# Geography and nursing: convergence in cyberspace?

Gavin J. Andrews[a] and Rob Kitchin[b]

[a]*Faculty of Nursing, University of Toronto, Toronto, Ontario, Canada,* [b]*NIRSA, National University of Ireland, Maynooth, County Kildare, Ireland*

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During the last 3 years the interface between geography and nursing has provided fertile ground for research. Not only has a conceptual emphasis on space and place provided nurse researchers with a robust and subtly different way to deconstruct and articulate nursing environments, but also their studies have provided a much needed focus on certain areas of health-care, and in particular clinical practice, not currently prioritized by health geographers. We argue that, as something that is forcing fundamental re-considerations of the nature of both nursing and geography, cyberspace is a particularly important phenomenon that lies comparatively under-researched at this interface. To encourage some interest in researching nursing and cyberspace through a geographical lens, and at least to showcase a range of potentially useful and transportable concepts, we provide an overview of some of the key debates pertaining to cyberspace developed by human geographers, and make some initial and tentative connections to nursing.

**Key words:** cyberspace, geography, place, space, therapeutic landscape, virtual nursing.

Geographical and nursing research developed quite independently of each other during much of the twentieth century, rarely crossing paths. Why this might be the case is debatable, although a broad range of possibilities include theoretical and empirical divergence (including tensions between professionally focused and perspective-oriented disciplines), perceptions of limited 'relevance', gender divisions, or even lack of general interest, chance, stigma or mutual ignorance (Andrews, in press). Whilst nurse researchers developed sophisticated sociological, psychological, anthropological, historical and, more recently, economic approaches to investigate their practices, the geographical imagination remained relatively untapped. For their part, geographers concerned themselves predominantly with distributive features of disease, health, services and man (doctor) power without focusing on the intricacies of, and issues relating to, health professional practice (Andrews, in press). Indeed, even studies published in the past 10 years that are clearly

part of a reformed qualitative 'postmedical' health geography, have not engaged significantly with professional caring practice, being instead more concerned with informal care-giving (Parr 2003). However, since the mid-1990s, a convergence of interests has occurred, but with nurses and other 'non-geographers' largely being the ones to bridge the gap and study nursing geographically (Andrews, in press). This has occurred particularly in the 3 years since, but not necessarily because of, the commentaries on geography and nursing published in this journal (see Andrews 2002, 2003b).

There has been a wide-ranging focus on contexts as varied in their scale as regions, countries, cities, neighbourhoods, hospitals, homes and bedsides. In terms of issues, foci include the gendered dimensions of health-care (Liaschenko 1997; Radcliffe 1999; Halford and Leonard 2003); intimacy, morality and the management of spatial interaction (Liaschenko 1994, 1996, 1997, 2003; Purkis 1996; Peter 2002; Lock and Gibb 2003; Malone 2003; Affonso, Andrews and Jeffs 2004; Peter and Liaschenko 2004), including the making of institutions (Montgomery 2001) and the role of cyberspace (Sandelowski 2002); the attractions of work environments and/or movements of the nursing

Correspondence: *Gavin J. Andrews, Faculty of Nursing, University of Toronto, Toronto, Ontario, Canada.*
E-mail: *<g.andrews@utoronto.ca>*

workforce (Buchan, Seccombe and Thomas 1997; Buchan 1999; Upenieks 2003; Buchan and Sochalski 2004; Andrews et al. 2005a; Brodie et al. 2005); and community, places and population health (Hall 1996; Roush and Cox 2000; Cravey et al. 2001; Larsson and Butterfield 2002; Skelly et al. 2002; Gesler et al. 2003, 2004). More generally, place effects on the outcomes of, and evidence for, clinical practice (Angus, Hodnett and O'Brien-Pallas 2003; Hodnett et al. 2005) and the role of mapping technologies (Moss and Schell 2004) are emerging interests. This empirical research has recently been supplemented by discussions that reflect on its collective contribution to both nursing research and health geography (Andrews 2003a, 2003b; Andrews and Moon 2005b; Andrews, in press; Wiles 2005; Cutchin 2005).

Although some of the above research uses a more geometrically abstract and mapped conceptualization of space (as the macro-scale distances that can be measured mathematically), in contrast, and 'mirroring' reform in the subdiscipline of health geography, a great deal of this new research has an additional emphasis on place, and has a richer understanding of space. Here, places are understood, not just as physical containers of human activities, but as complex interactions of physical and social features. Hence, places are attributed feelings — through acquiring a sense-of-place — and possess identities and symbolism at both the individual and collective level. People, then, make places and, at the same time, places make people (Andrews 2003a). Moreover, places are understood to be constituted, and given meaning, by their social spaces, created through individuals' spatial, performances, rituals and interactions. It is recognized therefore that, in this micro-context, space is more than a mathematical distance, and possesses meaning for people in terms of their movements through it, negotiations of it, and interactions within it (or indeed lack thereof). Importantly for this paper, space and place have been recognized to exist in non-physical forms where physical (bodily) co-presence is not a necessary condition. These spaces and places might be occupied by the mind through memories, imaginations or the practical use of cyberspace and, in research terms, can be studied in terms of their geographies (of … ) (Andrews 2004).

Although nurse researchers and health geographers appear to have reached the same basic conclusions about the nature of space and place, our earlier statement 'mirroring health geography' needs to be explained further. Indeed, rather than referring to debate amongst health geographers (see Kearns 1993), nurse researchers have developed their own arguments as to why a spatial emphasis is necessary in nursing research (Liaschenko 1994, 1996, 1997; Montgomery 2001; Malone 2003). Perhaps because it

is published in nursing journals, Joan Liaschenko's work is not acknowledged by geographers as being part of the history of changing priorities and approaches in the geographical study of health and health-care. Arguably however, it deserves greater recognition amongst them. Like Robin Kearns, she drew on cultural geography to support her arguments for a greater attention to place as a cultural and symbolic phenomenon (Kearns 1993). Uniquely though, her arguements centered on the proposition that structural change in health services had led to a transformation in nursing — and other forms of care by extension — and to new orders. The three contexts that exemplify this being the emergence and dominance of informal care settings (like home care) that change the nature of both those places and nursing; radical transformation within and between existing institutions that produce great spatial variations; and transformation in the everyday proximities between nurses and their patients (see also Malone 2003; Andrews, in press). This does not mean Liaschenko and other nurse researchers argue that a geographical approach is only applicable where structural change is occurring and/or has occurred. Like Kearns and other health geographers, they also call attention to the effects of place on human practices (and vice versa) in all places for health-care, regardless of change. For Liaschenko then, change is a general motivating factor for a geographical research perspective.

A word of caution is, however, necessary. It would be entirely unfair to label all the above empirical research as geography because, while certain nurse researchers have claimed explicitly that their work is geography (and notably back the claim by locating their research in geographical literature), others have not, and simply emphasize space and place within their analysis, without making particular disciplinary claims (Andrews, in press). For example, Gavin Andrews clearly emphasizes, and calls, for disciplinary linkages in his recent reviews of a 'geography of nursing' (Andrews 2002, 2003a; in press) and Elizabeth Peter and Joan Liaschenko present a clear case for moral geographies of nursing (Peter 2002, 2003; Peter and Liaschenko 2004; Liaschenko 2001, 2003). In contrast, however, Margarete Sandelowski (2002) talks in depth about place, presence and new spatialities of caring in cyberspace, and has been particularly influential in conceptualizing place in nursing research. Yet she does this quite independently of any explicit emphasis on disciplinary interfaces. Similarly, Maxine Duke and Annette Street consider the nature of place in hospital-in-the-home initiatives (Duke and Street 2003a, 2003b), yet these authors do not claim to be writing geography either. In this sense then, their studies — like many others — might appropriately be described as 'geographical' (i.e. in their nature). We would argue, however, that this distinction is not necessarily problematic,

nor confusing, and merely reflects the more general fuzzy boundaries and overlap between any two or more social sciences, particularly when research is originating from outside of typical and clearly defining institutional structures (like, for example, University departments of geography). In the case of nursing, this is likely to be a factor because the largest pools of researchers in the best position to adopt geographical approaches are existing nurse sociologists, psychologists, ethicists and philosophers.

While the above are not necessarily conflicting approaches to doing geography in nursing, and may even be complementary, as Sioban Nelson recently pointed out, a debate about the benefits and drawbacks of nursing research delineating and developing distinct social science subfields is arguably necessary, yet currently absent. This debate will involve some consideration of disciplinary hybridity vs. entanglement, and the formulation of some general 'rules of disciplinary engagement' for nursing research. This would be to maximize both the contribution and the quality of the geography undertaken. Moreover, the very obvious question of what exactly a geographical approach is opposed to, and can contribute above and beyond, the longstanding metaparadigm of nursing environment, has only recently become a consideration of the literature (see Andrews and Moon 2005a, 2005b). To date, some initial reflection has distinguished geography as a flexible, dedicated and almost exclusive focus on spatial relationships. It possesses the ability to articulate the many environments relative to those groups involved in the production and consumption of health-care (Andrews and Moon 2005a, 2005b).

## FURTHER CODEVELOPMENT IN CYBERSPACE?

To date, the majority of nursing research on cyberspace has not adopted an explicitly geographical disciplinary perspective (Lakeman 1998, 2000; Estabrooks et al. 2003). This is not to say, however, that there is not considerable potential for geography to be undertaken in this area. This is particularly the case because of the geographical qualities and implications of cyberspace. Indeed, in many respects, cyberspace moves far beyond a traditional conception of space. Without itself being a physical distance, it still spans great physical distances and, at the same time, renders the impact of distance ineffective by the facilitation of almost instantaneous time–space interactions. Moreover, in terms of being 'occupied' — as a place or places — cyberspace is physically spaceless yet provides the user with a seemingly limitless world to live in and navigate; movement between and interactions within potentially millions of 'sites'. All this challenges a traditional

assumption that human copresence (physical bodies in physical places) is necessary for complex human relationships. Subsequently, new ways of thinking about space, and human relationships with and within it, are required. As a dedicated spatial science, geography is arguably well positioned to help nurses meet these challenges.

Although, as suggested, geographical research on nursing and cyberspace has been scant, the work of a small number of commentators indicates the potential for further inquiry. With regard to nursing research, it is recognized that emerging cyberspaces in health-care are challenging the nature of nursing roles and identity, which have traditionally been dependant on physical copresence and visibility (Sandelowski 2002). Margarete Sandelowski's research, in particular, presents a strong case for studying cyberspace 'geographically', and its impact on nursing practice and identity. With regard to health geography, building on some existing disciplinary interest in the Internet (Gant and Walford 1998; Cutchin 2002; Theseira 2002), Hester Parr presents a strong case for advancing the geographical study of cyberspaces in health through, what she terms, a critical 'new medical geography'. This, she suggests, would broaden current disciplinary perspectives on health beyond their traditionally locally rooted reading of place (Parr 2002).

These disciplinary connections suggest that a geographical approach might help conceptualize and articulate the complexity of cyberspace as an emerging landscape of nursing. In the remainder of the paper we take two approaches. In the first section, we provide an overview of some of the key debates and concepts pertaining to cyberspace developed by human geographers and make some connections to nursing practice. In the second section, we introduce the specific health geography concept of 'therapeutic landscape' and the insights it might provide into nursing in cyberspace.

## GEOGRAPHY, THE INTERNET AND HEALTH-CARE

In recent years, there has been a broad engagement by geographers with Internet technologies and their consequences with regards to spatial organization and spatialities (see Graham and Marvin 1996; Mitchell 1996; Kitchin 1998; Janelle and Hodge 2000; Wheeler, Aoyama and Warf 2000; Wilson and Corey 2000; Dodge and Kitchin 2001). Here, a number of analysts have identified the diverse ways in which the Internet is affecting notions of identity and community, political structures and democracy, and how the economy is organized and operates.

This disciplinary engagement with the Internet has been driven by a realization that such technologies are highly

transformative, and are facilitating a process of deep restructuring, radically altering social and cultural, political and institutional, and economic life, and as a reaction to the proclamations that such changes herald the 'death of distance' or the 'end of geography' (see Cairncross 2001). Indeed, wider human geography has clearly been presented with a fundamental challenge and technology has challenged its very essence, and even its existence in its recognizable form. It is contended that the Internet has led to a collapse in spatial and temporal boundaries, leading to radical space–time compression, which frees social relations from the constraints of scale. Here, it is argued that the distributed and instantaneous nature of the Internet permits a wide-scale re-organization of businesses and services. Such rhetoric has been widespread in relation to examining the globalization of the economy, where it is suggested that office automation, telework and the adoption of back-office operations are leading to corporate restructuring and significant changes in employment patterns within and beyond high-tech companies. Contrary to this, geographers have counter-argued that, while the Internet does significantly disrupt the spatial logic of modernist societies, it does not render it obsolete. In fact, not only does geography continue to matter — as an organizing principle and a constituent of social relations — in many ways it has also become more important as the effects of the Internet deepen social and spatial divisions both locally and globally. Space only ceases to matter if access to the Internet is universal, and if the other imperatives of centralization are negated, such as the need for other infrastructures, face-to-face social networks, skilled workforce, access to materials, and access to markets. As these are inherently spatially uneven, it follows that the effects of the Internet will be uneven. In other words, whilst the Internet works to destroy space–time relations, and to render social relations 'spaceless', other spatial practices, forms and forces resist and work against this attrition (Dodge and Kitchin 2001). What this means in relation to health-care and nursing is that, while some activities can be decentralized or distributed (e.g. home care), others by their nature need to be centralized (e.g. hospitals). Nevertheless, the Internet offers the opportunity to think through how services are spatially organized, with the aim of improving services, reducing costs and addressing inequalities of provision across space.

In addition, geographers interested in the concept of nature and the natural have increasingly been drawn to examining the interface between body and technology (see Braun and Castree (1998) and Whatmore (2002) for an overview). In particular, there has been an engagement with Donna Harraway's notion of a cyborg; a body, part flesh, part machine (for a perspective related to cyberspace, see Kitchin 1998). It is argued that where the body was conceived as god-like, unchanging and fated, it is now chosen, moulded and contested. Clearly, many health technologies, and related fields such as cosmetic surgery, biotechnology and genetic engineering, produce cyborgs in the making. Such a blurring of the nature/technology divide raises important philosophical questions about the role and place of technology, including the Internet and the question of what it means to be human. Here, the connections of these observations to nursing are obvious and fundamental in terms of 'who' nurses will be caring for in future and the nature of this care.

More recently, there has been a broad attempt to re-theorize the relationship between technology (including cyberspace) and space, in particular drawing on the ideas of Bruno Latour (1993; see Whatmore 2002; Thrift and French 2002). There has been an attempt to reflect on the productive power of technologies, not simply as things that are used, but as actants that mediate, supplement, augment and regulate everyday life. From this perspective, 'human life and technology are produced through, or *folded* into, each other in complex ways', so that to understand 'technology means to comprehend the ways in which technology is plotted, designed, made … [a]nd to understand humans means to comprehend their relationship with the non-living (e.g. technology) and non-humans (e.g. landscapes, animals)' (Dodge and Kitchin 2005, 169).

Following on from this work, Dodge and Kitchin (2005) have posited that space itself needs to be re-theorized. Rather than adopting an ontology within which space is absolute (space is viewed as a container definable in terms of geometric properties in which life occurs) or relative (space is constituted and given meaning through social relations) (Hubbard et al. 2002), space should be understood as ontogenetic; that is, understood as continually being brought into existence through human practice. Here, space is theorized as a practice; a doing; an event; a becoming — a material and social reality forever (re)created in the moment (Dodge and Kitchin 2005). This formulation acknowledges that the forms and spatial relations of the world around us are clearly not static and fixed; they are constantly being altered, updated, and constructed in ways that alter socio-spatial relations. For example, at a macro-scale there are new local, regional and national development schemes that are constantly in the process of transforming and regenerating built infrastructures, including the physical healthcare landscape of hospitals, locations of primary care and so on. At a more micro-scale, infrastructure is constantly being modified, repaired, or redesigned, so that

streets and rooms are constantly in a process of being refashioned and remodeled and spatial layouts modified (Dodge and Kitchin 2005).

Technologies such as the Internet affect the ongoing production of space because they modulate the conditions through which space is (re)created. Mackenzie (2002, 2003a, 2003b) explains the power of technology to create such an effect through the concepts of technicity and transduction. Technicity refers to the unfolding or evolutive power of technologies to make things happen in conjunction with people. For an individual technical element such as a thermometer, its technicity might be its ability to measure heat (a product of human knowledge and production skills) that enables it in conjunction with human mediation to diagnose temperature (note that the constitution and use of the thermometer is dependant on both human and technology; they are inseparable) (Dodge and Kitchin 2005). Transduction is the constant making anew of a domain (environment) in re-iterative and transformative practices (Dodge and Kitchin 2005). The use of technology, its technicity, constantly changes the material and discursive conditions at a moment in time. As such, events are constantly unfolding through a process of transduction, so that a domain is forever restructuring itself as 'a partial, always incomplete solution to a relational problem' (Mackenzie 2003b, 10).

Technicity and transduction can be used to explain the *difference* technologies such as the Internet makes to healthcare delivery. The Internet affects nursing practice because its technicity alternatively modulates healthcare practice and its spatialities through the process of transduction (as incomplete solutions to relational problems). With regard to the former, the Internet alters the delivery, form and nature of care. It alters how care and advice is administered (e.g. care through healthcare aids and advice through helplines, e-mail and web pages) and performed by nurses and other healthcare professionals. In relation to the latter, the Internet enables profound space-time distanciation with regards to health-care organization, management and delivery. It enables healthcare services to be re-organized spatially in terms of what is located where and how services are delivered over a geographic area. In addition, the presence of Internet and healthcare technologies transform the spatiality of the home, altering the relationship between place and identity. Thinking more broadly, it is not difficult to argue that the relationship between technology and health-care has become pervasive. For example, there is widespread use of sophisticated healthcare technology, pagers, mobile phones, patient record databases, patient monitoring, healthcare site security (CCTV, passcards), medical research, remote surgery, manufacture of pharmaceuticals,

billing software, insurance modeling, financial regulation, the logistics of supplies and delivery, the reliance on utilities (electricity, water, gas), and so on. All of these are organized spatially and give rise to diverse spatialities.

According to Dodge and Kitchin (2005) the use of technologies such as the Internet alternatively modulate the spaces of health-care into two forms. First, *code/space* refers to a transduction wherein the relational, health problem *cannot* be solved without technology (their formulation of code/space is based on the use of software, hence the use of the term code; however, the dyadic relationship can be mapped onto other none-coded technologies). Here, technology dominates the transduction of space to the extent that the transduction is *dependant* on technology. For example, without technology the operating theatre fails to be a place within which operations can occur. Without the home dialysis machine the home fails to be a place where a kidney patient can be treated. In these cases, technology and space are *dyadic*, with the relationship so mutually constituted that if one half of the dyad is put 'out of action' then the entire intended transduction fails (the operating theatre merely becomes another room) (also see Dodge and Kitchin 2004). Second, *coded space* is a transduction mediated by technology, but differs from code/space in that the relationship between technology and space is not dyadic. Here, technology matters to the transduction of a space but if the technology does not work as intended or not at all, the space continues to be brought into being largely as intended, although not necessarily as efficiently, or least costly or safely (Dodge and Kitchin 2005). Technology mediates the solution to a spatial problem, but it is not the only solution available. For example, if the CCTV fails then the accident and emergency room still functions as such; if the lights fail an intensive care unit can still perform its function, albeit less securely or less efficiently.

In general, most healthcare settings are coded spaces in that old forms of technology and the tactic knowledge to use them still exist, and can be relied upon when newer technologies fail. Further, the take up of technologies across locations are patchy and non-linear (and especially marked between the developed and developing world) (Thrift 2004). That said, as more sophisticated technologies become more widespread, code/space will become more common. Even so, it should be noted that code/space and coded space are negotiated, even where hegemonic, as they are non-deterministic and non-universal in formulation; how code/space operates and is experienced is embodied through the performances and interactions of the people within the space (between people, and between people and technology; Dodge and Kitchin 2004).

These spatial forms, we think, help to see health-care and nursing in a slightly different light, as practices inherently constitutive of people, technology and space. Furthermore, the proposition of space as ontogentic has repercussions for nursing practice. This is particularly the case with respect to new technologies and the roles of nursing in the becoming of new cyberspaces. There are many issues that could be discussed in this regard. One of the more obvious is how, with appropriate input from nurses, the creation of these cyberspaces could change the uneven power-relationships and gendered dimensions to health-care that to this point have reflected, and been created by, physical actions in traditional physical spaces (Halford and Leonard 2003). Indeed, if space is effectively created through action in the moment, this gives nurses the opportunity to affect the very nature of cyberspace in health-care and hence their position with respect to other health professionals and patients.

## THERAPEUTIC CYBERSPACES?

Finally, we call to attention a quite different geographical field of research, currently existing somewhat outside of current discussions of technology and cyberspace, but where we argue they may have relevance in terms of disciplinary convergence. Based on the work of Wil Gesler, over the last decade health geographers have become interested in the therapeutic qualities of places, what have been described and conceptualized as therapeutic landscapes (Gesler 1992). Empirical research has focused on the healing qualities of places ranging in scale from vast natural wildernesses to urban locales and individual buildings, and ranging in form from healthcare facilities to holiday destinations. They might vary in both their 'production' and 'consumption' from being actively marketed by the private sector or being part of healthcare systems, to being more subtle historical, spiritual or cultural societal constructions (Andrews 2002). Moreover, although they might be individually constructed and experienced, it is acknowledged that wider group and societal construction leads to their reputation, notoriety and reproduction (see Williams 1999; Andrews 2002; Andrews 2004 for detailed reviews and a recent special edition of the journal *Health and Place*, volume 11, issue 4).

Despite a wide range of applications, recent critiques have emerged that have begun to challenge the nature of both therapeutic and place in therapeutic landscapes, and these critiques have particular relevance to the subject of the current paper. Specifically, studies have challenged the assumption of human copresence being required for therapeutic effect. In particular, the empirical examples of imagination in therapeutic practice (Andrews 2004) and

memory in mental well-being have been presented as exemplars (Gastaldo, Andrews and Khanlou 2004). In unison, research has also called for a greater attention to therapeutic places in clinical practice (Andrews 2004). Developing these critical engagements, an attention to cyberspace and nursing might provide an opportunity to further explore and expand the concept of therapeutic landscapes. The therapeutic effects of cyberspace need to be investigated, and the different forms that this may take. There are many avenues of possible inquiry. One example is the therapeutic effects of healthcare websites that provide information on a diverse range of health issues (from disease to fitness, enabling self-diagnosis and self-discipline) and on facilities (from conventional to complementary medicine). These cyberspaces, how they are used, and their concurrent impact in terms of encouraging a more critical and questioning health consumer culture, have implications with regard to the patients nurses will increasingly have to care for, and these patients' expectations and actions throughout their engagements with healthcare systems (see Parr 2002). Indeed, the extent to which they may gain therapeutic effect and/or knowledge from multiple formal and informal, cyber and physical spaces — and the role of nurses in any contest and negotiation between them — are important issues for investigation. Another example of possible inquiry is the role of nursing in the provision and consumption of telemedicine and how, through cyberspace, more technologically advanced forms of telemedicine might facilitate or restrict therapeutic experience (see Cutchin 2002). Meanwhile, the recent adoption of video gaming in pediatric health-care is yet another relevant subject for investigation. Initial inquiry suggests that this use might be strategic to help normalize institutional environments for children and provide short-term diversions from their disease, and outlets for their emotions (Andrews and Moon 2005b). Such developments run against conventional wisdom that these cyberspaces are all bad for children's physical and mental health. Studying the complex therapeutic — and certain anti-therapeutic — geographies of video gaming could involve nurses and other health professionals in a unique form of cyber-environmental health research. Certainly, beyond the three examples outlined above, are many other possible avenues for inquiry.

More generally, these types of empirical studies merely reflect a much broader and more fundamental theoretical opportunity for both nursing and geography that includes, but also extends beyond, considerations of cyberspace. This opportunity involves investigating the relationships between some mainstream nursing concepts in the field of therapeutics — such as therapeutic relationships, and communications, and communities — and space and place. In doing so,

they might add some insightful geographical interpretations to important practice debates. For health geographers, they might provide a much-needed progression of the therapeutic landscape concept within clinical practice domains (see Andrews 2004).

## CONCLUSION

The relationship between cyberspace and nursing is a subject that has the potential to bridge, and mutually develop, geographical and nursing research. The contribution to health geography is twofold; it provides a critical focus on applied professional practice, but also on cyberspace and health-care, both arguably lacking in that subdiscipline. The contribution to nursing research is the opportunity to integrate further geographical concepts and debates. Indeed, whether talking about the cyborg body, the production of space, technicity, transduction, code space or coded space, they are concepts that have a relevance to studies of nursing and cyberspace. These concepts were only very briefly introduced in our broad discussion, but we argue that more dedicated and focused attention beyond the current paper might articulate this contribution more substantively. In particular, they need to be considered in the varied contexts of nursing as a science, art, personal interaction, process, part of healthcare systems, and as symbolic to society.

Geographical studies of nursing have very recently emerged and have engaged with a wide range of clinical specialties, patient groups, forms and scales of health-care, and a variety of social and work relationships. Based on the connections we have articulated, we argue that cyberspace might be a fertile ground for the further theoretical and empirical convergence between nursing and geography. Certainly it is a difficult terrain, that poses significant challenges, yet to negotiate it is to be at the theoretical forefront of both disciplines.

## ACKNOWLEDGEMENTS

## REFERENCES

Affonso D, GJ Andrews and L Jeffs. 2004. The urban geography of SARS: Paradoxes and dilemmas in Toronto's healthcare. *Journal of Advanced Nursing* 45: 1–11.

Andrews GJ. 2002. Towards a more place-sensitive nursing research: An invitation to medical and health geography. *Nursing Inquiry* 9: 221–38.

Andrews GJ. 2003a. Locating a geography of nursing: Space, place and the progress of geographical thought. *Nursing Philosophy* 4: 231–48.

Andrews GJ. 2003b. Nightingale's geography. *Nursing Inquiry* 10: 270–4.

Andrews GJ. 2004. (Re)thinking the dynamic between healthcare and place: Therapeutic geographies in treatment and care practices. *Area* 36: 307–18.

Andrews GJ. In press (2006). Geographies of health in nursing. *Health and Place* 11: 1.

Andrews GJ and G Moon. 2005a. Space, place and the evidence base, part one: An introduction to health geography. *Worldviews on Evidence-Based Nursing* 2: 55–63.

Andrews GJ and G Moon. 2005b. Space, place and the evidence base, part two: Rereading nursing environment through geographical research. *Worldviews on Evidence-Based Nursing* 2: 142–56.

Andrews GJ, D Brodie, JP Andrews, G Thomas and J Wong. 2005. Place(ment) matters: The impacts of nursing students' clinical placement experiences on their preferences for first employers. *International Nursing Review* 52: 142–54.

Andrews GJ, D Holmes, B Poland, P Lehoux, K Miller, D Pringle and K McGilton. 2005. Airplanes are flying nursing homes: geographies in the concepts and locales of gerontological nursing practice. *International Journal of Older People Nursing* 14(8): 109–120.

Angus J, E Hodnett and L O'Brien-Pallas. 2003. Implementing evidence-based nursing practice: A tale of two intrapartum nursing units. *Nursing Inquiry* 10: 218–28.

Braun B and N Castree. 1998. *Remaking reality: Nature at the millennium.* London: Routledge.

Brodie D, GJ Andrews, JP Andrews, G Thomas, J Wong and L Rixton. 2005. Working in London hospitals: Perceptions of place in nursing students' employment considerations. *Social Science and Medicine* 61: 1867–81.

Buchan J. 1999. Still attractive after all these years? Magnet hospitals in a changing health care environment. *Journal of Advanced Nursing* 30: 100–08.

Buchan J, I Seccombe and S Thomas. 1997. Overseas mobility of UK based nurses. *International Journal of Nursing Studies* 24: 54–62.

Buchan J and J Sochalski. 2004. The migration of nurses: Trends and policies. *Bulletin of the World Health Organization* 82: 587–94.

Cairncross F. 2001. *The death of distance: how the communication revolution is changing our lives.* Boston: Harvard Business School Press.

Cravey AJ, S Washburn, W Gesler, T Arcury and A Skelly. 2001. Developing socio-spatial knowledge networks: A qualitative methodology for chronic disease prevention. *Social Science in Medicine* 52: 1763–75.

Cutchin M. 2002. Virtual medical geographies: Conceptualizing telemedicine and regionalization. *Progress in Human Geography* 26: 19–39.

Cutchin M. 2005. Spaces for inquiry into the role of place in older peoples' care. *International Journal of Older People Nursing* 14(8): 121–129.

Dodge M and R Kitchin. 2001. *Mapping cyberspace.* London: Routledge.

Dodge M and R Kitchin. 2004. Flying through code/space: The real virtuality of air travel. *Environment and Planning A* 36: 195–211.

Dodge M and R Kitchin. 2005. Code and the transduction of space. *Annals of the Association of American Geographers* 95: 162–80.

Duke M and AE Street. 2003a. Hospital in the home: Constructions of the nursing role: A literature review. *Journal of Clinical Nursing* 12: 852–9.

Duke M and AE Street. 2003b. The impetus for the development of Hospital in the Home (HITH) programs: A literature review. *Contemporary Nurse* 14: 227–39.

Estabrooks CA, KA O'Leary, KL Ricker and CK Humphrey. 2003. The Internet and access to evidence: How nurses are positioned. *Journal of Advanced Nursing* 42: 73–81.

Gant R and N Walford. 1998. Telecommunications and disabled people: A rural perspective. *Health and Place* 4: 245–63.

Gastaldo D, GJ Andrews and N Khanlou. 2004. Therapeutic landscapes of the mind: Theorizing some intersections of health geography, health promotion and immigration studies. *Critical Public Health* 14: 157–76.

Gesler W. 1992. Therapeutic landscapes: Medical issues in the light of the new cultural geography. *Social Science and Medicine* 34: 735–46.

Gesler W, M Dougherty, T Arcury, A Skelly and S Nash. 2003. The importance of obtaining information from assessment of community service providers for a disease prevention program. *Journal of Multicultural Nursing and Health* 9: 14–21.

Gesler W, M Hayes, TA Arcury, AH Skelly, S Nash and AC Soward. 2004. Use of mapping technology in health intervention research. *Nursing Outlook* 52: 142–6.

Graham S and S Marvin. 1996. *Telecommunication and the city.* London: Routledge.

Halford S and P Leonard. 2003. Space and place in the construction and performance of gendered nursing identities. *Journal of Advanced Nursing* 42: 201–8.

Hall JM. 1996. Geography of childhood sexual abuse: Women's narratives of their childhood environments. *Advances in Nursing Science* 18: 29–47.

Hodnett E, D Downe, S Edwards, N Walsh and D. 2005. Home-like versus conventional institutional settings for birth (review). *The Cochrane Database of Systematic Reviews* 1: 1–38.

Hubbard P, R Kitchin, B Bartley and D Fuller. 2002. *Thinking geographically: Space, theory and contemporary human geography.* London: Continuum.

Janelle D and D Hodge. 2000. *Information, place, and cyberspace: Issues in accessibility.* Berlin: Springer-Verlag.

Kearns RA. 1993. Place and health: Towards a reformed medical geography. *Professional Geographer* 46: 67–72.

Kitchin R. 1998. *Cyberspace: The world in the wires.* Chichester: John Wiley and Sons.

Lakeman R. 1998. The Internet: Facilitating an international nursing culture for psychiatric nurses? *Computers in Nursing* 16: 87–9.

Lakeman R. 2000. Charting the future today: Psychiatric and mental health nurses in cyberspace. *Australian and New Zealand Journal of Mental Health Nursing* 9: 42–50.

Larsson LS and X Butterfield. 2002. Mapping the future of environmental health nursing: Strategies for integrating national competencies into nursing practice. *Public Health Nursing* 19: 301–8.

Latour B. 1993. *We have never been modern.* New York: Harvester Wheatsheaf.

Liaschenko J. 1994. The moral geography of home care. *Advances in Nursing Science* 17: 16–25.

Liaschenko J. 1996. A sense of place for patients: Living and dying. *Home Care Provider* 1: 270–2.

Liaschenko J. 1997. Ethics and the geography of the nurse–patient relationship: Spatial vulnerable and gendered space. *Scholarly Inquiry for Nursing Practice* 11: 45–59.

Liaschenko J. 2001. Nursing work, housekeeping issues, and the moral geography of home care. In *Aging: Caring for our elders*, eds DN Weisstub, DC Thomasma, S Gauthier and GF Tomossy. Netherlands: Kluwer Academic Publishers.

Liaschenko J. 2003. At home with illness: Moral understandings and moral geographies. *Ethica* 15: 71–82.

Lock LR and HJ Gibb. 2003. The power of place. *Midwifery* 19: 132–9.

Mackenzie A. 2002. *Transductions: Bodies and machines at speed.* London: Continuum Press.

Mackenzie A. 2003a. The problem of computer code: Leviathan or common power? http://www.lancs.ac.uk/staff/mackenza/papers/code-leviathan.pdf

Mackenzie A. 2003b. Transduction: Invention, innovation and collective life. http://www.lancs.ac.uk/staff/mackenza/papers/transduction.pdf

Malone R. 2003. Distal nursing. *Social Science and Medicine* 56: 2317–26.

Mitchell WJ. 1996. *City of bits: Space, place and the infobahn.* Cambridge, MA: MIT Press.

Montgomery P. 2001. Shifting meaning of asylum. *Journal of Advanced Nursing* 33: 425–31.

Moss M and M Schell. 2004. GISc. A scientific framework and methodological tool for nursing research. *Advances in Nursing Science* 27: 150–9.

Parr H. 2002. New body-geographies: The embodied space of health and medical information on the Internet. *Environment and planning D: Society and space* 20: 73–95.

Parr H. 2003. Medical geography: Care and caring. *Progress in Human Geography* 27: 212–21.

Peter E and J Liaschenko. 2004. Paradoxes of proximity: A spatio-temporal analysis of moral distress and moral ambiguity. *Nursing Inquiry* 11: 218–25.

Peter E. 2002. The history of nursing in the home: Revealing the significance of place in the expression of moral agency. *Nursing Inquiry* 9: 65–72.

Peter E. 2003. The home as a site of care: Ethical implications for professional boundaries and privacy. *Ethica* 15: 57–69.

Purkis ME. 1996. Nursing in quality space: Technologies governing experiences of care. *Nursing Inquiry* 3: 101–11.

Radcliffe P. 1999. Geographical mobility, children and career progress in British professional nursing. *Journal of Advanced Nursing* 30: 758–68.

Roush CV and JE Cox. 2000. The meaning of home: How it shapes the practice of home and hospice care. *Home Healthcare Nurse* 19: 388–94.

Sandelowski M. 2002. Visible humans, vanishing bodies and virtual nursing: Complications of life, presence, place and identity. *Advances in Nursing Science* 24: 58–70.

Skelly A, TA Arcury, W Gesler, A Cravey, M Dougherty, S Washburn and S Nash. 2002. Sociospatial knowledge networks: Appraising community as place. *Research in Nursing and Health* 25: 159–70.

Theseira M. 2002. Using Internet GIS technology for sharing related data for the West Midlands Region. *Health and Place*, 37–46.

Thrift N. 2004. Remembering the technological unconscious by foregrounding knowledges of position. *Environment and planning D: Society and space* 22: 175–90.

Thrift N and S French. 2002. The automatic production of space. *Transactions of Institute of British Geographers NS* 27: 309–35.

Upenieks V. 2003. The interrelationship of organizational characteristics of magnet hospitals, nursing leadership and nursing job satisfaction. *Health Care Manager* 22: 83–98.

Whatmore S. 2002. *Hybrid geographies.* London: Sage.

Wheeler JO, Y Aoyama and B Warf. 2000. *Cities in the telecommunications age: The fracturing of geographies.* New York: Routledge.

Wiles J. 2005. Conceptualizing place in the care of older people: the contributions of geographical gerontology. *International Journal of Older People Nursing* 14(8): 100–108.

Williams A. 1999. *Therapeutic landscapes: The dynamic between place and wellness.* Lanham: University Press of America.

Wilson MI and KE Corey. 2000. *Information tectonics: Space, place, and technology in an electronic age.* Chichester: Wiley.