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Translating Research into Practice: Implications for Organizations and Administrators

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Only some 500 years ago German artisan Johannes Guttenberg unleashed the information age with the invention of the printing press. We have come far from the first vacuum tube triode in 1906 to the first Intel micro processor in 1971 — to where we now talk in terabytes. Scientific knowledge is increasing exponentially; in 1997 Thomas Dodson suggested that over 600,000 articles are published every year in the biomedical literature, and that even the diligent and well-prepared clinician reading two articles a day would, at the end of a year, be 800,000 articles behind! (Dodson, 1997) Given the tremendous growth in knowledge and the rapid pace at which societies and their institutions around us are changing, our as yet unmet challenge of how to get the best available research knowledge into the hands of and used by clinicians in a timely and efficient manner seems increasingly urgent.

Since the 1997 call by the National Forum on Health for a culture of evidence-based decision-making, the term "evidence-based practice" has become a mantra for advocates of contemporary quality health-care systems. This despite the fact that we still know relatively little about the complex factors that influence *research use*. Since the creation of the Canadian Health Services Research Foundation in 1997 and the Canadian Institutes for Health Research in 2000 — the latter with a clear and unique mandate for knowledge translation written into its legislation — the knowledge translation agenda has accelerated at an ever increasing rate in Canada, moving across the country like a juggernaut. As we invest significant and increasing amounts in this country to get research from the "bench" to the "bedside," the question *How much attention have we focused on the role of organizations and senior administrators?* remains largely unasked.

This question is particularly relevant if considered in the context of a common oversight in the field of research utilization — treating research utilization and evidence-based practice as if they were separate from the broader body of research addressing healthy workplaces, quality workplaces, optimal practice environments, and so on. There have been important research and significant efforts undertaken to improve the environ-

ments in which nurses work — often cast within discussions of "magnet hospitals" (Aiken, Clarke, Sloane, & Sochalski, 2001; Aiken, Sloane, & Sochalski, 1998; Aiken, Smith, & Lake, 1994; Dopson, FitzGerald, Ferlie, Gabbay, & Locock, 2002; Estabrooks et al., 2002; Kramer & Schmalenberg, 1988a, 1988b; Lake, 2002; Laschniger, Shamian, & Thomson, 2001; Leveck & Jones, 1996; McGiliton & Pringle, 1999; Sleutel, 2000; Snyder-Halpern, Corcoran-Perry, & Narayan, 2001). If optimal practice environments result in improved patient outcomes, and if using research is really an important dimension of quality patient care, then research use, or, in today's jargon, evidence-based practice, will be an important feature of an optimal practice environment. The implication is that astute research-utilization investigators will work closely with health researchers interested in organizational, workplace, and related issues.

In this paper I will briefly describe (1) how the characteristics of individual clinicians influence research use, (2) what we know about how organizations influence research use, and (3) some of the emerging perspectives on communities of practice and the roles they may play. Finally, I will offer thoughts on how our findings relate to the increasingly important — and sometimes overlooked — role of organizations and nursing service administrators in creating and sustaining practice environments that enable clinicians to engage actively as members of a culture of evidence-based decision-making.

Individual Determinants

Historically, investigators have focused largely on individual predictors of research use such as age (Butler, 1995; Champion & Leach, 1989; Winter, 1990), education (Brett, 1987; Butler; Lacey, 1994; Parahoo, 1998, 1999), attitude (Bostrom & Suter, 1993; Champion & Leach, 1989; Coyle & Sokop, 1990; Estabrooks, 1999; Hatcher & Tranmer, 1997), employment status (Butler), years of experience (Butler; Champion & Leach; Kirchoff, 1982), clinical specialty (Bostrom & Suter; Michel & Sneed, 1995), journals read (Brett, 1987; Kirchoff; Rodgers, 2000a; Rutledge, Greene, Mooney, Nail, & Ropka, 1996), and continuing education (Brett, 1989; Coyle & Sokop; Estabrooks, 1999; Rodgers, 2000b). In a recent systematic review of individual determinants, Estabrooks, Floyd, Scott-Findlay, O'Leary, and Gushta (in press) identified six categories of individual predictors of research use: beliefs and attitudes, involvement in research activities, information seeking, education, professional characteristics, and other socio-economic factors. The most frequently assessed determinant, and the only one with a consistent pattern of significant and positive effect, was attitude towards research. Findings for other belief and attitudinal determinants were equivocal. Findings in the remaining categories

of determinants (involvement in research activities, information seeking, education, professional characteristics) were also equivocal, precluding any generalizations.

Recently, Profetto-McGrath and her group (Profetto-McGrath, Hesketh, Lang, & Estabrooks, 2003) found a relationship between research use and overall critical thinking dispositions. They found support for the belief that nurses who have attributes consistent with the ideal critical thinker, especially those who are open-minded, inquisitive, and systematic, are more likely to use research findings in their work. The findings of Profetto-McGrath et al. also suggest that open-mindedness is one of the most important dispositions for research utilization. Traits like curiosity and an affinity for seeking out new information have obvious links to the behaviours required to maintain standards of evidence-based practice. Without a desire to learn, nurses are unlikely to feel compelled to make time to read or discuss new research. Profetto-McGrath et al. concluded that critical thinking is central to notions of the nurse as scientific practitioner, and using research is an essential element in such a practice.

Strategies that we usually use to change individuals' behaviour focus naturally on the individual. Such strategies include trying to increase the reading activity of clinicians, teaching research critique and appraisal, and offering a variety of educational programs targeted at the individual. However, research on the sources of knowledge that nurses draw upon in their practice consistently reports that non-individual factors play a larger role in informing nurses' practice. The most common knowledge sources include individual patient information, personal experience in nursing, information acquired in nursing school, discussions with physicians, and discussions with fellow nurses. In contrast, professional journals of all types consistently rank among the least frequently accessed knowledge sources (Baessler et al., 1994; Estabrooks, 1998; Estabrooks, Chong, & Brigidear, 2003). Nurses' reports of their most commonly used knowledge sources suggest a work pattern that is highly relational and verbal, with high value placed on experiential learning. These findings, coupled with the awareness that individual behaviour is notoriously difficult to alter, have led us to focus on organizational influences in research utilization.

Organizational Determinants

Historical Trends

Historically, a number of factors thought to influence innovation adoption have been studied, but relatively few studies have specifically addressed the impact of these or related factors on research or knowledge

utilization. It is important to note that although investigators commonly treat innovation diffusion and adoption as synonymous with research utilization, these terms are not synonymous and may differ in ways that are poorly understood. Those organizational factors whose effect on innovation adoption have been traditionally studied (usually outside of nursing) include organizational complexity, centralization, size, presence of a research champion, traditionalism, organizational slack, time constraints, access to and amount of resources, professional autonomy, and organizational support.

Organizational *complexity,* consisting of functional differentiation, specialization, and professionalism (Damanpour, 1987), has been examined in organizational studies (Damanpour, 1996; Meyer & Goes, 1988; Mohr, 1969; Orlandi, 1986). In a meta-analysis, Damanpour (1991) demonstrated that these factors are generally positively associated with innovation diffusion in organizations.

Centralization of authority and decision-making is generally believed to inhibit innovative thinking and behaviour. It has been studied by, among others, Kimberley (1981), Kimberley and Evanisko (1981), and Moch and Morse (1977), who report that its presence exerts a negative influence on the adoption of innovations (Damanpour, 1991).

Organizational size is generally accepted as exerting a positive influence on innovation adoption — that is, the larger the organization, the more innovation adoption there will be (Damanpour, 1987; Germain, 1996; Kimberley & Evanisko, 1981; Meyer & Goes, 1988; Moch & Morse, 1977; Mohr, 1969; Zmud, 1984). In his study of health units, Mohr found that size probably reflects other variables such as presence of motivation, obstacles, and resources. Rogers (1995) concurred, suggesting that while size is probably frequently studied because it is easy to measure and relatively precise, investigators should seek to uncover its underlying structure rather than study this surrogate variable. In nursing, Brett (1987, 1989) found no relationship between size of the hospital and adoption of innovations by nurses, while Varcoe and Hilton (1995) found that organizational support and expectations about research use differed according to size.

Research shows that the presence of an innovation or research *champion* consistently exerts a positive influence on the adoption of innovations and the utilization of research (Chakrabarti, 1974; Howell & Higgins, 1990; Markham, Green, & Basu, 1991; Schon, 1963). As Wolfe (1994) points out, most of the studies have examined the presence of a champion but have not examined the relative importance of the champion in relation to organizational context, or included an examination of the influence of the power of the champion in that context.

Little has been written about *traditionalism,* although Downs and Mohr (1976) and Mohr (1969) mention traditionalism with the perspective that the less traditional an organization is, the more likely it is to innovate. Similarly, Scott and Bruce (1994), in discussing organizational climate, infer that more creative organizations (i.e., less traditional) facilitate more innovation. Finally, Rogers (1995) implies that innovative organizations are more creative and flexible (i.e., less traditional).

Organizational slack refers to uncommitted resources in the system (Damanpour, 1987, 1991; Fennell, 1984; Kimberley, 1981; Mohr, 1969; Rogers, 1995; Zaltman, Duncan, & Holbek, 1973). More innovation is believed to occur in organizations with high levels of slack. Nurses, however, have rarely felt the benefit of slack in the same way that employees in the private sector have. For one, structural constraints on the delivery of nursing care in hospitals and other health organizations have not resulted in slack being experienced at the point of care delivery.

In the nursing research literature, *lack of time* is consistently reported as having an adverse effect on research use (Funk, Champagne, Wiese, & Tornquist, 1991a; Humphris, Littlejohns, Victor, O'Halloran, & Peacock, 2000; Pettengill, Gillies, & Clark, 1994; Richens, 2001; Rizzuto, Bostrom, Newton Suter, & Chenitz, 1994; Rodgers, 1994, 2000b; Walczak, McGuire, Haisfield, & Beezley, 1994). Little has been written about the meaning of the concept of time to nurses generally or, more specifically, within the context of research utilization. Tydén (1996) discusses the complexity of time (or, more accurately, lack of time) as a variable in research utilization studies. Time is a dominant theme in the "barriers to research utilization" studies published by Funk and others (Dunn, Crichton, Roe, Seers, & Williams, 1997; Funk, Champagne, Tornquist, & Wiese, 1995; Funk, Champagne, Wiese, & Tornquist, 1991b; Funk et al., 1991a; Funk, Tornquist, & Champagne, 1995; Griffiths et al., 2001; Mayhew, 1993; Parahoo, 2000; Retsas, 2000). For nurses who participated as subjects in the cited studies, time *may* have meant designated on-the-job time, during which nurses are encouraged to and do engage in activities related to research and research utilization. Such time would ideally have certain characteristics: it would be "replaced" time, so that the nurse's patients receive the same level of care in her absence, thereby eliminating "activity or role conflict" for the nurse; it would be adequate to complete a discrete undertaking and so would most likely occur in segments of, for example, 4 or 8 hours; it would be "optimum time," so would probably occur on day or evening shifts rather than night shifts; and it would be facilitated time in that there would be guidance to ensure that the activity is carried out efficiently and results in a tangible product. However, these characteristics or attributes of time are speculative. In our own work we see "busyness," "interruptedness," and personal

energy levels as additional dimensions of this at best loosely conceived construct of time.

Access to research and resources, including findings, studies, libraries, and other sources, has also been consistently identified in nursing as important to the utilization of research (Champion & Leach, 1989; Funk et al., 1991a; Pettengill et al., 1994; Walczak et al., 1994). It seems self-evident that clinicians require access to research literature. This assumption is premised on beliefs such as "most research consumption will or should occur at work" and "research in published report form is relatively accessible (and usable)." Research sources other than the institutional paper-based library have not yet received much attention in the research utilization literature, although we can expect this situation to change as technologies such as the Internet make their way into workplaces. Aspects that have been examined include available research facilities and information availability at work (Clifford & Murray, 2001; Humphris et al., 2000; Royle, Blythe, Ciliska, & Ing, 2000); access to libraries, research expertise, and research committees (Rodgers, 2000b; Royle, Blythe, DiCenso, et al., 2000); attendance at conferences; and availability of research journal clubs (Hefferin, Horsley, & Ventura, 1982).

Professional autonomy has received some support as an organizational variable thought to influence nurses' research utilization behaviours (Funk et al., 1991a; Lacey, 1996; Rodgers, 1994; Walczak et al., 1994). The investigators are not clear as to whether they were addressing organizational, professional, and/or individual autonomy. The importance of professional autonomy may be underestimated in the empirical literature because it has been infrequently studied, and also in light of its importance in other, related, areas of work (Aiken, Clarke, Sloane, & Sochalski, 2001; Aiken, Clarke, Sloane, Sochalski, et al., 2001; Aiken & Patrician, 2000).

Finally, the following kinds of *support* have been identified as important to the use of research within the context of nurses' workplaces: peer support (Pettengill et al., 1994); support of nursing leaders/administration (Funk et al., 1991a; Hatcher & Tranmer, 1997; Pettengill et al.; Rodgers, 1994); support of other members of the health-care team such as physicians and physiotherapists (Lacey, 1994; Rodgers, 1994); a supportive infrastructure for nursing research (Champion & Leach, 1989; Rizzuto et al., 1994); and administrative support expressed both materially and in less tangible ways (Alcock, Carroll, & Goodman, 1990; Bostrom & Suter, 1993; Champion & Leach; Nelson, 1995).

Recent Trends

Recently we have seen an increasing focus on the importance of organizational context in facilitating knowledge utilization. Kitson and col-

leagues, for example, are working on an approach in the United Kingdom that addresses evidence and the organizational concepts of context and facilitation (Harvey et al., 2002; Kitson, Harvey, & McCormack, 1998).

In the context of civilian and military environments, we (http://www.ualberta.ca/~kusp) are comparing research utilization among nurses sampled from the two different organizational contexts (Estabrooks, Kenny, Adewale, Chong, & Mallidou, 2003). The predictors of research utilization in these contexts include beliefs and attitudes and organizationally focused items such as time to participate in research/projects, presence of a research champion, and number of in-services attended.

We are also examining organizational predictors using data from the Alberta arm of the International Study on Hospital Outcomes (Aiken, Clarke, Sloane, & Sochalski, 2001; Estabrooks et al., 2002; Sochalski, Estabrooks, & Humphrey, 1999). Initial findings show that variation in research utilization is mainly due to individual rather than organizational factors. The organization is, however, a significant predictor of research use — that is, the better the hospital environment, the greater the likelihood that nurses will use research findings in their practice — although it does not explain much of the variability. Although organizational determinants explain less of the variance in our model, they are statistically significant and may constitute the threshold needed before individual determinants can exert their more potent influence. Without the right environment, individual factors promoting research utilization may not be able to exert their influence. This implies that there is an interaction between organizational context and individual determinants of research utilization — a supportive organizational context enables individuals to increase their use of research in everyday practice.

Implications: Mixed Models

Concrete conclusions about the impact of organizational context are difficult to draw from existing research. However, findings to date suggest that nursing unit practices and organizational variables exert strong influences on research utilization. The organizational context may be critical in enabling individual determinants to exert what is a greater influence than previously thought. Hence, investigators in the field need to adopt a more "ecological approach" to studying the influences on research utilization — using mixed models that incorporate individual, unit, organizational, and regional levels of analysis.

Developing a greater focus on organizational models of research utilization is critically important because we know that organizations exert significant influences on both nurse and patient outcomes (Aiken, Clarke,

Sloane, Sochalski, & Silber, 2002; Needleman, Buerhaus, Mattke, Stewart, & Zelevinsky, 2002). Investigators have treated research utilization as the dependent variable; however, we should explore research utilization as a predictor variable if we implicitly and explicitly assume that research use improves outcomes. If organizational context exerts significant influences on patient outcomes, it should also influence provider behaviour and hence research utilization, thereby holding considerable promise for advancing the research utilization field.

Communities of Practice

As we analyze the data within our research unit (www.ualberta.ca/~kusp)[1] and review the results of recent studies, we are becoming increasingly aware of the influence of groups and social interaction on how nurses conduct their practice. It is becoming increasingly obvious that very little nursing knowledge exists as discrete "bits" of knowledge that are written down and acquired by reading, and that organizations exist not as monolithic entities but as many small, often overlapping, "communities of practice." The idea of communities of practice originated in the field of education (Lave & Wenger, 1991; Wenger, 1998) and has not yet been applied intently in the knowledge utilization or organizational literature. It does, however, fit well with emerging trends in our data and with what nurses experience in their working lives. We are discovering that people do not learn in isolation and that the formation of community is essential for both the production and the transfer of knowledge. When applied to nursing, the theory of communities of practice suggests that nurses do not always act in prescribed or predictable ways. Instead, in order to get their jobs done, they interact with the people with whom they work and practise creatively with the tools and resources they have at hand. Through this negotiation of what does and does not work, of how to get around, nurses work together to create a community of practice (Lave & Wenger, p. 16). Newcomers to a unit have to learn and adapt to the way in which the people on the unit do things and, if successful, eventually become full members of this small community of practice. Increasingly, we are aware that nurses rely more on knowledge generated within their communities of practice than on knowledge generated by research. In particular, we have found that *social*

[1] CIHR: Knowledge Utilization and Policy Implementation: A Five Year Program of Research, 2002–2007 (C. A. Estabrooks [PI], R. Landry, H. D. Dickinson, and K. Golden-Biddle); CIHR: The Determinants of Research Utilization: Pain Management in Infants and Children, 2002–2003; Pain Management in Adults, 1999–2002 (C. A. Estabrooks [PI], J. Watt-Watson, L. O'Brien-Pallas, B. Stevens, J. Lander, K. Golden-Biddle, C. K. Humphrey, G. Donner, G. Boschma, and J. I. Williams).

interactions and *experience* are the two most important sources of knowledge for nurses. A key concept in the idea of communities of practice is that learning is social. People learn *in* practice — they learn by doing and interacting with other people, who are also trying to do the same thing. For example, the preceptor/new nurse relationship can be a productive means by which to transfer both professional knowledge and unit-based norms. Lave and Wenger note that the process of moving into full membership involves "the learning of knowledgeable skills" (p. 29).

In this sense, communities of practice theory emphasizes the practice of nursing as a craft that can be learned only by watching and following those with more experience. Learning to be a "good" nurse involves some kind of apprenticeship. Apprenticeship is a social process implicitly involving the notion of someone with less knowledge following, watching, and, in a difficult-to-articulate way, absorbing the knowledge that he or she needs in order to become skilful — to have the "knowledgeable skills" discussed above.

Nursing as a Culture of Knowing: Epistemic Cultures

People learn in communities of practice, and knowledge is transferred within and among them. These communities are also the sites of *knowledge production*. In the course of their regular day-to-day practice, nurses not only *use* knowledge but also *produce* knowledge. It is becoming increasingly evident that in order to understand how nurses *use* knowledge we need to understand how they *produce* knowledge as a result of going about their everyday work. Our research has shown that most nursing units develop "unit-based norms." This is knowledge produced from negotiations among people on the unit as they go about their everyday practice. Unit-based knowledge is produced over time as people work together to solve problems and make things work. Further examination of how nurses make use of the mutually reinforcing sources of knowledge of interaction and experience may help us to understand nursing as an epistemic community (Knorr Cetina, 1999) — that is, nurses as a community of knowledge producers. How nurses produce their "own evidence" through sharing their experiences with their colleagues is an underdeveloped area. A deeper understanding of this process, and its relationship to knowledge utilization, would make an important contribution to our understanding of how knowledge is used in practice.

Conclusion

Four working hypotheses can be taken from this discussion. First, a threshold of positive organizational climate may be needed before indi-

vidual factors can exert their considerable influence on knowledge utilization. Without the right climate, individual factors promoting research utilization may not be realized. Second, personal experience and interactions are not given due recognition as sources of knowledge in the scientific and academic communities. Third, clinicians and students are both users and producers of knowledge. Fourth, knowledge is produced and travels readily within communities of practice. In light of these evolving hypotheses, one important question that emerges is *what are the implications for organizations and administrators*?

- Are administrators aware of the potential relationships among practice environments, research use, and patient and system outcomes?
- Have administrators taken seriously their role in providing optimal practice environments so that knowledge transfer and uptake can occur?
- How might administrators tap into the notions of communities of practice, "epistemic cultures," or the importance of social interaction in order to increase the use of research and practice-relevant knowledge in their settings?
- How might administrators and researchers work collaboratively to undertake a productive agenda in this arena?

The remarks in this paper make the field seem far more regular and coherent than it actually is. In actuality the field is complex, requiring its students to master the literatures of several disciplines scattered across numerous sources, none of whom cite each other. The field is rife with terminology and jargon, and its inhabitants interchange terms such as research utilization, knowledge utilization, innovation diffusion, technology transfer, evidence-based practice, knowledge translation, knowledge transfer, and knowledge mobilization as if they were all synonymous. While these terms do have a great deal in common, they are not in fact synonymous.

In Canada we have an almost unrestrained enthusiasm for evidence-based health care. If left unbridled, this enthusiasm will treat anything construed as being evidence-based as sacrosanct, as the *quality* terms were treated in the 1980s and early 1990s. The ever-present danger is that we will end up with unwieldy doctrine instead of thoughtful research and implementation agendas, agendas that enable us to examine whether, by using a perspective like "communities of practice," we might as researchers and administrators see clinicians as forming epistemic cultures that are central to the health of organizations and that, if understood, will facilitate research use in the practice setting.

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