the master's level. Years of experience ranged from 0.1 years to 40 years. The majority of the participants had 6 years or more in public health service (53%); 47% reported 5 years or less of experience in public health service, and 18% had 1 year or less experience in public health.

In the rural workshop, 54% of the public health nurses reported working in a multiple-nurse office (with other public health team members and community service staff), and 46% reported working in a single-nurse office (the nurse was the only public health staff personnel). In the urban workshop, 80% of participants reported that they worked with urban communities and identified their work location as the main public health office. The majority of the participants worked in specialized roles in program foci areas such as communicable disease prevention and control, family health, and school health (primary to Grade 12), as well as youth health centers in high schools. The nutritionists worked with the health-promotion team.

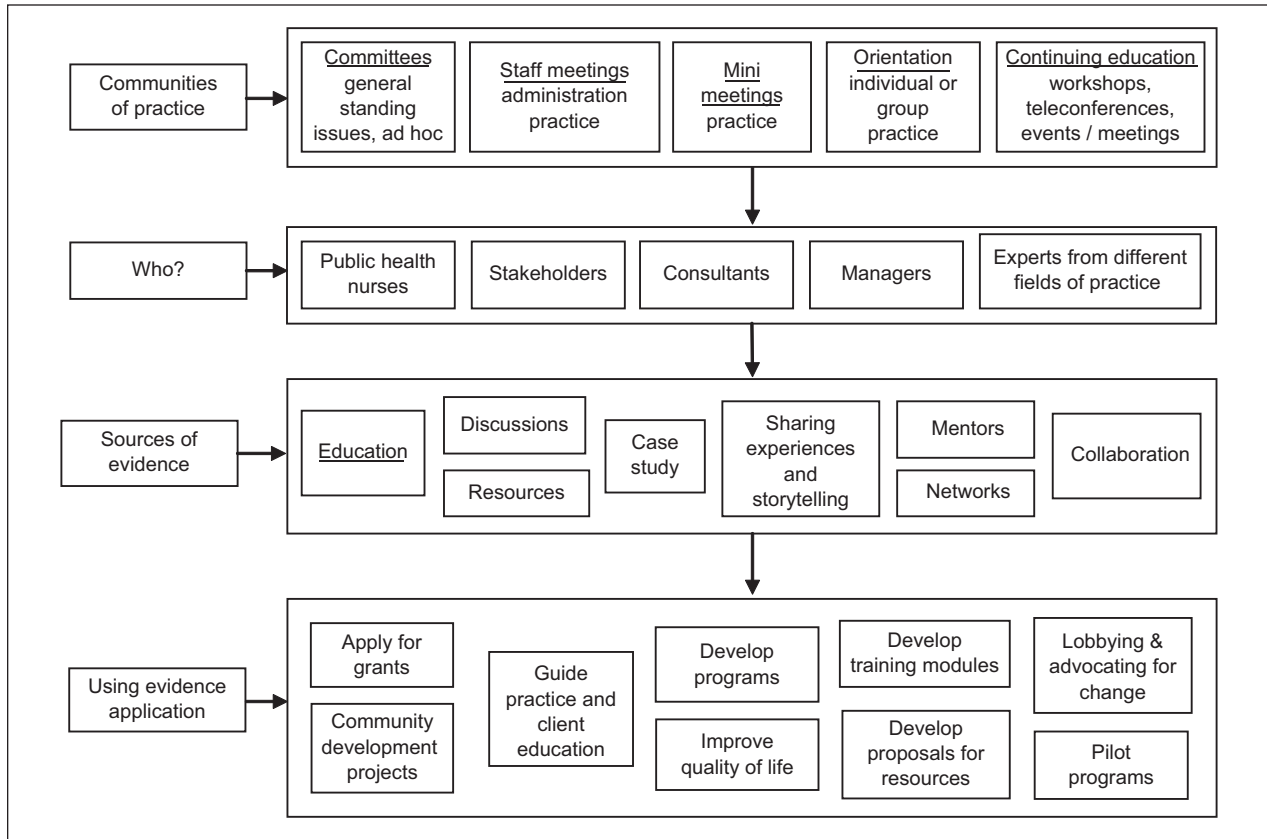


Figure 1. Communities of practice and evidence-informed decision making, Rural Group 6

Type of practice	Why?	<u>Program</u> (crisis) Immunization/new staff/new program	<u>Program</u> (3-year wellness clinic) Build a coalition	<u>Policy Development & Implementation</u> Hospital/public health breast-feeding initiative	<u>Program</u> Family health team	<u>Program</u> Youth health center advisory committee, youth leader development	<u>Program</u> Breakfast program; implement policy
Group structure	When?	Team of public health nurses & immunization coordinator; meet over 2 to 3 months	New group; meet monthly	Public health nurses, hospital staff, public health nutritionist; meet monthly	Not mandatory; current issues; staff & management; meet monthly	Meet regularly 6 to 8 times/school year	Teachers, guidance, youth health center staff
Leadership	Who?	Nurse-led committee	Family health coordinator, public health committee, public health nutritionist	Public health nutritionist	Shared between management & peers; team led	Shared/mentorship; adult consultant	Selective historical leader
	What information?	Look at resources, other public health sites, immunization book, what peers did	Share experiences, establish trust & purpose	Breastfeeding initiative guidelines & best practice evidence	Refer to resources; impetus to improve practice	Focus groups, other youth health centers, youth health center standards, evidence	Food policy, research, experiential workshop
Influence (thinking/actions)	How?	New team development	Team building, communication	Bedside to policy	Leader shift, team building, morale increase, morale awareness	Program development, relationship building, stronger voice for youth	Change dynamic, implement policy, healthy outcome

Figure 2. Communities of practice and evidence-informed decision making, Urban Group 3

Health promoters, dental hygienists, and the early childhood consultant worked across programs. The three main themes and their subthemes that emerged from the data in this study are discussed in the following section.

Theme 1: The Nature of Evidence-Informed Decision Making

Information for a myriad of community health issues and contexts. Regardless of the practice situation, all workshop participants said they needed information for a variety of purposes to focus their community practice, resolve safety or risk issues, develop resources and programs, advance community planning and advocate for change, foster client engagement and ownership, and promote their professional competencies. Several urban workshop participants reported that the public health clients (individual, family, or community) let them know when their needs were not being met by a current program on an individual basis or through community forums such as focus groups. Participants identified a need for additional research that would inform program content and help them understand how to apply the research to the current need.

Explicit and tacit sources of information. Locating information was described as highly context dependent and generally the easiest step in EIDM. Participants reported gathering information from a variety of explicit and tacit knowledge sources. Explicit or empirical information emerged as a major source of knowledge, with the greatest emphasis on reputable Internet sources, World Health Organization or Centers for Disease Control and Prevention reference books, statistical data, clinical practice guidelines, national and regional surveys, needs assessments, community focus group data, and policy and procedure manuals. Participants indicated that if the practice context involved more complex issues or strategies, then they would examine a wider web of information sources. When they needed complex information immediately (during a communicable disease crisis), then practitioners relied heavily on tacit knowledge by consulting with peers and managers about standard routines, and considering personal experience and the client context. In contrast, in long-term planning situations (e.g., increasing participation rates in health-promotion activities) when they had more time available, these practitioners sought a variety of explicit sources such as Web-based resources, clinical practice guidelines, and research literature.

Reliance on tacit knowledge was preferred by most participants as the primary mode to start looking for an answer to an issue or situation, especially in time-limited, decision-making situations. Although the term *tacit* was not specifically used, participants clearly discussed sources of information that included personal experience, client situations, and consultations with coworkers both internal and external to the health region (e.g., other public

health professionals, consultants, nurse managers, and community partners) about understood rules and routines. As one participant in the urban workshop said, "No amount of literature can translate what experience says." Some of the expert consultation that could be classified as tacit knowledge was asking how other public health jurisdictions/provinces dealt with similar practice issues; this was usually at the policy level.

Participants in the rural workshop noted that frontline staff in their public health unit normally consulted first with their peers and practice consultants in locating information. The practice consultants (5 public health nurses and 2 nutritionists) had the main responsibility in this organization to provide leadership in gathering and appraising statistical and research evidence. Eighty percent of the practice consultants had more than 12 years of experience in public health. There were no practice consultant positions in the urban setting.

One subgroup of urban workshop participants who were new to public health practice (2 weeks to 1 year) stated that although they valued the tacit knowledge of their more experienced peers, mentors, and/or preceptors, as well as community partners, they believed they rarely had the opportunity to access these resources when they needed them. They noted that the large volume, depth, and breadth of new information that they were expected to learn about their new position, and the limited time they had to find experienced colleagues, were key reasons for not accessing their peers' tacit knowledge. Therefore, they were more likely to rely on explicit resources such as electronic or print resources, manuals, and conferences to support their EIDM.

Participants from both workshops were respectful of their clients' tacit knowledge within their communities, whether it was youth in schools or mothers in breastfeeding groups. As one participant in the urban workshop stated, "I value Mom's experience." Participants' comments reflected that they sought clients' advice as a source of tacit knowledge. They also identified lack of community accessibility to resources and level of readiness for change as challenges for evidence-informed change within those communities.

The challenges of appraising information. Beyond the location of information, it became apparent that appraisal of the quality of the information was a separate and important factor in EIDM. Although we did not explicitly ask how participants defined critical appraisal of evidence, we were able to draw inferences based on discussion notes. Participants in the urban workshop noted that the following criteria were often used to appraise the information: consistency with the vision of their public health practice, relevance to the current situation, acceptability by the client, reputability and comprehensiveness of Web-based sources, trustworthiness of the information source, and consistency with their own general "gut" feeling.

For some participants in the urban workshop, the need to “go with their gut feeling” superseded all possible appraisal strategies. As one participant stated, “I trust in my gut that information is applicable and credible.” Trust in people with knowledge and experience, as well as their own experiential evidence, were the most common appraisal strategies cited. Similarly, participants in the rural workshop described their appraisal process as mainly based on trust in people, such as their consultants and peers, trust in their own personal knowledge and judgment, and confidence in practice manuals and other written resources.

Many participants did not believe they had the time and/or skill to perform the necessary critical analysis of research-based resources, which presented a major challenge. This was particularly true for new hires, who, despite the fact that they often relied on explicit sources rather than tacit sources when they had limited time, had difficulty synthesizing explicit data without guidance from those with experience. Furthermore, they commented that their lack of experience made it difficult for them to have confidence in their decision-making skills. They also explained that their limited understanding of their scope of practice, along with some workplace policies, compromised their ability to use the research knowledge in practice (i.e., policies that prohibit the provision of information on breastfeeding in places where formula is promoted).

With reference to appraising explicit knowledge sources, not having a nurse educator or practice consultant who was an expert at appraising explicit knowledge sources was frequently cited as a challenge in the urban workshop. There was consensus in one group in the urban workshop that a “go-to person” was needed. They believed that having access to skilled and knowledgeable people to help them assess explicit knowledge sources would compensate for the lack of available time to stay up to date and evaluate programs and policies. As one participant commented, they needed someone who could “translate the literature into the art of practice.”

Applying evidence broadly. Participants in both workshops provided examples of applying explicit and tacit knowledge that spanned a variety of community health issues and local contexts, including all types of public health programs, in private homes, schools, and the broader community. The knowledge they acquired was used to develop resources; promote individual/group professional competence; build collaborative practice skills; advance community planning; develop, implement, influence, and support outcome evaluations, social marketing, and policy changes; apply for grants; lobby and advocate for change; and foster client engagement and community ownership. Some participants stated that they were always looking for ways to make the programs understandable and feasible for the client, to encourage buy-in.

Theme 2: The Nature of CoP and Sharing Evidence

Engaged in a range of CoP. Although the term *communities of practice* might not have been used by the participants, they easily identified with the concept, and indeed offered situations when they worked within a CoP. They reported being engaged in a range of CoP, from informal to formal, including (a) small informal meetings with peers that were initiated by the practitioner and built on common interests or passion for a topic; (b) management- or staff-driven meetings; (c) formalized meetings with the larger public health team, such as staff meetings; and (d) more formal meetings with other coworkers or community partners. Generally, the participants’ objectives in engaging in CoP were to foster professional development; establish priorities on internal programs, administrative matters, or community-related issues; locate and share information; and develop and implement policy initiatives.

The composition of CoP depended on the purpose. CoP with a more formal structure included individuals with expertise in the issue as well as people who could implement the initiative. For instance, a school health-promotion group involved practitioners, school administration, and the school board’s health-promotion team. Usually management-driven CoP were initiated to address one or more of the following: program issues, community-related issues, policy development and/or implementation, and administrative matters. In these CoP, the practitioners’ roles varied depending on the nature of the issue and the group’s mandate. In more formalized CoP, participants identified an extensive list of community partners.

Building trusting relationships. Participants in both the urban and rural workshops described the benefits they received from having access to peers or role models who understood “the big picture,” so they could translate public health competencies, validate what they were doing well, and build their confidence. Participants indicated that CoP in which good relationships were developed among members created an atmosphere of trust that supported practitioners, because they increased their practice knowledge and skills and ultimately led to improvements in public health outcomes. They commented that building trust and establishing relationships within the CoP took time and usually necessitated regular meetings. Both formal and informal CoP that suffered from poor leadership and communication were challenging. Participants often reported that a safe, trusting environment was as important as reliable research upon which to base decisions.

Knowledge sharing and skill development. In general, participating in CoP enabled the public health practitioners to identify learning needs, clarify where they could find and use valid and reliable information (i.e., professional, trusted, certified, and accountable) to solve their issue, consider evidence-informed change, and share

achievements. Participants reported that working with individuals who had different styles or processes was important for them to expand their “toolbox,” which represented their perspectives on practice. Of note, informal groups with peers were the preferred source of information on practice issues. Participants reported that working in CoP with individuals who had similar experiences was beneficial because they were able to “get the context” of the situation. As a participant stated, it also helped them identify like-minded peers who could support them: “If you don’t have the support of those you work with, it would be difficult to pursue issues further.” Often the initial orientation and ongoing mentoring of newly hired public health professionals happened informally with respected peers. Peer CoP provided essential information that helped participants define “who to go to” and what they needed to get from those experts—a requisite for time-stressed positions—and/or helped them grasp what the issue was about and then “refer to the literature later.”

A public health practitioner in the study, who was responsible for sexual and reproductive health, described a multidisciplinary CoP that was challenged to increase attendance at cervical screening clinics as part of the Provincial Cervical Screening Initiatives Program. A small group was convened, consisting of public health nurses, a nurse practitioner, a communicable disease nurse, a physician, a cancer survivor, and a representative from the Canadian Cancer Society. The group’s objective was to tailor a campaign to encourage screening. The CoP opted to recruit women from bingo halls and hair salons, and used materials such as bookmarks, emery boards, and bingo markers, which carried a message to encourage screening tests. The CoP also assisted with a cervical screening awareness week that continued outside of the CoP. The initiative used sources of evidence such as empirical literature that suggested good recruitment strategies for screening, local tacit knowledge of where they might access the target population, and explicit evaluative evidence of past recruitment efforts on which to base their present campaign. This exemplar demonstrates how provincial health initiatives can make use of CoP to tailor specific services to a particular region and to ensure that local needs are met.

To further illustrate how a CoP could be useful, one group discussed a problem of how to determine where newly hired people with varied backgrounds were on the learning path. In this situation, the CoP was the public health team that was comprised of new staff, staff mentors, a manager, a supervisor, teammates, team leaders, and supporting public health staff external to the team. There was no explicit orientation program or rubric to communicate what the core competencies were for newly hired professional staff, or to inform them about the expertise that existed within the team. This made it difficult for newly hired individuals to determine who to approach for knowledge about a program, and for the

CoP to identify which newly hired people needed additional training. High turnover reduced organizational knowledge, making it doubly difficult for new hires to know who to go to for information. The group thought that establishing peer mentoring would be a good way to share practice expertise. The creation of a peer CoP would enable the identification of expert people within the team who could act as role models, allow new hires to feel supported while they gained knowledge, and validate that the new practitioner was gaining needed expertise in his or her position. We contend that this type of “occupational scaffolding,” as labeled by one of the participants, could also support staff while they challenged themselves to gain new skills.

One urban group expressed concern that although peer mentoring was currently happening in their public health unit, it was often an informal process. Practitioners mentored in their spare time, which meant that they did not receive any formal recognition for the amount of time they committed to helping others, and there was no way to track what knowledge the mentee gained.

Growing capacity to work with communities. One participant’s comment highlighted her group’s view that working with community partners enabled them to “know champions and experts in the community.” Additionally, sharing leadership with community members or peers helped foster a feeling of shared ownership, as articulated by one participant: “You can’t own health promotion.” The CoP allowed practitioners to feel their “passion.” It also exposed them to differing viewpoints that helped them work with and respect different people, and improved the flow of information between practitioners and community members.

Developing partnerships with communities enabled members to set mutual priorities and goals that led to increased community capacity, empowered community members who could take leadership on public health issues, and enhanced community ownership of public health programs. Practitioners were able to develop more accurate community profiles that helped identify where programs needed to be developed or improved. Partnerships with communities also enhanced practitioner skills in community evaluation and increased their awareness of resources in the community to support programs. Better community knowledge assisted practitioners in identifying areas where staff training was needed, and helped improve service delivery and cost effectiveness. Generally, participants cited “lack of understanding and respect” because of different philosophies of practice and/or lack of clarity of roles among community partners as important challenges.

Theme 3: Strategies to Enhance Use of Evidence in CoP

Participants were asked to identify strategies that would enhance access to and use of evidence in the CoP when it

engaged in collective problem solving around practice decisions. Once participants identified the strategies, they were asked to rank the top two strategies that they thought would best foster EIDM in their CoP. The top two strategies that emerged across the workshops were enhancing knowledge systems and professional skills, including access and appraisal of research and evidence-based sources, and increasing opportunities for peer networking and communication.

Enhancing knowledge systems and professional skills. Rural workshop participants said that accessing journals online was a very useful strategy. These participants also considered Web-based learning networks with other public health practitioners as important. Participants reported that lack of planning time and an inefficient computer network did pose challenges to knowledge access. They identified their practice consultants as ideal professionals for filtering information and for providing current and consistent information across health jurisdictions. The participants' rationale for drawing on consultants as knowledge brokers for the frontline practitioner was that consultants had a strong knowledge base, could provide direction, and could foster communication and linkages.

Participants in the urban workshop commented that they would like to have a "go-to person," such as a practice consultant/expert with the skills in research and evaluation who could find the evidence, teach them how to access and use evidence, and help implement and evaluate practice changes. Participants discussed the need for management to support this initiative and to allow them skill development time to build confidence and knowledge. Both the urban and rural groups reported that accessing journals online was a useful strategy, and suggested that a "one-stop approach" to the evidence would streamline the process, filter information, and provide current and consistent information across the public health units.

Increasing opportunities for peer networking and communication. The participants in the rural group strongly supported workshops on critical appraisal of evidence and clinical practice guidelines to foster EIDM among peer CoP. Participants noted that such workshops provided a venue for first-hand, consistent information sharing by researchers and experts, as well as opportunities to share and exchange ideas. These participants also highly valued contact with peer mentors and practice consultants. Although the distinction between mentors and consultants was not clear, a mentoring role seemed to apply very broadly to all staff, with mentoring being an informal process. Consultants exercised a formal role in the system while also performing a more informal mentoring role with staff. Both peer mentors and consultants appeared to serve as knowledge brokers who were important to staff, especially new staff, because they had a good knowledge

base that provided direction, were easily accessible, fostered future communication, and provided knowledge of the situation. Participants wanted additional opportunities to meet with peer groups, particularly nurses from their public health unit, other public health team members, and public health nurses from across their province. There was some interest in meeting with public health nurses from other Atlantic provinces.

Urban workshop participants noted that they wanted time to collaborate and build relationships. They also emphasized the need for allocated time to spend reflecting on and evaluating their practice with their peers. These participants looked to management leadership in creating an organizational culture that valued and supported the use of EIDM and CoP. Building relationships through collaboration was seen as a crucial strategy that played out in many different ways. Some participants discussed the notion of having "sharing days" that provided time and space to share ideas and experiences. There was consensus by one group of participants that there was a need to "prioritize contacting our peers and partners." Through collaboration, this allowed others to listen to and consider the "experiential wisdom" (i.e., tacit knowledge) of their colleagues. The urban participants thought that this could be achieved through different CoP, as well as through access to nurse specialists and educators.

Discussion

The primary goals of our consensus-building workshops were to explore first, how public health practitioners understood, defined, and used EIDM and CoP, and second, how CoP facilitated EIDM to enhance their practice. Participants explained that because of the nature of their public health work, the application of evidence spanned a variety of client circumstances and client/community capacity building, program and policy initiatives and evaluation, and professional development. Moreover, they described how the processes involved in using information were often complex. In addition, the nature of the work frequently meant CoP were interdisciplinary and often involved community leaders and representation from the general public.

Consistent with one model for EIDM in public health (DiCenso et al., 2005), the context included the nature of the presenting issue, client circumstances and collaborative nature of public health practice, practitioner experience and approach to public health decision making, and available public health resources, such as time available to gather information (either the time available before the information is needed, or the time that it takes to locate and apprise the evidence). New or novel situations that were described by the practitioners in this study provide good exemplars for examining the various information

needs of public health practitioners. These situations also highlight the complex, multidisciplinary, and often uncertain local context of EIDM in which public health practitioners make evidence-informed decisions (Ciliska et al., 2008), the indeterminate nature of clinical decision making, and the reason many sources of information are needed (Traynor, Boland, & Buus, 2010).

The practitioners in our study clearly recognized the importance of EIDM in public health, and their understanding included the integration of research evidence in their clinical decision making as well as consideration of other important dimensions such as tacit knowledge and public health resources. Although explicit knowledge emerged as a major source of knowledge, tacit knowledge was usually preferred and included client circumstances and preferences, peers, and personal experience. It might be as James et al. (2010) observed: when it comes to a particular knowledge application to a patient or situation, no one form of knowledge alone is sufficient. In this study, peer consultation and personal experience were preferred in time-limited situations and when complex information was needed immediately. These findings are consistent with the existing literature in which it has been concluded that the structure and nature of practice decision making and clinical expertise affect EIDM (Estabrooks, Chong et al., 2005; Spencely et al., 2008; Thompson et al., 2006). Kothari et al. (2010), in their study of how tacit knowledge was used to inform program initiatives in public health, concluded that tacit knowledge is embedded within various stages of program planning in public health, and is therefore an essential feature in evidence-informed public health decision making. These perspectives are in contrast to the narrow view of evidence-based health care that emphasizes explicit scientific research and devalues the interrelatedness of tacit and explicit knowledge and the power of the local practice context (Gabbay & le May, 2004).

Of particular note, practitioners in the rural workshop also called on their practice consultants who brought appraised knowledge as a first step in EIDM process. This expert consultation could be classified as explicit knowledge, yet the consultants also contributed tacit knowledge gained from years of experience in the local public health context. Their tacit knowledge helped to clarify and implement explicit knowledge in the local context (Kothari, Bickford, Edwards, Dobbins, & Meyer, 2011).

The participants recognized the significance of integrating tacit and explicit evidence in the EIDM process. There was often a reported blurring of tacit and explicit knowledge. For example, reliance on past personal or peer experience suggested tacit knowledge use. Of note, if that past experience was previously informed by organizational policies or procedures that, in turn, were originally informed by best available empirical evidence

when they were constructed, then there was an unintended blurring over time from explicit to tacit knowledge sources. The practice consultants were valued for their ability to integrate explicit and tacit knowledge in a timely way.

Various criteria to appraise evidence were used by the public health practitioners. However, trust in people with knowledge and experience, and their own personal knowledge and “gut feeling” emerged as the preferred appraisal strategies for most study participants. Eraut (2000) referred to Dreyfus’ 1986 Skill Acquisition Model to explain that as individuals progress through the stages of professional development from novice to expert, they replace deliberate forms of cognition with intuitive forms of knowing. Moreover, experts demonstrate intuitive decision making in which they tend to rely less on rules or guidelines and more on their own intuitive understanding of situations, based on tacit understanding, tacit procedures, and tacit rules. Indeed, “gut feeling” or intuition was identified as an important evidence-appraisal strategy for several of the public health practitioners in our study. Stolper et al. (2010) examined the role of “gut feeling” in diagnostic reasoning among general practitioners, and demonstrated how this phenomenon helped these practitioners realize that something was wrong and feel comfortable with how they were proceeding.

Those participants in the urban setting and new public health practitioners who did not have ready access to an expert or consultant emphasized the need for such assistance. They indicated that the consultant played an important role because he or she was someone who could be trusted to provide the most recent and relevant research evidence when it was needed, to help in appraising the evidence, and to assist with implementing and evaluating practice changes. Practitioners who did have access confirmed the value of this available expertise. According to Naylor (2003), optimal business processes and knowledge systems include a central resource for knowledge translation and EIDM, which includes identification of research needs. The use of a facilitator or knowledge broker within an organization whose responsibility is to build bridges between evidence and service providers is acknowledged as a popular strategy to increase knowledge sharing and EIDM (Dobbins et al., 2009; Tsui, 2006). Dobbins and colleagues (2009), in their randomized clinical trial of the introduction of a knowledge broker intervention in Canadian public health departments, concluded that the knowledge broker role has significant promise; yet they acknowledged that more research is needed to move forward with the role.

Participants in both workshops reported similar challenges related to information and knowledge systems, as well as client access to resources and readiness for change. Similarly, having the time and skills to critically

appraise evidence also posed a challenge for many participants. This was a more significant concern for participants in the urban workshop and new public health practitioners with less than 1 year of experience. These participants did not have practice consultants, or often the necessary skills themselves to assist them with critically appraising the evidence, nor confidence in their decisions. EIDM was more likely when intrapersonal knowledge and skills (i.e., critical appraisal skills, awareness of research resources, and perceived authority to make change happen) were present (DiCenso et al., 2005; Dobbins et al., 2002).

The public health practitioners engaged in a range of formal and informal CoP with peers, management, members of the broader public health system, and community partners. Both explicit and tacit knowledge acquisition and use were enhanced by CoP. Face-to-face, informal peer interactions were the favored form of CoP in support of EIDM, which participants said assisted them to develop a sense of trust, to build relationships and a sense of belonging and support, to increase knowledge and skills through sharing experiences, to build professional confidence, to generate a spirit of inquiry, to increase their skill in working with communities, and to support their evidence-informed public health practice.

Our findings are of significance in that they elucidate some of the core concepts of CoP in public health practice and add to the growing body of research that demonstrates that CoP, through their social learning process with trusted human sources, improve the integration of tacit and explicit knowledge in clinical decision making (Dobbins et al., 2002; Gabbay & le May, 2004; Li et al., 2009; Spenceley et al., 2008). In a recent systematic literature review related to concept analysis of CoP and identification of characteristics of CoP groups, Li et al. found that CoP in both business and health care sectors encompass social interaction, be it formal or informal, in person or virtual; knowledge sharing; knowledge creation; and identity building. The public health practitioners in the present study described all four components. The importance of these findings is that the components can be fostered to further strengthen a CoP, or used as strategies in creating a CoP to address a new challenge.

Not surprisingly, CoP engagement was especially important to newly hired public health professionals. Several researchers have examined the role of CoP in the capacity as formal apprenticeship structures with student nurses to acquire knowledge, skills, and professional identities (Cope, Cuthbertson, & Stoddard, 2000; Lindsay, 2000; Spouse, 1998). Plack (2003) observed that novice physical therapy clinicians' transition from an academic setting to a clinical setting relied on engaging and talking to experienced clinicians to help form a professional identity. Our findings would suggest that the same is true of newly hired public health care professionals, except in

situations in which they had little time to seek out public health mentors or consultants—if they existed in their work environment.

Many models and frameworks exist to explain EIDM and the knowledge-to-action process. Our findings on how CoP function to enhance EIDM of public health practitioners in their practice context can be conceptualized within two knowledge-to-action frameworks: promoting action on research implementation in health services (Kitson, Harvey, & McCormack, 1998; Kitson et al., 2008) and the Dobbins et al. (2002) and Dobbins, Ciliska, Estabrooks, and Hayward (2005) framework for the organizational adoption of EIDM. Kitson et al. explained the dynamic interplay and interdependence of evidence (research, clinical experience, and patient experience), context (environment or setting in which the proposed change will occur, culture, leadership, and evaluation), and facilitation (purpose, role, skills, and attributes) in the implementation of evidence into practice. In the Kitson framework (Kitson et al., 2008), CoP could be a key strategy in facilitating the uptake of evidence in a complex and often uncertain public health context. The importance of context in determining the use of research evidence is highlighted in the Kitson framework and has been supported by other investigators (Davis & Taylor-Vaisey, 1997; Dopson & Fitzgerald, 2005; Fink, Thompson, & Bonnes, 2005).

The Dobbins et al. (2002) framework is based on a social ecological perspective, a broad definition of EIDM (DiCenso et al., 2005), and the five stages of Rogers' (1995) Diffusion of Innovation Theory (knowledge, persuasion, decision, implementation, and confirmation) to understand and explain the adoption of research evidence by health professionals. The framework illustrates the complex interrelationship among multiple factors and levels across the five stages that affect clinical decision making. In the Dobbins et al. framework (2002), CoP could play a role across the five stages of public health practitioner decision making.

All participants in the study recognized the value of and need for CoP to improve their evidence-informed practice and ultimately client health outcomes. Despite this recognition, they identified several barriers to engage in CoP, including lack of time built into their daily schedules for CoP and learning related to research (evidence appraisal and evaluation), as well as how to effectively employ some promising or desired EIDM strategies. Organizational attributes similar to those identified by the participants have been described as important in making EIDM a reality for public health practice (Ciliska et al., 1999; DiCenso et al., 2005; Meagher-Stewart et al., 2010). Indeed, researchers in Canada have consistently concluded that public health professionals' participation and effectiveness in addressing health outcomes and healthy public policy are strongly affected by organizational opportunities, support, and resources within their public health work settings (Krueger

et al., 2002; Meagher-Stewart et al., 2004; Meagher-Stewart et al., 2010). Moreover, Thompson et al. (2006) reported that practitioners will choose tacit or explicit evidence based on the decision complexity (i.e., time-limited decision making, multiple and diverse decision goals, and conflicting decision elements). Tsui (2006) emphasized that multiple strategies are necessary to increase knowledge sharing, which requires a significant investment of resources and available time.

The public health practitioners in this study identified various organizational attributes that need to be in place to enable EIDM. These attributes included professional development opportunities related to EIDM and CoP, time to reflect, time and opportunity to interact and share with peers, availability of organizational support and experts when needed (Web-based learning networks, literature resources, and practice consultants), and strong management leadership that fosters an organizational culture that values CoP and EIDM.

In EIDM, if evidence is to be appraised, it must first be made accessible. In this study it was clear that readily available and easily accessible evidence was important for participants. A growing effort is being made to make research evidence more accessible to public health decision making (Ciliska, 2006; Ciliska et al., 2008). Some key resources exist in the Canadian public health field. Three of these resources are located at McMaster University in Hamilton, Ontario, Canada. First, the National Collaborating Centre for Methods and Tools in Public Health has a compendium of critical appraisal tools for public health practice (Ciliska et al., 2008). Second, the *health-evidence.ca* database includes knowledge-translation strategies that comprise knowledge brokers who work with public health decision makers to incorporate research evidence into public health decision making. Third, the Effective Public Health Project presents systematic reviews and targets dissemination strategies for public health nurses (Thomas, Ciliska, Dobbins, & Micucci, 2004).

Clinical practice guidelines to enhance EIDM and CoP, as suggested by the participants in this study, appear to be one of the most promising and readily accessible tools for increasing access to research evidence and improving the quality of health care (Grol, 2001). The application of clinical guidelines is a good example of how explicit and tacit knowledge can be integrated to improve EIDM. Clearly worded clinical guidelines that are based on research evidence, are compatible with clinician values, and require minimal changes to existing routines are reported to achieve higher levels of adoption (Foy et al., 2002; Grol et al., 1998; Grol & Grimshaw, 2003).

Although we included strategies to enhance the credibility and confirmability of our qualitative descriptive approach (member checking, documentation of decisions and actions), there were limitations in this exploratory project. We did not audiotape the group sessions, and we

recorded in writing only the participant exchange used to reach consensus and the final consensus statements. Our findings are context-dependent based on our sampling of rural and urban practice settings in the Atlantic provinces, and might not have meaning and relevance to practitioners in other locations. For example, practitioners in settings that are actively conducting research might have more trust in the research evidence, and rely less heavily on tacit knowledge.

In conclusion, despite the aforementioned limitations, our consensus-building workshops generated meaningful collective knowledge of public health practitioners' practice-based understanding of EIDM and CoP, and how CoP act as facilitators to increase evidence-informed public health practice. The study results provide important insights into the role of tacit knowledge and the contribution of CoP to the integration of tacit and explicit knowledge in public health decision making. Moreover, these findings highlight the value of additional strategies to enhance EIDM, such as the availability of practice consultants and their roles as members of CoP, the professional development for public health practitioners to access and appraise evidentiary sources, and the need for more peer networking and communication in the public health setting. Although the workshops generated meaningful collective knowledge on EIDM and CoP, the exercise reinforced the significance of future research using a knowledge-to-action framework to provide detailed descriptions and interpretation of the complex public health practice context, and a greater understanding of the dynamic interplay between tacit and explicit knowledge in EIDM in public health and particularly the role of CoP in this process. The ultimate intent of this research knowledge is to contribute to regional, national, and international efforts to more fully integrate explicit and tacit evidence into the everyday decision-making process of public health practitioners.

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