

Development of Communities of Practice to Facilitate Quality Improvement Initiatives in Surgical Oncology

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Abstract

Background

The process of developing clinical guidelines and standards for cancer treatment and screening is well established in the Ontario healthcare system; however, the dissemination and implementation of such guidelines and standards is a more recent undertaking. Traditional implementation strategies to improve surgical practice and the delivery of cancer care have not been consistently effective. There is a recognised need to develop integrated models that offer direct support for implementation strategies. Such a model should be feasible, adaptable, and open to evaluation across diverse surgical settings.

Discussion

Research suggests that successful implementation should consider tools and expertise from other disciplines. This paper considers a Community of Practice (CoP) model to provide a supportive infrastructure for quality improvements in cancer surgery. The CoP model was adapted for cancer surgeons. It is supported by five enablers referred to as tools: communication system, project development support, access to data, access to evidence review, and accreditation with Continued Medical Education (CME) and Continued Professional Development (CPD). These tools need to be part of an infrastructure that is both provided and supported by a team of administrators

and health care professionals who have active roles and responsibilities. Therefore, the primary objective of this paper is to describe our CoP model in cancer surgery including the key success factors necessary for providing the infrastructure and tools. The secondary objective is to offer the integrated CoP model as a basis for future research and the evaluation of various collaborative improvement projects.

Summary

Building on Knowledge Management concepts, we identified the four essential processes that should be targeted by implementation strategies. A common CoP evaluation framework uses the outcomes of four knowledge conversion modes - organizational memory, social capital, innovation, and knowledge transfer - as proxies for actual provider and organizational behaviour. Insights from different collaborative improvement projects described in a consistent way could inform future research and assist in the collation of systematic reviews on this topic.

Background

The rate of cancer incidence in Ontario, fuelled by population growth and aging, is projected to grow from 60,000 cases to 83,000 cases in 2015 [1]. Increasing cancer incidence rates have serious implications for cancer care delivery and patient access. Improving the appropriateness and accessibility of cancer has become a priority on the agenda of the provincial government. Although Cancer Care Ontario has a well established track record for its development of clinical guidelines and standards for cancer treatment and screening, the implementation of the guidelines and standards is a more recent undertaking [2]. The Surgical Oncology Program (SOP) at Cancer Care Ontario (CCO) was formed to take a leadership role in monitoring, assessing, and improving the delivery of cancer surgery services in the Province of Ontario.

The program engaged a broad range of stakeholders with administrative, clinical, and research perspectives to develop a systematic implementation plan. The review process helped to identify implementation challenges and strategies to address them.

Global challenges included the development of quality standards to ensure that patients have access to appropriate care, improving access to information and coordination of care across settings and services, building effective multidisciplinary teams, and using performance measures for accountability and decision making [3].

Surgery-specific challenges, essential for improving the delivery of quality cancer surgery, included both systemic and cultural barriers. Systemic barriers included the independent contractor status of surgeons, fee-for-service reimbursement, poor or limited quality assurance, and a lack of infrastructure support [3, 4, 5]. Cultural barriers included negative attitudes towards guidelines and standards perceived as a loss of professional authority, a fast-paced individualistic decision-making style centred on individual patients, and the perception that the engagement in improving patient care at the organizational level dissipates one's primary focus on individual patient care [6, 7]. A focus on practice, the pursuit of practical improvements, and integrating what is already known into practice instead of discovering new knowledge has been identified as immediate challenges [8]. In order to address these, surgeons

should develop critical appraisal skills and assume active roles in the administrative decisions that affect the care they provide [9, 10].

Additionally, there are some challenges related to the existence of different subgroups of surgeons that have different problems and needs for improvement. Cancer surgery is dispersed across the province, offered in both academic and community hospitals, and is provided by general, specialty, and oncology surgeons. A large majority of cancer surgery is conducted in a general surgical environment, which varies from a single subspecialty in large centres to broad-based practice in small communities. Differences between subgroups targeted by provincial quality standards influence the actual implementation and require tailored implementation approaches.

In order to deal with the complexities of implementation at the provincial scale in a standardized way, the organization (SOP) needed an implementation model that was flexible, adaptable, manageable, and open to evaluation. We needed a model that could be applied to multiple settings, disciplines, and quality issues in a systematic way.

Traditional strategies to improve professional practice and the delivery of health services have not been consistently effective [11]. The evidence for successful implementation strategies is poorly described in academic literature and does not allow generalizations [13]. Grol and Grimshaw (2003) identified a number of the most promising implementation strategies in medicine. These strategies include clearance of evidence (local consensus, feedback on performance, both personal and group learning plans, etc.), blending professional development in the daily work of the clinical units, and linking physician problem-solving abilities with the organization of care processes and the political environment [12]. However, successful implementation requires an objective assessment of specific practitioner needs and flexibility in the choice of interventions [14]. Application of theoretical concepts from other disciplines is needed to better understand the behaviour and social context that facilitates successful implementation [15].

The SOP review process suggested that developing an implementation strategy that combines traditional health care improvement approaches with social science models that offer direct support for implementation interventions could be both measurable and effective.

The systematic quality improvement plan was developed and included financial incentives, approaches for performance measurement, research projects relating to cancer surgery, strategies for improved communication, and continuing professional development.

To improve communication and continuing professional development, the SOP considered developing professional networks to engage surgeons in Knowledge Transfer activities. The SOP strategic retreat in 2003 endorsed the Community of Practice model as a promising means to facilitate quality improvements in cancer surgery [3].

To date, no published studies have attempted to describe a conceptual framework that integrates social science concepts with implementation strategies to improve cancer

surgery. Therefore, the activities and structures to develop CoPs in diverse cancer surgery settings needed to be described. Importantly, we needed to identify the key success factors, infrastructures, and tools required to successfully implement knowledge transfer and implementation strategies through the CoP framework.

The primary objective of this paper is to describe our CoP model in cancer surgery including the key elements of supportive infrastructure and tools. The secondary objective is to offer the Integrated CoP Knowledge Spiral model as a basis for future research and evaluation of CoPs.

In the following sections, we briefly outline how Etienne Wenger and other social scientists describe Communities of Practice. We hypothesize that the Community of Practice domains can be adapted to facilitate quality improvements in cancer surgery. By modelling the implementation process in three different CoP groups, we identify the common elements of the enabling CoP infrastructure and tools. Finally, to inform future research and discussion, we outline an evaluation process for the CoP model that we believe could allow for comparisons between different implementation strategies and results.

Discussion

Knowledge Management Concepts

The administrative utilisation of the concept of Communities of Practice has spread widely across various businesses as a strategy to engage staff in organizational performance improvement. In “knowledge intensive organizations,” CoPs are accountable for sharing “tacit” knowledge that is informal and therefore hard to document [16]. Supporting CoPs include strategically engaging professionals in the process of defining organizational priorities, setting an infrastructure for activities such as work-based projects teams, communication, information exchange, and continuous feedback. Some of the world’s largest companies have embraced this concept as an opportunity to build the professional capabilities of their operational core in order to achieve a competitive advantage. Examples of these companies are BP Amoco, Royal Dutch Shell, World Bank, Xerox, IBM, and British Telecom [17].

The notion of a “learning organization” introduced by Senge (1990) further sets the stage for CoPs in the private sector. CoPs are viewed as a social structure that supports the five key components of the “learning organization”: promoting individual competence, encouraging a culture of systems thinking, developing cohesive vision, supporting team learning, and integrating different perspectives [18]. These five components formed the base for various definitions of barriers and facilitators of CoP. Key facilitators include accessibility and information sharing, networking, individual commitment, a shared understanding of common practice problems, the essential role of leadership, a range of perspectives, and inter-professional learning [19,20,21,22]. Barriers are described as the presence of professional boundaries, the lack of champions, tools, and skills, in addition to the absence of systems thinking and teamwork [23, 24, 25, 26].

The business focus on the acquisition of tacit knowledge held by employees was broadened by E. Wenger who took the knowledge management from the hands of the organization and handed it to Communities of Practice (CoP) concept. He described CoPs as ‘groups of people who share a concern, a set of problems, or a passion for a topic, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis.’ Wenger argued that knowledge management is a property of communities of practice and the organization’s role is to support them with tools, resources, and legitimization [27].

The choice of CoP as a natural forum for knowledge transfer is supported by Nonaka’s (1994) theory of dynamic organizational knowledge creation that transformed a static “community of learners” into a dynamic “community of social interactions” [19]. According to this theory, the ‘tacit to explicit’ knowledge acquisition task is only one of the four modes in the ‘knowledge spiral’ process [19, 20]. The other three include ‘explicit to tacit,’ ‘tacit to tacit,’ and ‘explicit to explicit’. Based on our understanding of CoP concepts, we could categorize the outcomes of Nonaka’s four key knowledge conversion processes as (i) organisational learning; (ii) knowledge transfer; (iii) knowledge socialisation; and (iv) innovation and knowledge generation..

An Integrated CoP Knowledge Spiral Model

Instead of reinventing the knowledge transfer process in health care, our model integrates three well established concepts: (i) a business Community of Practice model (focused on Organizational Memory, Innovation, and Social Capital); (ii) traditional health care improvement methodology (multidisciplinary consultations, opinion leaders, benchmarking, and pathways); and (iii) Nonaka’s dynamic organizational knowledge generation process. We then conceptualised the four essential processes of the knowledge spiral within CoP context as:

- Knowledge generation (creating new evidence and **Innovations**);
- **Knowledge Transfer** to disseminate evidence based practice;
- Knowledge socialization (creating **Social Capital** through a culture of knowledge sharing and collaboration); and
- Knowledge acquisition (building **Organizational Memory** through knowledge directories, mentorship, and leadership)

The essential components of the clinical culture that encompass learning and problem solving serve as a catalyst for our Integrated CoP Knowledge Spiral Model. See Figure 1 below.

This model identifies the four essential processes that should be targeted by implementation interventions in health care:

Explicit to Explicit – generation of new evidence (systematic reviews, performance data, guidelines)

Explicit to Tacit - evidence dissemination (reminders, opinion leaders)

Tacit to Tacit – process mapping, site visits, mentorship

Tacit to Explicit – multidisciplinary teams, development of pathways and local protocols.

Since these four processes are universal across all settings and cultures, the model allows for the development of a global evaluation framework that could be applied at both levels: the practitioner and the organization levels. The common outcome measures of the four knowledge conversion modes could assist in the collation of results from different collaborative improvement projects to inform research on CoP.

Applying a CoP Model in Cancer Surgery

We have tested the integrated CoP knowledge spiral model on a case-by-case basis against what actually happens in three subgroups of surgeons targeted by provincial quality standards:

1. Discipline-specific: Ovarian Cancer CoP focused on gaps in process
2. Region-specific: Champlain CoP focused on gaps in process and evidence
3. Problem-specific: CoP focused on gaps in practice and technical skills
(Introduction of a laparoscopic colon cancer guideline within Ontario)

Each CoP project has goals around improving a particular practice within a context of specific cancer surgery setting. The number of participants involved in each individual project ranges widely – from 20 to 600. As well, their specific needs vary across different quality problems, subspecialties, and settings. The applied CoP model is flexible, dynamic, and creative enough to allow multifaceted strategies tailored to meet the specific needs of each group. (See Tables 1, 2, 3 for the detailed description). The application of our integrated CoP model helped us to define the common determinants of success and the required infrastructure support.

Despite variations in the attributes of quality problems, organizations, and community members, the four common “knowledge spiral” processes emerge across all settings. These processes could be described as a set of logical steps:
Problem Identified > Gap Analysis (Data on evidence gaps, practice gaps, process gaps)> Communication (Iterative feedback of data) > Professional Development>Multidisciplinary Projects> Evidence adaptation and Development of new practice, process, evidence. See Figure 2 below.

CoPs are established around practice and in our case, around the quality of practice. Practitioners come together around common practice problems (technical gaps, process gaps, and evidence gaps). A synergy with an organizational commitment to improve quality presents a unique opportunity to systematically leverage the capabilities of the practitioners to solve the priority issues within the organization. The starting point here is a practitioner-informed identification of a practice problem or issue aligned with the organizational agenda (explicit-explicit). This is a key step. Then benchmarking **data** feedback stimulates a gaps and barriers analysis that allows participants to link variations in outcomes to differences in processes (explicit-tacit). Effective **communication** serves as a driving force for interprofessional socialisation (tacit-tacit). Lastly, the need for practitioners to foster **continuous learning and**

professional development determines their engagement and contribution to improvements in the organization of care (tacit-explicit).

The common mediators of this Integrated CoP Knowledge Spiral helped us to identify the key facilitation support tools: Access to Data, Communication, Accreditation for CPD and CME, Project Management, and Access to Evidence Review. (Figure 3)

CoP Tools

Facilitating a knowledge-based CoP in health care requires more structure than that identified in the business literature that explores Knowledge Management. The aforementioned “knowledge spiral” process requires active engagement of management expertise and executive sponsor to provide a supportive infrastructure, which includes: an adequate communication system, access to performance data, access to evidence, accreditation for group learning activities with CME and CPD programs, and project development support. We have included a description of these five key tools in the sections below.

CoP Tools: Communication System

A communication system (face-to-face meetings, tele- and video-conferences and online discussions) allows CoP members to meet, share, and learn from one another. In our experience, a successful CoP requires at least one face-to-face meeting per year, one-to-three Journal Clubs or similar events, a regularly disseminated newsletter, and an on-line discussion space (i.e., case-based, shared problem-based, shared documents-based) to activate communication within the group and to facilitate the formation of project teams. As CoP project teams mature, their communication becomes more frequent (weekly or monthly).

CoP Tools: Access to Data

During our interviews with participants and stakeholders, it was expressed that data is a strong driver for participation and change in practice. The majority of CoP respondents in each surveyed group agreed that the disclosure of performance levels is an important tool for facilitating CoP. Access to data is facilitated in various forms: administrative data review, analysis of gaps between group and individual performance and provincial benchmarks, presenting research findings, and regular feedback on progress in key target areas for improvement.

CoP Tools: Access to Evidence Review

The engagement of practitioners in a systematic review of evidence around the issue or gap identified is a key to providing a common ground for relationship and subsequent solution development. Access to evidence-based guidelines and standards is facilitated through a partnership with CCO’s Program in Evidence Based Care (PEBC). A CoP strives to facilitate a two-way linkage to disseminate information on the developed guidelines and to identify new areas for guidelines and standards development. Clearance of evidence in the CoP environment is facilitated through

small multidisciplinary and interactive group discussions. In the feedback forms utilised throughout CoP activities, 60% of the respondents stated that they plan to change their practice based on the information discussed at the meetings.

CoP Tools: Accreditation for CME and CPD

Self-assessment and self-directed learning are fundamental activities of the medical profession. However, the effectiveness of self-assessment is limited. Studies suggest that internalisation of comparative feedback on performance could reduce the variations between self- and external assessments [28]. CoP group practice reviews and specific practice improvement projects could assist practitioners in identifying areas of potential improvement. By integrating implementation activities in the formal CPD and CME programs, our model provides additional relevance and incentives for practitioners to engage in organizational improvement initiatives.

A formal relationship with the Centre for Learning in Practice (CLIP) at the Royal College of Physicians and Surgeons Canada (RCPSC) has helped us to create opportunities for CoP members to capture Maintenance of Certification (MOC) credits through their project interactions and informal group learning activities. For example, members of the CoP project team can collect a number of MOC credits under different sections corresponding to different types of learning that occur in CoP activities such as personal learning projects, group practice reviews and self-assessments, multidisciplinary case consultations, etc. That structured process allows us to track the linkages between individual and group learning across the entire integrated CoP knowledge spiral process.

CoP Tools: Project Management Support

CoP facilitators provide project management support to project leaders within each CoP. A resource manual for CoP facilitators was developed and includes workshop templates, project reporting, surveys, evaluation tools, and MOC accredited forms. This tool kit could assist project teams with planning, implementing, and evaluating their projects. The role of CoP facilitators is not to manage COP projects directly but to help the community leaders organize and manage their projects. Some examples of the supports provided by facilitators include: assistance in preparing a funding proposal that helped the regional CoP project secure additional funding, assistance in conducting a survey of referring physicians in the Northern region, and support for the development of a mentorship project for laparoscopic surgery for colon cancer patients.

Functions of CoP Facilitators

There are four functions of CoP facilitators that foster practitioner collaboration by sharing successes, interests, and projects with the organization and with each other. These functions are:

- To facilitate linkages and help align projects with executive sponsor objectives

- To collect and organize relevant information in a Knowledge Directory. This includes activity level and area of expertise, projects, and special interests (Warehouse function - a collective resource for future and ongoing initiatives)
- To recognize and celebrate the successes of surgeons across the province by sharing these successes within the surgical community and in the broader health system (Cheerleading function – promotion of the process)
- To connect surgeons with similar projects and research interests and to offer them templates and guidance (Clearing-house function – development of a critical synergy between research and practice)

The implementation challenges described in the background section and the CoP solutions in terms of leadership, facilitators, methodological expertise, and operational support are summarized in the Table 4.

Practical Steps to Set up CoP

Based on our observations of what worked and what didn't in the clinical application of KM concepts, we describe the process for developing and sustaining the clinical CoPs in a sequence of critical steps (See Table 5 below).

Implications for Research

The implementation challenge in healthcare is that researchers who have a 'rational' approach to knowledge management in medicine lack the understanding of what deters successful implementation strategies, while the researchers with the 'participatory' approach lack the understanding for change management, multidisciplinary health professionals, and varied health settings.

If, as both approaches suggest, the evidence-based implementation strategies in medicine could benefit from the application of theoretical concepts from other disciplines, there would appear to be a case for considering the business CoP model. First, the dynamic "knowledge spiral" that CoPs foster is common across all cultures and settings. Second, the infrastructural support for CoP could be defined, analyzed, and planned.

A global CoP model could be potentially useful for documenting a common implementation process and its determinants in different improvement projects. Such operational insights can inform an objective analysis of variations in effectiveness of different implementation strategies.

The following surrogate outcomes of the four stages of the implementation process could be used as a framework to evaluate actual change in practitioner and organizational behaviour:

Explicit to Explicit – Innovation

Explicit to Tacit - Knowledge transfer

Tacit to Tacit – Social Capital

Tacit to Explicit – Organizational Memory

To assess the interventions targeting the process of Knowledge Socialisation and creating the Social Capital, we draw on information from our evaluation tools (a meeting tracking tool, webmetrics, and an annual survey), which capture (i) attributes of successful teams and site-based activities; (ii) the behaviors and optimal mix of social influence elements (opinion leaders, existing professional networks, and multidisciplinary teams); and (iii) respondent perceptions of changes in culture during collaboration within and between disciplines.

To develop insights into situational factors that facilitate or impede the knowledge translation process, we review the changes in clinical outcomes and care processes that correlate to CoP activities (comparable institutional data) and attributes of evidence, organizations, and clinical teams associated with greater success.

To assess the organizational learning outcomes (Organizational Memory), an annual CCO survey [29] and the post-event feedback forms capture (i) respondents' satisfaction with clinical leadership and information sharing; (ii) accessibility of experts and mentors; (iii) the impact on recruitment and retention of clinical leadership; and (iv) documentation of agreed upon operating procedures (e.g. pathways). A meeting tracking tool captures the optimal mix of participants and activities, the number of hours invested in CoP activities, and the number and types of the Maintenance of Certification (MOC) credits collected.

To determine the effectiveness of strategies that facilitate the generation of new evidence and innovations, we draw on information from the project documentation and interviews with key stakeholders on the various types of innovations produced by CoP projects that result in changes in care processes, new guidelines, and new organizational approaches.

We need to stress the range of perspectives (practitioners, organization, and research) that is needed to generate this evidence. To use a CoP model as an instrument to build evaluation capacity, the concept should be well understood. Additionally, there is a need to further analyze the insights of developing communities from the practitioner and organization perspectives, such as:

- Can the CoP be a platform for cultural change in moving individual decision making authority to the multidisciplinary team-based decision making?
- Are CoPs simply ad hoc task forces built around specific problems or are they evolving structures that can be sustained?
- Can we standardize what we choose to measure and use the same measure to compare CoP outcomes across all health care settings?
- Can the mutually reinforcing relationship of the sponsoring organization and the CoP be defined more clearly to understand the implications for both?
- What types of core implementation capacities could participants develop by engaging in CoP projects (leadership, systems thinking, research expertise)?
- Can the CoP model deliver through the process of knowledge translation in terms of measurable clinical outcomes?

Summary

Our paper highlights some of the tools and methods that stimulated discussions around implementation strategies in cancer surgery. We hope that the proposed surrogate of the CoP outcomes (social capital, organizational memory, knowledge translation process, and innovation) will help accelerate the generation of valid evidence from different implementation-related studies. We acknowledge that future research is needed to fully understand the behaviour and social phenomena observed in Communities of Practice.

Our success to date is an approval of the Communities of Practice model as a strategic investment for the organization (CCO) and acceptance from those participants who had positive experiences. The preliminary results demonstrate that physicians participating in CoP have the highest levels of satisfaction with clinical leadership and knowledge transfer. The Champlain region that piloted our CoP model stands out with the higher-than-average ratings of physician satisfaction and levels of compliance with clinical practice guidelines [29].

Though the impact on clinical outcomes is yet recognized and validated, we are encouraged by the synergy in the clinical setting that echoes the well documented outcomes of CoPs in the private sector, “Ultimately, we know of no company that generated significant momentum in profound change efforts without involving spirited, active, internal networks of practitioners, people sharing progress and helping one another” [18].

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

MFKF conceived of the study, designed the model and drafted the manuscript, EG participated in sequence alignment and helped to draft the manuscript, AA carried out the study and participated in acquisition, analysis and interpretation of data, KS participated in study design and coordination, RC has made substantial contributions to conception and design of the evaluation framework and has been involved in revising the manuscript, CC made substantial revisions to the manuscript and continues to work with the CoP concept on a daily basis. BL has been involved in revising the manuscript critically for important intellectual content and contributed to the design of the study, AS and HS have made substantial contributions to conception and design of the study. All authors read and approved the final manuscript.

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Figure Legends

Figure 1 Integrated CoP model

The figure displays four edges of a business CoP model in the form of a square that contains the problem-solving and learning attributes of the performance-driven medical culture. It is inserted below the bullets about organization memory, social capital, KT and innovation.

Figure 2 CoP Tools

The figure illustrates 5 key elements of CoP infrastructural supports provided by executive sponsor. It is inserted before the section describing the 'CoP Tools'.

Tables and Captions

Table 1 Discipline –specific Community of Practice

The table summarises a case study of facilitating a CoP in gynaecologic oncology. A table consists from seven rows: Background, Objectives, Participants, Methodology, Sponsor, Outcomes, Lessons Learnt.

Clinical Domain	gynaecology cancer surgery
Background	The community focuses their efforts on a few projects in quality improvement: establishing a provincial referral system, piloting a synoptic operative reporting (OR) system and developing a database for ovarian cancer patients.
Objectives	improving provincial coordination, education, and quality of care for patients with gynaecologic cancers in underserved areas of the province
Participants	20 academic surgeons from 5 teaching hospitals across the province work with community surgeons from regional community hospitals that don't have a trained gyne oncologist on staff
Methodology	All surgeons were invited to participate in CoP projects through the initial interview process, a QI workshop and a series of Newsletters. The community members are located in teaching hospitals in different regions of the province. They have worked to improve the coordination, education, and quality of care for patients with gynecologic cancers in underserved areas of the province. Members use a private space in the facilitated CoP website for their clinical discussions, event planning, priority setting, and a workspace for projects and a reference document repository.
Sponsor	CCO Surgical Oncology Program
Outcomes	Establishment of an outreach multidisciplinary cancer clinic in underserved regions Pilot of a standardized synoptic OR reporting note in 3 centres to demonstrate the feasibility of standardised data collection intended
Lessons Learned	The essential support elements include facilitating linkages with evidence-based review, communication support, and access to data. Complimentary types of leadership (Innovation Champion, Relational Leader, Task Leader and Opinion Leader) that are needed to sustain the CoP project at different stages of its cycle

Table 2 Regional Situation-based CoP

The table summarises a case study of facilitating a CoP in the Champlain district of the province of Ontario. A table consists from seven rows: Background, Objectives, Participants, Methodology, Sponsor, Outcomes, Lessons Learnt.

Clinical Domain	Regional high volume cancer surgery
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Background	locally identified need to bring together health care providers from the community and teaching hospitals to meet volume and quality requirements of funding for additional cancer surgery cases
Objectives	to identify and address priorities in improving the quality of cancer surgery in Eastern Ontario
Participants	All 8 hospitals in the region that provided cancer surgery participated voluntarily. Each hospital identified a quality improvement team. Members include general surgeons that perform cancer surgery and allied professionals (Diagnostic Imaging, systemic therapists and pathologists), as well as administrators associated with participating hospitals.
Methodology	A half-day quality improvement workshop, leadership training session, performance data communication to the community members via site visits, and Newsletters, assistance to the site leaders in organizing CoP project team meetings, Journal Clubs and videoconferencing of the regular multidisciplinary case consultations to all regional hospitals
Sponsor	CCO Surgical Oncology Program, Ministry of Health, Change Foundation
Outcomes	Establishment of the regional practice parameters in colorectal and breast surgical care based on clinical guidelines Redesigned care process to facilitate access to sentinel nodes biopsy for breast cancer patients from community hospitals Increase in surgical participation in multidisciplinary case consultations from 11% to 27% in one year Regional rating of four (on a scale 1 to 5) compared to the provincial average (three on a scale 1 to 5) in the physicians satisfaction with knowledge sharing and clinical leadership (CCO Survey mailed out in February 2006)
Lessons Learned	A multi-institution, regional model of continuous quality improvement of surgical care requires clinical leadership, institutional commitment, methodological expertise in conducting a current state analysis and facilitation resources at each participating hospital

Table 3 Shared Problem-based CoP

The table summarises a case study of facilitating a CoP in the colorectal cancer disease specific site. A table consists from seven rows: Background, Objectives, Participants, Methodology, Sponsor, Outcomes, Lessons Learnt.

Clinical Domain	Colorectal cancer surgery
Background	A province-wide Laparoscopic Colon mentorship network based on collaboration between the Surgical Oncology Program, Ontario Association of General Surgeons and individual surgical leaders, researchers and educators in the area of colon cancer surgery

Objectives	Dissemination and support to adhere to a provincial guideline on laparoscopic (LAP) surgery for cancer of colon
Participants	Academic and community surgeons (600 general surgeons are registered in the province) and other allied health care professionals
Methodology	According to a newly released provincial LAP guideline, a surgeon who wants to perform laparoscopic colon resection for cancer should have formal minimally invasive surgery training or experience with at least 20 cases with a mentoring surgeon. To facilitate the acquisition of cases, a Laparoscopic Colon Mentoring program is being implemented that will enable practicing surgeons to upgrade their skills to perform laparoscopic surgery for colorectal cancer
Sponsor	CCO Surgical Oncology Program, Ontario Association of General Surgeons
Outcomes	The mentoring project facilitates surgeons' ability to train and perform laparoscopic surgery for colorectal cancer and simultaneously develop a CoP within the provincial colorectal cancer surgical community. The surgeons are linked by an overall interest in lap colon surgery and quality in cancer surgery. This network will allow for the future introduction and evaluation of other new technologies and new quality topics in an accessible and manageable way.
Lessons Learned	<p>Surgeons require support to access to the tools that are needed for them to meet the guidelines.</p> <p>The leadership base for a CoP needs to be expanded to include a "second wave" of leaders/mentors to ensure that provincial buy-in takes place. Given that surgeons learn in their peer networks, a participants survey and network analysis were used to identify Opinion Leaders in each region who could mentor and facilitate learning.</p> <p>According to the needs assessment survey of a target group, the most significant return for involvement in a CoP has been in receiving access to reliable and accurate data.</p>

Table 4 Implementation Challenges and CoP Solutions

The table summarises implementation challenges described in the background section and the CoP solutions in terms of leadership, facilitators, methodological expertise and operational support

Tools	Challenges	CoP solutions
Executive sponsorship	Lack of coordination and communication Institutional barriers	CEO commitment to support, assignment of admin resources to the project
Project Leadership (surgeons)	Physicians resistance to administration-driven change Ignorance of practitioners' initiatives by administration Lack of methodological expertise and operational support	Physicians input into hospital management decision-making Supply of implementation tools/expertise
Communication	Communication breaks between	On-line discussion space at the

	individual surgeons/ hospitals/disciplines, conflicting goals (multiple QI projects at different hospitals) Poor transparency of decision- making	collaborative website Newsletter Videoconferencing of multidisciplinary case discussions
Data Feedback	Lack of reliable and trusted data Punitive nature of public release of performance data Inconsistent methods of data collection at different hospitals	Engaging of surgeons into data collection and analysis Defining project-specific measures of performance
Evidence Dissemination	Negative attitudes towards guidelines/pathways perceived as loss of professional authority Disengagement with the evidence review process lack of critical skills required to practice evidence-based medicine	Community engagement in discussions of evidence Distribution of CoP reminders – summary of the key points from the guidelines/standards discussed and developed by CoP members
Professional Development	Different learning style in surgery (master/apprentice model) Lack of linkages between informal learning by doing and formal CME	Access to subject matter experts/mentors, accreditation of CoP activities with CME and CPD

Table 5 How to get started with developing of CoP

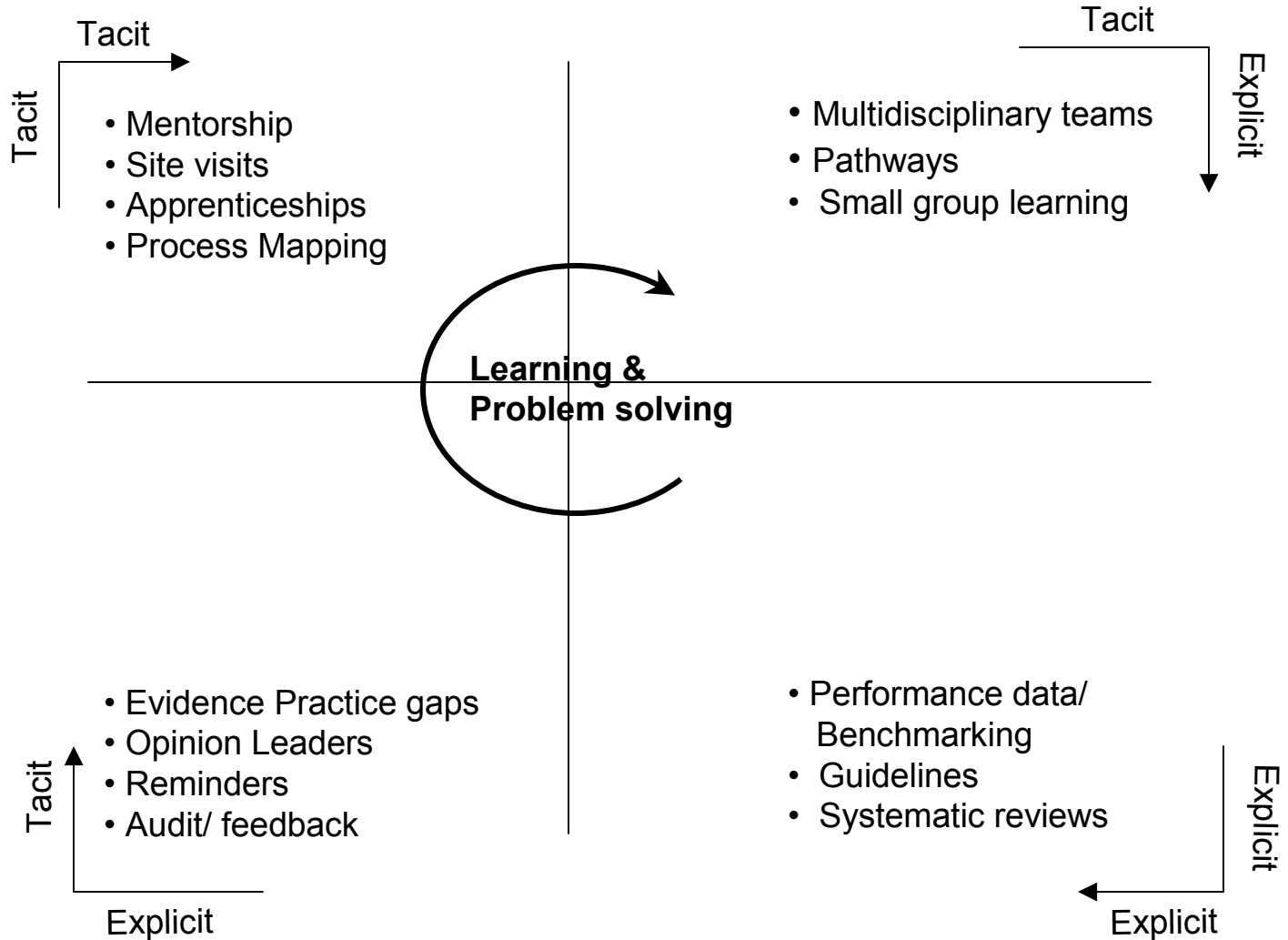
The table summarises a process of strategic engagement of key players for developing and sustaining the CoP as a sequence of critical steps.

Step One:	Find commonalities between the organizational strategic priorities and the practitioners' agenda
Step Two:	Create a case for engaging practitioners in the implementation of improvements as being of highest strategic importance
Step Three:	Secure Executive Sponsorship, Clinical Leadership and Infrastructure (Facilitators, methodological expertise and operational support)
Step Four:	Bring clinicians and administrators together around iterative comparative feedback on performance as part of their professional development and continuing learning
Step Five:	Focus and align practitioners' improvement projects with the organizational infrastructure and research expertise that supports dissemination and application of evidence

Figure 1. An Integrated CoP Knowledge Spiral Model

Social Capital

Organizational Memory



Knowledge Transfer

Innovation

Figure 2. Implementation process steps

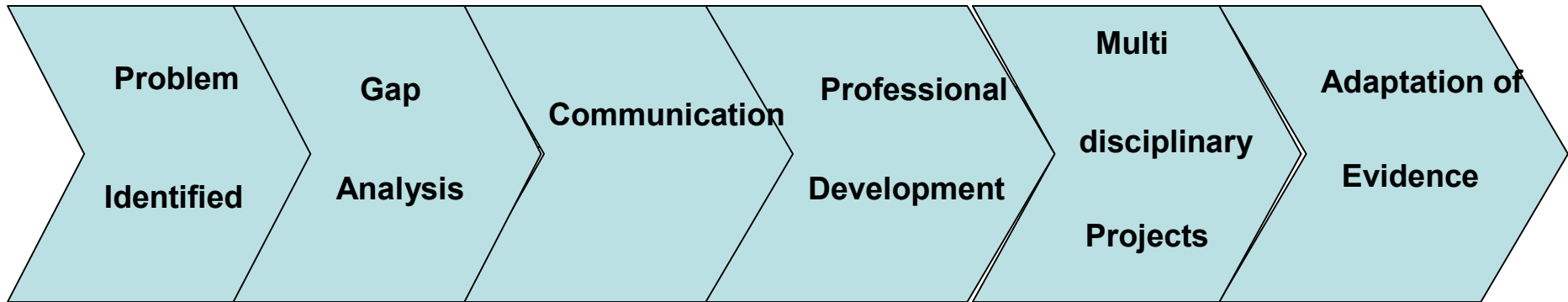
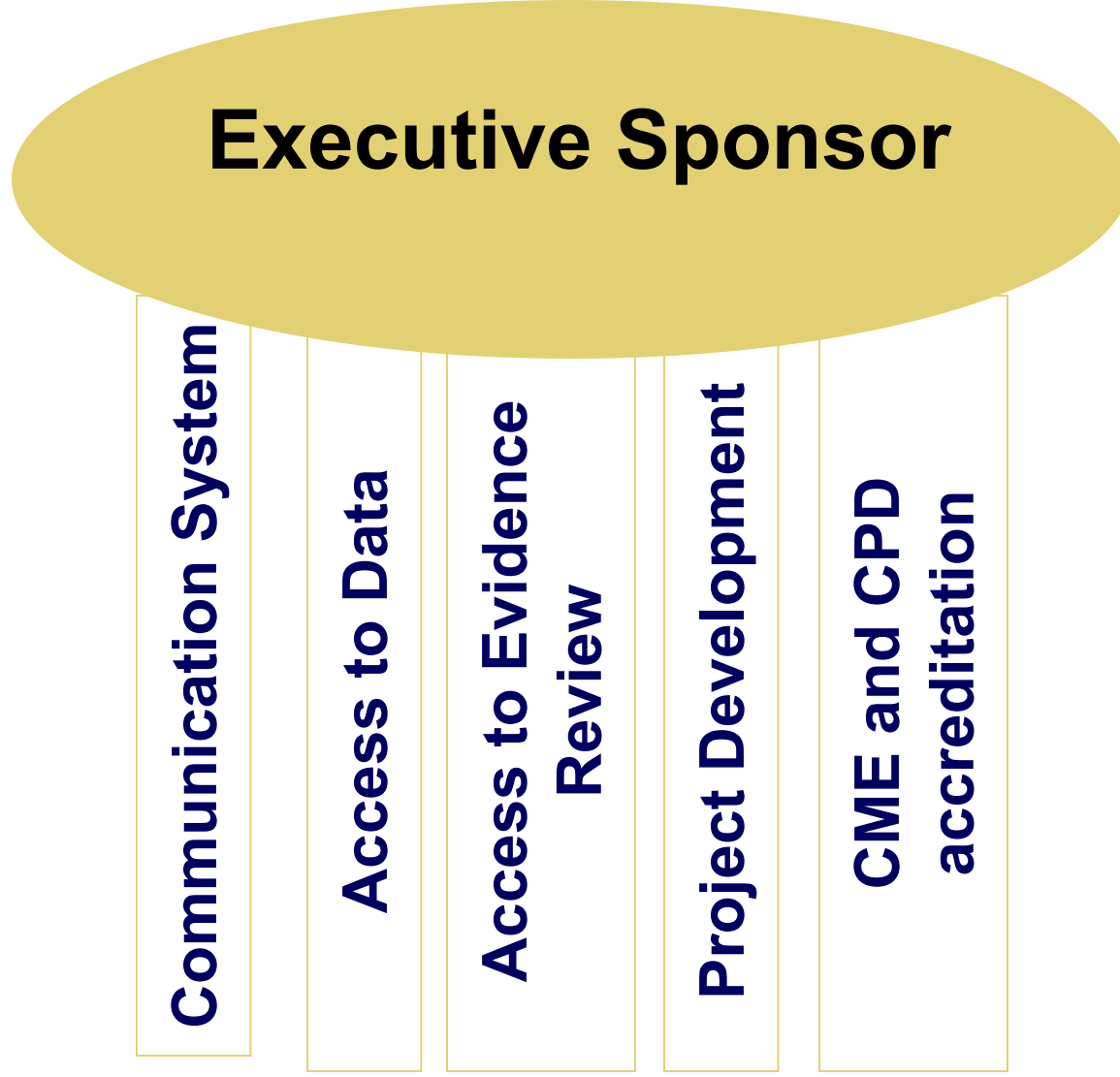


Figure 3. CoP tools



Additional files provided with this submission:

Additional file 1: tables.doc, 55K

<http://www.implementationscience.com/imedia/8227447413383518/supp1.doc>