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EDITORIAL

Conflicts between Professional Associations and Their Journals Strike at the Heart of Professionalism

While *CJNR* is an independent, academic journal not affiliated with a professional association, the rift between several professional associations and their official journals should be of concern to all. This rift is indicative of a fault line in a system that has been in place for almost a century, a system whose purpose has been to safeguard the role of professions within society and to ensure the highest standards of professionalism.

Many have been concerned about the growing crisis of professionalism in North America. There is mounting evidence that the public has lost faith and confidence in the professions, eyeing them with suspicion and cynicism. The professions are now perceived as serving their own self-interests rather than the public interest.

Sullivan (2005) attributes the public disillusionment with professions to a violation of the social contract. His thesis is as follows. A social contract was drawn up between the professions and society. Professions had services that only they could provide. These services required specialized knowledge and skills acquired through years of formal education and training, extensive experience, and mandatory continuing education. Professionals were expected to meet the highest standards of competent, ethical practice and to always act in the "public good." In exchange, society accorded professions status and respect and remunerated them well for services rendered. It also gave them autonomy and the authority to control entry into their profession, monitor and regulate their members, set direction for the profession, and create structures to safeguard the public.

Over a century ago, a system was developed to fulfil this contract. The system consisted of two interdependent bodies, the professional association and the professional journal. The primary responsibility of the association was to govern the profession, whereas the role of the professional journal was to provide the association's members with access to the latest information in the field. These two bodies formed an important partnership. Each supported the other's mission while serving, at arm's length, as a check and balance to the other's power.

While the system functioned relatively smoothly for decades, there have always been tensions between the two bodies. In recent years there have been a number of well-publicized rifts between professional associations and their journals. When the various cases are viewed together, the pattern that emerges is indeed troubling.

In 1999 the Massachusetts Medical Society (MMS) fired Dr. Jerome P. Kassirer, editor of its official journal, the *New England Journal of Medicine (NEJM)*. This incident was followed by the firing by the American Medical Association (AMA) of Dr. George Lundberg, editor of its official publication, the *Journal of the American Medical Association (JAMA)*. These firings sent shockwaves through the scientific community. The commercialization of medicine and editorial interference were cited as reasons for the breakdown (Hoey, 1999; Parmley, 2000). Seven years later, in 2006, two more journals became embroiled in conflict with their associations. I refer to the recent firing by the Canadian Medical Association (CMA) of Dr. John Hoey, editor of the *Canadian Medical Association Journal (CMAJ),* and the decision by the American Nurses Association (ANA) to sever its ties with the *American Journal of Nursing (AJN)*.

The recent termination, in February of 2006, of Dr. Hoey and senior *CMAJ* deputy editor Ann Marie Todkill calls into question a journal's editorial autonomy and its independence from the interests and dictates of the professional association with which it is affiliated (see Godlee, 2006; Shuchman & Redelmeier, 2006, Suzuki, 2006; Webster, 2006). Dr. Hoey's contract was not renewed after the *CMAJ* published, over the objections of the Canadian Pharmacists Association and the CMA, an investigative item on pharmacists' efforts to restrict access by Canadian women to the Plan B emergency contraceptive. A few weeks later, ANA's board decided to "drop" the *AJN* as its official journal and to establish a new journal that would be distributed to its membership, thus ending a century-long relationship.

When these events were made public, the response was quick, the outrage great, and the ripples far-reaching. Clearly, more was at stake than the firing of editors and the disaffiliation of professional journals. The conflicts suggested a loss of integrity and a lowering of ethical standards. E-mails flew across cyberspace on the listservs of the World Association of Medical Editors (WAME) and the International Academy of Nursing Editors (INANE). Journals around the world rushed to prepare editorials on the subject. The events were reported in newspapers and on network television. In response to the Hoey firing, the CMA established a commission, headed by a retired Supreme Court judge, to make recommendations on the journal's future governance.

In the case of the *AJN,* nurse editors around the world expressed their consternation in a letter to the ANA (see www.inane.vcu.edu).

Why have there been such strong, visceral reactions to these cases? Many believe that associations are being driven by greed, the "bottom line," at the expense of professional considerations and the public good.

The official journals of some professional medical associations have become cash cows (Hoey, 1999). Journals with high impact factors have translated their prestige into high subscription rates and large advertising revenues. With minimal investment, associations have reaped great profits. (Case in point: the *NEJM* brings the MMS revenues of over $20 million annually [Hoey].) In the past 15 years, professional journals have become a marketable commodity. It was this very issue that caused the rift at the *NEJM*. The MMS board saw an opportunity to "brand" the *NEJM* by creating other imprints bearing its logo. When Dr. Kassirer requested that, as *NEJM* editor, he be given some responsibility for the quality of these new imprints, he was turned down and his contract terminated. The fact that the Canadian Pharmacists Association was involved in the *CMAJ* issue raises the possibility that commercial considerations played a role, directly or indirectly. The ANA has stated that its decision to drop the *AJN* as its official journal was based on business considerations.

For some time now, there has been growing scepticism about the ability of professional associations to monitor themselves. New structures have been created to serve as "watchdogs." Journal editors have formed associations (WAME and INANE) and have published editorials alerting their members to the existence of dangerous practices. They have established committees to develop guidelines for improving the quality of scientific papers and to ensure that authors and editors meet the highest standards of ethical conduct. They stand on guard for signs of interference with editorial independence or violations of the principles of scientific publishing. When seeking to publish their work, researchers monitor the scientific and scholarly standards of journals and make their decisions accordingly. Clinicians look to many new sources for reliable and credible information rather than depend solely on "official" journals. The public have assumed greater responsibility for their own care, demanding to be treated as partners instead of as passive recipients. Interest groups monitor the professions and have become powerful lobbyists. They have found a voice in numbers and have become key drivers of the research agenda and essential sources of credible information. Foundations are and always have been valued partners of professional bodies. A case in point is the Preparation for the Profession Program of the Carnegie Foundation for the Advancement of Teaching. This program has committed large amounts of money to the study of professions, including nursing, with a view to developing a new system to address the crisis of professionalism.

Until the issues eroding professionalism are better understood and a new social contract between professions and society is drawn up, we can expect to see more rifts between professional associations and their journals. These rifts should be seen as symptoms of serious malfunctioning. During this period of breakdown and transition, as we await the emergence of a new system, we must be prepared to defend the integrity of our professions and to safeguard the public good. We all have a role to play.

Laurie N. Gottlieb
Editor-in-Chief

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GUEST EDITORIAL

Risk and Safety: The Current Landscape in Health Promotion and Health Care

Joan L. Bottorff

The purpose of this first Journal issue on Risk and Safety is to provide a forum for discussing developments, presenting new research, and recommending future directions for these important related fields of research. Although we have been interested in reducing risk for disease and injury for many years, and have made significant gains in areas such as smoking cessation and prevention of injury through the use of protective devices, we would be remiss in failing to acknowledge the factors that are changing the way that risk and safety are situated in the context of health promotion and health care.

The concept of risk has become increasingly important in health promotion and health care. Rarely a day goes by without a reminder about the risks associated with a range of lifestyle behaviours. In these situations and in the context of health care, risk is typically associated with adverse outcomes, such as disease, injury, other types of morbidity, and mortality. Risk and risk management have become deeply embedded in decision-making related to health and health care. Nurses have been identified as ideally situated to assess risk for adverse events because of their close relationship with patients and their ability to direct appropriate interventions to those individuals who are at greatest risk (Ropka, Padilla, & Gillespie, 2005). Risk behaviours, risk factors, risk assessment, and risk communication for human health and in the context of health-care management have therefore become important foci for all health professionals, but particularly nurses.

The importance of the concept of risk is clearly demonstrated in several papers published in this issue of *CJNR*, each addressing a different health issue. Mary Jane Esplen describes the rapid developments in medical genomics that have heralded an increase in genetic testing for risk prediction and significant changes in the way that health and illness are experienced. Not only do genetic risk assessments have the potential to disrupt people's taken-for-granted life worlds, but a diagnosis of "at risk" for hereditary diseases such as breast cancer or Huntington disease gives unaffected individuals the status of being neither sick nor healthy and can introduce new concerns (Scott, Prior, Wood, & Gray, 2005). Esplen highlights current and future impacts of developments in genomics on the delivery of health care, and she provides examples of emerging new research programs focused on developing counselling methods and clinical tools to assist individuals and their families to comprehend, cope with, and use genetic information. Karen MacKinnon and Marjorie McIntyre discuss the impact of risk discourses and biomedical constructions of risk on the everyday lives of women who are diagnosed with preterm labour. They expose the physiological consequences of these discourses and underline the need for critical reflection on practices that medicalize risk. Finally, two experts in the field of patient falls demonstrate important links between the concepts of risk and safety. Janice Morse provides a comprehensive summary and critique of the patient falls research that has taken place over the last two decades. She argues that falls risk prediction scales need to be used for rating patients' falls risk at regular intervals (just as we use thermometers to take temperatures regularly), to direct the implementation of falls prevention interventions when patients are at highest risk. David Oliver takes a different perspective, suggesting that the focus should be on reversing common risk factors for *all* patients, and using full assessment when patients have fallen to guide the implementation of management plans. Differences like this are not unusual in emerging fields of research and are important because they challenge us all to critically reflect on our approaches to clinical problems and the theoretical perspectives that guide research. What is clear is the need for research that is methodologically rigorous and ethically sound. This is as evident in the field of falls risk prediction and assessment as it is in human genomics. Not only is the field of falls risk research very complex, but the use of poorly developed tools in clinical settings can have dire implications.

The concept of safety is also the focus of several other papers in this issue. This is not surprising, because patient safety has been described as a "bandwagon" in health care (Storch, 2005). There are reasons why patient safety has become front and centre in the minds of health professionals, researchers, and the public. The issue is highlighted not only by media reports and legal cases, but also by estimates that 37% to 51% of adverse events arising from health-care management are preventable (Baker et al., 2005). Efforts are now being made to clarify risks related to health-care management in a variety of settings, all with a view to improved patient safety. As part of its first research funding competition, the Canadian Patient Safety Institute recently funded 28 patient-safety-related research and demonstration projects across Canada. And Safer Healthcare Now!, a grassroots campaign, is actively enlisting health-care organizations in the implementation of six targeted evidence-based interventions in patient care to reduce morbidity and mortality.

The papers included in this issue of *CJNR* provide excellent examples of the kind of research that is needed to examine the root causes of errors and to direct attention to the larger health-care problems that influence both patient and nurse safety. In an invited piece, Patricia Marck calls for a whole new approach to patient safety research, one that has the potential to transform health care in positive ways. Michele Balas and her colleagues make an important contribution to the emerging literature on health-care error by providing concrete examples of things that can go wrong for nurses and patients during a typical work shift in critical care. Their descriptions of errors and near errors should stimulate critical reflection on the significance of such events for clinical practice, education, and research. Sherry Bergeron and colleagues take a new look at the impact of the SARS experience by focusing on community nurses. The data they present bring a new understanding and appreciation of the burden of this crisis on nursing. Their findings show that with the rise of new communicable diseases we need to be much more concerned about the safety of nurses working in communities and homes, and to examine the impact of risks associated with diseases like SARS on nurses' ability to practise in their usual ways.

Anne Snowden and her colleagues remind us that safety is also important in our communities and make a noteworthy contribution to child safety in their research on vehicle safety devices. This study provides important descriptive information related to safety seat use by parents, highlighting particular problem areas such as premature transition to seat belt use. These findings, if used to stimulate routine safety seat assessment, tailor educational efforts, and build a national strategy to promote effective use of safety seats, have the potential to significantly reduce morbidity and mortality among children riding in vehicles.

Risk and safety issues form a large part of health promotion and health services today. These papers illustrate very clearly the importance of this field of research for nursing practice. They also illustrate the great potential for building programs of research on topics related to risk and safety, and the eventual impact of that research on health. What we need most are researchers committed to taking on the challenges of working in this complex field, interested in developing comprehensive and innovative research approaches, and capable of collaborating on interdisciplinary teams. I look forward to seeing the commentaries and research reports included in this issue of the Journal stimulate nurses to participate in the development of a better understanding of risk and safety, and to use these concepts in examining ways to improve health promotion and health services.

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Discourse

Field Notes from Research and Restoration in the Backcountry of Modern Health Care

Patricia Marck

> The place itself is unrecognizable… The trail is gone.… This place was once good and just how it was can no longer be found. (Strong, 1995, p. 40)

Shortly after I began to write this discourse for the *CJNR* issue on Risk and Safety, I met with two nurse colleagues to plan several Ethics in Practice (EIP) sessions for the emergency department of our hospital. After we concluded our meeting, we headed out from the Clinical Research Unit to check on the bulging emergency department where our over-worked practitioners and managers toil. I will not detail what we saw there that Monday afternoon at the height of flu season; I am quite confident that each of you can quickly recall a similar scene from your own experience. I will just say that the disparity between the number of EIP sessions we planned to provide (four) and the number of EIPs, or emergency inpatients, waiting for a hospital bed (26 at that moment, with a range of 12 to 40 that week) makes one thing utterly clear. We researchers who hope to translate our science into safer care environments have our work cut out for us. The managers and practitioners we want to work with are stretched further than ever, as are so many of the people who await their care.

This article is shaped by the memory of the patients, practitioners, and managers I saw that day. What follows are, in essence, field notes from a journey into an urban emergency department, a place where we are likely to find several members of our most vulnerable communities. We will probably see low-income parents with their children, a mentally ill young man who could not access timely community care, some frail elderly folks who fell on poorly maintained winter sidewalks, an aboriginal man with diabetes complications, a terminally ill woman with no hospice bed to go to, a vulnerable teenager who feels safer on the streets than in a violent home, a pregnant, methamphetamine-addicted young woman who has not had any prenatal care, an older homeless man on the far side of many years of alcohol abuse, and at least a couple of victims of trauma, another chronic condition of our time. To extrapolate from recent work by Edwards and Riley (2006), we could probably place many inhabitants of our emergency rooms on a lengthening public health wait-list that remains neglected by our health-care budgets. With all of these people from the backcountry of our health system in mind, then, it seems timely to ask: How can nurse researchers contribute to the building of the system wisdom we so urgently need in order to create safer and more sustainable health care for all? If the health-care places that we once knew are irrevocably gone, as they surely are, how do we use research to forge a viable path to other, safer places in the future?

In our share of the backcountry, we are responding to this challenge by using research and restoration to study and improve the safety of today's health systems. The goal of our EIP sessions on "Who Gets the Bed?" is to encourage our emergency nursing colleagues to use ethics, evidence, and their own practice wisdom to make sound clinical decisions and to maintain respectful relationships in the midst of their heavily strained care environment. Regular EIP sessions are one of several knowledge-integration initiatives in my research program on organizational ethics and health-care safety co-sponsored by the University of Alberta's Faculty of Nursing and Royal Alexandra Hospital, Capital Health (http://www.nursing.ualberta.ca/SaferSystems/). We are encouraged, in these early days of our research, to persevere, but, like a fellow veteran of modern health care (Wears, 2005), we proceed with a wary eye out for the confounding surprises of modern health systems and an evolving sense of realistic goals. With full knowledge that we will not succeed in clearing out the emergency rooms of our beleaguered health system any time soon, we nonetheless think that our research approach offers a viable path to safer and more sustainable health care. I hope you will read on, and that you will let us know why you can or cannot agree.

Research and Restoration for System Wisdom: The Work of Citizen Science

> Restoration is about accepting the brokenness of things, and investigating the emergent properties of healing. It's the closing of the frontier — ceasing our demand for open land to "develop" — and the reinhabiting of exploited or abandoned places. (Mills, 1995, p. 2)

The field of ecological restoration is concerned with the effective, resourceful repair and recovery of ecosystems that have been degraded, damaged, or destroyed (Society for Ecological Restoration, 2002).

Essentially, good restoration requires ongoing attention to the science of sustaining living systems, the ethical treatment of the places we inhabit, and the practice of adaptive management in our technologically complex and ecologically ailing environments (Higgs, 1999, 2003, 2005; Marck, 2004; Marck et al., 2006). While the term restoration is sometimes interpreted to mean the return of damaged habitats to their idyllic former conditions, most contemporary schools of restoration focus on practical, affordable repairs that ethically and effectively correspond with the realities and possibilities of an uncertain world.

Perhaps it is as striking to you as it is to me that just as health-system restructuring reached a maladaptive state of chaos in the mid-1990s, a broad interdisciplinary team of ecologists and social scientists were exploring two key questions about the restoration and management of ecosystems (Gunderson, Holling, & Light, 1995): Can human institutions learn from the successes or failures of past ecosystems management? Further, how do ecosystems respond to the management approaches that we adopt? Realizing that they would never fathom the best way to manage the interactions of natural and human systems with soil samples or policy studies alone, these scholars began to question their scientific assumptions about ecosystems by working together across disciplines. Using a case study approach, they investigated whether scientists, citizens, and policy-makers had succeeded or failed in repairing damaged ecosystems in New Brunswick forests, the Florida Everglades, Chesapeake Bay, the Columbia River, the Great Lakes, and the Baltic Sea. Their work transformed much of the scientific thinking about ecosystems management, which had largely turned on a "command and control" approach, returning degraded habitats to conditions of ecological "balance" to be maintained in a stable state. Rejecting the notion that ecosystems could or even should be managed to maintain steady states, they used their case studies to show that efforts to control for steady conditions actually accelerate an ecosystem's loss of resilience, or capacity to respond to threats (Light, Gunderson, & Holling, 1995). Their research on actual situations led to the refinement of a theory that views human and natural systems as closely coupled, complex systems that co-evolve, decline, and renew in uneven, nested cycles characterized by uncertainty and surprise (Folke et al., 2002; Gunderson et al.; Gunderson & Holling, 2002; Shindler & Cheek, 1999; Walker, Kinzig, Anderies, & Ryan, 2006). Calling for a civic or citizen science of "the long view" to serve the sustainability of natural and human systems, these scientists urge researchers to engage local community members, different levels of decision-makers, and diverse experts in the collaborative study and management of the systems interactions that shape these cycles of adaptive change (Gunderson & Folke, 2003).

As we think about these scientific efforts, over the past decade, to inform ecosystem management, it is impossible for us to ignore our own ill-conceived era of command and control, when short-sighted and unscientific health-system restructuring yielded today's fragile health-care environments. Also, we seem to have begun a journey towards citizen science in health-care safety research. Over the past decade, for example, we have seen human cognitive sciences used to illustrate the connections between the design of work and work environments and between the safety of patient handovers (Beach, Croskerry, & Shapiro, 2003) and the safety of complex resuscitations (Luten et al., 2002). In addition, health-care researchers are using ecological concepts like resilience (Rasmussen, 1990; Reason, 1997), cross-scale interactions (Ali, 2004), adaptive capacity (Glouberman, 2001), and the paradoxical effects of over-regulation (Amalberti, de Saint Maurice, Auroy, & Aslanides, 2004; Rasmussen, 1997) to explain the complexity of health systems in today's world. More recently within the safety research community, there has been a call for explicit theoretical approaches to all areas of inquiry, and the early emphasis on counting errors has been replaced with a deeper methodological debate on risk and safety in a complex health-care world (Edwards, Mill, & Kothari, 2004; Marck, 2005; Shojania, Duncan, & McDonald, 2002; Woolf, 2004). As a result, although we continue our efforts to learn from airlines and other "ultrasafe" industries, many researchers now realize that something distinctly different from the challenges of a "routine flight" is at work in the dangerous backcountry of modern health care. Most notably, we are letting go of a futile quest for perfectly controlled health systems as we tap into a growing body of interdisciplinary knowledge to develop wiser management approaches for the uncertainties of our technologically complex world (Amalberti, Auroy, Berwick, & Barach, 2005; Barach & Berwick, 2003; Berwick, 2005; Bion & Heffner, 2004; Marck, 2000; Pslek & Greenhalgh, 2001; Wears, 2004). I suspect that our friends in the natural and social sciences will say that we still have several miles of backcountry to traverse before we fully comprehend how different schools of systems theory lead to different questions and challenges (Holling, 2000). Nonetheless, we can at least point to these sightings of a longer view that might lead to safer, sustainable care.

To reframe the questions of our colleagues in ecosystems research: Have we learned from the past experiences of health systems management? Can we say that the health systems of today are responding well to the systems science and related research approaches we have adopted? I would argue that we have watched successive recommendations for systemic reform pile up on policy-makers' desks. For example, given practitioners' preferred sources of knowledge (Estabrooks, Cong, Bridear,

& Profetto-McGrath, 2005) and the persistent evidence-practice gaps (Altman, Clancy, & Blendon, 2004; Nicklin et al., 2004; Pepler et al., 2005; Tubman, Majumdar, Lee, Friesen, & Klassen, 2005), are researchers using translational strategies that actually improve the safety and quality of care (Buchan, 2993; Graham & Logan, 2004; Green, 2006)? Have we translated into better care the valuable research knowledge that is available on nurses' contributions to health outcomes (Doran, 2004; Stone & Tourangeau, 2003; Tourangeau, Stone, & Birmbaum, 2003)? Effective cycles of research and restoration attend to both the ecological integrity of living systems and the cultural integrity of our relations with each other and the places we share (Higgs, 2005, Marck, 2000; Mills, 1995). Yet, can we really claim a research ethos where researchers routinely collaborate with practice communities to design, study, and integrate our safety research into concrete improvements to the safety and sustainability of health care? Certainly, most clinicians and managers are relieved that decision-makers have finally "discovered" the complexity of the health systems they have been coaxing along with increasing difficulty for so many years. I would also argue that most health professionals, whether or not they use the terminology of complexity theories, can readily tell if adequate redundancy, resiliency, feedback loops, and other attributes of well-functioning systems are in effect in their workplaces. However, our emergency rooms remind us that, more often than not, these and other vital elements of safe systems continue to erode in the places where we give and receive care. Well over a decade after nurses initially registered formal safety concerns with modern health systems (Marck, 1995), we still await meaningful progress on most recommendations in the 2000 Final Report of Health Canada's Canadian Nursing Advisory Committee (Maslove & Fooks, 2004), the Institute of Medicine's 1999 report (Altman et al., 2004; Leape & Berwick, 2005), and similar reports from around the world. Public trust in modern health systems is steadily eroding (Blendon, Schoen, DesRoches, Osborn, & Zapert, 2003), nurses' knowledge was discounted in the management of SARS (Registered Nurses' Association of Ontario, 2003), and the risks to nurses' health and well-being are on the rise (O'Brien-Pallas et al., 2005). The same societies, governments, and health systems that initiated and digested inquiries on hospital tragedies around the globe (Australian Council for Safety & Quality in Health Care, 2002; Kennedy, 2001; Sinclair, 2000) are slow to address the needs of continuing-care residents (Auditor General of Alberta, 2005), mental health clients (Gagné, 2005), aboriginal people (Gregory, 2005), and low-income people (Stewart et al., 2005).

This partial list of pressing health and safety risks does not account for many of the hazards faced by nurses, patients, and communities in most developing countries (World Health Organization, 2005), nor does it begin to address a host of environmental health issues that many countries across the globe share but continue to ignore. Our experiences with AIDS, SARS, and other infectious diseases underscore this collective failure, as we reluctantly acknowledge the critical links between the ecological, economic, and social determinants of health (Ali, 2004; Emanuel, 2003; Glouberman, 2001; MacDonald, 2004; Waldvogel, 2004). To revisit my opening question, then, just how do we integrate the research that we conduct into tangible system wisdom and safer, more sustainable health care? On behalf of the practitioners and patients who inhabit our emergency rooms, I submit the following field note: The most rigorous risk and safety research in health care will not contribute substantively to safer practice environments until we synthesize our systems theorizing with equally rigorous principles of restoration ethics, research, and practice *in the field*. In short, if, like our colleagues in ecosystems and restoration sciences, we want our research efforts to contribute to wiser systems management, we need to engage citizens, practitioners, and decision-makers in the participatory design, conduct, evaluation, and integration of research that serves them and matters to them.

Fortunately for us, several nurse researchers and their fellow scientists in other disciplines are leading us towards this longer view, and one can find many exemplars of citizen science that embody a restorative intent. If you decide to look into the incomplete list of examples that follows, I hope you will agree, and I also hope you will alert *CJNR* readers to other cases in point. For instance, an explicit participatory research ethic informs the active engagement of local citizens in projects where seniors document, using their own photographs, the falls risks in their communities (Lockett, Willis, & Edwards, 2005), homeless people show us their streets using photo-voice (Wang, Cash, & Powers, 2000), or practitioners photograph and design interventions to address medications safety risks on their hospital unit (Marck et al., 2006). For research contributions based on a deep respect for local knowledge and experience, I invite you to learn about the parenting experiences of aboriginal people (Smith, Varcoe, & Edwards, 2005), diverse cultural beliefs in relation to taken-for-granted practices in modern health care such as organ donation (Molzahn, Starzomski, McDonald, & O'Loughlin, 2005a, 2005b, 2005c), a community knowledge translation partnership (Racher & Annis, 2005), or nurses' ethical and practical knowledge of safety as uncovered in numerous studies (Baker, 1997; Manias & Street, 2000; Varcoe et al., 2004). For ecologically sound methodological approaches to health-care research with a number of different marginalized populations, you could look at case study research from the view of complexity science (Anderson, Crabtree, Steele, & McDaniel, 2005), the call to elicit the voices of palliative care clients and families in our research (Addington-Hall, 2005), the unique challenges of rural health research (Hartley, 2005), an ecological systems model of child and family health promotion (Drummond, 2004), or a socio-ecological approach to community health intervention research (Edwards et al., 2004). Finally, to move from local to global research, citizen science can cross cultures to reduce risk and increase safety in some of the deepest backcountry of our world (Edwards & Roelofs, 2005; Mill, Astle, Ogilvie, & Opare, 2005; Ogilvie, Astle, Mill, & Opare, 2005). I hope these examples will drive you to ask: What funding and research partners do I seek out in my work, and why? Do I collaborate with the citizens of our communities and practice environments to study and improve the backcountry of modern health care? When I generate research findings, do I move beyond an impact publication or the next research grant, to work with nurses and others to create concrete, evidence-informed repairs? How do we use our research to integrate the discovery of knowledge with the ongoing construction of stronger, safer, more enduring practice communities? In short, if you think that the tenets of research and restoration are relevant to your work, will you answer a call to pursue citizen science in the service of better care?

Calling All Nurse Researchers: Recruiting Scientific Communities to a Longer View

> We need to develop a model for working together as a scientific community in order to meet the next health-care challenge brought about by our connected world and the realities of globalization. The health, recovery, and well-being of so many depend on it. (Gottlieb, Shamian, & Chan, 2005, p. 7)

Every research program tells a story about the ethics, culture, and practices of discovery that we value, and also demonstrates whether we see a real, vital place for the citizens of the communities in which we carry out our work (Marck, 2000). What if the forms of research and restoration that we need to do in order to build a safer, more sustainable health system for all are not the forms of science and knowledge initiatives that are consistently rewarded in our academic lives? If nurse researchers have to struggle to get the respect and recognition for their work in citizen science that corresponds to their efforts, will they answer the call for this difficult work in the backcountry of modern health care? Can we recruit a critical mass of colleagues in health care to a viable restorative approach to risk and safety research, or will most of us continue to opt for more well-known and well-rewarded research paths? In our faculty at the University of Alberta, we are attempting to strengthen our integration of research, teaching, and citizenship by building communities of students, scholars, practitioners, and decision-makers who can collaboratively develop, seek resources for, and contribute to the study and implementation of evidence-informed care. We do not necessarily know what these evidence-informed learning communities will look like, but we do know that they will not resemble the separate silos for research, teaching, and practice that continue to dominate education programs, research endeavours, and practice environments in the health sciences. As with the ailing ecosystems that await our attention right outside our office doors, the restorative integration of ethics, science, and practice in the service of better care would likely call for more profound sacrifices and more health-care reforms than re-engineering ever asked of us. Yet if we can find the communal commitment we just might reap much more meaningful and lasting gains — in health care and in our world.

As I finish this article several weeks after beginning it, our EIP sessions with emergency nurses have just concluded. After each EIP forum, I know that we have created a safe place to talk about difficult matters if several attendees have spoken up at least once, if we have managed to raise several provocative ideas and questions, and if my colleagues are still talking to each other as they head down the corridors and back to their units. That can be said about all four of the sessions we held in our emergency department over the past month. I also know that something about this way of sharing our research is working because, 3 years into this inclusive approach, both new and repeat attendees show up each time. Experts from almost every program have volunteered to collaborate on different sessions, and the evaluations provide us with a lengthening list of topics and questions to explore in future sessions.

I hope that this Discourse will serve as our own EIP session, a safe place for nurse researchers to spark debate as we ask each other these questions: How do we use our research to actively participate in the building of safer systems in the everyday? Do we interrogate the received wisdom in our own academic communities about what to study and how to study it, what to publish and where to publish it (Gottlieb & Clarke, 2005), or with whom to spend our scarce hours and to what ends? Loyal heretics have been valued members of the scientific community in ecosystem management for some time (Gunderson et al., 1995), but I would argue that we need many more loyal heretics within all of our health-care communities (Marck, 2004). As global citizens, nurse researchers can work with students, practitioners, and policy-makers to foster citizen science in a quest for more significant discoveries, safer systems, better care, and a healthier world. Whatever your views, I believe that with hard work, disciplined debate, and respect for the complexities of our living world, we can get there. It is your turn to say whether the quest for citizen science is or is not on a sound path to a safer world, as we strive to conduct research that makes a difference in the years to come.

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Résumé

La fréquence et le type d'erreurs et de quasi-erreurs signalés par les infirmières œuvrant en soins de phase aiguë

Michele C. Balas, Linda D. Scott et Ann E. Rogers

Selon la recherche, les taux d'erreurs médicales dans le domaine des soins aux patients en phase aiguë pourraient être très élevés. L'objectif de cette étude descriptive est de déterminer le type et la fréquence d'erreurs et de quasi-erreurs signalées par un échantillon aléatoirement choisi de 502 infirmières en soins de phase aiguë. Des données portant sur des erreurs et des quasi-erreurs ont été consignées quotidiennement dans un journal, pendant une période de 28 jours. Plus d'un quart des participantes ont dit avoir commis une ou plusieurs erreurs et plus d'un tiers ont dit avoir pris conscience d'être sur le point de commettre une erreur. Durant la période ciblée, 224 erreurs et 350 quasi-erreurs ont été signalées. Le type d'erreur le plus fréquent (56,7 %) portait sur l'administration de médicaments. Les participantes ont également signalé des erreurs et des quasi-erreurs de procédure, ainsi que des erreurs de transcription et de consignation au dossier. Ces résultats comportent des conséquences importantes en ce qui a trait à la sécurité des patients en phase critique, une population qui a peu de résilience naturelle ou de capacité de se protéger contre des accidents d'ordre médical.

Mots clés : erreurs médicales, sécurité des patients, soins de phase aiguë, infirmières

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Frequency and Type of Errors and Near Errors Reported by Critical Care Nurses

Michele C. Balas, Linda D. Scott, and Ann E. Rogers

Research suggests that critically ill patients may be at high risk for medical errors. The purpose of this descriptive study was to determine the type and frequency of errors and near errors reported by a randomly selected sample of 502 critical care nurses. Data on errors and near errors were recorded in logbooks daily for 28 days. Over one quarter of the participants reported making an error and more than one third reported catching themselves making an error. There were 224 errors and 350 near errors reported during the study period. The most frequent type of error (56.7%) involved medication administration. Procedural errors and near errors, as well as transcription and charting errors, were also reported. These findings have significant implications for patient safety among a seriously ill population that has little natural resilience or ability to protect itself from health-care mishaps.

Keywords: medical errors, patient safety, critical care, nurses, intensive care

Medical errors are common, costly, and dangerous threats to patient safety. Each year in the United States, 1.3 million patients are injured because of errors during hospitalization and approximately 100,000 deaths are attributed to adverse events and medical errors (Kohn, Corrigan, & Donaldson, 2000; Leape, 1994). Adverse events are unintended injuries or complications caused by health-care management rather than by the patient's underlying condition (Baker et al., 2004; Kohn et al.), while errors are "the failure of planned actions to be completed as intended or the use of the wrong plans to achieve a goal" (Kohn et al.). While the prevalence of adverse events has been estimated to occur during 2.5% to 3.7% of US hospitalizations (Brennan et al., 1991; Thomas et al., 2000), prevalence rates are almost double those figures, occurring during 7.5% of all Canadian hospitalizations (Baker et al.). Furthermore, adverse events have been reported to occur during 10.8% and 16.8% of all hospitalizations in the United Kingdom and Australia, respectively (Vincent, Neal, & Woloshyowych., 2001; Wilson et al., 1995). Each year, adverse events add approximately $750 million to health-care costs in Canada (Kondro, 2004) and between $37.6 and $50 billion in the United States (Kohn et al.).

Critically ill patients may experience higher rates of adverse events and errors than other groups of patients. For example, Berenholtz, Dorman, and Pronovost (2003) estimate that all five million patients admitted to critical care units each year in the United States experience at least one preventable adverse event. Other investigators report that the number of adverse events in critical care settings ranges from 13 to 80.5 per 1,000 patient days (Ferraris & Propp, 1992; Giraud et al., 1993; Osmon et al., 2004; Rothschild, Landrigan, et al., 2005; Rubins & Moskowitz, 1990). The rate of preventable adverse drug events in critical care settings is nearly twice the rate found in non-critical care settings (Cullen et al., 1997).

Actual errors, not all of which result in adverse events, may occur at even higher rates. For example, investigators who used self-report and direct observation to study errors in a medical-surgical intensive care unit (ICU) report a mean of 1.7 errors per day (Donchin et al., 1995). Similarly, the authors of the Critical Care Safety Study estimate that 148,000 serious or life-threatening intercepted and non-intercepted errors occur annually in US teaching hospitals (Rothschild, Landrigan, et al., 2005). Approximately one fifth (19%) of medication errors in critical care are life-threatening (Tissot et al., 1999) and almost half (42%) are clinically important enough to warrant additional life-sustaining treatments (Osmon et al., 2004). Given the advanced age and poor health status of today's critically ill patients (Chelluri, Grenvik, & Silverman, 1995), it is not surprising that these errors are associated with substantial increases in patient morbidity and mortality (Bates et al., 1995).

Because of the potential seriousness of these errors, much of the attention given to medical errors in critical care settings has focused on order-writing errors and medication-administration errors (Herout & Erstad, 2004; Leape et al., 1999; Rothschild, Keohane, et al., 2005; Tissot et al., 1999; van den Bemt et al., 2002). Administering medications, while of utmost importance, is only one facet of critical care nursing practice. Critical care nurses must be alert to changes in patient conditions, properly use numerous types of equipment, and communicate with patients and their families as well as with other members of the health-care team.

Errors are not limited to medication administration; nurses may make errors in performing various procedures, transcribing orders, or charting, or by missing subtle changes in a patient's condition (e.g., failure to rescue) (Clark & Aiken, 2003). In fact, Balas, Scott, and Rogers (2004) found that only 58% of the errors reported by a random sample of US hospital staff nurses were associated with medication administration; the remaining errors were associated with incorrect performance of procedures, transcription errors, or charting errors. Unfortunately, the investigators did not examine the prevalence of errors by type of nursing unit.

Thus it remains unknown whether critical care nurses would report similar numbers of non-medication-related errors and near errors. Nor is it known if the distribution of the medication-administration errors will more closely resemble that of American hospital staff nurses (Balas et al.) or the prevalence of errors made by French ICU nurses (Tissot et al., 1999). While Balas and colleagues found that time-related medication errors were the most common type of medication error (33.6%), followed by administration of incorrect medications (17.2%) and omission of medications (15.5%), French investigators found that the most common errors were those due to physicochemical incompatibility (18.6%) (Tissot et al.).

With these findings in mind, the purpose of this study was to examine the type and frequency of errors reported by a large sample of randomly selected critical care nurses in the United States.

Method

The data for the current study were collected as part of a large American study examining the relationship between fatigue reported by critical care nurses and errors (Scott, Rogers, Hwang, & Zhang, 2006). Since the methodology and sample have been described in detail elsewhere (Scott et al.), they will be only briefly outlined below.

Participants

The sample of 502 registered nurses (RNs) was predominantly female (93%), Caucasian (87%), and middle aged (mean 44 ± 8 years, range 23–66 years), with an average of 17 ± 8 years of experience as a staff nurse (range 0–43 years). Participants worked in a variety of critical care units (Table 1), and most worked 12-hour shifts (88%). Over half the participants reported working during the day (55%), while only a few reported working a rotating shift pattern (12%) or evening shift (2.7%);

Table 1 ***Practice Settings of Nurse Participants***

Type of Critical Care Unit	Frequency (%)
Combined ICU/CCU	188 (38)
Surgical ICU	89 (18)
Intensive Care Unit (ICU)	80 (16)
Coronary Care Unit (CCU)	56 (11)
Pediatric ICU	32 (6)
Medical ICU	31 (6)
Neonatal ICU	5 (1)
Other	18 (4)

the remaining participants (31%) reported working night shifts. Most participants were employed in hospitals with over 300 beds (49.7%), with the remainder employed in hospitals with 100 to 300 beds (41.7%) or fewer than 100 beds (8.6%). These hospitals were located in mainly urban (51.8%) and suburban areas (26.7%), with fewer than one quarter of the participants working in hospitals located in small towns (14.9%) or rural areas (5.8%).

Procedure

During the summer of 2002 a covering letter describing the study and a demographic questionnaire were mailed to a random sample of 5,261 members of the American Association of Critical Care Nurses. Of the 2,184 nurses who expressed interest in the study, only the 1,148 nurses who met the inclusion criteria (e.g., employed at least 36 hours per week as a hospital staff nurse, working in a critical care unit) received two logbooks, directions for completing the logbooks, and postage-paid envelopes for returning the logbooks. Each logbook contained 14 pages, one page for each day of a 2-week period. In all, 382 nurses completed both logbooks (providing 28 days of data) and 120 completed only one of the logbooks (providing 14 days of data). As a result, 502 of the 1,148 eligible nurses provided data for at least 14 days, yielding an overall response rate of 43.7%. Agency nurses, members of a hospital float pool, nurse managers, clinical educators, and advanced practice nurses were ineligible to participate. The participants were paid for their input. All study procedures were approved by the Institutional Review Board at Grand Valley State University (in Michigan) and at the University of Pennsylvania.

Instruments

Each logbook page contained 41 questions. Participants completed the first 17 questions, regarding their sleep, mood, and caffeine intake, every day. The remaining questions, about work hours, drowsiness, and overtime, were completed on days when participants worked. Questions regarding errors and near errors were included, and space was provided for the participants to describe any errors or near errors that might have occurred during their work shift. Participants were first asked to indicate if they had made any medication or other errors during the shift, as well as if they had caught themselves before making an error. They were then asked to describe the episode, including the time of day (or night) when it occurred. Participants were not asked to determine whether the error resulted in patient harm (adverse event), nor were they given a specific definition of what constituted an error. This approach allowed participants to describe any perceived deviations from standards of practice.

As discussed elsewhere (Rogers, Hwang, Scott, Aiken, & Dinges, 2004), these logbooks are considered reliable and were pilot tested prior to their use in this study.

Analysis

Descriptive statistics were used to summarize the quantitative data obtained from the demographic questionnaires and logbooks. Data collected did not include any patient characteristics, diagnoses, or acuity levels, nor did they pertain to the number of patients cared for during the work shift.

All narrative statements regarding errors and near errors were transcribed verbatim. Errors and near errors were then classified using the procedures developed during the initial study on fatigue among hospital staff nurses and patient safety (Balas et al., 2004). The principal investigator identified five mutually exclusively categories — charting errors, procedural errors, medication-related errors, transcription errors, and not specified — and provided these categories and exemplar statements to two other investigators with critical nursing experience and expertise in content analysis. Minimal discrepancies in coding were identified and were resolved with 100% agreement. Similar procedures were used to further subdivide medication-related errors and near errors into six subcategories: wrong patient, wrong drug, wrong dose, wrong route, wrong time, and omission. Medications were considered to have been given at the wrong time if the nurse reported that they were administered more than 30 minutes before or after they should have been.

Results

One hundred and thirty-four nurses (26.7%) reported making at least one error and 190 nurses (37.8%) reported catching themselves making an error at least once, for a total of 224 errors and 350 near errors. Although the majority of nurses who reported making errors described only one error (*n* = 87, 17.3%), 21 (4.2%) reported making two errors, 14 (2.8%) making three errors, and 12 (2.4%) making four or more errors. The findings were similar for near errors, with 115 nurses (22.9%) reporting catching themselves making a single error, 39 (7.8%) catching themselves twice, 22 (4.4%) three times, and 14 (2.8%) four or more times, including one nurse who reported catching him/herself making an error 11 times.

Over half of the errors involved medication administration (56.7%), with procedural errors, transcription, and charting errors being reported less often. Medication errors were also the most common type of error that nurses reported catching (intercepting) (see Table 2).

Table 2 ***Type and Frequency of Errors and Near Errors Reported by 502 Critical Care Nurses***

Type of Error	Number of Errors (%)	Number of Near Errors (%)
Medication	127 (56.7)	99 (28.3)
Procedural	44 (19.6)	16 (4.6)
Charting	3 (1.3)	3 (0.9)
Transcription	2 (0.9)	2 (0.2)
Not specified	48 (21.4)	230 (65.7)
Total	224	350

Although sufficient information was given to categorize the majority of errors (78.6), approximately two thirds of the near errors (65.7%) could not be categorized because a narrative description was not provided. The number and type of errors and near errors by critical care unit is shown in Table 3.

Nearly half of the medication-related errors and intercepted errors (43.7%) involved antimicrobials, antihypertensives, vasopressors, or anti-arrythmics. Other high-risk medications, such as narcotics, anxiolytics, antipsychotics, electrolytes, anticoagulants, and medications for regulating blood sugar, accounted for an additional 28.5% of the total medication-related errors and intercepted errors. Medications with similar names — for example, dobutamine and dopamine, vancomycin and gentamycin, and heparin and hespan — were also regularly cited as being problematic.

As shown in Table 4, over half of the medication-administration errors involved the inadvertent omission of a dose (22.0%) or the administration of a medication later than prescribed (37.8%). Potentially more serious errors, such as administering the wrong dose or the wrong drug, were less frequently reported. In contrast, the most commonly intercepted errors involved either the wrong drug (28.3%), the wrong dose (32.3%), or administering a drug to the wrong patient (17.2%).

Many of the nurses provided information about the reason for their medication error or near error (Table 5). The most common reasons cited included simply forgetting (*n* = 20) or heavy workload, distraction, and high patient acuity levels (*n* = 17). In 19 cases the nurse reported either "missing or misreading the orders" or "having the orders taken off wrong" as the reason for the medication error or near error. Nurses also described not having medications available from the pharmacy (*n* = 3), receiving the wrong dose or the wrong medication from the pharmacy (*n* = 5), and pulling the wrong drug from the medication cart or refrigerator (*n* = 9).

Table 3 ***Number and Type of Errors and Near Errors by Critical Care Unit***

ERRORS

Type		**Combined ICU/CCU**	**Surgical ICU**	**ICU**	**CCU**	**Pediatric ICU**	**Medical ICU**	**Neonatal ICU**	**Other**
Medication	(*n* = 127)	42	29	18	14	8	11	3	2
Procedural	(*n* = 44)	17	9	6	6	2	2	2	
Charting	(*n* = 3)	1				1		1	
Transcription	(*n* = 2)	1					1		
Not specified	(*n* = 48)	6	14	10	8	2	5	2	1
Total	(*n* = 224)	67	52	34	28	13	19	8	3

NEAR ERRORS

Medication	(*n* = 98)	48	13	14	7	6	9		1
Procedural	(*n* = 15)	6	3	3		2			1
Charting	(*n* = 3)	2					1		
Transcription	(*n* = 2)	1			1				
Not specified	(*n* = 230)	98	36	41	29	17	4		6
Total	(*n* = 348)	155	52	58	37	25	14		7

Table 4 *Number and Type of Medication-Related Errors and Near Errors*

Type of Error	Number of Errors (%)	Number of Near Errors (%)
Wrong patient	6 (4.7)	17 (17.2)
Wrong drug	13 (10.2)	28 (28.3)
Wrong dose	26 (20.5)	32 (32.3)
Wrong route	5 (3.9)	3 (3.0)
Wrong time	48 (37.8)	13 (13.1)
Omitted dose	28 (22.0)	6 (6.1)
Not specified	1 (0.8)	0 (0)
Total	127	99

Table 5 *Narrative Examples of Medication Errors and Near Errors*

Wrong patient

"Answered call light IVPB for another patient in hand and started to hang in room where I answered call light." (Combined ICU/CCU)

"Almost gave drug on wrong patient. Busy critical care unit." (Surgical ICU)

"Gave digoxin to wrong patient." (Surgical ICU)

Wrong drug

"Nearly bolused patient with dopamine which was connected to normal saline." (Combined ICU/CCU)

"I needed to give 64 [units] Regular insulin; I grabbed the vial of NPH and noticed it was the wrong vial when I went to draw up the med." (Other, neuro ICU)

"Hung the wrong antibiotic on a septic patient." (CCU)

"I hung a Primacor [milrinone] drip for amiodarone, I caught the mistake before any infused." (Surgical ICU)

Wrong dose

"Very busy time of day. I almost gave an antibiotic that had been D/C. I was distracted." (Medical ICU)

"Could not figure out how to figure rate for vasopressin. …repeatedly kept forgetting vasopressin name." (Surgical ICU)

"Changed IV bag. Levophed [norepinephrine]. Did not initially realize that concentration was different." (Surgical ICU)

"Switched rates on dopamine and D5LR rates. 15 minutes [later] error was caught." (Combined ICU/CCU)

"Morphine dose to be given was drawn up at twice the ordered dose because RN forgot to dilute." (Neonatal ICU)

"10X the amount of med ordered." (Pediatric ICU)

Wrong route

"Gave Phenergan [promethazine] IV instead of IM as ordered." (CCU)

"Order for Demadex [torsemide] 20 mg PO written. Entered and verified for IV route. Given IV. Error caught during 7 pm report and chart review." (CCU)

"Route of heparin dose difficult to read [on] MAR so gave SQ instead of IV." (Surgical ICU)

Wrong time

"At 0900, I was so busy with patient care, I almost forgot to get their meds out on time." (ICU)

"Messy med sheet. Almost gave a noon Lopressor [metoprolol] at 10 am instead of 12 noon." (Combined ICU/CCU)

"Missed physician order for new medication. Gave med 3 hours late." (Combined ICU/CCU)

"Medication late because it had not been delivered by pharmacy." (Medical ICU)

"Forgot to unclamp IV antibiotic. Antibiotic given late due to this." (Surgical ICU)

"I was too busy to get 0900 meds out on time. Some weren't given until 11 am." (Combined ICU/CCU)

"Nitroglycerin patch due at 10 pm was given at 1130 pm because I was unable to leave my other patient's room and no else could help." (Medical ICU)

Omission

"Had an antibiotic due at 11 am. Had admission of very ill patient at 330 am who required my full attention." (Combined ICU/CCU)

"Missed med during and after patient code. Med was an antibiotic." (Combined ICU/CCU)

"Patient had a very large list of meds. Almost missed one pill due to pill not being available at due time and extended wait for medication." (Pediatric ICU)

One of the more interesting reasons given for intercepting an error appeared to be associated with correct storage of medications — for example, "JCAHO was in-house and we were not keeping patient medications at the bedside. [I] almost hung [the] other patient's naficillin instead of ancef which was due."

Although most errors and intercepted errors involving intravenous (IV) medications and fluids were categorized as medication errors, others were considered procedural errors. For example, pump-programming errors and attaching medications to the incorrect IV lines were considered medication errors, whereas inserting intravenous catheters (IVC) in patients who did not need them, inserting an IVC in the wrong arm, flushing IVs with the wrong solution, labelling incorrectly, and inadvertently disconnecting lines were considered procedural errors. In addition to being the most frequently reported procedural error and near error, mishaps involving IVs could, in many cases, have had serious if not fatal consequences. For example, a nurse with over 30 years' experience as an RN reported, "[My patient] just returned from the OR, restless. [I was] looking for IV access on tubing different from institutional norm and almost put MS into [the] ICP drain." Another participant reported, "Soon after I turned [my] patient, [his] BP [dropped into the] 70s. [I]thought [it was] due to morphine. Fifteen minutes later [I] found [the] levophed had been disconnected."

Other procedural errors and near errors were associated with laboratory procedures (*n* = 10) and the use of various types of equipment (*n* = 9). Nurses reported forgetting to draw blood specimens, either failing to report or failing to act on abnormal laboratory values, forgetting to draw drug levels, and accidentally discarding or inappropriately labelling laboratory specimens. They also reported errors and near errors with the use of equipment such as Swan-Ganz catheters, patient-controlled analgesia (PCA) pumps, intracranial drains, dialysis machines, rapid transfusers, chest tubes, epidural catheters, pacemakers, and even Foley catheters.

As with the medication category, most nurses attributed their procedural errors and near errors to forgetfulness, distracting environments, problems concentrating, or high patient acuity levels. Less frequent causes of procedural errors and near errors were the use of unfamiliar devices and difficulties with, or a lack of knowledge regarding, procedures for programming IV pumps.

Discussion

The results of this study suggest that errors and near errors are common in critical care settings. Slightly more than one quarter (26.7%) of the critical care nurses in the sample reported making at least one error and

37.8% reported making at least one near error in the 28-day reporting period. If these results were extrapolated to a 1-year period, errors and near errors for this sample of 502 RNs would total 7,482 incidents. Although patients in critical care units typically require more medications and procedures than patients in general care units, the number of errors and near errors found in this study are only slightly higher than those found in a similar study examining the prevalence and nature of errors and near errors reported by staff nurses employed in a variety of hospital units (1.2 incidents/nurse vs. 1.0 incidents/nurse) (Balas et al., 2004).

Medication errors were the most frequent type of error reported by critical care nurses in the present study, and were quite similar, in terms of percentage, to medication errors reported in an earlier study (Balas et al., 2004) (56.7% vs. 57.7%). The majority of medication errors in the present study were associated with the administration of drugs at the wrong time (37.8%) or the omission of a prescribed medication (22.0%), again mirroring the findings of the earlier study (Balas et al.). Dosage errors and errors involving the wrong drug, wrong patient, or wrong route were less common. In fact, the number of wrong-time errors (37.8%) reported in this study is quite similar to the 40.5% time-related medication administration errors reported in two Dutch critical care units (van den Bemt et al., 2002), but much higher than the 3.7% reported in a French ICU (Tissot et al., 1999). Although Tissot and colleagues attributed the low rate of time-related errors in their observational study to having predefined times for administering all oral and injectable medications, most critical care units in the United States share this characteristic for administering routine medications. While time-related errors are usually considered less critical than other types of medication error (van den Bemt et al.), 55% of the wrong-time errors observed in the French ICU during the 30-day study period were judged clinically significant due to interruptions in therapeutic effects over a 24-hour period (Tissot et al.).

Most incidents in the sample involved antimicrobials and antihypertensive, vasopressor, or antiarrythmic agents. While this finding is not surprising, since these drugs constitute a high proportion of the medications administered to seriously ill patients, their inadvertent omission or ill-timed administration can have significant clinical implications. More surprising was the frequency of errors with medications recognized as high risk. These included insulin, potassium, and anticoagulants such as heparin and warfarin sodium. While strategies suggested by the Institute of Medicine (Kohn et al., 2000), such as implementing computerized physician order entry and unit dosing, having high-risk medications supplied by the central pharmacy, not storing concentrated solutions of hazardous medications on patient-care units, and including pharmacists in patient-care rounds, have been implemented in some critical care units, these practices are not universal.

This study also revealed that procedural errors, although rarely studied, are very common in the critical care setting. Most procedural errors and near errors involved IV fluids and catheters. While some of the mistakes in this category could, arguably, be categorized as medication-administration errors, there are several reasons for categorizing them as procedural errors. Mistakes such as inserting IVs into patients who do not require them, mixing/pushing medications in incompatible IV fluids, or forgetting to unclamp IVs do not necessarily fit neatly into one of these categories. It was also believed that some of the errors and near errors reported by participants — for example, flushing IV lines with saline instead of heparin, incorrectly labelling IV lines, or monitoring IV insertion sites — may have been violations of institutional procedures rather than universally accepted practices.

Some procedural errors and near errors were clearly violations of accepted practice and could have led to significant complications. For example, one participant described the following situation: "Yesterday, when changing a pleuravac [chest tube] at shift change I needed to give general report, I forgot to unclamp it. Caught by night shift nurse and brought to my attention this AM." In terms of patient safety, moreover, these incidents appeared equally as dangerous as, if not more dangerous than, many of the medication errors reported by participants. Although two studies (Beckmann et al., 2003; Osmon et al., 2004) suggest that delays or omissions of prescribed non-medication treatments or diagnostic tests are one of the most common types of error reported in the critical care setting, delays or omissions of prescribed treatments were rarely reported by participants in the present study.

The present study is one of the few investigations in which nurses were asked to report incidents of catching themselves making an error (near error). Error interception is rarely mentioned in patient safety research, and when it is studied the focus is usually on the detection of order-writing or dispensing errors (Leape et al., 1995). It is obvious, however, that the nurses in this study, like those who participated in the first phase of the Staff Nurse Fatigue and Patient Safety Study (Balas et al., 2004), were vigilant and careful, preventing a large number of errors from reaching the patient. What is not known, however, is if the large number of near errors (n = 350) compared to actual errors (n = 224) reported represents the actual proportion of near errors to errors or a greater reluctance on the part of nurses to disclose having made an error. Nor is it known what kinds of error were most frequently intercepted, since participants provided information on only one third of the near errors. However, given the results of this study, as well as previous results (Balas et al.), one can assume that the majority of the non-specified near errors involved medication administration (230 non-specified near errors x 56.7% = 130 intercepted medication-related errors).

Numerous studies have shown that nurses often under-report errors because they fear disciplinary action (Osborne, Blais, & Hayes, 1999; Wakefield, Wakefield, Uden-Holman, & Blegen, 1996). In fact, traditional error-reporting systems are believed to capture information on only the most serious life-threatening errors (Leape et al., 1995; Osborne et al.; Wakefield et al.). We believe that the blinding of the present researchers to participant and employer identification served to reduce the fear of disclosure, allowing participants to more freely report errors. However, it is acknowledged that our failure to collect data on participants' place of employment limited comparison between units in the same institution, between types of institution (e.g., teaching and non-teaching hospitals, for-profit and not-for-profit hospitals), and among units of different types or with different levels of patient acuity and/or staffing ratios.

It is also acknowledged that the self-report method used in this study may not have captured information on all the errors and near errors that occurred during the 28-day data-gathering period. Participants may not have been aware of making an error, or may not have taken the time to describe a case of making or intercepting an error. The latter may partly explain the high number of instances where participants indicated that they caught themselves making an error but did not describe the situation (65.7%). It is also possible that, since nurses in the United States are usually required to report actual errors but not intercepted errors, participants did not see the importance of describing near errors.

Critical care nurses make multiple decisions, during the course of each day, that have the potential to either elevate or diminish the likelihood that their patients will experience a medical error. Participants in the present study reported that their decision-making ability and performance were frequently affected by factors such as high patient acuity levels, distractions, and the need to juggle multiple tasks. Also, it is to be expected that medications such as vasopressors and antiarrythmics, which require complex calculations and patient monitoring in a distracting critical environment, will be more frequently involved in errors and near errors. In some cases nurses may have had to prioritize their administration of medications, choosing one agent over another and judging medications such as antibiotics as less important. One participant stated, "Missed med during and after patient code. Med was an antibiotic."

While little is known about the effect of staffing patterns, workload, and medical error in critical care units in the United States, research from the United Kingdom and France suggests a causal relationship between these factors and increased mortality risk (Giraud et al., 1993; Tarnow-Mordi, Hau, Warden, & Shearer, 2000). Results of studies with US hospital nurses employed in a variety of units support this presumption (Aiken, Clarke, Sloane, Sochalski, & Silber, 2002; Kovner & Gergen, 1998; Needleman, Buerhaus, Mattke, Stewart, & Zelevinsky, 2002). Participants in the present study reported being unable to count on their colleagues for help — "I was unable to leave my patient's room and no one else could help out" — and only on one occasion mentioned a colleague discovering their error. Fatigue and long work hours could also have been a contributing factor (Rogers et al., 2004; Scott et al., 2006).

Future research should include assessments of patient acuity, staffing, and institutional factors (e.g., hospital size, number of critical care beds, type of hospital), as well as revision of the data-gathering tool. Modifications might include the addition of the operational definitions of error and near error, use of predefined categories with forced responses, and perhaps the addition of a category to capture communication issues. Comparisons between types of unit and identification of factors predictive of errors in each type of unit would also be helpful for the development of error-reduction strategies.

In summary, a large number of errors and near errors were reported by RNs employed in the critical care setting. While many of these episodes involved medication administration, an almost equal number involved other nursing functions. These errors and near errors were often attributed to factors such as distraction, high patient acuity levels, and communication failure. Critical care nurses need to take an active role in designing and implementing strategies for improving patient safety. Identifying, acknowledging, and understanding the frequency and types of errors that may occur in critical care nursing practice is an integral step in fostering a paradigm shift from a culture that is punitive to one that rewards efforts to maximize patient safety.

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Résumé

Les conséquences d'une crise sanitaire nationale : une exploration qualitative de l'expérience des infirmières communautaires face au SRAS

**Sherry M. Bergeron, Sheila Cameron,
Marjorie Armstrong-Stassen et Karen Pare**

Nous avons mené cette étude dans le but d'approfondir notre compréhension de l'effet provoqué par la crise du SRAS sur le travail et la vie personnelle des infirmières communautaires. Afin de connaître leurs perceptions à ce sujet, nous avons sondé 941 infirmières communautaires employées dans différents services de santé de la province de l'Ontario au Canada. Les données qualitatives recueillies ont été organisées en thèmes et sous-thèmes selon deux catégories : *L'expérience* en tant que telle (récits sur les opérations, l'organisation de l'intervention et le vécu personnel) et *Les leçons tirées de l'expérienc*e (occasions d'apprentissage personnel, de formation professionnelle, d'élaboration des politiques et réflexion sur les enjeux politiques et administratifs). Les résultats sont analysés sous l'angle des enseignements suscités par la crise à l'échelle locale, nationale et internationale. Le rôle de facteurs comme l'efficacité de la communication, la coordination des interventions d'urgence et la formation sont examinés à la lumière des politiques et des réactions administratives face au protocole à observer en cas de maladie infectieuse. Une réflexion d'une grande pertinence en ces temps où la crainte de nouvelles pandémies refait surface.

Mots clés : SRAS, infirmières communautaires, maladie infectieuse

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Diverse Implications of a National Health Crisis: A Qualitative Exploration of Community Nurses' SARS Experiences

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The purpose of this study was to enhance our understanding of the influence of the SARS crisis on the work and personal lives of community nurses. A total of 941 community nurses employed in a range of health-care settings in the province of Ontario, Canada, provided qualitative information about their perceptions of the impact of SARS in their workplace and in their personal lives. Themes and subthemes from the data were organized into 2 categories: *The Experience* (operational, organizational, and personal narratives), and *Learning from the Experience* (opportunities for personal learning, professional and policy development, and insight into policy and administrative implications). The findings are discussed within a framework of the learning opportunity presented by the crisis at the local, national, and international levels. The roles of effective communication, emergency response coordination, and education are considered with respect to policy development and administrative responses to infectious disease protocol. The findings are particularly relevant at this time of heightened fear of global epidemics.

Keywords: SARS, community nursing, infectious diseases, qualitative methodology

Headlines warning of potential threats to public health dot the landscape of local, national, and international media. Effective emergency response is essential, especially in light of the continuing threat of new epidemics such as avian flu. The outbreak of SARS (severe acute respiratory syndrome) presented an opportunity for Canadians to examine our practices, policies, and procedures at both the local and the provincial level. Apart from the Asian Pacific region, Canada was the country most severely impacted by SARS (Gottlieb, Shamian, & Chan, 2004). The experience not only tested the capacities of many distinct sectors of health-care provision (Emanuel, 2003) but also challenged Canada's entire health-care system (Bernstein, 2003). Review of this experience and identification of systemic strengths and weaknesses can guide us in preparing for future epidemics and other demands on our health-care system (Wenzel & Edmond, 2003).

In this article we report on a study conducted to explore the effect of the SARS experience on the lives of community nurses in the province of Ontario and to offer suggestions for how this information may be used to enhance our public health system.

In Canada, SARS was first reported in March of 2003 (McGillis-Hall et al., 2003). In May of 2003 it was estimated that health-care workers constituted an alarming 65% of the probable cases of SARS in Canada (Emanuel, 2003). Nurses are in contact with patients for longer periods than any other group of health-care providers (Chan, 2003) and therefore are disproportionately exposed to factors that can affect their health and well-being. This close and extended contact places nurses at the greatest risk among health-care workers for exposure to infectious diseases.

The uncertain nature of SARS and the speed at which it spread produced stressful environments and required constantly evolving health practices (Maunder, 2003). The media attention on the outbreak led to a stigmatizing of health-care workers (McBride, 2003). Health-care workers were quarantined, scrutinized, and shunned within the community, compounding their own anxiety about the threat of SARS (Fletcher, 2003). Psychological reactions to SARS ranged from fear, anxiety, and frustration (Maunder et al., 2003) to psychological trauma (Hurst, 2003). However, despite the personal risk associated with providing health care, nurses continued to tend their patients (Chan, 2003). The Registered Nurses Association of Ontario has lobbied for systematic evaluation of the effect of SARS on the nursing profession and on nurses working in Ontario (Falk-Rafael, 2003).

In examining the personal experiences of acute-care nurses with the crisis in the workplace, Mavromichalis (2003) found stress, fear, uneasiness about the unknown nature of SARS, and shunning by the community. Overall, the author concludes, it was a sense of community and teamwork, a supportive workplace, and the ability to rely on each other that got the nurses through the crisis. Similarly, themes of fear — primarily fear of contracting or transmitting SARS — stress, and exhaustion emerged in Jonas-Simpson's (2003) interviews with nurses who cared for probable SARS patients at Sunnybrook and Women's College and Health Sciences Centre in Toronto. A co-worker's diagnosis of probable SARS was a source of distress that often led to feelings of devastation and shock. Many respondents in the Jonas-Simpson study used war analogies to describe their experiences with the outbreak. The author reports that support and understanding of colleagues were the most commonly cited factors that helped the nurses to cope during the outbreak, with involvement of managerial staff and open communication being crucial to the perceived sense of support.

In a study with 2,001 employees (26% of whom were nurses) of Sunnybrook and Women's College and Health Sciences Centre, Nickell and colleagues (2004) found that nurses were most concerned with their own health and reported significantly higher levels of emotional distress than employees in other occupations. However, nurses also cited positive outcomes of the SARS crisis. These included increased awareness of disease control, a sense of cohesion among staff members, and learning opportunities provided by the SARS experience.

Finally, in a study with staff members in a teaching hospital affected by SARS, Maunder and colleagues (2003) found a fear of contagion among both staff and patients, with personnel reporting health-related anxieties and concerns similar to those of quarantined patients; the discouraging of staff members from interacting with the public at a time of dire need for emotional support and reassurance intensified the negative emotional experience.

Although information on the experiences of hospital nurses contributes to our understanding of the effects of SARS, it is also imperative that we broaden our scope beyond the hospital setting, to address future outbreaks more comprehensively (Sim & Chua, 2004). Nurses in community settings such as public health and home care were also affected by this health emergency, and their experiences may differ from those of nurses employed in acute-care settings. Through this qualitative analysis of the impact of the SARS outbreak on the professional and personal lives of community nurses, we were able to uncover perceptions that otherwise may not have been recorded given the novelty of this type of threat. The non-financial costs of the SARS outbreak for health-care workers have not been adequately explored (McGillis-Hall et al., 2003). The present study serves to narrow this gap in the literature and may help us to better understand the diverse implications of a national health crisis.

Method

Ethics approval for the study was obtained from the University of Windsor Research Ethics Board. The questionnaire, part of a larger survey examining workplace factors affecting retention of community nurses, asked participants about the impact of SARS in their workplace and in their personal lives. Specifically, in a two-part open-ended question, respondents were asked, "How would you describe (a) the impact of SARS in your current workplace, and (b) its effect on you personally."

Questionnaires were mailed to 3,000 community nurses randomly selected from the Registered Nurse database of the Ontario College of Nurses. A total of 1,519 questionnaires were returned, for a response rate of 50.6%. Of those, 999 (65.2%) included the SARS information sheet (941 of these were useable, with the remaining 58 being returned incomplete or illegible). All written responses were included in the analyses. For work settings, 898 respondents provided information; settings included public health (n = 290), home care (n = 280), Community Care Access Centres (n = 197), nurse practitioner (n = 15), and "other" (i.e., clinics) (n = 116).

All responses to the SARS items were transcribed and imported into N6 (QSR, 2002), a computer program for qualitative research analysis, and a thematic analysis was conducted. Text units with shared meaning or expressing similar sentiments were grouped and major themes were identified, sorted, and coded using open and axial coding. Further analysis and coding resulted in the identification of subthemes. Comments that referred to more than one category were coded under all relevant categories. Response prevalence was also noted.

Results

The nurses' comments fell into two overarching categories: those referring to some aspect of the experience of SARS *(The Experience),* and those reflecting what might be learned from the experience *(Learning from the Experience).* Under each of these categories, three broad themes were identified. *The Experience* category comprised operational, organizational, and personal dimensions. *Learning from the Experience* included learning opportunities, professional development opportunities, and opportunities for gaining insight into policy and administrative implications.

The Experience

Operational dimensions of nurses' SARS experience related to the work of community nurses and represented a number of workplace challenges. Workload issues represented by far the most commonly reported impact of SARS, with 66% of respondents citing increased hours and weekend shifts, increased paperwork, staff shortages, program stoppages, and additional work relating to patient and visitor screening and the mandatory use of gowns and masks. Some nurses felt that they were "drowning in paper" and that disruption of program delivery negatively affected their relationships with partners and clients as well as workplace morale.

Some respondents focused on the long hours and uncertain, anxiety-provoking working conditions. "I became very moody and irritable," wrote one nurse. "Neglected my family due to stress. It was a nightmare." Others expressed dissatisfaction with the expectation that they work extended hours and a belief that their employers had taken advantage of them. Screening and precautionary procedures instituted in response to the crisis created unique problems for community nurses: "We were asked to gown, glove and goggle and mask for every client. That's a joke! Maintaining isolation protocol going from car to house — back to car, client to client, is impossible."

In addition to the anticipated consequences of a disease outbreak, including the threat to public health, the redirection of health-care resources to meet the demands of SARS also resulted in difficulties with other health-related issues. Expanding on the effects of short-staffing, one nurse wrote, "Personally, [I feel] vindicated. [I] have been 'preaching' for many years that [having only] skeleton infectious diseases staff in hospital, public health etc. spells disaster."

Increased levels of stress were frequently associated with workload issues. Changing directives, a perceived lack of direction, and a shortage of staff and resources took a toll on nurses and their families: "Every one of us has made personal sacrifices...in terms of time, physical, mental, and emotional energy."

An operational aspect identified in 13% of the comments related to nurses' interactions with members of the public. The nurses not only had to deal with anxious and frustrated clients, but felt that they were at the mercy of the honesty of their clientele. Some participants had difficulty trusting clients to answer screening questions honestly and to abide by quarantine rules. The effect of visitor restrictions on clients' well-being was also a concern, as illustrated by the comment of one frustrated nurse: "Money talks even during SARS. If my office patients could be screened by the hospital surely family members…[of] long term care patients could have been as well." Participants also described their feelings about the role of the public in responding to and complying with SARS-related directives:

> *My experience in the workplace regarding lack of compliance from clients in quarantine orders also makes me angry and afraid. I feel that even after all the work of ALL health care professionals, this issue may be impossible to be contained without support of public.*

Finally, some community nurses reported feeling isolated from friends, family, and the public and receiving negative comments stemming from people's fear of contracting SARS. Home-care clients refused visits from nurses because of the threat of exposure, people in nurses' social networks withdrew invitations to social events, and clients made remarks about the threat of catching SARS directly from nurses.

Together these experiences offer some insight into the impact of the SARS crisis on the daily work and personal lives of community nurses.

Organizational dimensions of nurses' SARS experience were cited less frequently (21%) than operational dimensions or factors relating to the work itself as opposed to the work environment. Organizational dimensions included those related to the dynamics and culture of the work environment. Although negative organizational experiences outweighed the positive at a rate of approximately 3 to 1 (17% vs. 5%), it may be that respondents found only negative experiences worthy of mention. Experiences that were directly related to the organizational environment were leadership, communication, resource allocation, professional recognition, and feeling supported.

The nurses felt organizationally supported when management considered their safety concerns and provided them with options if clients or situations made them feel unsafe. The nurses relied on their superiors to institute regulatory response initiatives to protect them from SARS. One nurse wrote, "We were kept informed as Ministry information and directives were available. SARS kits and necessary instructions on wearing of protective equipment [were] readily available." However, many nurses contrasted information provided by their superiors with inconsistent messages, ineffective communication, and a lack of consensus in the identification of priorities, causing concern about miscommunication and a lack of organizational support, as illustrated in the comments of a home-care nurse:

> *I felt like my agency was putting my life in danger and could not care less about it.... I will never forget the day I was threatened by my supervisor as long as I live. It completely convinced me that my agency is only interested in the contract and not my health and safety.*

The respondents described instances of both adequate and inadequate provision of proper protective gear to nurses and, in some cases, to clients. Failure to provide necessary resources in a timely manner had implications for public health:

> *One of the most frustrating and frightening aspects of the SARS outbreak was the fiasco regarding the delivery of masks for people in quarantine. They depended on volunteers to deliver them and they didn't get there for days after their quarantine was over and many of the clients were angry (rightfully so) that they had possibly put their family members' health in jeopardy.*

The final topic encompassed by the organizational dimensions of the impact of SARS was professional recognition. Some respondents felt that their contributions were valued and recognized in both tangible and intangible ways. Many nurses highlighted the latter, indicating that the SARS experience was a positive one, with people pulling together and the health department playing a visible role. Others, however, wrote that they felt unappreciated, that their personal sacrifices and risks went unacknowledged. Some respondents reflected on the implications of their experience for the nursing profession, expressing a need for action to address systemic health-care issues and policies:

> *The SARS epidemic changed my view of nursing in Ontario. I finally realized that nurses were undervalued, underappreciated and undercompensated for the risks they take on daily to provide adequate healthcare to their clients. I hope the provincial and federal governments will use this opportunity to increase funding to the healthcare system.*

Personal dimensions of nurses' SARs experience. The respondents' SARS experiences also reflected substantial personal implications of SARS for community nurses. They highlighted the emotional toll by citing the stress and frustration they experienced during the crisis and the personal sacrifices or costs associated with working under such conditions. Fifty percent of the comments described this type of experience.

Of the personal dimensions of the SARS outbreak, emotional toll accounted for the majority (30%) of the experiences described. Many of the comments reflected a fear of contagion, of infecting one's family and friends. One nurse wrote that the assumption of personal risk "makes you realize that you are putting your family at risk and is making me think that perhaps nursing in the community is not the safest type of nursing out there." The respondents' sense of vulnerability to this risk varied according to their personal circumstances and the perceived consequences of exposure. For example, a single parent recounted:

> *I feared exposing myself or my child to SARS. There was an incident where lack of others following protocol could have led to my possible exposure. I called my mother to collect my child and…stayed at work until this was done. I thought about what might happen to him if I died. Who would care for him?*

Empathy with as well as fear and concern for health-care providers in the Greater Toronto Area and SARS-affected areas were identified frequently: "…concern for my hospital colleagues who have had it way worse than PH [public health] Units"; "the emotion I felt especially with the death of 2 healthcare workers is heart wrenching — it could have very easily been a person I worked with had the outbreak occurred in my area of the country."

The unknown nature of SARS unsettled even the most experienced nurses: "Not too many infectious diseases have frightened me over the years (34 yrs since graduation) but this one has!" Such fears led some nurses to reconsider their jobs and to worry about future outbreaks.

In addition to the job-related effects of the increased workload, SARS caused difficulties for community nurses trying to manage the competing demands of work and family. This was a great source of distress: "Bottom line, it is my problem to pay for the additional hours of child care if shifts are required to be filled." The juggling of work/family demands often had personal costs: "I rarely saw my husband and when I did I had little energy left for him. The strain almost cost me my marriage." Nurses described personal sacrifices such as having to discontinue PhD data collection and paying an additional year of tuition, or experiencing loss of income due to reduced home visits.

Finally, some respondents shared information about somatic experiences that they linked to the SARS outbreak, describing nightmares, insomnia, loss of appetite, tension, and headaches. One nurse wrote, "I have found myself to be more tense, irritable. I am seeing a significant impact on my health." Another stated, "I started having more nightmares re being yelled at by clients and managers. I developed aches and pains."

Atypical Responses

The attitudes of very few nurses diverged from those reported above. For example, only 12 of the 941 respondents indicated that they believed the attention generated by SARS was exaggerated: "[I] thought [it was] overkill — goggles etc. [People had] unrealistic fears." Finally, some community nurses indicated that SARS had little or no effect on their lives professionally (17%) or personally (12%). In most cases this lack of impact was attributable to geography rather than type of nursing environment.

Learning from the SARS Experience

Interwoven throughout the responses of this sample of community nurses was an emphasis on learning everything possible from the SARS experience in order to prepare for future outbreaks and to improve healthcare delivery. Included in the second overarching category, *Learning from the Experience,* were learning opportunities on personal, institutional, and global levels, professional development opportunities, and opportunities for gaining insight into policy and administrative implications. These positive learning outcomes were cited in 50% of the comments that referred to the organizational dimensions of the SARS experience.

Learning opportunities. Many community nurses saw the SARS outbreak as a unique opportunity for personal, institutional, or global learning. At the personal level, respondents viewed the working conditions imposed by SARS as challenging and exciting, allowing for the "honing" of nursing skills. Many nurses believed that the knowledge gained would provide insight into preparedness issues.

At the institutional and global level, respondents cited the need to capitalize on the SARS experience in order to develop or refine policies, directives, and protocols as well as to attend to areas of weakness revealed during the crisis. "Nursing," one respondent concluded, "is the critical link in protocol and advocacy for knowledgeable client populations. Recognition for this role should be a result of SARS." Some nurses wrote that the problem extended beyond the SARS experience: "SARS is a 'wake up' call to [ensure] that sufficient resources are in place to deal with the…unknown (...future disease e.g., pandemic flu...)." One of the most frequently cited positive effects of the crisis was the exposition of flaws in the public health system, opening up opportunities to more adequately address areas of weakness.

Professional development opportunities. Another perceived positive effect of the crisis was the opportunity for professional development. Some respondents pointed out that managers and staff worked together for a common goal. Many nurses appreciated the chance to work with others, increase communication across different sectors of the health-care system and health-care professions, and develop collaborative relationships with physicians, agency inspectors, investigators, and public health nurses. Some respondents gained a new perspective on nursing as a career. McGillis-Hall and colleagues (2003), in their analysis of the media coverage of the crisis, found that military analogies were common both within the media and within nursing. This was also true of some community nurses, especially with reference to nurses working in hospitals: "Nurses have truly been heroes during this time, they have put themselves on the line for their clients and patients"; "…profound respect for those nurses who worked on the front lines in this crisis."

Opportunities for gaining insight into policy and administrative implications. Many aspects of the crisis led respondents to consider policy and administrative responses to SARS. One frequently cited factor was a renewed and heightened awareness of potential infectious agents. The acknowledgement that similar viruses will emerge in the future suggested a renewed commitment to vigilance with regard to disease control.

Broader areas in need of improvement (i.e., prevention initiatives) and recognition (i.e., the critical role of public health) were also identified, as well as the importance of education in public health. Some comments referred specifically to areas of improvement at the practice and organization levels, and outlined how the SARS experience could address these shortcomings, while others dwelled on the role of nurses in achieving the needed improvements:

> *We, as nurses, need to be actively involved at all levels; we need respect for what we do and know; we need to ensure our younger colleagues know how to express themselves adequately — how to negotiate — how to insist and resist being swept along by others' opinions when they do not agree.*

The respondents also expressed the opinion that, despite all precautions, emergencies do happen and vigilance is needed in the development of emergency initiatives. Many nurses remarked on the benefits of having an emergency plan in place and expressed the view that risk-management measures and emergency planning had served the public well during the SARS crisis.

Discussion

The results of this study address the gap in the literature concerning the effects of disease outbreaks on community health-care providers. Although the nurses' experiences reported here are specific to SARS, similar experiences may be expected for the outbreak of other infectious diseases that require isolation or precautionary measures. The strengths and weaknesses in practices and policies reported by the community nurses in this study may help to guide us in preparing for future epidemics and other demands on our health-care system. The response to SARS described by these nurses exposes both positive and negative aspects of public health infrastructures, risk-management strategies, and emergency response initiatives. The reported lack of coordination among the many groups of administrators, managers, and providers illustrates the dire need for emergency planners to consider the fallout from uncoordinated efforts and untimely or ineffective communication. Communication was a pivotal factor in the experiences of this community nursing sample. Changing directives, isolation protocols, and organizational support are all areas that were identified as significantly influenced by the quality of communication. Attention to the development of sound and effective communication practices — especially in community nursing, where practice is often decentralized — offers promise as a fundamental component of emergency planning.

The response to outbreaks of diseases such as SARS not only has serious implications for our health-care system and for public health but also takes a toll on the lives of health-care workers. At a time when staff shortages are adding tremendous stress to the lives of health-care providers and are taxing the health-care system, health emergencies can push the limits of sustainability. Many community nurses cited a supportive environment as helping them to cope with the stress and demands of SARS. Institutional, organizational, and collegial support, both practical and emotional, served to ease nurses' burden during the crisis, not least because it helped them to avoid the negative consequences of any perceived lack of support. The establishment of an integrative support network may help health-care workers to negotiate the physical and emotional demands of health emergencies such as SARS. The isolation felt by many nurses and the negative reactions to which they were subjected are clearly unacceptable. Further, the complexity of having to deal not only with clients but also with the community in general points to the need for the education of health professionals and the public alike. Concern about public compliance and uncertainty about risk management must be met with vigorous enforcement of emergency protocols. Health-sector personnel and the public must work together to minimize risk.

Finally, we concur with Maunder (2003) that the SARS experience should be used to examine such issues as organizational culture, the fostering of collaboration, and the effectiveness of our health-care systems. Societal factors such as fund allocation and resource commitment place parameters around what is possible (O'Brien-Pallas, 2002), but government and institutional resource allocation must allow for the full execution of emergency planning if we are to — as urged by Health Canada (2003) — achieve the goal of a "seamless public health system."

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Résumé

Des contractions de Braxton-Hicks à l'accouchement prématuré : la constitution du risque pendant la grossesse

Karen MacKinnon et Marjorie McIntyre

L'introduction récente de programmes de prévention des accouchements prématurés a modifié notre perception du phénomène des contractions survenant pendant la grossesse. Elle a aussi donné lieu, en matière de reconstitution des risques, à une approche qui tend à faire augmenter le nombre de femmes considérées à risque d'accouchement prématuré. Cet article présente les résultats d'une ethnographie institutionnelle menée dans le but d'analyser l'influence des discours sur le risque sur l'expérience des femmes qui accouchent prématurément. L'étude visait notamment à décrire l'effet des discours sociaux, des structures institutionnelles et des interventions infirmières sur la vie quotidienne de ces femmes. Les discours sur le risque exercent un contrôle social sur les femmes enceintes, selon les auteures. En effet, ils alimentent la crainte et la culpabilité, l'impression d'être jugée ou punie et le sentiment d'être personnellement investie de la responsabilité de prévenir un accouchement prématuré. L'étude fait aussi ressortir l'influence des constructions biomédicales du risque et de l'accouchement prématuré sur l'organisation des services de santé, dont la prestation des soins infirmiers.

Mots clés : risque, accouchement prématuré, discours social, ethnographie institutionnelle

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From Braxton Hicks to Preterm Labour: The Constitution of Risk in Pregnancy

Karen MacKinnon and Marjorie McIntyre

With the recent introduction of preterm birth prevention programs there has been a shift in our understanding of what the presence of contractions during pregnancy means and a reconstituting of risk in ways that position increasing numbers of women at risk for preterm birth. This paper highlights the findings of a study exploring the influences of risk discourses on women's experiences of preterm labour. The primary goals of this institutional ethnographic study were to describe the effects of societal discourses, institutional structures, and nursing work processes on the everyday lives of childbearing women experiencing preterm labour. The findings suggest that risk discourses exert social control over pregnant women and result in fear, guilt, feelings of being judged or punished, and an overwhelming sense of personal responsibility for preventing preterm birth. The study also exposes ways in which biomedical constructions of risk and preterm labour affect the organization of health services, including nursing practice.

Keywords: risk, preterm labour, discourse, disciplining effects, institutional ethnography

> The uterus is able to stretch in this way because progesterone encourages relaxation of smooth muscle but even at 8 weeks gestation the uterus begins to generate small waves of contraction known as Braxton Hicks contractions. These are usually painless although some women do experience pain. Braxton Hicks contractions last approximately 60 seconds, continue throughout pregnancy and later change in intensity eventually becoming the contractions of labour. (Thomson [in *Myles Textbook for Midwives,* 11th ed.], 1989, p. 91)

Approximately 6 years ago an advertising campaign was launched in several Canadian cities as part of a national preterm birth prevention program. The campaign was designed to teach pregnant women about the risks of preterm labour and birth. Some professionals questioned this move, fearing it would "medicalize" yet another aspect of women's childbearing experience. Feminist scholars have also challenged the biomedical thinking behind such programs (Davis-Floyd, 1992; Jordan, 1997; Katz Rothman, 2000), expressing concern that all pregnant women will be considered "at risk" for preterm birth. In fact there has been a significant shift in our understanding of what the presence of contractions during pregnancy means. In the past, contractions during pregnancy were referred to as Braxton Hicks contractions and were considered a normal part of the childbearing experience. But what was once thought of as a minor complaint is now seen as a condition to be managed. Women are being asked to report uterine contractions, as these are being interpreted as a symptom of preterm labour. More women are reporting symptoms of preterm labour to their care providers or presenting themselves at a hospital for assessment and treatment. However, preterm labour is an uncertain diagnosis (Stevens-Simon & Orleans, 1999) based on ambiguous symptoms (Weiss, Saks, & Harris, 2002) for which there is little effective treatment (Enkin et al., 2000). Medical treatment, such as bedrest, for preterm labour has not been shown to reduce the risk of preterm birth (Goldenberg & Rouse, 1998) and the "stubborn challenge of preterm birth" remains (Lumley, 2003).

Background

When health professionals assess pregnant women they are usually looking for risk factors or risks that have been isolated as "significant" through medical science. For example, women who experience preterm labour are "at risk" for preterm birth. The list of more than 35 identified risk factors for preterm labour includes behavioural factors (such as smoking), demographics (such as age), reproductive pathologies, medical disorders, psychosocial factors (such as stress), and environmental factors (such as job-related exposures and poverty) (Maloni, 2000). Women are then classified as "low risk," "high risk," or "at risk," and this classification predetermines, in some very interesting ways, how health professionals treat women. Health professionals conduct risk assessments, risk classification, risk prevention, and even risk management.

The term risk as it is used in obstetrics is understood as a technical term representing the probability of a poor obstetrical outcome. The medical use of the term is tied up with scientific understandings about measurement and progressive science. Risk can be understood as something measurable, predictable, and manageable. The related discourses of legal risk, risk management, and institutional safety are important for understanding the context of maternity care in Canada today. Elizabeth Cartwright and Jan Thomas (2001) suggest that childbirth has always been dangerous but that when it moved into the hospital setting the "danger was transformed into biomedically constructed and sanctioned notions of risk" (p. 218). This new biomedical understanding of risk requires that women be monitored by professionals and suggests that risks can be controlled by medical interventions. Birthing women who resist the medicalization of pregnancy and childbirth are considered a risk to their unborn baby and in many situations coerced into complying with medical recommendations for the sake of their baby.

According to Cartwright and Thomas (2001), in the complex, highly technological hospital environment, fears and feelings of risk or vulnerability have frequently resulted in the creation of hospital rituals and protocol, even in the absence of sound evidence to support their use. In North America, providers of maternity care practise in a climate of risk and under the threat of malpractice litigation. Annandale (1996) describes the palpable presence of risk experienced by those who work in perinatal settings: "Risk surrounds practice, it is in the background, there in an atmosphere, it is always there" (p. 420).

Literature Review

In obstetrics the concept of "preterm labour" was developed to support diagnostic reasoning. A variety of "symptoms," such as uterine contractions, in pregnant women are diagnosed as if the woman has a disease that predates the outcome of preterm birth (defined as birth before the 37th week of pregnancy). The biomedical literature is, then, concerned with the diagnosis and treatment of preterm labour and the search for underlying biological or pathological causes. As with other diseases, the diagnosis of preterm labour is the result of a rational decision-making process that is learned by physicians during their socialization to medicine (Good, 1994; Kleinman, 1995). In the sociological and anthropological literature this process is defined as "biomedical rationality" (Good; Kleinman, Das, & Lock, 1996).

Biomedical rationality includes the mental transformation of people into patients and ultimately into cases — the objects of biomedical care. It also entails the search for biological causes of disease, the diagnosis or reframing of subjective experiences of illness into symptoms and signs that can be measured, and prescribed treatment based on objective scientific evidence. Biomedical rationality is effective for medical emergencies and single-cause acute illnesses such as infections. It is less effective for persons with chronic illness or disability, and it underestimates the self-healing capacities of individuals and the influence of their environment. In addition, biomedical rationality excludes subjective experiences of health and illness (Kleinman, 1995). The literature on biomedical rationality explicates biomedical assumptions about health and illness (disease is something whose diagnosis requires observable pathology) and questions the limits of biomedical knowledge and progressive science.

In epidemiology, preterm labour is conceptualized as the prevention of preterm birth through the identification of "risk factors." Epidemiologic research is based on large population studies using probability statistics to identify associations between variables (Lumley, 2003). Historically, epidemiologists studied the relationships among individual (or host) factors, the agent (or disease), and the environment (Gordis, 2000). Risk factors for preterm labour and birth have been described as either "modifiable" (related to a number of social or lifestyle factors) or "non-modifiable" (related to pre-existing medical conditions or demographic characteristics) (Stewart, 1998). Medical risk factors for preterm labour and birth include having a previous preterm birth, a history of two or more second-trimester abortions, abnormalities of the uterus or cervix, and multiple pregnancy (Adams, Elam-Evans, Hoyt, & Gilbertz, 2000; Iams et al., 1998).

Using a population approach, Heaman, Sprague, and Stewart (2001) found that programs targeting high-risk women have been ineffective in preventing preterm birth. These authors recommend the development of a more comprehensive model based on the five determinants of health: social and economic environment, physical environment, personal health practices, individual capacity and coping skills, and health services.

The likelihood of a preterm birth occurring can be determined by means of a number of interacting "risk factors." From an epidemiologic perspective, it is not possible, during the current pregnancy, to change most medical risk factors (such as previous preterm birth) or demographic risk factors (such as maternal age or socio-economic status). Although a comprehensive population health approach would also suggest the need for strategies targeting whole communities or populations, most of the research has recommended targeting "lifestyle behaviours" and "psychosocial factors" that can be changed during pregnancy (Heaman, 2001).

Most of the research underpinning current preterm birth prevention programs is shaped by individualized understandings of biomedical risk. The difficulty with individualizing risk is that it negates social and political effects of biomedical and epidemiological conceptualization on the lives of childbearing women and their families. Biomedical rationality and epidemiology are, then, intimately tied up with discourses of risk, responsibility, and blame (Douglas, 1992). Individuals are held morally responsible for lifestyle choices that result in disease. Discourses of risk can also construct women and families as responsible for the outcomes of childbearing (Cartwright & Thomas, 2001).

Pregnancy texts prepared for women tend to support similar understandings of pregnancy and its accompanying risks. Harriette Marshall and Anne Woollett (2000) examined eight popular pregnancy texts in the

United Kingdom and found them to construct the pregnant body as different and isolated from the woman's previous body knowledge and pregnancy as distinct from the woman's history and experiences. Marshall and Woollett report that the texts characterize the risks and dangers facing women as numerous but that they give little attention to the risks posed by medical screening and intervention. They conclude that the texts "often fail to engage with diversity in women's experiences in reproduction and the varied circumstances of women's lives" (p. 366) and reproduce biomedical understandings of pregnancy.

The Disciplining Effects of Pregnancy Risk Discourses

As the practice of medical obstetrics has developed, so too have the discourses surrounding obstetrics. Discourses constitute new objects, such as obstetrical risk. They also produce subjects (Foucault, 1972). When pregnancy and childbearing are spoken of as "risky," women and health-care providers are constituted in certain ways. Risk opens up a world of relations in which childbearing women are patients:

> There has been and continues to be confusion within obstetrics about risk and its meanings. Often obstetrics has stated with great authority that risk of serious illness and death can be defined precisely, a position that by definition should also entail pinpointing those women not at risk. But just as often and sometimes simultaneously to this first position, obstetrics states that every woman is at risk, an argument which is advanced with the rider that all women must give birth within specialist obstetric units because of the unpredictability of risk. What is more important about these incongruous and disparate lines of argument is the notion of risk itself and the extent to which this has saturated the thinking around childbirth. (Murphy-Lawless, 1998, p. 190)

Risk has also become associated with the need for hospitalization and obstetrical intervention. New and improved technologies and obstetrical interventions have come to mean reduced risks and decreased mortality and morbidity for both mother and child (Murphy-Lawless, 1998). Women, it seems, have had to be convinced that the dangers seen and measured by technology are real. Women who believe that childbirth is a normal, healthy process and challenge medical authority are labelled difficult and are sometimes forced to sign themselves out of hospital against medical advice (Cartwright & Thomas, 2001). The notion of risk is based not on the reality of dangers but rather on how these dangers are politicized (Douglas, 1992).

Anne Queniart (1992) studied the childbearing experiences of healthy women using grounded theory interviews with 48 women in Montreal, Quebec, during their first pregnancy. The women's stories were characterized by acute insecurity. The women felt guilty and were very concerned that their baby would not be normal. They also lacked knowledge about where danger starts and stops. Queniart points out that technology and biomedical research tend to discover more and more risks and to label as risky what used to be considered normal. She also documents the increasing social control of women for the sake of the baby.

The present study was born out of a concern about a shift in our understanding of the meaning of contractions during pregnancy and about the reconstituting of risk in ways that position increasing numbers of women at risk for preterm birth. There was a need to examine the effects of societal discourses, institutional structures, and nursing work processes on the lives of childbearing women, in order to develop a more complex understanding of how women's experiences of preterm labour are organized and to provide a basis for improved health services.

The investigation was guided by three questions: 1. *How do pregnant women experience preterm labour?* 2. *How do women who experience preterm labour describe their everyday work in caring for themselves, their unborn baby, and their family?* 3. *How are the experiences of these women affected by societal discourses, institutional structures, and nursing work processes?*

Methods

The methodology underpinning the study was institutional ethnography (Smith, 1987, 1999), a transformative approach to inquiry that reveals the "ideological and social processes that produce experiences of subordination" (DeVault & McCoy, 2002, p. 754). In conceptualizing institutional ethnography, Dorothy Smith (1987) describes a "problematic" as a place to begin investigation and as a sense that something troublesome, interesting, and worthy of study is taking place. Smith uses the concept of problematic to "direct attention to a possible set of questions that may not have been posed or a set of puzzles that do not yet exist in the form of puzzles but are 'latent' in the actualities of the experienced world" (p. 91). The title of this paper, "From Braxton Hicks to Preterm Labour," describes our sense that something troublesome and socially interesting is occurring.

Though the larger study on which this paper draws (MacKinnon, 2005) included an in-depth exploration of the everyday work of pregnant women when caring for themselves, their unborn baby, and their family, the paper focuses on the discourses that influenced women's understanding of their preterm labour experiences as well as the effects of these discourses on professional nursing practice. Smith (1987) identifies the *socially organized* character of everyday life and proposes that discourse is the organizer of experience.

In this paper, discourses (such as risk) can be understood as sociocultural concepts that are circulated through talk, texts, media images, and the like. Institutional ethnography attempts to disrupt abstract conceptualizations of discourse by focusing on how they are taken up and enacted in particular social situations. "It is a method of inquiry that works from the actualities of people's everyday lives and experience to discover the social as it extends beyond experience" (Smith, 2005, p. 10). Institutional ethnography is concerned with the social organization of experience and the effects of discourse on everyday life. "The aim is not to explain people's behaviour but to be able to explain to them/ourselves the socially organized powers in which their/our lives are embedded and to which their/our activities contribute" (Smith, 1999, p. 8).

Expert Informants

Childbearing women. Within the framework of institutional ethnography, participants constitute not a sample but rather a panel of expert informants. The standpoint of childbearing women provides an entry point into the institutional relations that organize their experiences (McCoy, in press). In institutional ethnography, standpoint is understood as a shared or common mode of experience. Eight women who self-identified as having experienced preterm labour were recruited from selected health-care or community organizations in a western Canadian city. These volunteer informants ranged in age from 21 to 36 years and consented to an audiotaped interview conducted within 5 months of their experience of preterm labour. The women's experiences of preterm labour differed as follows: four of the women delivered a preterm baby within 2 weeks of experiencing preterm labour symptoms; the other four first experienced preterm labour symptoms between 24 and 34 weeks into their most recent pregnancy, lived with the "threat" of preterm labour for the rest of the pregnancy, and gave birth to a healthy full-term baby. Two of the women had other small children to care for in the home and several had limited financial and/or family resources.

Nurses. Eighteen nurses working in the obstetrical triage/antepartum units of three hospitals in a western Canadian city agreed to be observed during one shift. The observations took place over 10 shifts as the volunteer nurse informants went about their work interacting with childbearing women and their families and with other health-care providers. Although the focus of the observations was nursing work, verbal consent was obtained from all the people with whom the nurses interacted.

Seven nurses working in a home-care program for women experiencing pregnancy complications were recruited to participate in a focus group. Following analysis of the preliminary interviews and informant observation, three managers and two community health nurses were identified and approached directly by the researcher for their consent to participate in an audiotaped face-to-face or telephone interview. This final recruitment included nurses working in other home-care programs for childbearing women; these nurses were selected for their ability to provide further information regarding the institutional factors that shape nursing practices.

Procedure

All interviews were conducted by one investigator, who listened carefully for traces of societal discourse and references to institutional texts and/or work processes in the women's accounts of their preterm labour experiences. The interview began with the woman being asked to describe how she first suspected she might be experiencing preterm labour. Next she was asked to describe her experiences with regard to the hospital and/or medical treatment. These accounts were usually constructed chronologically, sometimes with reference to other events that were significant in the woman's life. The women also described their interactions with health-care providers and any difficulties they encountered as a result of their medical treatment. In addition, texts developed for pregnant women and for preterm prevention programs in Canada were examined.

Analysis

The goal of analysis, in keeping with institutional ethnography, was to make visible *as social relations* the complex practices that coordinate the actions of women, nurses, and other health-care providers across space and time (Campbell & Gregor, 2002). The first author spent long periods immersed in the data in order to identify traces of social organization that might have implications for nursing practice. This approach to data analysis entails looking for patterns in the data, focusing on textually mediated discourse, and determining how discourses such as our current understandings about risk are organized to recur. Analysis of the women's transcripts included identifying and describing the complexity of the women's experiences and their work within the family, listening for traces of social organization in their talk, and determining how their experiences intersected with those of the nurses and other health-care providers they encountered. An example of social organization found in the women's transcripts was reference to a handout on preterm labour prepared for a local preterm birth prevention program. Observation in the hospital setting helped to identify the key texts mediating the interactions between the women and health-care providers. Further analysis of these texts revealed how risk functioned in the hospital setting. Preliminary analysis of interviews and field notes served to identify a number of areas for further investigation and analysis, such as what home-support services were being provided.

Findings

This paper focuses on the intersection between the discourses of "risk" and the women's accounts of their preterm labour experiences. In the analysis the researchers traced the ways in which the women were drawn into the risk discourse, the influence of this discourse on the women's experience/understandings of preterm labour, and ultimately the effects of the risk discourse on the professional practice of hospital and home-care nurses.

Drawing Women into the Risk Discourse

Many women learn about the risk of preterm labour through books written for pregnant women and materials prepared for preterm birth prevention programs. Many texts developed for such programs in Canada ask women to monitor their bodies for "symptoms" of preterm labour without reference to the context of their lives. Careful examination of a text prepared for one program revealed that it assigned the woman responsibility for avoiding pregnancy risks (including some beyond her control), for engaging in self-surveillance to identify early signs of preterm labour, and for presenting herself to medical authorities for early diagnosis and treatment (MacKinnon & McCoy, in press). The text provided some very general pregnancy advice not directly related to preterm labour and omitted information that may have been helpful, such as that on occupational stressors. Employers were not drawn into or held accountable in the risk discourse, which was highly individualized and focused on the responsibilities and self-surveillance work of pregnant women.

Taking Up the Risk Discourse

Traces of the risk discourse were apparent in the profound sense of personal responsibility for preventing preterm birth that was expressed by each of the women. Even more troubling, the women who had given birth early felt that they had failed in the work of "keeping the baby in" and that they were being judged:

> *There's definitely a stigma [to having a preterm baby], and I began to see it when I started running into my coworkers, and that was the most*

> *difficult part… I was just thinking, so here we go, this is a black mark against me…you know, that I didn't have a normal pregnancy.* [Khanya]

Khanya went on to say that preterm birth is seen as "the mom's fault."

The four informants who had given birth early, even those who had diligently avoided all the listed risk factors, spoke about the "shame" of preterm birth. Eve, for example, could not understand why she had a preterm baby when she "did everything right" and "never took an aspirin." She described the "other women" who had delivered prematurely as the "kind of people they expect to be here." These "other women" included a prostitute who took drugs during her pregnancy and a young woman who did not eat "properly" because she was "underprivileged."

The women gave numerous examples of messages linking preterm labour to poor lifestyle or behaviour. Educational materials provided to them stressed that all pregnant women are at risk for preterm birth and should monitor and report symptoms promptly. They highlighted "lifestyle choices" such as avoiding smoking, drinking, and taking drugs, thereby emphasizing the woman's responsibility for reducing the risk of preterm birth. The result of these individualizing risk discourses is the creation of categories of "good" mothers and "other" mothers (those who do a poor job of caring for their unborn babies).

Vicki, who had experienced preterm labour and birth in two previous pregnancies, expressed fear and guilt for "cheating" with regard to prescribed bedrest. Vicki was the primary breadwinner in her family and was caring for her two preschool children. Vicki's talk about her experiences shows how discourses of risk were taken up and used by her family members:

> *My mother-in-law…believes strongly…and I try not to put too much guilt on myself, but she believes that I was much too busy and much too active… And so I felt like…I was being blamed, and of course it's her son who's in school and it's affecting his life…so it turned out to be a bit of an issue.*

The discourse on risk for preterm labour suggests that Vicki was at high risk for recurrence of preterm birth and would direct Vicki to limit her activities. However, the context of Vicki's life and her work within the family is invisible (and irrelevant) in biomedical constructions of risk for preterm labour. Individual risk discourses intersected with economic and social discourses in ways that forced the women to carry the burden of responsibility for preterm birth prevention and for the work of managing their household along with the health work for preterm labour (MacKinnon, 2005).

Risk and Nursing Practice

Obstetrical triage consisted largely of the repetitive assessment of "risk factors" and the completion of institutional forms and procedures. Perhaps the most striking feature of the interactions observed in triage was the posing of the same questions again and again by a variety of health-care workers. Women were repeatedly asked about risks before their pregnancy (such as medical conditions), about risks in their past obstetrical history (such as pregnancy complications), about risks during their current pregnancy (such as hospitalizations), and about risks seen as relevant to their presenting concern (such as leaking fluid). Both the nurses and the childbearing women observed in triage expressed frustration with having to ask and answer the same questions over and over. This repeated assessment of risk factors served to underscore (for both the woman and the health-care provider) the seriousness of the woman's situation, increasing her likelihood of complying with the treatment plan. It also served to keep the focus on risk and the pregnancy, rendering invisible the woman's life, work, and social circumstances.

Teaching and Disciplining Women

The identification of risk factors creates an opening for physicians and nurses to give medical advice to pregnant women. Nurses working in the hospital setting were actively involved in teaching women to be diligent with self-surveillance and were observed to chastise women whose behaviours did not reflect the nurses' understanding of pregnancy risks. One woman (26 weeks pregnant) who presented at triage for assessment told the nurse that she had slipped on the stairs the day before, after which she had leaked "a lot" of clear fluid. Although the nurse was considerate in her interactions with the woman, she gave her a very clear message that she should have come in for assessment the previous day. She later explained to the researcher that since this was the woman's third baby "she ought to know better," inferring that Canadian women are expected to know about the "risks" of leaking clear fluid. The woman later told the researcher that she had a 3-year-old and a 14-month-old at home and had not had a chance to "look up leaking in the book" until the evening when the children were in bed. She explained that she had to arrange for her elderly parents to care for her children so that she could come to triage "to be checked, just in case." None of this family contextual information was entered in the triage record. The triage record was then carefully examined for its work of determining what is or is not considered institutionally actionable (MacKinnon, 2005). The everyday experiences of the woman were rendered invisible by the predominant risk discourses; they did not enter into her interactions with the nurse and were not recorded in her chart.

The Risk to the Baby

Because of fetal health surveillance technology (ultrasound and fetal heart rate monitoring, for example), the fetus has an active presence on hospital units. The nurses frequently used the technology to remind women of the risks to the baby. Their reminders took the form of disciplining, shaping the behaviour of the women in order to make them "good mothers." Some nurses were clearly disapproving of behaviours that posed a "risk" to the baby, such as taking analgesics for pain or requesting a pass to leave the hospital in order to deal with family concerns. One nurse said, "We don't take any chances where babies are concerned." Clearly, the nurses believed that, with pregnancy, there is no acceptable level of risk. Their understanding of risk did not reflect the women's concerns about the risks that hospitalization and medical treatment posed to their family members, particularly their other children. The fear and uncertainty of the preterm labour experience (Berardelli, 1994; Maloni, 2000) also helped to establish the women's subordinate position in their interactions with nurses and physicians.

The Risk of Going Home

The childbearing women reported that they were fearful upon returning home from the hospital and that they felt alone with the burden of responsibility for preventing preterm birth. Although individual nurses working in the community-based prenatal home-care program did engage in some creative acts of resistance, their work was shaped by the discourse of risk, which accentuated their surveillance and disciplinary role. The lack of sufficient community resources and biomedical constructions of preterm labour contributed to the development of strict admission and discharge criteria. Eligibility criteria for community programs functioned as "institutional gatekeepers," displacing the local knowledge of physicians, nurses, and the women themselves.

Discussion

One of the goals of this study was to trace the organization of women's experiences and of nursing practices across space and time through discourses and textually mediated work processes. The findings are necessarily limited to the particular historical and social context explored in one western Canadian city following the introduction of one preterm birth prevention program (MacKinnon, 2005). The social relations identified may be of interest to other researchers concerned with how understandings of biomedical risk come to be transmitted across space and time.

In our larger study (MacKinnon, 2005) we also examined the restructuring of maternity services and the ways in which nursing work processes are influenced by business management discourses and an exclusive focus on health-care outcomes. Although at first glance many of these discourses and practices appear neutral, our analysis shows how they function to maintain existing power relations. These objectifying discourses and practices displace local knowledge about the needs of women and families.

Biomedical constructions of risk mask the disjuncture between women's everyday experiences and the need to comply with medical regimens that frequently include the prescription of bedrest. Since women are usually responsible for family care work, it is not surprising that some of the women in the study could not easily drop all of their usual activities and responsibilities for the sake of their unborn baby. Risk discourses served to exert social control over the women, resulting in fear, guilt, a feeling of being judged or punished, and an overwhelming sense of personal responsibility for preventing preterm birth.

Biomedical constructions of risk and preterm labour also affect the organization of health services. The overriding concern with biomedical risk and institutional safety limits nurses' opportunities for sharing the burden of responsibility with childbearing women. Risk discourses intersect with economic and social discourses that locate responsibility for care in the private sphere. The assumption that the family is responsible for care in the home results in a lack of assessment of resources for managing the medical plan on discharge and the lack of resources available to families.

Discourses of legal risk management and institutional safety also affect the work processes of nurses and other health-care providers. They direct the focus and the work of nurses away from caring for women and their families and towards nursing the chart, the unit, and the institution. Biomedical understandings of population health science construct measurable health outcomes as the only valid means of evaluating health services. Preterm birth prevention discourses and an exclusive institutional focus on health outcomes contribute to the public perception of preterm birth as a tragedy. Such societal discourses also affect the work of women who become mothers of preterm babies. What would happen if we shifted our gaze from the outcomes of pregnancy to the celebration of childbearing as a "workful" process? Would we come to value the work performed by these women as they become mothers to the smallest citizens?

Nursing Work Processes

In the hospital setting in particular, nursing work has become increasingly structured by institutional processes of admitting, charting, and discharging patients, with little opportunity for getting to know patients or assessing their needs. Much important nursing work is driven underground, remaining unrecognized and undervalued by health-care institutions. We need to ask what nursing work is left undone when nurses take on more and more institutional work, such as nursing the chart. By shifting our gaze, as nurses, from assessing needs to determining eligibility for services, we are in effect accepting institutional priorities (Gustafson, 2000) and complying with the relations of ruling. Nurses are also affected by management discourses of scarcity, cost-effectiveness, and the importance of measurable outcomes and by practices grounded in decentralized cost accounting (Rankin, 2001). We need to maintain the practice of putting the needs of women and families first and to recognize the embodied work performed by women in preventing preterm birth.

This sustained critique of discourses and practices aimed at preterm birth prevention is not intended to imply that preventing preterm birth is not an important goal. Our analysis has shown that current approaches place the burden on the woman and her family instead of treating it as a joint responsibility of governments, communities, employers, institutions, and health professionals. Awareness of how risk discourses are reproduced in institutional texts and through institutional work processes creates an opening for changes that might more fully acknowledge the everyday realities of women and their families.

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Authors' Note

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Résumé

La fiabilité de la recherche sur la sécurité : le cas de l'évaluation des risques de chute

Janice M. Morse

La plupart des programmes de prévention des chutes comportent deux volets : d'une part, des instruments de prédiction du risque de chute chez les patients et, d'autre part, des stratégies visant à empêcher les chutes ou à prévenir les blessures en cas de chute. Malgré leur rôle essentiel, un grand nombre de ces instruments ont fait l'objet de critiques parce qu'ils ne permettent pas d'identifier avec précision les patients sujets aux chutes. Le présent article examine, à la lumière des essais sur la validité touchant l'échelle de Morse [Morse Fall Scale], les recherches menées au cours des vingt dernières années sur l'évaluation du risque de chute. Certains travaux en la matière s'appuient sur des hypothèses erronées ou des erreurs de conception, tant en ce qui concerne la mise au point des échelles de risque que leur évaluation. Bon nombre de ces instruments ont été élaborés uniquement en fonction de leur validité apparente et n'ont pas bénéficié d'une évaluation adéquate ou, s'ils ont été mis à l'essai en milieu clinique, d'un plan expérimental valide. Enfin, l'usage à mauvais escient des échelles d'évaluation du risque de chute peut accroître le risque de chute chez les patients. L'auteure conclut qu'une grande part de la recherche menée en sciences infirmières sur ce thème ne contribue pas à améliorer la sécurité des patients.

Mots clés : évaluation des risques de chute, prédiction du risque de chute, échelle de Morse, prévention des chutes

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The Safety of Safety Research: The Case of Patient Fall Research

Janice M. Morse

Most fall intervention programs consist of 2 components: fall risk prediction instruments to identify the patient who is likely to fall, and fall intervention strategies to prevent the patient from falling or to protect the patient from injury should a fall occur. While critical to the effectiveness of a fall intervention program, many of the fall risk prediction instruments have been criticized for their failure to accurately identify the fall-prone patient. In this article, in the context of the validity assessments conducted on the Morse Fall Scale, the research conducted in the past 2 decades on fall risk assessment is critiqued. Some fall prediction research is based upon invalid assumptions and/or errors in design, both in the development of risk scales and in the evaluation of these instruments. Many of these instruments have been constructed with inappropriate reliance on face validity, have been evaluated inadequately, or have been tested in the clinical setting using an invalid design. Finally, improper use of fall scales in the clinical area may increase the risk of injury to the patient. The author concludes that much nursing research on patient falls does not contribute to improved patient safety.

Keywords: patient fall risk assessment, fall prediction, Morse Fall Scale, fall intervention, Cochrane criteria

All research has consequences. The intent of nursing research is to improve care, and ideally the outcomes of nursing research will lead to improved practice. If the consequences of research are not positive, researchers hope that the unintended outcomes will not cause harm if the recommendations are implemented. But what if our research does not perform as intended and has negative consequences?

In this article, I will review research into patient falls that is targeted towards developing an instrument to screen for risk of falling, using one of the oldest (and therefore most frequently discussed) instruments, the Morse Fall Scale (MFS) (Morse, Morse, & Tylko, 1989). The assumption supporting this research is that if we can predict the patient who is likely to fall, then appropriate fall prevention and protection strategies can be implemented, and either (a) the patient will not fall (i.e., the fall *prevention* strategies were effective), or (b) the patient does fall but is not injured (i.e., the fall *protection* strategies were effective). Using the research published about the MFS, I will review the models of evaluation used to assess this fall risk prediction research. Finally, I will consider the expectations of clinical performance from the perspective of both the scale developer and the clinician, and problems with the clinical utilization of fall prediction instruments.

Fall intervention programs usually consist of two parts: first, identifying the fall-prone patient so that fall interventions can be appropriately targeted, and second, making available and applying appropriate fall intervention strategies. Thus, the key to a fall research program is the accuracy of the instrument used to predict the risk of a patient falling, and therefore enabling the targeting of interventions to those patients actually at risk of a *physiological anticipated fall* (Morse, 1997). The second component, the fall intervention program, is equally essential for patient safety, and the ultimate goal is to prevent injury should a fall occur. Again, both the performance of the fall risk scale and the effectiveness of the preventive or protective interventions subsequently put in place for those patients rated at risk are crucial for preventing the actual fall or, if the fall occurs, protecting the patient from injury. Note that assessing a patient at risk of a fall in itself does not *prevent a patient fall* (the fall prevention strategies are intended to do that) *nor prevent injury* (that is the purpose of fall protection strategies) (Morse, 2002).

While extremely important and a high priority for patient safety, fall research is difficult and complex. Accordingly, some published research is prone to technical errors in the construction of the scale, design errors in the evaluation of the instruments, confusion about the expectation of performance, and errors in utilization. In practice, these mistakes place the patient at risk, place the staff and the hospital at legal risk, and result in increased health-care costs. Such research provides a false assurance of safety; that is, it provides a façade of care intended to make the patient safe but which is actually not safe. Errors in clinical application further weaken the usefulness of the research. Patient fall research is an excellent example of the importance and significance of nursing research, but the quality of the research needs to be drastically improved.

Quality of the Risk Assessment Instruments to Identify the Fall-Prone Patient

The intent of research-related fall risk prediction scales is to develop an instrument that will quickly triage for those who are at risk of falling, thereby enabling preventive and protective strategies to be immediately put in place to prevent patient injury,[1] and to monitor fall risk throughout their hospital stay. Before continuing with the discussion,

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[1] Because the Morse Fall Scale (MFS) was the first of this type of instrument designed to predict which patients are likely to fall, much information is available about it, and I will place this discussion in the context of the MFS.

however, it is important to differentiate fall risk prediction scales (instruments intended to identify the fall prone and to *predict the risk of falling*) from instruments that are used for patient assessment; that is, to assess the individual's *condition* (usually physiologically based factors) that may cause a patient fall, such as gait assessment. *Assessment instruments* are time-consuming to use but provide information about the nature of physiologically based deficits so they can be rectified before a fall occurs (i.e., fall preventive measures, such as exercise or balance training programs to improve gait). By extension they may also assist in identifying the need for fall protective strategies (such as a hip protector to prevent a fractured hip should a fall occur). For example, a fall risk prediction scale might rate gait as normal, weak, or impaired, according to gross indicators based on mobility, while assessment instruments would require actual measurement of strength, balance, and so forth. Note that risk prediction scales provide patient scores that indicate risk of falling but do not tell us why there is a risk or what to do to prevent the fall, just as a thermometer will tell us if the patient has a fever but not what is causing the fever or how it should be treated.

Altman (1997) notes the tension between the purposes of these two types of instrument in trying to "reconcile pragmatism with methodological purity" (p. 1309): clinicians expect risk prediction scales to provide prescriptive information about fall prevention strategies, so they are tempted to add variables that provide diagnostic validity. But adding variables not only invalidates the scale's performance, but also moves the purpose away from fall *risk prediction* towards *fall assessment*. Recently, for instance, McFarlane-Klob (2004) published a "Modified Morse Scale" (without consultation with the developer), and added medication variables. If this researcher had understood how the MFS was developed and how it worked, she would have known that medications were evaluated during the scale construction.[2] Furthermore, making the scale longer defeats the purpose of efficient rating and does not increase the validity of the scale.

Methods of Scale Development

Fall prediction scales "work" because researchers have developed both the items and the item scores (the weights for those items) in an exploratory process by comparing a large number of variables that may possibly

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[2] Medication is a part of the scale in the secondary diagnosis score. In developing the indices (items), we first included medications that were thought to contribute to falls, then numbers of medications, then combined this item with comorbidity (i.e., secondary diagnosis). Of course, medications contribute to falls, as they relate to the other variables (mainly gait and mental status). These results were also replicated in the Hendrich II (Hendrich, Bender, & Nyhuis, 2003).

contribute to a fall in subjects who *have* fallen, compared to those who have *not* fallen. This comparison of groups enables the identification of items that are statically significant. Computer modelling should be used in an exploratory manner, combining variables to form indices, hence enabling the identification of the minimal number of variables to eventually constitute the scale items, without reducing the ability of the scale to differentiate the fall group from the control. Next, statistical weights of the significant items may be converted to produce item scores, and the scale is subsequently modelled in the data set to assess validity, performance, and cut-off scores[3] to determine levels of risk. Of course, these statistical weights as they are first calculated are not likely to be whole numbers, and would not be practical for use in the clinical setting. In the MFS, these numbers were rounded to the next whole number divisible by 5, and then the discriminant function of the scale was re-calculated to ensure that the scale still worked.[4]

This method of scale construction has been used with only two scales — the MFS (Morse et al., 1989) and the recent modification of the STRATIFY tool (Oliver, Britton, Seed, Martin, & Hopper, 1997) in Hamilton, Ontario (Papaiannou et al., 2004). The Hendrich II (Hendrich, Bender, & Nyhuis, 2003) approximates this approach, but it is not clear how the scores were calculated from data presented, why all significant items were not included in the final scale, and if the final scale was subsequently clinically tested.

However, most of the fall risk prediction scales available do not follow this design. Some have been developed using a control group to identify statistically significant items, but with the item scores arbitrarily assigned (e.g., Downton Index [Vassallo et al., 2004]; STRATIFY scale [Oliver et al., 1997]). In addition, some scales used retrospective chart reviews as data, rather than patient assessment (e.g., the Scott and White Falls Risk Screener [Yauk, Hopkins, Phillips, & Bennion, 2005]), hence limiting variables that could be identified as significant. Furthermore, some researchers have selected scale items using techniques of *face validity*, which is considered atheoretical, imprecise, and the weakest of all validities (Newfields, 2002). Using their own clinical judgement, these researchers have selected items by surveying other scales for the items most frequently used, or have selected those that they consider, from their own clinical experience, may cause a fall. Some of these instruments are simply checklists[5] (e.g., Charting tips: Documenting a patient's fall risk,

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[3] A cut-off score is the lowest high-risk score.

[4] However, the MFS is often not considered for clinical use, because the scores are still too difficult for nurses to add! Dempsey (2004) writes that the MFS was "considered complicated and time consuming" (p. 481), yet developed her own assessment tool.

[5] The MFS is not a checklist, because the items are indices (see footnote 2) and weighted.

2000; Haines, Bennell, Osborn, & Hill, 2004); others have arbitrarily assigned scores to the items — scores also based on the researcher's own judgement and convenience. These values are often 1s, 2s, and 3s, selected for the clinicians' ease for totalling the scores, and the resulting scores are used to determine classes of high or low risk of falling (e.g., Browne, Covington, & Davila, 2004). (Note that when easily added numbers were assigned to the MFS, the discriminant function went down to .5 [or to the same ratio that one would obtain by flipping a coin]. It is *both* the combined function of item selection *and* the weight of the score assigned to the item that makes the MFS valid.)

Another criterion of validity of risk prediction scales is that they must work clinically. Scales must be sensitive to patients' conditions by providing a range of scores (the MFS is scored 0 to 120) and also be sensitive to the individual patient's change in condition. Finally, they must have been tested independently by another institution. This criterion was met by McCollam (1995) for the MFS.

Often these poorly constructed scales are used internally by hospitals. Some have been published (e.g., Brown et al., 2003; Dempsey, 2004; Hathaway, Walsh, Lacey, & Saenger, 2000; Undén, Ehnfors, & Sjostrom, 1999), others disseminated via the Internet (Farmer, 2000). These scales are usually "tested" in the clinical area by noting the fall score of the patients who actually fall: if the score of the patient who falls is in the estimated "high risk" range, then the scale is considered to "work" and is declared valid. However, except at a very gross or obvious level, if tested correctly with a control group, these scales probably will not differentiate the fall-prone patients from those who are not fall-prone. Of greatest concern, these instruments do not have the refinement to be able to accurately predict the fall-prone patient, and worse, have not been finely tuned to minimize the false negatives — that is, patients who are actually at risk of falling are not identified. Hence, these scales may have little validity or psychometric standardization (Perell, 2002).

The cost of using poorly constructed scales clinically is that the number of false negatives (or rating a patient *not at risk* when the patient actually *is fall-prone*) is very high, thus risking not identifying patients in need of fall protective and preventive strategies, and placing the patient at risk of injury should a fall occur. *This is the most serious consequence of "homemade" instruments.* The quality of homemade scales is poor and the safety of patients may be jeopardized. Given the availability of scales with diagnostic accuracy, there is no need for facilities to develop their own scales (Perell et al., 2001).

Why do clinical nurse researchers go to all the trouble and expense of developing a homemade scale when scales with reliability and validity data are available? Some nurse researchers have reviewed the MFS and determined that it was not generalizable for their context. I am puzzled by such comments as "it was developed on Canadians" or "not suitable for our Australian context" (McFarlane-Klob, 2004), because the MFS does not contain contextual variables.

Another problem is that in the development of these scales, specialized patient populations are used. For instance, the STRATIFY scale was developed using elderly patients from three hospitals (Oliver et al., 1997). In the development of the MFS, patients were also recruited from three hospitals: acute-care, rehabilitation, and nursing-home hospitals. Although we deliberately tried to make a scale that would be valid for all patients, we did not include outpatients or day surgery, psychiatry, or home-care patients. There is no theoretical rationale, however, why the scale will not perform for these groups, and it would be faster to develop normative scores for those populations than to develop another scale.

Models Used to Evaluate Fall Risk Scales

Unfortunately, researchers have caused harm by inaccurately or improperly evaluating fall risk scales. As a consequence of these errors, excellent research is devalued and even debunked, and research gains are lost. Worse, some of these reviews have been published, so that rather than using completed research, the research effort, of varying quality, has continued in search of a reliable means to predict fall-proneness. The problems of the evaluation research include (1) inappropriate design used for clinical testing, and (2) errors in evaluation.

Inappropriate design used for clinical testing. Once a scale is developed, it is tested for clinical feasibility. Two problems of invalidity have emerged, affecting both homemade scales and those developed more rigorously. These are the Hawthorne effect, and disregarding of interventions that form intervening variables between obtaining the patient's fall score and the opportunity for a fall to occur.

The Hawthorne effect. Unfortunately, simply implementing a fall intervention program alters the fall rate: (1) staff previously casual about reporting falls may now conscientiously report every fall, causing the fall rate to increase (see, e.g., O'Connell & Myers, 2001); and (2) staff are more aware of fall risk and may adopt fall prevention strategies, causing the fall rate to decrease. Therefore fall rates may be unreliable, and the fall *injury* rate is a more valid statistic for evaluating the efficacy of the fall intervention program. Nurses always file a fall incident report when a patient is injured, but, because injury is a relatively rare event, this may also be unstable for statistical reasons.[6]

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[6] A recent clinical trial randomly assigning matched pairs of clinical units (as control or intervention) tested fall intervention strategies (Healy, Monro, Cockram, & Heseltine,

Problems of design of clinical trials. Researchers often use the number of falls and the fall scores of the patients who fall to assess the efficacy of the risk prediction scale. But the number of falls *evaluates the fall intervention program, not* the efficacy of the scale. Once a patient is rated at risk of falling, staff are obligated to implement fall prevention strategies that actually stop the patient from falling. Therefore these intervention variables interfere with the measurement of the dependent variable and invalidate the trial to the extent that it is unreasonable to use these numbers to ascertain the sensitivity and specificity of a fall risk scale. Implementing such research design is akin to developing a Suicide Prediction Scale and administering it to all pedestrians who walk onto a bridge. Because the bridge is a favourite place from which to leap, barriers have been erected, video surveillance alert guards, and the police prevent anyone from climbing onto the bridge railing in order to leap; hence, no one is able to commit suicide regardless of intent. Does this mean there is anything wrong with the Suicide Predictor Scale? No — the intervening variables interfere with the relationship. Understandably, using a similar research design for determining the validity of a fall risk scale will not provide meaningful information about the validity of the scale. Yet researchers have done this, and published their results in refereed journals, and even wondered why their results obtained using the MFS are at variance with those originally reported (see, for instance, O'Connell & Myers, 2001, 2002).

Errors in evaluation.[7] Faulty methods of evaluation have also been used. These include the reliance on face validity, failure to use the original publications when assessing performance, and trialing scales against each other and with nurses' clinical judgement.

Reliance on face validity. Review articles present tables listing all of the scales and comparing the items in each scale (see Evans, Hodgkinson, Lambert, Wood, & Kowanko, 1998, 2001; Joanna Briggs Institute, 1998; Morse, 1993) to determine whether they "fit" some preconceived domain of factors that cause patient falls. Note that the value assigned to

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2004) and obtained a statistically significant drop in fall rate, even though the fall interventions may be considered "normal practice." However, as the fall injury rate actually increased in the intervention units, the difference in the fall rate, as the authors note (p. 391), may have been due to the Hawthorne effect.

[7] How should the MFS be evaluated? Some researchers investigating falls have reported positive results regarding the validity of the MFS. Camicioli and Licis (2004) noted that the MFS was a predictor of risk of falling in a specialized Alzheimer disease care unit. When investigating the association between medications and falls, Dyer et al. (2004) noted that it was the number of medications, rather than a specific medication or class of medications, that was significant, adding credence to the *secondary diagnosis/comorbidity* item on the MFS.

each item in the respective scales is omitted from these tables, so that the comparisons are meaningless.

Failure to use the original source when assessing performance. A review is valid only if it is complete. Yet in the review of fall risk scales reported by the Joanna Briggs Institute in Australia (Evans et al., 1998) this was not the case. Instead of using the publication reporting the MFS development (i.e., Morse et al., 1989), they used a publication describing the characteristics of types of fall (Morse, Tylko, & Dixon, 1987). This is a surprising error,[8] for the original source is cited in many earlier publications, and the research program is even summarized in a book (Morse, 1997). Given their omission of key publications, one must challenge Evans et al.'s strong conclusion that "Falls risk assessment tools are very inaccurate…no evidence to suggest that the generic risk tools…offer any additional benefits over tools that are used within a single institution and have been developed based on that population's characteristics…no particular risk assessment tool can be assessed" (p. 30).

Trialing of scales against each other and with nurses' clinical judgement. Some researchers have trialed risk assessment scales against nurses' clinical judgement and, when finding neither excellent, have recommended the use of a combined approach (both the scale and clinical judgement) (Moore, Martin, & Stonehouse, 1996). However, these trials are inadequately designed: researchers did not control for nurses' prior knowledge about falls or knowledge about fall assessment. Of greater concern, the study by Eagle et al. (1999) testing three methods of assessment — nurses' clinical judgement, the Functional Reach Test to measure balance (Duncan, Weiner, Chandler, & Studenski, 1990), and the MFS — the researchers used the MFS incorrectly, scoring the patients using retrospective chart review rather than assessing them. The MFS cannot be validly completed by using chart data — patients *must* be examined — but these evaluators did not do this. Further, while the raters and the nurses were blind to the patients' MFS scores, it was not known if raters (who were using their clinical judgement) had used the MFS and/or other methods to rate patient risk of falling previously. In other words, there was no control over the nurses' knowledge about fall risk assessment. Was their clinical judgement blind to research knowledge? This threat to validity would be very difficult to control.

Invalid Design of Clinical Testing

The most problematic design of fall intervention program research is the simultaneous testing of the fall risk prediction scale and the fall

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[8] The Joanna Briggs Institute is responsible for evaluating research for a number of institutions internationally. These reviews are highly specialized and accuracy is an imperative.

interventions. The O'Connell and Myers (2001) study used this design, but it was further confounded by a second fall intervention study conducted simultaneously, but unknowingly, by the occupational therapy staff. Despite these problems (which included the intervention program interfering with their dependent variable, the fall rate), O'Connell and Myers (2001, 2002) were still critical of the predictive validity of the MFS. Their false positive rate (i.e., 79% of patients rated at risk of falling and who did not fall) perhaps meant that their interventions were working, not that the scale was problematic, with limited generalizability, as they concluded.

How did we therefore obtain sensitivity and specificity statistics for the MFS that apparently cannot be replicated? First, we studied patients who fell *at the time of the fall (confirmed fallers)* and controls — those who had *not* fallen — and this provided sensitivity of 78% and specificity of 83% (Morse et al., 1989). These results were satisfactory, but were still not without problems, for there were a number of errors — false positives (patients who had not fallen and who were considered by the computer to be at risk) and false negatives (patients who had fallen and were rated as not at risk). We investigated these errors by examining the charts of these patients 10 weeks after the initial analysis. We found that the false positive group had a high rate of falls (5 of the 17 patients had fallen; one patient fell 3 times) and concluded the computer was correct — these patients were at risk but had not had the opportunity to fall before the time of the original data collection, and they increase the sensitivity to the scale to 91%. The falls that were experienced by patients who rated at risk of falling by the MFS we labelled *physiological anticipated falls.* Next, by examining the circumstances of falls that occurred in patients in the false negative group, we identified two additional types of fall: the accidental fall (true accidents, slips and trips in those who are rated at not risk of falling), and the unanticipated physiological fall (falls due to a seizure or fainting in patients who also scored not at risk) (Morse et al., 1987). Recalculating the ability of the scale to discriminate after making these corrections, the sensitivity and specificity of the scale increases to 84% sensitivity. But the importance of recognizing the three types of fall is that the scale will never identify 100% of falls in a hospital, and staff should always try to determine what type of fall occurred, record statistics accordingly, and be aware that the preventive and protective strategies for each type of fall differ (Morse, 1997). The site of accidental falls must be investigated to prevent recurrence, and strategies implemented to protect those with unanticipated falls from injury should a second fall occur.

Clinical Errors When Using the Scale

Essential to the clinical performance of a scale is its correct use in patient assessment. This assessment is reasonably quick for the MFS (it takes 1–3 minutes), but users need to have received instruction.[9]

Not using the MFS according to directions. As noted above, the lack of correct assessment and inaccurate scores results in errors. Despite the availability of instructional tools for the MFS, some clinicians do not realize that scoring the patient requires patient examination. As with all forms of assessment, if the scale is not used correctly, regardless of its reliability and validity, it will not perform as expected clinically. Patient safety will be jeopardized.

Failure to acknowledge the sensitivity of the scale. The second problem occurs when the staff record the patient's score as *high risk* or *low risk* and do not record the total score (Perell et al., 2001). This is akin to recording a patient's temperature as high or low without recording the actual figure, so that staff do not know if the temperature is increasing or decreasing or the severity of the fever. Similarly, if the actual fall score is not recorded, then staff will not know how high the fall risk is, and whether it changes throughout the 24 hours. As the goal of care is to reduce the score, if the actual score is not recorded, then it will not be possible to gauge improvement (and decrease of fall risk) or an increasing score (and therefore increased risk of falling).

"All patients scored at high risk." A frequent complaint is that all of the patients scored high risk of falling — that is, the scale does not discriminate adequately. It is possible that all of the patients are, for instance, at high risk. Raising the level of risk will not change this fact, and will place those who are at risk in the "not at risk" category (i.e., a false negative). But if each patient's actual score is recorded, then the staff will recognize that there are discernable degrees of high risk.

Infrequent scoring. The final problem is not scoring the patient frequently enough. An emerging standard is that patients should be scored upon admission, and thereafter if a patient's condition changes. This is not frequent enough for patients in acute care, who should be scored at least once per shift. In long-term care, where patient fall risk is more stable, the patients should be scored frequently over several 24-hour periods, until their pattern is recognized, and then scored less often — as infrequently as once a week — if the resident's condition remains stable.

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[9] When the scale was first developed, an instructional videotape was available to teach the use of the scale. In 2003, this was replaced with an instructional DVD, provided without charge by Hill Rom Industries (safetyprograms@hill-rom.com).

Discussion: So What? What Is at Risk?

Given the poor quality of this clinical evaluation research, and unrealistic expectations of the scale's performance, it is not surprising that the quest for a perfect — or at least improved — scale has continued since the development of the MFS. Patient falls is probably one of the most researched clinical problems in nursing. The responsibility for patient falls has been placed squarely on the shoulders of nursing. We feel guilty if a patient falls, blaming ourselves for not remaining vigilant and perhaps even for neglecting basic care ("I should have asked this patient if she needed toileting"). Because of this firm link to basic nursing skills, many nurses have attempted to examine the problem of falls in various ways. Researchers are motivated by clinical *problems* — they hope interesting problems — those that will improve nursing care and change patient outcomes. Thus patient falls has been researched and researched by nurses, and this research continues to the present time.

However, the research is extraordinary. Each project is conducted in relative isolation from other projects, so that the research is not cumulative overall. Project after project is conducted with the aim of developing yet another fall risk prediction instrument. The failure to utilize the work of others has "levelled the playing field" and often results in mighty steps backwards.[10] The problem is compounded by invalid methods of evaluating and testing the available instruments and a lack of rigorous, funded inquiry by experienced researchers.

Review articles, including the Cochrane reviews, do link fall research, but these are not without error and omissions — which are then perpetuated by means of meta reviews (see, for instance, Burrows, 1999).

Astonishingly, this research is by and large being conducted using "opinion," albeit under the guise of clinical judgement. The Cochrane criteria are correct: opinion (be it "clinical judgment," "intuition," or "expert committee decisions") results in poor research involving measurement and in a low level of evidence. In the case of nursing fall research, this over-reliance on soft data results in the paradox of applying "qualitative" data[11] to a quantitative problem. It is the poorest of qualitative work, inappropriately applied, with the results masquerading as a quantitative tool that jeopardizes patient safety. Patients risk injury and even death.

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[10] But this independence has extended to the developers of the instruments, who are rarely consulted about proposals for evaluating their tools or asked to comment on the accuracy of articles evaluating their work prior to publication.

[11] I am using qualitative as a descriptor for non-numerical data, not to indicate a legitimate qualitative method.

Safety research is important, but it must be safe. It must be given adequate funding, conducted by researchers with appropriate qualifications, implemented wisely, and evaluated appropriately. Fall risk prediction is not easy to research: the outcome variable is intercepted; fall risk changes rapidly, and — particularly in the acute-care setting — is unstable, so that frequent assessments are essential. Fall intervention programs are not a low-cost add-on in the clinical area; they are expensive in time and dollars, but are essential to safe care. Fall risk assessment is a task that can be achieved only through the education of nurses, some time commitment in their workload, some attention by the quality assurance department to the recording of scores and fall statistics, and some investment on the part of administration for program costs. Fall intervention programs require all of these commitments, plus funding of a position for a clinical specialist to organize the program, funding for fall prevention and protection devices, funding to ensure that the building and equipment are as safe as possible, and vigilance and responsiveness to the program as a whole. Without the complete package, fall injuries in hospitals will not be reduced.

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Commentary

Assessing the Risk of Falls in Hospitals: Time for a Rethink?

David Oliver

In this issue, Janice Morse discusses the process by which the Morse Fall Scale was derived, then validated across a range of institutional settings (Morse, 2006). Using this scale to illustrate the discussion, she describes with real clarity the pitfalls in developing such scales and the misunderstandings that can lead to their misapplication — which, in turn, can compromise patient safety by giving false reassurance that "something is being done" to prevent falls or that most patients "at risk" have been identified. It is important to reflect on the evidence for our clinical practice before we rush headlong to implement solutions. H. L. Mencken (1917) said, "For every complex problem there is a an answer that is clear, simple, and wrong," and John Salak, "Failures are divided into two classes — those who thought and never did, and those who did and never thought."[1] My question is simply, Is there really an assessment tool that can *consistently* and *accurately* classify patients as being at either "high" risk or "low" risk of falling and that is an e*ssential* part of falls prevention in any institution?

Falls in hospital (especially in settings where most patients are older) are common, with rates reported at 5 to 18 falls per 1,000 bed days — translating at the higher end to 15 or so falls per month on a 25-bed ward (Australian Council for Quality and Safety in Health Care, 2005; Registered Nurses' Association of Ontario, 2005). They are the commonest adverse incidents in hospital practice. A recent analysis by the National Patient Safety Agency found that of 560,000 recorded incidents in UK hospitals in 2004–05, 270,000 were fall-related (Healey & Oliver, in press). Falls lead to fractures and head, facial, or soft tissue injuries. These are, in turn, associated with increased mortality, morbidity, length of stay, and discharge to institutional care. Even a "minor" injury can significantly impair mobility and rehabilitation in an older person at the

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[1] Retrieved May 2, 2006, from http://quotableonline.com/JohnCharlesSalak.html

margins of physical independence. Falls also lead to complaints, anxiety, and litigation from patients' relatives, who often feel that they "should not have been allowed to happen" in an apparent "place of safety" and that staff or institutions are at fault (Oliver, 2002; Oliver & Healey, in press). This, in turn, leads to guilt and anxiety among staff. The occurrence of a fall is also a marker of underlying frailty or illness, which should (but usually does not) prompt further investigation. Unsurprisingly, hospitals feel under great pressure to develop policies to prevent such falls. But what to do?

All that glitters is not gold. When hospital staff are seeking a solution, the idea of a "falls risk assessment tool" comprising a small number of risk factors on a checklist is very attractive. It could be either an "off the shelf" model that can be imported to their unit or, to use Morse's phrase, a "homemade" one (Morse, 2006). Either way, staff can now relax, secure in the knowledge that at last "something is being done" about the problem. But is it?

To be truly useful in practice, a prognostic tool needs to have certain characteristics (Oliver, Daly, Martin, & McMurdo, 2004; Wyatt & Altman, 1995). It should have transparent and easy scoring with a small number of items — the selection and weighting of which should be based on research evidence (comparing risk factors in fallers and non-fallers, with multivariate analysis) and not someone's "best guess." It should be "user-friendly" and consistently applied — that is, with a high degree of adherence by staff, a short completion time, and good interrater reliability. Most importantly, it should work! And it should work in the setting in which it is to be used! However well a tool may have worked in a high-quality original study *(internal validity),* your own patient population may be very different and the tool needs to be validated in a similar one *(external validity).*

The operational properties of an effective tool *(predictive validity)* need to be subjected to prospective validation on a sufficiently large group of patients for results to enter statistical significance. And, of course, any tool should perform better than the professional judgement of staff about which patients are at risk — if it is to be a substitute for that judgement. The key operational properties are *sensitivity* (i.e., what percentage of patients who fall had been scored at "high risk"?); *specificity* (i.e., what percentage of patients who did not fall had been scored at "low risk"?); *positive predictive value* (PPV) (i.e., what percentage of patients scored at "high risk" go on to fall?); and *negative predictive value* (NPV) (i.e., what percentage of patients scored at "low risk" go on *not* to fall?). PPV and NPV are dependent on the prevalence of falls in the population (which does not influence *sensitivity* and *specificity*). The best cut-off score will differ between populations and settings, and picking the definition of "high risk" entails a trade-off between sensitivity and specificity. Hence *receiver operating curves* (ROC) is often used to select the optimum cut-off (Bowers, House, & Owens, 2003). Here, sensitivity is plotted against 1–specificity, with the best cut-off being the point on the curve lying closest to the top left-hand corner. This point will correctly classify or discriminate the highest number of fallers and non-fallers. And it is on this point, above all, that falls risk assessment tools fall down. Their ability to correctly classify fallers and non-fallers is not good enough, if we compare it to that of predictive tests for other medical conditions. This ability tends to diminish the more dissimilar the population from the one used in the original validation cohort. And especially for hospital patients, risk changes as quickly as clinical status, mobility, or cognition. Yet staff may be tempted to import a risk tool and then, without ever validating it in their own unit, apply it to patients on their admission to hospital only.

All of this may seem to be an abstract and hypothetical "turn-off" to practical clinicians who want to prevent falls. But it matters. For instance, if the PPV is low for your population, then you will target your falls interventions very poorly. If the NPV is low, you will potentially gain false reassurance that patients are at "low risk" of falls. If specificity is high but sensitivity low, then you have a good way of reassuring staff that patients are at low risk but a poor tool for picking out potential fallers. And if a tool does not perform well, then staff time may be wasted in completing it — time that could have been better directed elsewhere. So potentially we have false reassurance, poorly targeted interventions, and opportunity costs.

Systematic reviews (Myers & Nikoletti, 2003; Oliver et al., 2004) have revealed numerous examples of falls risk assessment tools that have been literally "made up," with no validation and no rationale to the weighting of items, or that have been validated in only one cohort of patients, or where staff had added items to existing scales on the grounds of *face validity* (i.e., the items made sense to them in their daily dealings with patients). This is the result of a serious misunderstanding. The risk factors that *cause* falls are not necessarily synonymous with those that *predict* them — nor with those that can be reversed or modified to prevent them. So a *risk factor checklist* — prompting staff to look for common reversible risk factors and then to do something about them — is different from a risk assessment tool. And when it comes to risk assessment tools, only two — the Morse Fall Scale (Morse, Morse, & Tylko, 1989) and the STRATIFY score (Oliver, Britton, Seed, Martin, & Hopper, 1997) — have been repeatedly validated in a variety of settings using sensitivity/specificity analysis. As the original author of one of these tools, I am repeatedly asked for advice on its use, and my general advice on a good day is "consider its limitations…beware false friends…how well will it work in *your* unit?" and on a bad day "don't bother; I don't believe in it any more." Year by year, my view is evolving towards this stance. The diagnostic accuracy and operational properties of these tools are simply not good enough to make them the main plank of a falls prevention strategy. Yet time and time again I have people telling me how useful they find STRATIFY or the Morse Fall Scale. If people value them, they must have something in them, my guess being that they are a useful way of focusing the minds of staff on the problem — an important part of total quality improvement in falls prevention.

So what is the way forward? Well, we need to remember, firstly, that about 50% of all falls in hospital occur in people who have already fallen once, and, secondly, that a small number of falls risk factors have emerged consistently from the literature on falls in hospital (Myers & Nikoletti, 2003; Oliver et al., 2004; Perell et al., 2001). These are, in essence, (i) a recent fall; (ii) gait instability and lower-limb weakness; (iii) delirium, agitation, or behavioural disturbance; (iv) urinary frequency/incontinence; (v) postural hypotension/cardiac syncope; (vi) prescription of "culprit" drugs; and (vii) hazards/suboptimal equipment in the physical environment. Rather than rely on a risk assessment tool, much better to look at common reversible risk factors for *all* patients, then repeat the full assessment and management plan after they have fallen once — instead of simply filling out a form to exclude injury. If we are going to use tools to raise awareness, to prompt good practice, to formulate a plan once someone has fallen, let us attend to these risk *factors* rather than simplistic risk *prediction*, which may be inaccurate and does not of itself do anything to stop patients falling.

There have been any number (Oliver et al., in press) of poor-quality falls prevention trials in hospital of "before and after" design — inadequately powered, uncontrolled for confounding variables such as case mix, length of stay, staffing, or underlying trends in the falls rate and with no thought to the *Hawthorne effect* (Mayer, 2004), whereby falls recording may be altered by the very act of observation. This poor quality is partly due to the difficulties of performing research in a group of patients with high turnover and a high prevalence of dementia, delirium, frailty, and acute illness. It also epitomizes the problems discussed by Morse (2006). Enthusiastic practitioners have often instigated a laudable change in practice — designed to improve quality of care, yet not planned as a research trial. These trials have then been presented as quasi science — simply by reporting reported falls rates before and during interventions, but rendering the significance or generalizability of the results doubtful.

In a recent systematic review (Oliver et al., in press), three better-controlled, higher-quality in-hospital falls prevention trials were identified. None of these relied on the use of a falls risk assessment tool to classify patients as "high" or "low" risk. Rather, they relied on risk factor assessment (Fonda, Cook, Sandler, & Bailey, 2006; Haines, Bennell, Osborne, & Hill, 2005) or on the targeting of patients who had already fallen or had had a "near miss" (Healey, Monro, Cockram, Adams, & Heseltine, 2004).

If the original purpose of falls risk assessment research is to use the assessment in falls prevention programs, then this finding, above all others, casts doubt on their usefulness. I would argue that the quest for the Holy Grail of a risk assessment tool that anyone can use and does its job sufficiently well is one that should now cease.

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Response

Janice M. Morse

I thank David Oliver for taking the time to respond to my article. But I view with dismay his position that we should move away from using risk assessment tools to identify the fall-prone patient. To revert to using certain symptoms — or even a fall itself — as the indicator for implementing fall prevention strategies is a mighty step backwards. I will address this issue after correcting some misperceptions Oliver has of my article.

First, the Morse Fall Scale (MFS) is not a checklist. Second, I do not recommend the 1997 STRATIFY (Oliver, Britton, Seed, Martin, & Hopper, 1997) but the version with weighted scores (Papaioannou et al., 2004). The MFS has been used extensively in many independent settings, is beyond the "trial" period, and the VA Hospital system in the United States will soon be introducing it in all of their 160 acute-care hospitals and thereafter, commencing in July 2006, in their other hospitals. Third, the variation in "success" of the performance of the MFS results not from differences in patient populations — of course these give different mean scores and ranges — but from misuse when scoring. One cannot rate a patient's fall risk using the MFS and chart data — one *must* assess the patient. I recommend that patients be scored at least once per shift. We must move away from the ordinal categorization of scores as low/high, to using the actual MFS score — both item scores and total scores. Again, it is the interventions that prevent the fall; the MFS merely identifies patients at risk.

I am unable to support Oliver's suggestions for future research:

1. Both the study by Haines, Bennell, Osborne, and Hill (2006) and the study by Fonda, Cook, Sandler, and Bailey (2006) identified patients at risk using fall assessments that included medical tests. This method of assessment is not quick nor easy. Rather, it is expensive, slow, and specialized, and should be used once patients have been scored at high risk of falling, as determined by an initial risk score. (It is of concern to note that in the study by Healey, Monro, Cockram, Adams, and Heseltine [2004] the number of *injuries* in the experimental group actually increased. As researchers are aware, it is the number of *injuries,* not the number of *falls,* that should be used as the significant outcome variable in fall research.)

2. The approach used by Healey et al. (2004) to assess only those patients who have fallen or who have a near miss is unethical and immoral. It is astonishing that such a study was approved by an ethics review committee and published in *Age and Ageing.* This study violates principles of prevention and would be an extremely costly approach in terms of morbidity and mortality — as well as placing the staff and the institution in legal jeopardy.

I am concerned about suggestions that fall assessments be completed following a fall, instead of triaging for fall risk on admission and implementing a fall protection program. There is a need to move beyond subjective evaluation of fall instruments. Further, there is a need for healthy debate on these issues, to ensure that the practices that we implement are those that provide the best ethically and scientifically grounded care for the patient.

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Résumé

La connaissance parentale des harnais d'auto pour enfants et de leur utilisation

**Anne W. Snowdon, Jan Polgar,
Linda Patrick et Lynette Stamler**

Les traumatismes liés aux accidents de route constituent au Canada la principale cause de décès et de blessures chez les enfants de moins de 14 ans, malgré l'imposition de l'utilisation de dispositifs de retenue dans les véhicules. Un sondage a été mené pour examiner le taux de connaissances et les perceptions de la population parentale quant à l'utilisation de harnais d'auto pour enfants dans deux communautés de la province d'Ontario. Des parents de poupons et d'enfants âgés jusqu'à 9 ans ont été recrutés dans trois commissions scolaires urbaines et rurales, dans des garderies et dans des hôpitaux. Un total de 1 263 parents ont donné de l'information sur l'utilisation de harnais d'auto pour 2 199 enfants. L'analyse des données a révélé que seulement 68 % des enfants étaient assis dans des sièges appropriés à leur poids. Notamment, au fur et à mesure que l'enfant grandissait, le taux de non-utilisation de siège sécuritaire augmentait de façon importante en raison d'un taux de transition précoce vers des sièges inadéquats pour la grandeur et le poids de l'enfant. Les résultats ont également révélé que les parents avaient des connaissances limitées concernant l'utilisation adéquate des sièges de sécurité pour enfant et qu'ils recouraient fréquemment à des sources d'information non professionnelles pour obtenir des renseignements sur la sécurité dans un véhicule. Les auteures recommandent au personnel infirmier de développer une stratégie globale et systématique visant à faire comprendre aux familles les façons d'asseoir correctement un enfant dans un véhicule en utilisant un siège de sécurité approprié à la grandeur, le poids et l'âge de l'enfant.

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Parents' Knowledge about and Use of Child Safety Systems

Anne W. Snowdon, Jan Polgar,
Linda Patrick, and Lynnette Stamler

Road crashes are the leading cause of death and injury in children under 14 years of age in Canada, despite mandatory use of vehicle restraints. A survey design was used to examine parental knowledge and perceptions of the use of safety systems for children in 2 communities in the province of Ontario. Parents of children aged newborn to 9 years were recruited from 3 urban/rural school boards and from daycare centres and hospitals. A total of 1,263 parents reported on 2,199 children's use of safety systems. Data analysis revealed that only 68% of children used correct seats for their weight and that as the child advanced in age the rate of misuse increased significantly due to high rates of premature transitioning into safety seats inappropriate for the child's height and weight. The results also revealed that parents had limited knowledge concerning the correct use of safety seats and frequently used non-professional sources of information for vehicle safety information. The authors recommend that nurses develop a comprehensive and systematic strategy to ensure that families understand how to secure children in vehicles using the correct safety seat for the child's height, weight, and age.

Keywords: child safety, education program, intervention, car seat safety

Literature Review

Road crashes are the leading cause of death and serious injury for Canadian children under the age of 14 years (Howard, Snowdon, & McArthur, 2004; Safe Kids Canada, 2004). In Canada, approximately two children die or are seriously injured every day as a result of road crashes. In the United States, six children die and 673 are seriously injured every day due to road crashes (National Highway Traffic Safety Administration, 2004). Road crash injury is not limited to North America; it is a growing global health challenge that claims the lives of 3,200 people every day worldwide and is estimated to result in lifelong disability in over 50 million people annually (World Health Organization, 2004). Analysis of US crash data reveals that the risk of death can be reduced by as much as 74% and serious injury by as much as 67% with the correct use of child safety restraints (Weber, 2000; Wegner & Girasek, 2003). The rate of accurate use of such restraints has been reported as between 6% and 21% in American studies (Wegner &

Girasek). Correct use requires that the safety seat be appropriate for the child's height, weight, and age; be accurately installed and positioned in the vehicle; and be used every time a child is transported in the vehicle, with the child securely fastened into it.

Issues of Use and Misuse

The primary goal of child safety seats is to protect the central nervous system of children while travelling in vehicles (Weber, 2000). Restraints in vehicles (seat belts, safety seats) are designed to limit and control the body's rate of deceleration during a crash, thus reducing the forces acting on the body's surface to minimize the differential motion between the skeleton and the internal organs (Weber). Rapid deceleration of the body and the impact of the vehicle's structure on body surfaces are both associated with severe injury during collisions. Safety seats are designed to create a tight coupling of the restrained child and the crushing vehicle, and to distribute the remaining load as widely as possible over the child's strongest anatomical structures (Weber). A child secured in a correctly used safety seat is 2.7 times more likely to survive a crash without serious injury than an unrestrained child (Berg, Cook, Vernon, & Dean., 2000; Weber). Injuries associated with misuse of safety seats or premature use of seat belts in young children include laceration or rupture of abdominal organs (liver, spleen, bladder), spinal cord damage, and head injury (Weber).

One of the most common types of misuse is premature transition from child safety seats to seat belts, which often results in disabling or fatal injury (Berg et al., 2000). A US study found that children between 2 and 5 years of age who used seat belts were 3.5 times more likely to sustain significant injuries than children who used safety seats, and 4 times more likely to sustain significant head and abdominal injuries (Winston, Durbin, Kallan, & Moll, 2000). In Canada, fewer than 28% of children aged 4 to 9 years use booster seats (Safe Kids Canada, 2004; Transport Canada, 1997); thus it is estimated that 1.8 million children in Canada are at risk of serious injury due to the prevalence of premature seat belt use.

Installation of safety seats in vehicles is a complex task that poses a particular challenge for parents. A study of car-seat clinics conducted throughout the province of Ontario found that four out of five safety seats were installed or used incorrectly by parents (Ministry of Transportation of Ontario, 2005). Common types of misuse include safety seat straps fastened too loosely to the vehicle, incorrect use of tether straps, incorrect use of locking clips or latches, harness straps fastened too loosely over the child, and straps incorrectly positioned over the child (Kohn, Chausmer, & Flood, 2000; Lane, Liu, & Newlin, 2002).

Product manuals may also contribute to misuse, as their presentation and vocabulary often exceed parents' comprehension levels (Block, Hanson, & Keane, 1998; Decina & Knoebel, 1997; Gaines, Layne, & DeForest,1996; Wegner & Girasek, 2003). A recent US study of 107 manuals from 11 different manufacturers found that a grade 10 reading level was required, on average, to fully comprehend the instructions (Wegner & Girasek).

Non-use is another significant issue for child safety in vehicles. Between 1998 and 2002 there were 402 child fatalities in vehicles in Canada. In the majority of these cases (66% for infants, 50% for toddlers, 97% for school-aged children), the child was either unrestrained or fastened in a seat belt (Chouinard & Hurley, 2005). Non-use of safety seats or seat belts for children is estimated at 13% in Canada and 11.8% in the United States (Chouinard & Hurley). In one US study, the rationale used by parents for choosing not to use a child safety seat included the child's fussiness and discomfort, the inconvenience of using the device, and needing the device for a younger child (Decina & Knoebel, 1997).

Growth and Development

Rapid patterns of child growth and development also pose a challenge to parents and caregivers with regard to accurate and effective use of safety devices. Because of changes in children's height, weight, and cognitive development, parents must learn to instal and use a series of different devices. For example, infants quadruple their weight in the first 2 years of life and then gain steadily at the rate of four to six pounds per year until adolescence (Wong, 1999). Given the number and variety of safety seats on the market, parents may have difficulty deciding when to use which type of safety seat for each stage in their child's growth and development.

The risks associated with premature transition to seat belts in young children are well documented (Safe Kids Canada, 2004; Winston et al., 2000). Canadian and US studies have found that most parents do not know that a seat belt offers less than optimal protection for a school-aged child (Rivara et al., 2001; Safe Kids Canada). One study found that parents believed booster seats were unsafe because they were not anchored to the vehicle in the same way as child safety seats (Simpson, Wren, Chalmers, & Stephenson, 2003). Other studies have found that parents prematurely transition their children to seat belts, completely unaware of the risks or believing they have made the right choice (Safe Kids Canada; Simpson et al., 2003).

Parents' knowledge and perceptions about safety seat use are not well documented in Canada. In order to develop intervention programs for

Canadian families to improve their children's safety in vehicles, we need greater insight into what parents know about vehicle safety systems and how they use them. The purpose of this study was to examine parents' knowledge about and use of safety systems for their children. The research questions were: *What are the patterns of safety seat use for children (aged 0 to 12 years)? How does knowledge influence parents' decisions to use safety seats for their children? What sources of information do parents access regarding vehicle safety for children?*

Theoretical Context

The revised Health Promotion Model (HPM) was the theoretical basis for the study (Pender, Murtaugh, & Parsons, 2002). Although this model offers a theoretical context, it does not account for the unique way in which parents interact with and on behalf of their children to achieve health. One assumption of this study was that the choice of a vehicle restraint for a child requires the dynamic and active involvement of an adult, which in turn is influenced by multiple factors. The revised HPM framework identifies a link between individual characteristics and experiences that affect one's behaviour-specific cognition and lead to a behavioural outcome, described as a health-promoting behaviour. In this study, the health-promoting behaviour of interest was parents' use of safety seats for their children.

Method

Design

Survey methodology was used to examine parents' knowledge about and use of safety seats for their children. This was the first phase in a program of research to develop intervention strategies to support children's safety while travelling in vehicles. This survey phase was intended to provide evidence to support the development of intervention programs that promote children's safety in vehicles.

Sample

The study was conducted in a large urban area in Southwestern Ontario and in a smaller urban and rural area in Northern Ontario. Ethics approval was obtained from the University of Windsor Research Ethics Review Board, Nipissing University Ethics Board in North Bay, and the ethics boards of three participating community hospitals. Permission to access schoolchildren was granted by the directors of the school board once ethics approval had been obtained from the universities.

In Southwestern Ontario, families of children aged 0 to 9 years were accessed from an entire school board and its daycare programs (surveys placed in children's backpacks for Junior Kindergarten [JK] to grade 5) and from the obstetrical and pediatric units of two local hospitals. In Northern Ontario, two school boards (JK to grade 5) and the obstetrical unit of the local hospital were accessed using the same sampling strategy. In school settings, surveys and completed consent forms were returned to the researchers in self-addressed stamped envelopes or were collected in classrooms. In hospital settings, research assistants approached parents to obtain consent and then administered the survey to the parent, to increase the rate of response and to ease the burden of survey completion. In total, 10,600 surveys were circulated; 1,263 were returned, reporting on 2,199 children, which represents a response rate of 11.9%. The demographics of the sample are described in Table 1.

This convenience sample is not representative of families in Ontario since 90% were married (Ontario families = 75.2% married), 73.8% were educated at the postsecondary level (Ontario = 54.9% educated at this level), and 85.5% identified as Caucasian (Ontario visible minority population = 19.0%) (Statistics Canada, 2001).

Instrument

The survey was designed to examine parents' use of child restraint systems (safety seats or seat belts), parents' knowledge and decision-making relative to safety seat use, and parents' sources of information on safety seats. The questions were developed based on instruments used in car-seat clinics and on previous research identifying common patterns of use and misuse. The questions were grouped according to type of safety seat commonly used (rear-facing, forward-facing, booster, seat belt); use of the seat, installation of the seat, and location of the seat in the vehicle; and age, height, and weight of the child using the seat (the questions were designed to elicit responses for up to three children in a family). In this study, "correct use" was based on best practice guidelines (Safe Kids Canada, 2004), defined as correct seat for the height and weight of the child (i.e., rear-facing infant seat = < 12 months and < 20 lbs.; forward-facing seat [preschool] = 20–39 lbs.; booster seat = 40–79 lbs.; seat belt = > 80 lbs.), correct location of seat in the vehicle, and correct fit of the child in the seat. Patterns of use of safety seats for up to three children were examined relative to parents' decision-making on choice of safety seat and on transitioning the child to the next seat for his or her height and weight. The questions employed a variety of strategies to elicit clear and accurate information. Parents were asked to rate the importance of their decision-making rationale on a five-point Likert scale. Pictures of various styles of safety seat were included so that parents could readily identify and more accurately report the seats they were currently using. Short-answer and fill-in-the-blank questions were used so that parents could add more description to the data.

Table 1 ***Demographics of Sample***

Variable	**S.W. Ontario** **% *(N)***	**N. Ontario** **% *(N)***
Age (years)		
< 18	.3 (6)	1 (4)
18–25	5.3 (93)	11 (46)
26–30	19.2 (340)	17.2 (72)
31–35	39.9 (707)	32.2 (135)
36–40	26.6 (471)	25.8 (108)
41–45	6.9 (123)	9.8 (41)
> 45	1.8 (31)	3.1 (13)
Sex		
Female	90.5 (1,518)	87.5 (357)
Male	9.5 (159)	12.5 (51)
Marital Status		
Married/common-law	87.8 (1,556)	75.4 (316)
Race		
Caucasian	86.2 (1,495)	82.8 (342)
Native Canadian	5.7 (99)	13.1 (54)
Other	8.1 (141)	4.1 (17)
Region		
Urban	72.8 (1,163)	65.5 (260)
Rural	27.2 (434)	34.5 (137)
Education		
High school	25.6 (450)	28.9 (121)
College	33.6 (592)	43.2 (181)
University	29.4 (518)	21.5 (90)
Postgraduate	11.4 (200)	6.4 (27)
Income		
< $25,000	7.8 (129)	21.3 (87)
$25,000–35,000	11.7 (194)	22.7 (93)
$36,000–45,000	11.8 (195)	14.7 (60)
$46,000–60,000	18 (298)	16.9 (69)
$61,000–80,000	21.8 (361)	12.2 (50)
> $80,000	28.9 (479)	12.2 (50)
Mean years of driving experience	16.57	15.93

Content validity was supported in a series of pilot tests of the instrument. Initially, the survey was administered to 120 undergraduate nursing students. They were asked to identify questions that were difficult to answer or to understand, and unclear or redundant questions were then deleted. The survey was next administered to a different class of 100 undergraduate nursing students. On the basis of the second pilot test, the survey was administered to a group of 25 parents of children under 9 years of age in the community who had been identified by the research team. The number of questions in the survey ranged from 56 to 65, depending on the number of children for which each participant responded.

Data were entered into the SPSS statistical program and the initial phases of the analysis focused on descriptive statistics to indicate the demographic characteristics of the sample. The two communities were compared using *t* tests and chi square to examine differences in demographics (income, education, age) and correct use of safety systems. There were no significant differences between the two samples for correct use of safety systems. However, when the samples were compared according to age group and correct use, significant differences were found (Table 2). In addition, there were no significant differences in the two samples with regard to the parents' ages ($t = 0.354$, $df = 562$, $\alpha = .723$) or years of driving experience ($t = 1.775$, $df = 546$, $\alpha = 0.076$) but there were significant differences in education levels ($\chi^2 = 36.313$, $df = 4$, $\alpha < 0.001$) and income levels ($\chi^2 = 138.943$, $df = 5$, $\alpha < 0.001$). Over half of the parents in Northern Ontario (58.7%) reported a family income of *under* \$45,000, but well over half of the parents (68.7%) in Southwestern Ontario reported a family income of *over* \$45,000. Education levels differed less: 31.9% of parents in Northern Ontario were university-educated, compared to 40.8% in Southwestern Ontario.

Results

The data provide a wide range of insights into parents' knowledge about and use of child safety seats.

Correct Use of Safety Seats

Overall, 74.3% ($n = 1{,}586$) of children in the study were seated in the correct safety seat for their height and weight and their age. The rate of correct use varied with the age of the child and the geographic location of the family (Table 3). Infants in Northern Ontario were correctly seated (87.5%, $n = 56$) much more often than those in Southwestern Ontario (76.1%, $n = 175$). Preschool children (20–39 lbs.) were correctly seated more often in Southwestern (76.7%) than in Northern Ontario

Table 2 *Chi-Square Results for Correct Use of Safety Seats*

	S.W. Ontario		N. Ontario			Degrees	
Seat	**Correct**	**Incorrect**	**Correct**	**Incorrect**	**Chi-Square**	**of Freedom**	**Significance**
Rear-facing	231	0	4	61	273.05	1	< 0.001*
Forward-facing	699	166	0	177	434.51	1	< 0.001*
Booster seat	502	119	0	156	356.3	1	< 0.001*
Seat belts only	50	0	15	1	3.173	1	0.242

* Significant at 0.0.

Table 3 *Correct Use of Safety Seats*

	Rear-Facing		Forward-Facing		Booster		Seat Belt Only		Correct Use (%)	
	S.W. Ont.	**N. Ont.**	**S.W. Ont.**	**N. Ont.**	**S.W. Ont.**	**N. Ont.**	**S.W. Ont.**	**N. Ont.**	**S.W. Ont.**	**N. Ont.**
Infants ≤12 months										
0–20 lbs	***169***	***54***	19	1	0	0	0	0	89	98.0
21–39 lbs	***6***	***2***	35	7	1	0	0	0	14	28.5
Infants ≥13 months										
0–20 lbs	0	***1***	***5***	***2***	0	0	0	0	67	67.0
Toddlers x = 3 years										
21–39 lbs	0	1	***543***	***92***	150	42	1	4	78	66.0
School-aged x = 6 years										
40–79 lbs	0	0	***52***	***8***	***492***	***118***	177	53	71	67.0
School-aged x = 8 yrs										
80+ lbs	0	0	0	0	***2***	***2***	***60***	***18***	100	100.0

* Correct use appears in bold italics.

(66.2%). In the school-aged population, use of booster seats was 70.1% in Southwestern and 66.7% in Northern Ontario. Thus, the Northern community had a very high rate of correct use for infants but a lower rate of correct use in all of the other age groups with the exception of the children over 80 pounds using seat belts.

Transition of Children in Safety Seats

Parents were asked the age at which they transitioned their child to the current safety seat and the factors on which they based this decision. Figure 1 illustrates the rate at which parents transitioned their infant from a rear-facing to a forward-facing seat. Premature transition of infants began at 4 months, and by 9 to 12 months the majority of infants (78%) were in a forward-facing seat. Parents identified the child's "fit" in the safety seat and the child's weight as the most important factors in the decision to transition to a forward-facing seat; age was not a factor in the decision.

The second clearly apparent transition was that from a safety seat to a seat belt. Figure 2 illustrates parents' timing of this transition. Families reported using seat belts when their children were as young as 3 years, after which age the use of seat belts increased rapidly, with half of all children in the study using seat belts by the age of 7. Correct use of seat belts requires that the occupant be at least 80 pounds and 57 inches tall (Safe Kids Canada, 2004). Although age is not the main criterion, most booster seat laws in Ontario and Quebec identify 8 years as the minimum age for seat belts (Safe Kids Canada).

Figure 1 ***Use of Rear-Facing Safety Seats in Infants Up to 12 Months (n = 296)***

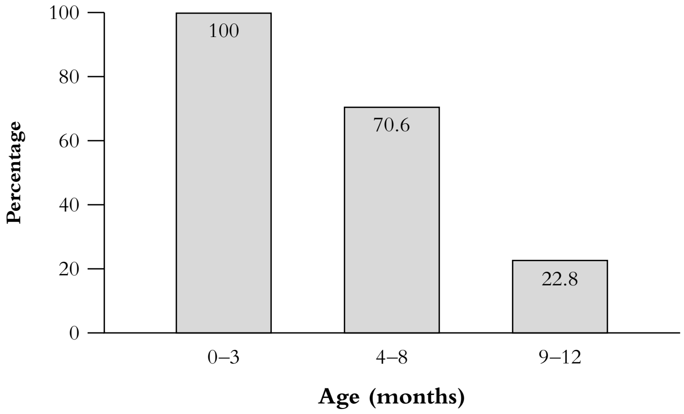
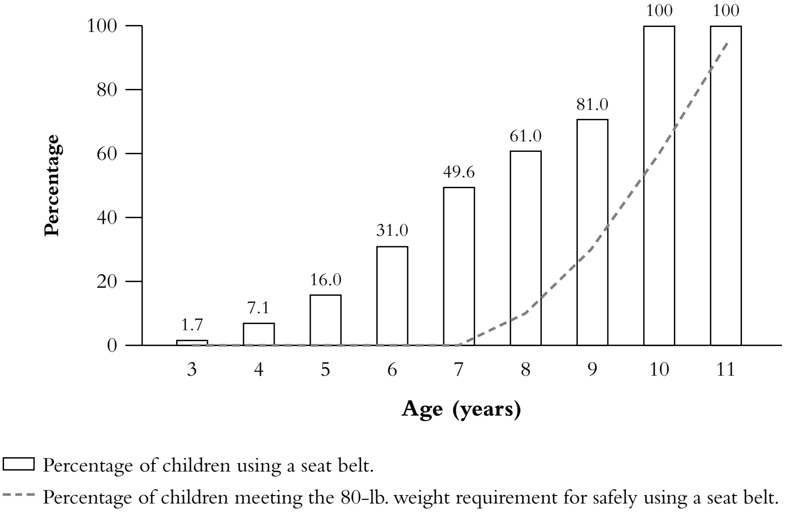


Figure 2 ***Premature Use of Seat Belts in Children Aged 3 to 11***



Parental Knowledge

Parents were asked to rate the importance of a number of factors in the decision to purchase a safety seat for their child or to transition their child from one safety seat to another. It was assumed that parents' knowledge influenced their decisions regarding safety seats. A Likert scale was used for this purpose. The most important factor in choosing a new safety seat was the "fit" of the child in the seat (mean rating = 4.27), followed by the child's weight (mean rating = 4.24). Age was not considered important (mean rating = 2.73), nor was the child's resistance (mean rating = 2.70).

Patterns of Safety Seat Use in Families

In the majority of families, both parents worked and therefore required others to transport their child in a vehicle as part of the family routine. The survey included items on strategies used by parents to ensure their child's safety in vehicles other than their own. Most parents (77%, *n* = 670) reported transferring the child's own safety seat to the other vehicle and routinely instructing the other driver regarding its use for their child. The most common group of other drivers transporting the child were grandparents (84%, *n* = 778), followed by "other family members" (41%).

Location of Safety Seat in the Vehicle

Regarding placement of the child in the vehicle, the majority of children (96%, *n* = 1,179) were correctly placed in the rear seat. There was little variation in parents' use of rear seating for their children when it was examined according to the age of the child.

Challenges of Safety Seat Installation

The majority of parents (86%, *n* = 1,069) reported "little or no difficulty" (scored on a 5-point Likert scale) with installing the safety seat in their vehicle. However, the study did not observe for accuracy regarding installation of the seat. Seventy-eight percent (*n* = 947) of the parents reported that the instruction manual packaged with the safety seat was clear and easy to follow, 17% (*n* = 201) reported that it was moderately easy to follow, while 5% (*n* = 63) reported that it was unclear and not easy to follow.

Safety Seat Purchase

Ninety-six percent of parents stated they had purchased a new safety seat. The factors influencing parents' choice of safety seat were ease of use (74%, *n* = 911), affordability (37%, *n* = 450), and aesthetics (22%, *n* = 269).

Sources of Information

Parents were asked to describe the sources of information they routinely accessed to support use of safety seats for their children. Sixty-five percent (*n* = 787) indicated that finding information was "easy," 23% (*n* = 272) that it was moderately easy, and 12% (*n* = 137) that it was not easy. The majority of parents used pamphlets and magazines as their primary source of information (*n* = 766, 63%), followed by friends and family (*n* = 382, 32%). Health-care professionals and car-seat clinics were not common sources of information.

Discussion

The rate of correct use of child safety seats found in this study (74%) is generally consistent with rates found in Canadian national surveys (Chouinard & Hurley, 2005). The most surprising finding was a very high rate of reported use of booster seats for school-aged children (70.1% in Southwestern Ontario, 66.7% in Northern Ontario). Although an entire school board was sampled in Southwestern Ontario (JK to grade 5), it is possible that parents who were knowledgeable about safety seat use self-selected more than parents who were less knowledgeable and that a random sampling approach would have yielded different results.

A study of booster seat use that was conducted in the same Southwestern Ontario community 1 year earlier and that accessed children through after-school "latchkey" programs in the same school board region found that only 40% (*n* = 105) of children used booster seats. The present findings need to be validated with more rigorous sampling approaches.

Another compelling finding was the pattern of premature transition of children to seat belts or to other safety seats. The majority of research to date has relied solely on a cross-sectional sampling approach as well as observation and self-report (Chouinard & Hurley, 2005; Safe Kids Canada, 2004; Simpson et al., 2003). The retrospective approach used in the present study elicited valuable insights into how and when parents make decisions regarding safety seat transition. Many of the parents mistakenly believed that "fit" and weight are the most important factors in safety seat transitioning; they were unaware that, for infants, age is a critical marker for transitioning. Parental knowledge about the correct age and the correct height and weight at which to transition children has been reported as very limited due to confusion about these factors; however, work in this area has focused primarily on the US booster seat population (Rivara et al., 2001) rather than on the premature transitioning of infants. An American roadside survey found that only 54% of infants under 1 year of age were properly restrained (Staunton et al., 2005). Public awareness through prenatal classes and education of new parents has been successful in supporting the use of rear-facing safety seats for newborn babies. However, parents need more detailed information on how and when to transition children beyond the newborn period.

Similarly, premature seat belt use was evident in the present study, with half of the children using seat belts at age 7 (Figure 2). This finding is consistent with the results of US studies, which report that 40% to 80% of 5 to 8-year-old children use seat belts (Staunton et al., 2005; Winston et al., 2000). In one of the studies, police roadblocks were used to ensure obligatory participation in the observation, which reported only 1% of children using the correct safety seat (Staunton et al.). This use of roadblocks may lead to a more reliable estimate of safety seat use than the voluntary participation used in most observational research. The most recent Transport Canada survey (1997) used "drive by" observation of safety seat use at intersections; the accuracy of these national data may therefore be limited. More rigorous methods for observing actual safety seat use in Canadian families are clearly needed. In the United States, premature use of seat belts for children has been widely studied (Ebel, Koepsell, Bennett, & Rivara, 2003; Rivara et al., 2001; Winston & Durbin, 1999; Winston et al., 2000), with seat belt use found to begin at age 2 and to be very common by age 5. In the present study, similarly, seat belt use began as young as age 3 and increased dramatically as the children approached the age of 6.

Another important finding of the present study was the sources of information used by parents to support the proper use of child safety seats. Parents reported relying heavily on "instructions on the box" and family and friends, rather than physicians, nurses, or safety seat experts. Lack of access to consistent and accurate information may be a major contributing factor in the misuse of safety seats in Canadian families. It may also reflect the lack of school-based education for children and lack of vehicle safety information for parents, whose reliance on friends, neighbours, and family members contributes to the perpetuation of misinformation throughout communities. In a recent study, only 16% of parents reported ever being asked about child seat safety by their primary care provider (family physician, pediatrician, nurse practitioner) (Lemoine, Lemoine, & Cyr, 2006). Thus, car seat safety may not be viewed as a primary care issue, despite the fact that riding in a vehicle is the most dangerous activity a child can engage in (McKay, 2003). Why do health professionals not raise the issue of car seat safety with families? If they have not received training or education in effective use of child safety seats, they may not be aware of children's risk of injury. Educational programs might consider addressing injury prevention more directly, so that professionals can adequately counsel families and help to prevent the spread of misinformation.

This study also found that the drivers (other than parents) to most frequently transport children in vehicles were grandparents. This finding raises a number of issues. Grandparents are not likely to have had experience with safety seats for their own children, since even seat belts were not made mandatory by law until 1977 in Canada. There are no published studies of grandparents' knowledge and use of safety systems for children travelling in vehicles. Future research could examine grandparents' knowledge and use of child safety systems and consider tailored intervention programs that reflect the learning needs of older adults who routinely provide care for children in vehicles. This particular area of research will become increasingly important as Canada's population ages and grandparents assume more active roles in transporting children.

There are two limitations to the study. The preponderance of Caucasian respondents is not representative of the diversity of Canadian urban populations; while the Northern Ontario site contributed some aboriginal participants, these were too few in number to allow for a strong comparative analysis. In addition, the use of self-report surveys may have resulted in a selection bias on the part of parents, which could mean that the findings represent a "best case scenario" regarding correct use of safety seats in Canadian families.

Implications for Nursing Practice

Nurses clearly have an extraordinary opportunity to take a leadership role, nationally and internationally, in championing injury-prevention initiatives for children travelling in vehicles. Every year in Canada, the equivalent of three classrooms full of elementary schoolchildren never reach grade 5 due to fatalities in vehicles (Safe Kids Canada, 2004). The development of a comprehensive strategy to prevent death and serious injury in Canadian families is long overdue. Such a strategy would engage nurses in community agencies, ambulatory care, obstetrics, and pediatrics to ensure that parents and children have the knowledge and skills necessary to travel safely in vehicles. Just as height, weight, and allergy and immunization status are assessed throughout childhood using a standardized approach, so too should safety seat use be screened and assessed. Nurse practitioners, nurses in school health programs, pediatric nurses, and emergency room nurses should be conducting routine safety seat assessment for all children and providing consistent, accurate information to families on a routine basis.

Interdisciplinary and cross-sector partnerships are needed in order to achieve the 70% reduction in fatalities and 67% reduction in serious injuries among Canadian children reported as achievable in the current research (National Highway Traffic Safety Administration, 2004). Partnerships with school boards, police/fire services, and educators would be a unique and critically important means for nurses to influence in-class health and safety education in primary schools. Teachers and parent councils could partner with nurses to facilitate the implementation of programs that teach children and parents about the correct use of safety seats, as schoolchildren experience higher rates of death and serious injury than any other age group (Chouinard & Hurley, 2005). Such cross-sector partnerships would be an ideal opportunity for nurses to build on community education programs for families with infants and toddlers and extend safety education into schools, to ensure that all children travel safely in vehicles. Cross-sector strategic partnerships may also position nurses to more directly influence policy, such as federal booster seat legislation.

There is no question that vehicle safety programs, in order to provide a comprehensive, national approach to education that supports effective use of safety seats in Canadian families, need the involvement of professionals from education, health, police services, and even the private sector (i.e., the auto industry). Nursing is the ideal discipline, with its wealth of knowledge and experience in health promotion, to conquer road crashes as the leading cause of death among Canadian children. Theoretical development of injury prevention research for children travelling in vehicles has not been addressed in the health literature. The present findings may represent a first step in identifying some of the conceptual underpinnings of injury prevention in this important area of health promotion research in Canada.

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Happenings

Mapping the Human Genome: Psychosocial Impacts and Implications for Nursing

Mary Jane Esplen

Introduction and Background

The Human Genome Project is a fast-developing area of health research that is leading to new ways of dealing with health and disease. The information and technology gained as a result of the Human Genome Project are expected to have a profound impact on individuals and society. This paper highlights Canadian research initiatives related to genetics, including the implications of such research for nursing.

Until recent developments in the field, geneticists mainly dealt with rare disorders and prenatal or pediatric populations. To this area of practice has been added counselling and testing for adult-onset hereditary disorders, whereby individuals may be provided with information about their own risk for disease. Hereditary diseases include, among others, cancers (e.g., breast, ovarian, and colorectal), cardiovascular disease, diabetes, and some neurodegenerative diseases such as Alzheimer disease and Huntington disease. Genetic advances are leading to new approaches in the assessment of disease risk and in prevention recommendations for healthy individuals (Burke et al., 1997). Genetic treatments and prevention strategies are already being integrated into clinical medicine; this trend will continue over the coming decades as translation of research findings becomes possible for a wider and wider range of conditions. Biomedical advances are increasing our understanding of genetic differences in pharmacological sensitivity among individuals, leading to the tailoring of medications based on inherited characteristics (Evans & Relling, 1999). Preventive or surveillance interventions will be specifically targeted to those at greatest risk, with the goal of reducing the incidence and mortality of disease. As well, careful assessment of health behaviours (e.g., with regard to smoking, diet, exercise, use of oral contraceptives) and biomedical and genetic factors in those at increased genetic risk will be a greater focus in nursing care.

Advances made by the Human Genome Project will, accordingly, raise questions about how the information will be used and interpreted by individuals, families, and society, and about the impact of such use and interpretation. Additionally, empirically based interventions will be required to assist individuals in adapting to and comprehending genetic information, in making decisions concerning risk-reducing options, and in adopting surveillance regimens.

Recent Research Initiatives

In anticipation of the full impact of the Human Genome Project, a series of special initiatives was launched, initially by the Medical Research Council (MRC) and then (with partners) by the Institute of Genetics of the Canadian Institutes of Health Research (CIHR). The late 1990s witnessed the first competition for grants to conduct pilot or small studies on ethical, legal, and social issues surrounding genetics. The MRC recognized the need for research on the potential social impacts — for example, ways in which people understand inherited risk. Perception of statistical risk is notoriously poor, even among members of high-risk families with single-gene mutations, the least complex of the genetic circumstances (Evans, Burnell, Hopwood, & Howell, 1993; Lerman, Seay, Balshem, & Audrain, 1995), and is subject to a variety of influences that can lead to misunderstandings. How will individuals respond and adapt to genetic knowledge? How will family communication and interaction be altered? The role of genetics in medicine suggests that the ways in which family members communicate with each other about illness and genetic susceptibility will have considerable impact on how genetic and family history information is disseminated and utilized (Glanz, Grove, Lerman, Gotay, & LeMarchand, 1999; Patenaude, 2001). Developmental considerations further complicate the thinking about how to talk with children and teenagers about disease risk.

Our team responded to this initial competition and has collaborated nationally with leaders across Canada, and across disciplines, in committing to the investigation of the psychosocial impact of genetic testing, particularly in the development, standardization, and testing of counselling methods and clinical tools to assist individuals and families in comprehending, coping with, and utilizing genetic information. As a result of the MRC competition, several small descriptive studies were funded, including two projects by our team: a project to develop and test a group-support intervention for women with BRCA1/2 mutations; and a program of research to develop and validate psychological instruments to examine the psychological impacts of genetic testing (e.g., an instrument to measure self-concept among individuals who carry genetic mutations).

The establishment of CIHR and its institutes brought about further opportunities to support research. Several institutes joined together to hold workshops related to the social, ethical, and health-care implications of genetics knowledge. In 2003, CIHR's Institute of Genetics and Institute of Health Services and Policy Research funded two Interdisciplinary Capacity Enhancement Teams to build capacity and promote research and knowledge translation in this area. One of these teams is known as GeneSens (with Drs. Wilson, Caulfield, and Wells as principal investigators). The goals of GeneSens are to support sharing and learning about new perspectives in health services research; to improve the methods and skills of those members of the research team who are established investigators; and to identify, develop, and conduct research projects to address key questions relating to the effectiveness, efficiency, or sustainability of policies or services in genetics health care. Also, two proposals related to knowledge translation of genetic services recently received funding from CIHR. One of these focuses on disseminating new genetic knowledge to primary care practitioners in a timely fashion and is led by Dr. June Carroll, a family physician and researcher in Toronto.

One area where genetics knowledge will have a potential impact is the realm of psychosocial and behavioural response. Any test result that has implications for challenging decisions can pose a psychological burden. Examples include decisions about prevention and treatment options (e.g., increased surveillance, prophylactic surgery, chemoprevention); communication of test results to extended family members, offspring, and insurance companies; and relationship decisions, such as those concerning marriage or childbearing (Esplen et al., 2004). Relationships among siblings, parents, and offspring can be complicated by different test results. For example, it appears that some people found not to carry the mutation for Huntington disease feel rejected by their family when they no longer appear to have one of the key "bonds" (being at risk) that had tied them together (Tibben et al., 1999).

In 2003 a request for proposals entitled Staying Ahead of the Wave was designed to fund a range of reserach projects in genetics-related health services and policy. Our team, with principal investigators (Drs. Mario Cappelli and Mary Jane Esplen) and team members across Canada, was funded to conduct a clinical and training needs assessment as a first step in developing a Canadian genetics health service to meet the overall needs of individuals considering genetic testing and their families. The goal of the needs assessment is to provide baseline information for service providers, decision-makers, and funders. The assessment, which has the potential to influence training programs for genetics health professionals, focuses on the level of psychosocial need as perceived by clinicians in direct contact with patients undergoing genetic testing for adult-onset disorders. It is intended to identify the types and level of psychosocial services currently available to such patients; determine whether psychosocial services now in place, however delivered, are sufficient to meet current and projected future needs; and identify options for meeting needs. The ultimate goal is to develop a national strategy for addressing research and service gaps.

Preliminary findings from the needs assessment indicate a lack of professionals to provide psychological support. In centres where psychosocial services are available, there is variability within multidisciplinary teams. In urban centres, for example, the team may include a psychiatrist, psychologist, or advanced practice nurse practitioner. Rural centres have limited or no access to specialty services for psychosocial support. This pattern reflects the general lack of psychosocial/psychiatric services across Canada, particularly in non-urban centres. All the centres identified psychosocial care as an important area for further development. The assessment of training programs suggests a lack of formal courses on psychosocial issues; however, lectures on risk communication and counselling are provided in graduate programs in genetic counselling.

In 2004 CIHR developed an additionl request for applications, Addressing Health Care and Health Policy Challenges of New Genetic Opportunities. Again, our team (led by Drs. Esplen and Cappelli) responded, and was funded for a proposal with two components: a review of the literature for evidence of predictors of difficulties in psychological adjustment to genetics information and an effort to develop and validate a psychological screening instrument for use across adult onset heriditary disorders; and the development of evidence-based clinical guidelines for managing distress. These tools are considered critical for the field: genetics counsellors, genetics nurses, and geneticists have cited challenges in identifying and managing distress and in screening for particular areas of adjustment difficulty, including grief issues and psychological issues related to prior experiences with the disease in the family. The emerging descriptive literature on genetic testing provides evidence for predictors of poor adjustment that can be incorporated into a screening tool. Our team comprises a number of disciplines and includes researchers, clinicians, and policy-makers, in an effort to produce a "user-friendly," clinically relevant yet evidence-based tool that will be rigorously validated.

The use of screening mechanisms, drugs, or prophylactic surgery targeted to those at increased hereditary risk will rest in large part on the psychological factors that govern acceptability of and adherence to recommendations. These factors include cultural and socio-economic differences in attitudes towards genetics and affect uptake of target treatments. Behavioural research will be important not only in understanding and addressing these differing views among groups, but also in understanding what accounts for differences in views of genetics and related treatment recommendations among members of the same group or family. Empirically supported decisional tools will be required for frontline clinicians involved in genetic services to assist individuals in making difficult choices concerning risk reduction. Decisional aids are typically designed to assist individuals with regard to known risks and benefits (both physical and psychological) and personal values, as well as to help them work through difficult decisions.

Dr. Joan Bottorff's team has also been instrumental in contributing to the general literature on psychosocial impacts and has developed and conducted testing on counselling tools, such as a decisional aid (developed by Mary McCullum) to enhance decision-making on prophylactic mastectomy among women at high risk for breast cancer. Pilot testing of the aid is complete, and promising preliminary findings have implications for a future randomized controlled trial. Dr. Kelly Metcalfe is currently pilot testing a decisional aid for women with a BRCA1 or BRCA2 mutation who have not had breast cancer. The aid is intended to help women make decisions regarding breast cancer prevention and screening, including the options of prophylactic mastectomy, chemoprevention, prophylactic oophorectomy, and screening surveillance. It is designed to be used in addition to standard genetic counselling and is being pilot-tested for its impact on knowledge, decisional conflict, and cancer-related distress.

Over the past decade several teams and proposals have been funded in Canada to establish genetic and epidemiologic registries for biological and epidemiological data on probands and family members (e.g., Interdisciplinary Health Research Teams funded by CIHR; collaborative cancer registries funded by the National Institutes of Health). Registries allow for a range of hypothesis-testing studies involving the discovery of new genes related to disease and for exploration of gene-gene and gene-environment interactions, providing ample opportunity for behavioural research. CIHR has funded two large Interdisciplinary Health Research Teams in cancer (e.g., breast; colorectal); both include behavioural researchers and separate studies to investigate psychosocial impacts and interventions (M. Dorval in Quebec; Dr. Esplen in Toronto).

In relation to health professional education, Dr. June Carroll leads a research program focused on the education of primary care providers. Her team has developed a number of educational tools to help providers gain knowledge in genetics and to translate new information into care. Dr. Esplen and her team collaborate closely with Dr. Carroll to integrate new knowledge on the psychosocial and behavioural aspects of care.

In relation to nursing roles, Dr. Bottorff has taken a leadership role in Canada in systematically reviewing the literature and studying current and emerging nursing roles in genetics services (funded by CIHR). A recent series of papers, focused on a literature review, describe current roles and important factors in developing future roles for nurses in Canada (Bottorff et al., 2004; Bottorff et al., 2006; Bottorff, McCullum, et al., 2005). This work is significant in that it points directly to the wide gap in nursing training in Canada. In contrast to the situation in the United States and the United Kingdom, Canadian training programs for nursing include little or no formal education in genetics. A few faculties report lectures or integration of genetic information within existing courses; the content, however, is minimal. This absence of training is troublesome: a recent survey (Bottorff, Blaine, et al., 2005) found that most nurses are already encountering issues surrounding genetics and related risks in their practice and believe that they will have a significant role to play in genetics health care in the future. Nurses report virtually no formal training in genetics and a lack of confidence related to these clinical situations. Nurses currently working in the field of genetics health care have been pioneers in carving out innovative roles (Bottorff et al., 2006). They have mostly been trained and mentored by other disciplines and have sought out workshops outside of Canada to enhance their knowledge, often obtaining certification or registration in the United States. The identified roles for both specialty and general nurses vary, but usually include taking a family history, communicating risks, providing psychosocial counselling, and supporting family communication. Training programs have been established, particularly in the United States but also in the United Kingdom, at all levels of nursing education (undergraduate and graduate) and include specialty in-depth training as well as continuing education workshops (Bottorff, McCullum, et al., 2005).

The National Coalition for Health Professional Education in Genetics (NCHPEG), a multidisciplinary organization in the United States, has initiated a national effort to promote health professional education. The organization has outlined core competencies recommended for all health professionals involved in care and recommends a basic level of genetics knowledge, terminology, and skill. While medical schools in Canada have begun to take some steps in this direction, the goals of NCHPEG are yet to be reached among nursing programs and providers in Canada. The goals can be achieved through increased awareness of the Human Genome Project, its health-care implications, and the efforts of current nurse leaders in the field.

In summary, the Human Genome Project is an exciting initiative that will lead to revolutionary new treatments and preventive programs. The opportunities for nursing care and research are vast. Nurses represent the largest group of health-care providers, and, as more genes are cloned and as more information on disease risk/genomics health care becomes available, there will be a need for professionals to provide new genetics services and to translate new technologies into health care, as there will be an insufficient number of specialists (e.g., genetic counsellors, geneticists) to meet all of Canada's health-care needs. Nurses will have to be equipped to identify individuals at risk for disease and individuals who may stand to benefit from targeted treatments and preventive measures. Nurses in most health areas will be involved in the coordination of care and in communicating with patients and their families concerning new technologies and health promotion. Opportunities exist to develop training programs and courses to address current knowledge gaps and to evaluate educational models. Nurse scientists are in an ideal position to lead research on the health-care and psychosocial aspects of genetic knowledge. CIHR's research initiatives present several opportunities for training graduate-level nurses and for nurse researchers to lead or collaborate with the multidisciplinary teams that are often required to generate new knowledge in this area. Ultimately, generating and applying new knowledge on the psychological and social implications will result in optimal care for Canadians.

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Book Review

Quality Work Environments for Nurse and Patient Safety

Edited by Linda McGillis Hall
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Reviewed by Elizabeth Manias

This publication funded by the Ontario Ministry of Health and Long-Term Care represents a critical analysis of the literature on indicators associated with nurse staffing and the quality of nursing environments. It brings together authors who have conducted exemplary research on the effects of work environments on nurse and patient safety. The majority of these authors are world renowned, having published extensively on structural variables influencing health-care settings. They include Linda McGillis Hall (the editor and principal investigator of the initiative), Diane Doran, Deborah Tregunno, Amy McCutcheon, Linda O'Brien-Pallas, Joan Tranmer, Ellen Rukholm, Allison Patrick, Peggy White, and Donna Thomson.

The literature review is guided by two frameworks, the Quality of Worklife Issues Framework and the Nursing Role Effectiveness Model. The Quality of Worklife Issues Framework considers external and internal dimensions influencing nurses and their work environments. External dimensions include patient demands on the environment and changes in health-care policy and the labour market, while internal dimensions include nurses' individual needs, decision-making styles, and care delivery, as well as institutional policies. The Nursing Role Effectiveness Model examines the contribution of nursing roles based on the structures, processes, and outcomes of care. Using these frameworks, the authors examine concepts of nurse staffing and quality of the nursing environment. Nurse staffing concepts include proportion of registered nurses to nursing assistants and licensed practical nurses; nursing hours per patient day; ratio of registered nurses to patients; mix of nursing staff; percentage of full-time, part-time, and casual nurses; number of full-time equivalents; and level of education and experience. Concepts around quality of the work environment that are explored include nursing and multidisciplinary teamwork; organizational climate and culture; span of control; workload and productivity; autonomy and decision-making; professional development opportunities; scope of nursing leadership; overtime; and absenteeism. These concepts are covered in 10 chapters;

nurse staffing is examined collectively in one chapter while concepts around quality of the work environment are explored individually in separate chapters.

Although a different author is responsible for each chapter, the material is presented in a logical, systematic, and structured way, which facilitates the flow of arguments and the reader's understanding of complex issues associated with each concept. Introductory and concluding chapters provide good insight into relationships between concepts. Each chapter begins with definitions of the concept under discussion, followed by theoretical underpinnings and influencing factors. The authors make links between the concept and achievement of nurse and patient outcomes. They consider issues associated with empirical assessment of the concept and examine evidence regarding approaches to measuring the concept. Finally, implications and future directions are extensively discussed. I shall highlight particular aspects of each chapter that cover the ways in which the concept under discussion affects nurse and patient outcomes.

In examining the concept of nurse staffing, early studies explored links between various measures of nurse staffing, such as the proportion of registered nurses to nursing assistants and licensed practical nurses, number of full-time equivalents, and the outcome of patient mortality. Research has examined data on hospital-level staffing and the hospital-level patient case mix, which may not accurately depict the effects of nurse staffing at the unit level. For instance, patient acuity scores have been analyzed only at the hospital level, patients with different levels of nursing need have been mixed, and patients from various types of unit have been integrated. Nurse staffing considered at the hospital level presents additional challenges, since all nurses have been included in the analysis regardless of their level of involvement in direct patient care. *Quality Work Environments for Nurse and Patient Safety* shows clearly that future work should focus on (1) predicting the influence of changes in nurse staffing on patient outcomes, and (2) unit-level measures of nurse staffing adjusted for patient acuity.

Teamwork is explored as a composite phenomenon having several dimensions, including communication, coordination, and shared decision-making. Growing concerns about patient safety and the need for a systematic approach to ensuring safe care have focused attention on ways of improving teamwork in order to reduce adverse events. For example, according to the Joint Commission on Accreditation of Healthcare Organizations (in the United States), problems with communication between health professionals are the root cause of some 60% of reported sentinel events (p. 47). A vast array of nursing instruments that measure dimensions of teamwork is presented. Also cited are power relations among nurses and between physicians and nurses. These may entail differences in gender, effects of working in different practice areas, and management structures. Power relations include those associated with institutional, professional, and historical relations. Through such relations, a physician's dominance is secured by means of institutional arrangements supported by the legal system, the recruitment and training process, and the exclusive "right" to exercise certain powers and skills. At the same time, a physician's authority is commonly surrounded by mystique. The argument concerning factors that influence teamwork would have been complemented by a discussion of these power relations.

Organizational climate and organizational culture are important considerations for the uptake of improved practice. Similarities in and differences between the two concepts are demonstrated from theoretical and research perspectives. Organizational climate refers to the way in which individuals feel, behave, and think in relation to a given situation. It is temporal, is open to manipulation by influential people, and, generally, has been studied using quantitative methods but from a qualitative perspective. Organizational climate concerns the "evolved context in which a situation may be embedded" and how "individual behaviors reflect adherence to group norms" (p. 70).

Span of control is considered in terms of the influence of nurse managers on staff outcomes and on the creation of a positive work environment. The chapter devoted to this concept examines the complexity of the argument that a narrow span of control — a small number of people reporting to a single manager — gives the manager ample time to mentor, monitor, and encourage staff; any additional time will not necessarily be spent with staff members and any additional time spent on interaction will not necessarily be beneficial for staff. Despite these complexities, it is cogently argued that, as the span of control increases, relationships between managers and staff become less positive. The review supports the need for a validated tool that includes the complexity of nursing functions, number of staff assigned to a unit, and unit unpredictability.

Workload and productivity are treated as important management indicators whose utility is highly dependent on the quality of data collected and the rigour of the analytical process. Nursing workload is defined as the amount and type of "nursing resources needed to care for an individual patient on a daily basis" (p. 106). Nursing productivity, as defined by the Canadian Institute for Health Information, is "the relationship between nursing workload units and direct care worked hours" (p. 108). This chapter of the book systematically considers the complexity of currently available nursing measures of workload and productivity and cites gaps in the literature, especially in the areas of community, long-term, and chronic care. It also points to the urgent need for a gold standard in the measurement of nursing workload, to be used by all health-care institutions to facilitate comparison across environments.

Autonomy is considered in terms of the right to exercise clinical and organizational judgement in decision-making. While *Quality Work Environments* suggests that autonomous practice is likely to enhance patient care and nursing practice, no empirical evidence is available to support this assumption. An extensive analysis is undertaken of available instruments of nurses' autonomy as well as general instruments that include autonomy. Of these instruments, only two, the Revised Nursing Work Index and the Clinical Autonomy Ranked Category Scale, are recommended for testing. The authors point to the need to examine nurse autonomy from a patient-outcomes organizational perspective.

Professional development opportunities are systematically examined from the perspectives of nurses themselves, the workplace, and regulatory bodies. A comprehensive evaluation of professional development opportunities reveals that research has focused mainly on learning (e.g., critical thinking and reflection skills and self-reported responses concerning the usefulness of programs). An interesting argument is raised about whether critical thinking and reflection are outcomes of professional development or processes through which professional development is achieved. The book points to the need for experimental studies that examine the impact of professional development on patient outcomes.

The scope of nursing leadership is an important factor in the work environment: when nurses are encouraged to demonstrate leadership by using their expertise and judgement, increased job satisfaction can result (p. 182). A strength of the chapter on this topic is its examination of the complex factors that influence nursing leadership, including history, education, personal leadership traits, organizational structure and power, organizational redesign, and gender. An extensive appraisal of the literature demonstrates the need for research aligning the concept of nursing leadership with measured leadership behaviours, and ultimately linking those behaviours to quality patient care.

Overtime is a growing concern in nursing, especially because of problems with recruitment and retention. Overtime refers to "any hours that a nurse works beyond those which were originally scheduled whether paid or unpaid, voluntary or involuntary" (p. 224). *Quality Work Environments* features an excellent discussion of economic, legal, and social factors impacting on overtime use, including unpredictable worker demand and supply, limitations of work contracts, nurse shortages, unpredictable environments in terms of cost constraints, wage levels, and lack of information on staffing patterns. Complexities relating to different types of overtime are comprehensively examined — for example, unpaid involuntary overtime and paid voluntary overtime can produce different effects on both individuals and organizations. The book identifies a critical research gap in relation to the level of overtime that would lead to negative patient outcomes and a loss of productive hours of nursing care.

Absenteeism, the last concept considered, is defined as a nurse's absence from the health-care setting at a time when he or she is expected to be present (p. 231). Individual factors that affect absenteeism are a nurse's demographic profile, physical and mental health, job dissatisfaction, and personality. Organizational factors are job strain, position grade, level of supervisory support, work hours, size and type of organization, unit environment, content of nursing work, and organizational climate and policies. An organizational factor that might have been included is the use in hospitals of agency nurses, or itinerant workers whose employment is controlled by private contractors. The role of agency nurses in the work environment could well be a factor in patient and organizational outcomes.

In summary, this book is a wonderful and comprehensive resource — the first to offer a critical appraisal of the health-care literature on indicators that can be measured in nurses' work environment. *Quality Work Environments for Nurse and Patient Safety* is essential reading for any clinician, manager, academic, researcher, or policy analyst who is committed to identifying and supporting initiatives in nurse staffing and the nursing work environment in order to improve nurse and patient outcomes.

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