The Knowledge Audit as a Launch Pad for Knowledge Management in Hospitals: A Case Report from Sunnybrook and Women's Health Sciences Centre

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INTRODUCTION

A recent issue of *HealthcarePapers* addressed the topic of evidence-based healthcare, or more specifically, its implementation in organizational practice. The lead article by Browman, Snider and Ellis (2003) identified a key gap that impeded the integration of clinical evidence in healthcare practice – specifically, the cultural "solitudes" inhabited by hospital managers, the keepers of the financial keys, and clinicians, the primary custodians of quality care. Other articles in the same issue suggested variations on the metaphor of negotiation and the practice of storytelling proposed to improve evidence uptake. Whatever the specific flavour of sharing adopted, contributors to the issue recognized a core problem in which knowledge management, in a general sense, has a central role. They recognized that innovation was required to resolve the problem. Though the possibilities of negotiation are in a sense unbounded, in essence what was proposed was a movement towards a culture that is more knowledge-friendly than that of the professionally siloed organizations common in healthcare delivery. In this paper, we argue that another important barrier to effective knowledge utilization must be addressed if real knowledge management is to be better, and more fully, implemented in healthcare delivery. This barrier is the failure to use evidence to target knowledge process interventions.

Knowledge Management

But first a word about knowledge management, or the capitalized Knowledge Management (KM) that became a buzzword in management circles in the 1990s and emerged as a hot topic in healthcare – predictably somewhat later, given healthcare's traditional and possibly necessary caution – at the beginning of the new millennium. By now, with major books on the topic by a number of authors, including Thomas Stewart, Nancy Dixon and Thomas Davenport, a KM consensus has emerged. Though there are a multitude of custom definitions of this broad concept, it is the common mainstream that we draw on for this paper. Thus, we understand KM as broad-based organizational programs, including tools, culture and technologies, for optimizing knowledge flows to ensure that staff members have access to the knowledge they need when they need it and in a usable form. KM addresses both explicit (captured) and implicit (tacit) knowledge using tools and techniques such as communities of practice, knowledge mapping, custom taxonomies, lessons-learned processes and local depositories, to prevent waste, facilitate exchange and maximize benefits. Basic to KM is the assumption that better knowledge flows improve organizational performance. If people know more and better, they make better decisions, and better decisions make for better outcomes.

Within this overall conceptual rationale for KM, our theoretical framework for analyzing knowledge flows is an ecological cycle: from knowledge creation through capture, organization and dissemination/sharing to application, retrieval and back again to generation, where a new cycle starts. Organizations may underperform at any point in the cycle and on any level, be it cultural, technological or structural. Much of the KM literature assumes

that most organizations are deficient throughout the knowledge cycle.

The literature implies or explicitly states that this is either because organizations ignore whole areas of important knowledge, particularly the tacit, or informal, or because they limit whatever knowledge they have by hoarding it. Our starting point, however, is that organizational specifics are key to effective remediation and that notwithstanding possible generic weaknesses, it is important to identify the key challenges for specific environments.

In contrast, it is also common for KM to be implemented as a generic application-based approach. "Content management" software is often promoted as a KM solution, courting the practical disappointments that have dogged many software packages in the past. But even when not technological in instrumentality, KM models, if not their concrete details, are those of the "off-the-shelf" software packages. For instance, KM tools and techniques such as communities of practice and others identified above are often applied in a heuristic way, in effect to see if they work. This is not much different from throwing things against a wall to see if they stick. Though this is never wholly unproductive, it is literally hit-and-miss. This in turn perpetuates an often-reported skepticism about, and poor performance of, KM initiatives that are not evidence-based (Davenport 1998).

KM and Healthcare

It is our contention that a culture of negotiation, cooperation and teamwork is by no means a given. Health delivery organizations, particularly larger hospitals, are diverse collections of subcultures under one roof. Specific groups may work well internally – for instance, specific clinical subgroups like emergency room teams are often miracles of collaborative human process and may even negotiate well with other teams, but they may still fail to build stable knowledge out of their experience unless they recognize this as a formal responsibility. Or, they may work well only up to the point where they have to connect with external groups. In fact, a culture of negotiation may work well, but is still not guaranteed to address all the relevant issues. A recent article in the *Harvard Business Review* (Ittner and Larcker 2003) has shown that many management interventions, such as the balanced scorecard, are poorly grounded in the organizations they are ostensibly designed to assist.

KM, while recognized as important to organizational performance, has been little formally applied in healthcare delivery organizations to date and, anecdotally at least, is commonly underperforming in sectors where it has been adopted. For instance, Health Canada's Knowledge Management Situational Analysis and Future Directions (2002) found a "very low profile of the KMIG (Knowledge Management Information Group) and the minimal number of resources allocated to their work" even though a formal KM strategy had been developed at Health Canada as far back as 1998. Such generally disappointing results have occurred despite the attention accorded to the concept at secondary and tertiary healthcare levels at the end of the 1990s (e.g., the Ontario Hospital Association's Knowledge Management Strategic Advisory Committee, established in 2000). This may be because the institutions that most need better KM are, almost by definition, poorly prepared to adopt it. A culturally polarized institution will find the transition to a culture of negotiation difficult. The recent example of a physician-order system (Davenport 2002) that evades much cultural resistance by silently "baking" warnings into an existing automation process is an example of where a knowledge problem – the failure of physicians to research and/or act on potentially harmful drug interactions – may be resolved, in a sense, by technological sleight of hand. We do not propose that culture and cultural change are unimportant to optimizing the use of knowledge, only that the relative weight of different knowledge process factors in different institutions is not a given.

To avoid the danger of misapplied energy, then, we suggest an important process reorientation before knowledge-related initiatives are implemented. Something like a legal discovery process is necessary. In the context of knowledge exchange and utilization, the concept we promote is that of the institutional knowledge audit. Below, we describe a recent knowledge audit – to our knowledge, one of the first, if not the first of its kind in a major Canadian hospital – and make recommendations about its utilization in all health delivery institutions.

THE SUNNYBROOK AND WOMEN'S COLLEGE HEALTH SCIENCES CENTRE KNOWLEDGE AUDIT

Background

Adding weight to the general rationale for attention to knowledge process evaluation in healthcare, discussed in the first section of this paper, were the findings of a large-scale worklife survey conducted at Sunnybrook and Women's College Health Sciences Centre (S&W) in 1999. Two main findings cited in its summary were staff's felt need for more support resources and the existence of gaps in communication. Though the scale and focus of the survey did not allow it to track the implications of such findings for the hospital's knowledge ecology, that there were some was an unavoidable inference. Thus it was decided that a knowledge audit would be the hospital's first implementation of the corporate Information Technology/Knowledge Management plan adopted in 2000 as a central component of the hospital's corporate goal of transforming healthcare. It was decided that its first practical KM initiative would involve an assessment of S&W's overall knowledge ecology to see what stage the institution was at. The approach was inclusive, addressing the key intersection of content, technology, organizational

process and human factors that is fundamental to KM. Although such a preliminary self-assessment phase had been an early recommendation of at least one major KM actor (Dixon 1999), it has rarely been adopted in the healthcare delivery sector, judging by the published literature and the personal evidence of the authors, who have spoken about the S&W project at a number of settings including the 2002 annual conference of the Ontario Hospital Association. Jay Liebowitz and others (2001) have reported on their knowledge audit at ReVisions Behavioral Health Systems, "a small behavior healthcare organization" in Maryland, where the methodology consisted only of a survey. But even the relatively narrow scope of that initiative has rarely been attempted, it appears.

At S&W, a comprehensive knowledge audit was undertaken, both because of the size of the organization itself and, given the relatively fragmented and differentially sequenced implementation of many ideas in healthcare, because it was recognized that KM may have been going on at the hospital, even though not labelled and/or monitored. A knowledge audit combined both the breadth that is key to effective KM and the empirical focus necessary to facilitate practical impact. This said, the fact that no ongoing funding was initially guaranteed beyond the audit itself was symptomatic of persistent reservations about the concrete value of KM to healthcare at ground level.

To set the stage for coordinated future interventions, the audit had four goals:

1. To raise awareness about the importance of staff sharing knowledge with colleagues who need it for their work
2. To assess how conducive S&W's culture is to creating and sharing knowledge, and to identify any cultural barriers that may need to be addressed
3. To gather data about and evaluate the quality (efficiency and effectiveness) of knowledge practices and formal KM initiatives at S&W
4. To create a set of resources for ongoing knowledge development at S&W

Clearly, then, our audit had purposes above and beyond the evaluation of S&W's KM performance. Because we were aware of the innovation that our audit represented, both internally and more generally, we saw the project as an important opportunity for communicating the KM approach. At the same time, in line with both good project management and KM methodology, we saw the process itself, and its results, as a foundation to support future development. But the core rationale for the project was the overall identification and evaluation of the hospital's knowledge processes. The necessary conceptual framework used for achieving this was that of an optimal knowledge ecology, whereby organizations integrally (1) create, (2) capture, (3) distribute, and (4) retrieve knowledge before applying it and reentering the cycle. Within each major area a number of sub-areas exist, but the overall ecological model we utilized comprises these four major phases. The data-gathering tools we used were shaped consciously to identify the relative effectiveness and efficiency, in the eyes of staff, of the hospital's knowledge processes.

Technically, the primary mission of the audit was to describe the characteristic knowledge processes and techniques and the knowledge culture of the hospital, that is, which phases of the knowledge ecology were most commonly addressed, which knowledge tools and technologies were accessible and used and how ready S&W was to change.

Responses were segmented by major occupational groupings, in recognition of the different knowledge roles and functions performed by different groups of staff – for example, clinical vs. non-clinical, teaching vs. non-teaching, and managerial vs. operational. In essence, we sought to describe the kinds of knowledge activity happening at the hospital, and how satisfied staff was with it. These findings were used to generate recommendations for improvement.

A Note on Methodology

Audit findings were generated with multiple tools to reflect the multiple channels in which knowledge flows in midsize-to-large organizations (S&W in 2002 had approximately 7,000 staff). Preliminary interviews were conducted with key figures, including leaders in education, research and clinical practice, to guide the development of a multidimensional questionnaire split into major sections (demographics, knowledge processes, knowledge types, KM). Completing the data-gathering apparatus was a 30-second survey, modelled on one used by the nursing department, which was designed to identify key cultural characteristics relevant to knowledge flow. Both of these structured tools were made available to all staff; an online version was included in order to cater both to personal predilections and to access options. Finally, focus groups were held to clarify initial responses as needed. More than 600 S&W staff provided data for the audit in one or more of the three modes described.

FINDINGS

The key findings of the audit validated the need to foster and formalize KM at S&W. Although as a teaching hospital S&W is dedicated to education, research and quality patient care, much of the hospital's knowledge is created and distributed routinely, albeit often on a narrowly need-to-know basis, and much internal expertise, which is often informal or tacit, is not well identified or accessible. In general, then, the weakest points of

the S&W knowledge ecology were found to be capture, organization and dissemination/sharing, particularly at inter- and intradepartmental professional interstices. S&W's strengths were in knowledge creation and, with some conditions, retrieval. S&W staff emerged as creative and resourceful, willing to pitch in and innovate to make things better. They review and retrieve knowledge as part of their commitment to improving and transforming healthcare. For instance, 85% of those surveyed reported learning from experience, thereby creating new knowledge at the same time as they personally devised a way of improving a particular process or procedure.

Organization and evaluation of knowledge were not identified as major problems, although empirical observation of existing hospital tools, such as e-mail directories and on-call lists, suggested there was considerable opportunity for taxonomic enhancement. It is not easy, for instance, to identify knowledge specialists – even medical specialists – if they are not already known within a set of local contacts. When it comes to non-health-related knowledge such as language skills, which can have critical medical significance, the discovery task is even more difficult. Knowledge evaluation is hard to capture except in very microanalytical processes, as a subset of regular administrative processes such as team meetings. We were unable to address it, though we found no hard evidence of formal knowledge process evaluation procedures. However, as a consequence of the problem areas, frustration and sub-par performance were identified as common by many of the surveyed staff. To quote the executive summary of the final Knowledge Audit report: "Sunnybrook and Women's is an underperforming team with talented players in many areas, whose excellent skills do not always produce the desired results because they have not adequately worked on coordinating their moves."

As for the knowledge culture at the hospital, results again bore out much of the literature of KM when they indicated a relationship between insecurity (socially and economically induced) and knowledge breakdowns. The time period of the audit was one when S&W, like many hospitals in Ontario, was under great stress resulting from a combination of growing demand (demographics), reduced resources (especially nursing) and organizational complication (S&W had recently emerged, in 1998, from an amalgamation of three separate institutions).

To recycle once again Lew Platt, the much-quoted CEO of Hewlett-Packard: "If HP knew what HP knows, we would be at least three times as profitable" (Davenport and Prusak 1998). *Mutatis mutandis*, if S&W knew better what it knows, performance of all kinds could be significantly improved. As noted above, the key problems of underperformance in the knowledge ecology at S&W arose because key knowledge is often not captured. For example, procedural protocols like clinical best practices, whether formally captured or not, are not shared with all who could benefit. In large measure, processes do not exist to promote and achieve these desirable ends. As one staff member reported of her attempts to communicate information about a key knowledge source (another staff member): "It's not just that we don't know what she knows. We don't know how to get hold of her … People don't have an easily understood model of how to achieve care delivery for anything that strays beyond the routine." Here we have a good example of how the audit revealed important connections between informal knowledge capture, communication and access. Although it is clearly conceivable that a mobile technological solution could help in this case, the task must be recognized in a medium-independent way first if it is to generate a working alternative. Another staff member provided evidence of the failure to capture and communicate both formal and informal knowledge: "You don't really get the proper background on a patient that you need to do your work. So maybe from the other end of things, as well, they're not really clear on what you need to provide the service you're there to provide." Again, solutions present themselves as ongoing mutual sharing of knowledge needs and better tools for knowledge capture and access. A final comment about the retirement from the hospital of a senior staff member attests to the crucial issue of knowledge succession and conservation, which has received much attention in the KM literature: "We don't really have any formal mechanisms to best capture what it is that she's known or been involved with … I know we're going to lose out … How do you grab all that?" In this case, a standard human resources exit interview would be unable, without a formal knowledge transfer plan, to conserve the retiring person's knowledge within the hospital.

Similar problems have been identified in other industrial sectors, for example British Petroleum (Prokesh and Browne 1997): "Our challenge has been getting people to systematically capture the information the company needs in order to be able to use both tacit and explicit knowledge." The problem is not new, but our audit has allowed us to ground it in our own organizational context. For instance, we found that much information about research activity by S&W staff is gathered and accessible on manual billboards that are not accessible without a journey to the location of the billboards themselves – a challenge to staff at other campuses – and the information is not searchable in any form. As for knowledge culture, when an ancillary suggestion was made as part of the audit to develop an online depository of documents created by S&W staff, many responses were less than enthusiastic, evincing concern about violations of intellectual ownership. The key weaknesses of the knowledge culture were lack of recognition for progressive knowledge behaviour and instinctive lack of trust between interacting groups, often as a result of occupational allegiances. Another focus group quotation captures the problem: "It

comes down to a lot of departments don't want to let out what they're doing because they want to get credit for this project … It has to do with people being territorial."

Anyone who has worked in Ontario hospitals over the last decade will probably recognize much that is familiar in this brief overview of the knowledge environment revealed by the S&W audit. In a context of economic constraint, increasing quality expectations, radical technological change and massive organizational restructuring, knowledge and one of its key outcomes – service quality – are inevitably affected. Since consistent parameters, and therefore data, during the last two decades do not exist for evaluating knowledge performance, it is not possible to provide clear evidence of the relationship between knowledge breakdown and medical error, for instance, let alone even more challenging issues like healthcare quality. It seems reasonable to assume, however, that the significant prevalence of errors in hospitals evidenced in the U.S. by the groundbreaking Institute of Medicine study "To Err is Human" (2001), and, since then, by the Canadian study "Building a Safer System" (2002) from the National Steering Committee on Patient Safety, is at least partly related to knowledge breakdowns of the kind staff attested to at S&W.

Lastly, there were some revealing demographic sidelights to this overall picture. Non-clinical staff members, particularly those with administrative/managerial roles, were notably more confident about fulfilling necessary knowledge processes and were also more satisfied with these than their clinical colleagues, even those clinicians with significant administrative/managerial roles. In other words, those with arguably often the most urgent knowledge needs were, on the whole, relatively less confident about fulfilling them.

RECOMMENDATIONS

Both general and specific recommendations were made based on this study. The challenge of improving KM was relevant across the institution, notwithstanding variations in nature and degree. The need for a coordinated approach to fixing problems and greater awareness of the role of knowledge in all operational performance was fundamental. The specific recommendations offered a number of potential "quick wins" for follow-up implementation, including: knowledge champions (to increase awareness and understanding), formal taxonomies (to facilitate retrieval), communities of practice (to foster collaboration), formalization of the lessons-learned process (to improve capture and sharing of organizational knowledge), ongoing knowledge mapping (to monitor knowledge processes as they happen, and to identify gaps) and reminder systems (to undercut human error). In summary, our audit provided a knowledge base for both institution-wide and targeted Step 2 implementations. The audit was thus validated as a necessary stage-setting that will help the hospital proceed in a more focused and productive way in managing its knowledge in future.

LESSONS LEARNED AND DIRECTIONS FOR DEVELOPMENT

We believe that the audit is a model first step in a serious and effective approach to improving healthcare knowledge ecologies, for the following reasons:

- Unlike narrowly focused KM application-based interventions, particularly the technological, an audit both learns from experience and is capable of accommodating the multiple factors that converge in organizational knowledge environments.
- Standardized institution-wide knowledge-improvement campaigns ignore the fact that some sectors within the institution may manage knowledge relatively effectively, and some manage at least some aspects of their knowledge effectively. One-size-fits-all approaches are more likely to generate the kind of cosmetic compliance suffered by other comprehensive management "solutions." By contrast, the knowledge audit approach, as identified here, provides an evidence base for more directed and strategically coherent interventions, which are thus more likely to be accepted and achieve results.
- In a similar way, the audit facilitates an efficient approach to knowledge solutions, focusing resources on those areas with the greatest need and potential for the highest "return on investment," both tactically and strategically.
- By addressing issues of both knowledge culture and organizational structure in the same framework as technology, an audit of the kind described here increases the likelihood that technical applications will be understood and treated as fundamentally human processes.

Nearly a year later and with no follow-up implementation, it seems equally important, in the spirit of bona fide KM, to learn longer-term lessons of the S&W audit:

- KM is a challenge because by definition it spills over institutional divisions. Even though one organizational area must inevitably champion the project, from an institutional point of view KM presents methodological and professional challenges. Further, its long-term prosecution in hospitals is, like many other initiatives in such settings, under threat from multiple other priorities that are often unanticipated and short-lived.
- In retrospect, a more micro-organizational focus at the start might have saved some time and resources, while contributing more practical detail for possible follow-up corrective measures. However, this would have severely limited the communications and promotion benefit of the audit.
- Finally, in a perfect world, a more thorough preliminary scan of the explicit knowledge landscape would have

been advantageous. Typically, in large institutional environments, valuable knowledge captured over time in multiple projects and processes exists within the institution. However, resources committed to locating previously captured knowledge could have constituted another audit-like study in itself and would not have honoured the multidimensional model we felt requisite for grounded conclusions.

How should other healthcare delivery institutions, particularly hospitals, implement a knowledge audit approach to KM programming? We recommend the following actions:

- Decide on the scope of the audit – in particular, whether it should be deep and narrow or broad and thin. This was an area of considerable early debate at S&W and was affected by both its institutionally specific goals and the available resources; it will usually not be possible for audits to be both comprehensively deep and broad, we suspect.
- Ensure that a broad multidisciplinary reference group as well as high-level leadership support is available, to sustain the project over time.
- Using a knowledge ecology conceptual framework, as described above, develop data-gathering tools that reveal the relative strengths and weaknesses of the institution in different areas of the knowledge cycle. Ensure that the cultural and process issues related to knowledge are addressed, as well as the technological ones.
- While gathering information using generic and open-ended questions, ensure that information is also collected about concrete knowledge areas addressed by established KM tools and techniques.
- Implement the audit approach on either an organizational, section by section, or global basis, depending on resources available. Customize local implementation as appropriate.
- Break down data demographically to identify local problem areas and facilitate targeting of follow-up initiatives.
- Use the audit results as a database to support a long-term KM program, and coordinate with that program all relevant new initiatives to ensure coherent and trackable knowledge performance. Unless the audit is formally identified as part of a longer-term commitment, standard organizational dangers of "agenda abduction" are heightened, particularly when the results of an audit are, by definition, not predictable.

A FINAL WORD

It can be claimed that the Knowledge Audit approach proposed here is in fact a cop-out in that once it is done the real work has to begin. We disagree, in that we don't believe the real work can begin if an audit-like process has not been performed. Audits pave the way for targeted intervention, but also, in general, beginning at the beginning is a good idea, especially with new concepts. We can think of no better place to start. In principle, it should be, as far as possible, a "pure" research process, in which evaluation of the institution's knowledge ecology is ongoing, whether independent or as part of already installed processes. If, in contrast, an audit is simply a component of a narrow stand-alone application, its integrity is almost inevitably compromised.

Clinicians and healthcare managers are faced with a swarm of providers offering solutions to problems that are real, hypothetical and theoretical. Their natural and prudent caution is intensified by the clamour of such voices vying for their attention. There is no magic tool for speeding up the arrival into cluttered mind space of the conviction that should precede adoption. Some issues are inherently, and increasingly, complex. But there are process enhancements that can help. For example, systematic reviews have signally facilitated and popularized the use of research evidence. We believe the audit approach as described here, though apparently modest, is one such. One benefit of this "modesty" is its relatively small price tag. As noted in the introduction, KM as a concept is not yet making many explicit inroads into healthcare delivery as a practice, and the "knowledge audit" as a KM tool appears to be rare indeed. With the exception of the S&W audit reported here, no references to knowledge audits as such were discovered in either the Medline or CINAHL databases over the last 10 years. We recognize that there have been self-examinations at secondary- or tertiary-level supra-clinical organizations like Health Canada and Cancer Care Ontario, but where "knowledge audit" in healthcare surfaces on the World Wide Web it is still largely the preserve of professional KM providers, with the unavoidable vested interests entailed. Where explicit audits are reported in non-institutional healthcare contexts, they are often hard to distinguish from broad environmental scans, and they lack systematic focus on knowledge-specific variables. Finally, the summary report of the Ontario Hospital Association's Knowledge Management Strategic Advisory Committee (2002), while recognizing as a priority the need to develop practical tools for hospitals, makes no concrete proposals about how hospitals should begin to implement KM.

These are still early days for KM in healthcare, as acknowledged by Jadad (2000) three years ago. The latest (2004) accreditation process for S&W and other Canadian hospitals requires an Information, not a Knowledge Management team, though advance is apparent in the attention it gives to evidence and outcomes. It is our contention that if we take seriously the proposition that hospitals are knowledge-based organizations par excellence (Lowe 2002) and that knowledge is not just a human, but, especially within organizations, a

social process, then hospitals should find ways of incorporating the knowledge audit into their standard self-monitoring and/or quality improvement processes. The challenges, such as the understandable opaqueness of the term "knowledge" itself – let alone KM techniques – should not be underestimated, but the potential rewards are large. Beyond strategic institutional commitment to a quality workplace, hospital workers' opportunities for improving their efficiency and effectiveness require a consistently supportive knowledge ecology. Local key areas of strategic focus are most likely to emerge from the kind of diagnostic knowledge investigation we have described in this paper. But along with the evidence-grounded targeting of KM interventions that emerges from a formal knowledge-assessment initiative, KM's contribution to the maturation of organizational understanding in these still relatively early days of healthcare attention to managing knowledge may be equally important in the long term. Knowledge optimization in healthcare includes more than increased utilization of evidence. It can also benefit from the shift to a culture of negotiation promoted by Browman, Snider and Ellis. KM has taught us that working knowledge ecologies are multi-levelled phenomena, combining people, processes and tools. Their improvement requires similarly inclusive and comprehensive initiatives.

Key challenges to system-wide implementation of cohesive KM programming in hospitals, as in other organizations, remain. A multitude of hard demographic and financial pressures always clog management horizons, particularly in healthcare. Reliable outcome metrics, whether ROI-based or not, are not yet available. Staff does not necessarily use tools that have been constructed for them, however conceptually attractive. In the medical environment there is still a cultural tendency to treat non-medical process tinkering as "fluff," and as chickens emerge from eggs, and vice versa, KM becomes identified as the hobbyhorse of information knowledge professionals. Yet a knowledge audit remains, we believe, a practical opportunity to kick-start a knowledge-improvement development process and related opportunities that might otherwise languish unexplored. S&W recently identified its corporate priorities as efficiency and accountability, innovation and teamwork. Many Canadian hospitals would probably echo these priorities. By formally evaluating their knowledge processes, hospitals can take a significant first step toward identifying opportunities for improvement.

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References

Browman, G. P., A. Snider and P. Ellis. 2003. "Negotiating for Change: The Healthcare Manager as Catalyst for Evidence-Based Practice: Changing the Healthcare Environment and Sharing Experience." *HealthcarePapers* 3(3): 10–28.

Davenport, T.H. and L. Prusak. 1998. *Working Knowledge: Managing What Your Organization Knows*. Boston: Harvard Business School Press.

Davenport, T.H. and T. Glaser. 2002. "Just-In-Time Delivery Comes to Knowledge Management." *Harvard Business Review* 80(7): 107–111.

Dixon, N. 1999. *Common Knowledge: How Companies Thrive by Managing What They Know.* Boston: Harvard University Press.

Drucker, P. 1988. *The Coming of the New Organization.* Boston: Harvard Business School Press.

Health Canada. 2002. Knowledge Management Situational Analysis and Future Directions. Ottawa: Health Canada. < www.hc-sc.gc.ca/iacb-dgiac/km-gs/english/kmdirections_en.htm>

Institute of Medicine. 2000. Committee on Quality of Health Care in America. *To Err is Human: Building a Safer Health System.* Washington: National Academies Press.

Ittner, C.D. and D.F. Larcker. 2003. "Coming Up Short on Nonfinancial Performance Measurement." *Harvard Business Review* 81(11): 88–95.

Jadad, A.R. et al. 2000. "The Internet and Evidence-Based Decision-Making: A Needed Synergy for Efficient Knowledge Management in Health Care." *Canadian Medical Association Journal* 162(3), 62–5.

Liebowitz, J. et al. 2001. "The Knowledge Audit." University of Maryland – Baltimore County, Baltimore. Accessed Aug. 24, 2001. < userpages.umbc.edu/~buchwalt/papers/Kmaudit.htm>

Lowe, G.S. 2002. "High-Quality Healthcare Workplaces: A Vision and Action Plan." *Hospital Quarterly* 5(4): 80-–88.

Ontario Hospital Association Knowledge Management Strategic Advisory Committee. 2002. *Summary Report.* Toronto: OHA.

Perruzzi, W. 2001. "Translating Outcomes Research into Fiscal Responsibility and Knowledge Management in Health Care." *Critical Care Medicine* 29(3): 679–80.

Prokesh, S.E. 1997. "Unleashing the Power of Learning: An Interview with British Petroleum's John Browne." *Harvard Business Review* 75(5), 146-63.