The 'actualities' of knowledge work: an institutional ethnography of multi-disciplinary primary health care teams

Elizabeth Quinlan

Department of Sociology, University of Saskatchewan, Canada

Abstract   This study is set against the backdrop of the evolving order of a health care system in a province implementing a set of concurrent reforms. The study investigates how 'knowledge work' of multi-disciplinary health care teams is actually done and how it is co-ordinated across sites. Knowledge work involves three processes: the creation of new knowledge during the transfer of knowledge, in the context of the application of knowledge to their collective clinical decision-making. Institutional ethnography is used to explore the social and institutional forces that shape the knowledge work of health care providers in and across multi-disciplinary teams by way of examining how the texts trans-locally organise the formation and functioning of multi-disciplinary teams. The study confirms that in the course of their collective clinical decision-making, teams' dialogical exchange facilitates the articulation of tacit knowledge and opens up the communicative space for the creation of new knowledge. In addition to this confirmatory finding, the study contributes to the existing health-related knowledge management by illustrating the importance of the social, communicative aspects of the knowledge processes, and in particular, the relationship between knowledge and the social organisation of power.

Keywords: knowledge creation, transfer and application, health care reform, multi-disciplinary health teams, institutional ethnography, knowledge work

Introduction

The technological, economic, and social transformations of the last part of the 20th century are often considered to have heralded a new 'knowledge society'. A defining feature of the knowledge society is that the processes of knowledge creation, transfer, and application are routinised and formalised through a complex, negotiated set of social relations, which are embedded in increasingly differentiated roles and institutions (Holzner and Marx 1979). This paper seeks to explore these social relations of the knowledge society in the context of the health care system. The work is part of a broader analytical project of investigating multi-disciplinary knowledge teams as a new form of work organisation, associated with the rise of the knowledge economy. This paper contributes to the broader project by exploring primary health care teams as multi-disciplinary knowledge teams in which knowledge creation occurs in the context of knowledge transfer and application. Applying their

knowledge to their collective clinical decisions requires dialogical exchange between co-workers to frame problems and to validate and share crucial information. In these dialogical exchanges lies the potential for knowledge creation. The overarching aim of the study reported in this paper is to investigate how this 'knowledge work' of multi-disciplinary health care teams is actually done. The study employs institutional ethnography, a sociological theory/method that investigates the social relations of knowledge as they are constituted in people's everyday practices and activities.

Background

The recent interest in 'knowledge management' reflects the search for appropriate strategies and techniques to co-ordinate the knowledge processes of creation, transfer, and application (*e.g.* Nonaka and Toyama 2005, Davenport and Prusak 1998, Szulanski 2003). Drawing on cognitive psychology, organisational theory, change management, and other disciplinary perspectives, the knowledge management literature is concerned with ways of mobilising knowledge for the purposes of achieving organisational goals such as innovation.

According to Nonaka and Takeuchi (1995), discussion is an effective mechanism for the articulation of taken-for-granted, tacit knowledge. Although tacit knowledge is often difficult to express, it is precisely in its conversion into explicit knowledge through articulation that new knowledge is created. Knowledge creation also occurs when explicit, codified knowledge becomes part of the stock of taken-for-granted understandings. Thus, it is the conversion from tacit to explicit knowledge, or vice versa, that form the conditions for the development of new knowledge. The iterative conversion of explicit-to-tacit and tacit-to-explicit knowledge is facilitated by disagreement, as 'knowledge creation is guided by the synthesis of contradictions' (Nonaka and Toyama 2005: 425). The resulting synthesis forms new positions taken by the individuals involved.

In the health care delivery system, one form of knowledge management is evidence-based practice (EBP). Through the creation of codified knowledge, in the form of practice guidelines, knowledge is transferred and applied to clinical decision-making sites. Proponents of EBP suggest that the algorithmic clinical guidelines and protocols increase quality and outcomes of health care. Opponents argue that EBP is related to increasing regulation and de-legitimising of alternative forms of knowledge (Jackson and Scambler 2007), and reduces clinical decision-making to 'cookbook medicine' (Harrison 1998, Hunter 1996). Still others have offered a critique of its assumption that clinical guidelines are carried out by rational actors (Champagne, Lemieux-Charles and McGuire 2004) and its limited view of the nature and use of evidence (Upshur *et al.* 2001).

This paper responds to two deficits in the knowledge management literature applied to health care. The first is that EBP, indeed most models of knowledge management in health care, do not fully account for the importance of tacit, practice-based knowledge in the creation of new knowledge, despite the emphasis given to tacit knowledge in the conceptual work of the foundational authors (*e.g.* Greenhalgh *et al.* 2005). A second deficit of the knowledge management literature is that the knowledge processes are conceptualised as technical, cognitive processes. In doing so, the social, communicative aspects of the knowledge processes are not featured; in particular, there is little consideration of the relationship between knowledge and the social organisation of power.

By focusing on knowledge work, as the paper does, it avoids the narrow treatment of knowledge creation, translation, and utilisation as individual, cognitive processes.[1] Knowledge work, as defined by this paper, is the text-mediated, communicatively achieved exchange of knowledge claims in the context of clinical decision-making. It is a collective form of work carried out during formal meetings and informal interactions among team

members. It involves the three knowledge processes: the *creation* of new knowledge during the *transfer* of knowledge, the sharing of knowledge between team members, in the context of the *application* of formal and practice-based knowledge to a particular clinical decision. The attention directed to knowledge work is in keeping with the established focus of institutional ethnography to inquire about people's everyday work experiences in order to understand the macro-social co-ordination of those activities and experiences.

The paper opens by providing the context of the study of knowledge work as it is carried out by the new multi-disciplinary primary health care teams in a western Canadian province. The paper then outlines the study's theoretical and methodological orientation, institutional ethnography, and then moves to the analysis.

Saskatchewan's new multi-disciplinary primary health care teams

Multi-disciplinary health care teams are generally understood to be a group of health professionals, each contributing to the common goal in accordance with his/her competence (WHO 2005). Where there has been extended periods of experimentation with multi-disciplinary health care teams, results indicate that they can increase research use among team members (Hansen *et al.* 1999), while not necessarily improving team members' reflective practices (Opie 1997) or achieving system-level imperatives such as reduction in length of hospital stay (Liedtka 1998). Other research demonstrates that barriers to integrated, team-delivered health care include incompatible communication styles, negative team norms, lack of willingness to share equally in the work of the team, power differentials, and role conflict (Abramson and Mizarahi 1996, Cashman *et al.* 2004, Coeling, Van Ess, and Curkr 2000, Coombs and Ersser 2003, Ray 1998, Reese and Sontag 2001, Rice 2000, Van Eyk and Baum 2002).

Although multi-disciplinary health care teams have been operating in many parts of the world, they are relatively new to Canada. Perhaps unsurprisingly, they were first introduced in Saskatchewan, a province that is noted for its history of progressive initiatives in health care. It led the way in Canada by introducing the first publicly funded hospital insurance in 1947, and later in 1962, a medical care insurance programme. In the early 1990s, the goal to democratise health care policy decision-making by regionalisation was nowhere more evident than in Saskatchewan: its health boards, established under regionalisation, were the only wholly elected boards whose members had the greatest degree of autonomy, charged them with financial, governance, and delivery responsibilities (Lomas *et al.* 1997).

In the 2000s, Saskatchewan's health reforms focused on improving access to primary care and on improving the quality of primary health care services. One such reform was the introduction of multi-disciplinary primary health care teams. The traditional form of work organisation in Saskatchewan's health care system has been the solo practice model in which hierarchical relationships and well-defined professional knowledge jurisdictions prevail. In the solo practice model, clinical decision-making is seldom subject to peer review in 'real' time: expert advice is delivered by individual professionals in the privacy of the consulting room. In this way, the knowledge work is individualised and impenetrable to the scrutiny of peers or the public. In the context of the new multi-disciplinary teams, however, the traditional divisions of labour are disrupted and the accompanying logic of auto-nomous decision-making does not hold. That is, the organisation of health providers into multi-disciplinary teams collectivises their knowledge work.

In addition to the introduction of multi-disciplinary primary health care teams, primary health care reforms are also responsible for the licensing of a new professional group, Nurse Practitioners (NPs). In contrast to the very recent positioning of NPs in Saskatchewan and several other regions in Canada, NPs in the United States have a 40-year history

as a profession (Mundinger 2000). Within the emerging multi-disciplinary teams, Saskatchewan's NPs are often the most stable, central, and sometimes the only full-time, team members. Most teams consist of a core of practitioners including a physician and other professionals who might belong to more than one team, particularly in the rural and remote areas. The NPs are institutionally positioned as the cornerstone of Saskatchewan's multi-disciplinary care teams with a scope of practice that includes both medical and nursing functions. Although most NPs have training and experience as registered nurses (RNs), their scope of practice in Saskatchewan includes functions that have traditionally been exclusively in the realm of physicians. These include ordering, performing, receiving and/or interpreting reports of screening and diagnostic tests; prescribing and dispensing drugs; performing minor surgical procedures; diagnosing and treating common medical disorders (SRNA 2003).

Institutional ethnography

This study uses institutional ethnography (IE), an approach to sociological inquiry that investigates the co-ordination through texts of people's work as embedded within institutional orders (Smith 2005). IE has recently attracted health researchers because of its particular emphasis on exploring system-level co-ordination of people's everyday work experiences (Fisher 2006, MacEachen 2004, Mykhalovskiy 2001, Rankin 2001).

IE draws on Garfinkel's ethnomethodology (1967) and shares its concern with the everyday activities by which that social order is produced. Unlike Garkfinkel's ethnomethodology, however, IE's ontology is materialist in the sense that social organisation is explored through the actual practices of individuals and the interaction of those practices with material objects, particularly texts.

Methodologically, IE proceeds inductively, moving from the particular experiences to the general analysis of the social relations. It involves taking a 'standpoint', the sum of experiences of everyday practice embedded in an institutional order, while simultaneously bringing into focus relations that are not particular to, but co-ordinate the experiences. These trans-local relations, named the 'ruling relations', are forms of consciousness that are objectified in the sense that they are constituted externally to particular people and places. Attending to both of these levels of data and analysis is what, in part, distinguishes IE from its ethnographic cousins. This dual focus involves thinking about the setting as the informants do, but at the same time being preoccupied by how the setting is organised by the 'trans-local' (Campbell and Gregor 2002). An institutional ethnographer's starting point is the actualities of people's everyday experience; their end point connects the actualities to the social organisation that governs the local setting.

IE also stands apart from other forms of ethnography in its emphasis on replicable texts, those written, drawn, or otherwise reproducible, because of their capacity to co-ordinate social action. Texts are crucial to IE because they create an essential connection between the local and the trans-local. The replicability of text makes it possible for the same words/images to be presented to people in different times and places. Related to the concept of discourse, as defined by Foucault, texts shift the focus away from individuals towards the social organisation of power. Because texts stabilise and reproduce institutions, they are implicated in the ruling relations.

Texts are investigated by IE as the visible traces of institutionalised social relations. A fundamental aspect of people's work is 'activating' texts which 'involves anchoring the text into the local realities' (2002: 105). Texts are read and interpreted across time and space.

Different readers will have different interpretations of any given text, but the text remains constant. The constancy of texts provides for standardisation of people's actions that are integral to institutions.

At the level of the everyday, experiences and interactions of the local setting are captured using standard field methods. The method used in this study, shadowing, is particularly compatible with the goals and intentions of IE (Quinlan 2008). Shadowing entails a researcher closely following a subject over a period of time to investigate what people actually do in the course of their everyday lives, not simply what their roles demand of them (Pickering 1992). Both behaviours and opinions, actions and explanations for those actions, are reflected in the resulting rich, thick descriptive data. Through shadowing, the institutional ethnographer becomes a part of the 'living experience' and takes a standpoint.

At the level of the 'trans-local', what is beyond the everyday experiences and not necessarily visible to the individual, is also captured by field methods, with special attention to documents and texts. At this level of analysis, texts are used to illuminate the first-level data.

Instead of the descriptive and explanatory goals of most social science inquiries, IE's overarching aim is transformative. It seeks to make visible the social relations of knowledge so that they might be reorganised. The social world is explored with each informant contributing a piece of a social organisation that is the co-ordinated achievement of people's activities. While IE's commitment is to remain in the world of everyday experience and knowledge, its task is to assemble those everyday experiences of informants to display how they are co-ordinated. By making visible how we are all connected to the social relations of ruling and economy and their intersections, IE contributes to progressive social change.

Data collection
This IE study takes the standpoint of the teams' cornerstone members, the NPs. To do so, three of these newly minted health professionals were shadowed as they performed their clinical duties in the evolving institutional order of Saskatchewan's health care system. Recruitment of the NPs was aimed at maximising diversity of teams' tenure and geographical location. Consequently, one of the shadowed NPs was in an urban setting, another in a rural setting, and the third in a remote region of Saskatchewan. One team has been operating for over 20 years as a team, although not officially sanctioned as such; another had been in existence for four years, and the third had been very recently formed. The shadowing took place over an elapsed period of several weeks: because it was more convenient to do so, the remote NP was shadowed in a concentrated period of a week whereas the urban NP was shadowed over several day-long sessions. All were recruited with the help of the Saskatchewan Registered Nurses' Association, the professional organisation for the province's NPs. The recruited NPs then secured approval for the shadowing from their respective teams.

Following the traditional approach of institutional ethnography to explore texts as constituents of institutionalised social relations, mandating texts, which co-ordinate how the knowledge work is actually done, were collected through interviews with appropriate policy analysts and health care administrators subsequent to shadowing the NPs.

Ethics approval for this study had been secured from the author's university behavioural ethics committee. Interviews and team meetings were audio-taped. In the field notes and transcribed notes, individual and collective names, and other identifying information, were changed to ensure anonymity and confidentiality.

Analysis of the field notes and obtained documents was directed by examining the data using the following questions, as described by Campbell and Gregor (2002): what is

accomplished by the texts that are being used?; what are the external causes and effects of people's activities?; what does this tell us about how this setting or event happens as it does?; what social relations are reflected in the everyday activities? and how do those social relations play a part in generalising institutional processes? NVIVO was used as an aid to identify and track answers related to these questions.

The illustrative data used in this paper are reported according to the conventions proposed by Silverman (1993) and enclose verbatim speech in double quotes, paraphrased speech in single quotes, and contextual data, such as personal comments and immediate interpretations of events, in brackets.

The actualities of the teams' knowledge work

The following examples, drawn from the teams that were observed for this study, are illustrative of dialogical exchanges.

Knowledge work: diagnosing a breast lump
The following excerpt is from an informal encounter between a general physician (GP) and an NP in one of the observed teams. At the beginning of the exchange the NP presents her idea of requesting a mammogram for a 19-year-old female patient because she had recently detected a lump on the patient's breast. The GP responds:

GP: (with incredulity) A mammogram at 19?
NP: Yea, but I've never felt anything like it, Stewart.
GP: You're not going to pick up much from a mammogram at 19. I don't know if they'd even agree to do it at that age.
NP: But, maybe they'd do an ultra-sound. . . . if not, at least they'd know about it.
GP: Any family history?
NP: No.
NP: I just haven't felt good since that exam on Monday. I don't know whether to take the chance.
GP: No, you're right.

Discussion ensues between the NP and GP in which they attempt to resolve the question of how to proceed.

NP: Maybe I should just phone the radiologist.
GP: Yea, she can book her in.
NP: If I ask her, then at least she'll know about it.
GP: That's good. Then they can tell you right then if they'll do it.
NP: Yea, fine. That's what I'll do.

The GP's initial surprise is not because he questions the NP's clinical knowledge of the presence of a breast lump. He does not ask her to double check or reconsider her findings. He trusts that there is an abnormal lump in the breast. Despite the authoritative weight of the epidemiological data, which suggests the probabilities of breast cancer in this age group of women are low, the GP supports the NP's practice-based knowledge. He does, however, express his scepticism about the technology's ability to detect abnormal breast tissue on women of that age and the willingness of the radiologists to accept the referral. It is on this

basis that he articulates his doubts about her proposed course of action. But, further discussion with the NP proceeds because they both agree that the NP is right to pursue some form of care strategy and eventually they come to a resolution about what that strategy should be. In the end, the GP endorses the strategy proposed by the NP. In the course of the discussion, the GP changes his position from doubting the efficacy of the NP's proposal to supporting her in the strategy that takes shape in their exchange.

Knowledge work: diagnosing 'red stool'
In other observed teams knowledge work does involve the transfer and application of knowledge in a collective space, but, there is little dialogue that involves disagreement. There are few challenges to the team members' premises that require them to make sense of their experiences, and extend their knowledge base in new and unexpected ways. The development of new knowledge is thwarted by some team members' differential ability to silence others' expression of their taken-for-granted, tacit knowledge.

The following excerpt from a clinical review team meeting is one such example of a team's knowledge work being mediated by hierarchy. The team, consisting of a GP, RN, and NP, is reviewing the medical status of their patients and updating charts. The case notes are used to present a disease process as the object of the team's knowledge work. They serve as background information for the teams' re-assessment of current medications and other orders; as well, the case notes guide and organise the flow of discussion. The team meeting begins with a patient being 'introduced' to the team by the RN reading the case notes out loud, which she and other RNs have created at the end of each work shift. Upon hearing an entry in the case notes that refers to 'red stool' during the team meeting, a GP responds:

GP: There's no difference. I mean ah . . . I want to know where the problem is. I mean if it is a. . . . And, the only way of knowing really is that. . . . you can clinically say 'it's red blood and so it should be, probably distal'. But, I mean, red is red. You know. How red is red? I don't know that. I think we better have him scoped, because, you know, there is a very real chance of CA with this thing.
RN: (interrupts) Ok, that's the thing I want to know because . . .
GP: (interrupts) there might be some underlying lesion.
RN: It's a day when he's had one of those stools where it was . . . there was blood in it. And, then the next time he had a bowel movement.
GP: (interrupts) there was some tissue.
RN: it was clay coloured.
GP: oh. Clay coloured?
RN: Not a lot, but I mean there . . .
GP: (interrupts) Let's not speculate. We'll get a letter in and get him all scoped.
RN: ok.
GP: right.

For the RN, the colour and texture of the bowel movement holds considerable significance. The knowledge claims she asserts are rooted in sensory, practice-based understanding of the situation. The GP expresses a reliance on scientifically-produced, explicit knowledge on the question, 'how red is red?'. The rhetorical question casts doubt on the precision and accuracy of the RN's tacit knowledge. In response, the RN attempts to open up the floor to the other team members to collectively work to reconcile the two forms of knowledge, to find the link between her experiential, and their formal medical, knowledge to achieve

a mutual understanding of the patient's condition. Neither the physician, nor the NP follow up on the offer. Within their frame of reference, the RN's knowledge claims are causally ambiguous and they are unable to formulate a response that satisfies the RN. In the end, the physician shuts down any further discussion by ordering a referral to a specialist for a scope of the bowel. At the end of the meeting, the team members congratulated each other for having 'moved through' a record number of patients in the allotted meeting time.

The above excerpt is representative of knowledge work in which there is little dialogue that involves articulation of tacit knowledge that opens the floor for disagreement and challenges to existing premises. The creation of new knowledge is inhibited by the supremacy of the physician's position in the team. The discussion proceeds sequentially, patient by patient. The close of the discussion on one patient and the move to the next is signalled by pragmatic decisions concerning the documents that need to be created (*e.g.* referral letters) or updated (*e.g.* patient charts) and the assignment of those functions to a particular team member. Efficiencies are consolidated by limiting the discussion time, but at the cost of creating new knowledge through shared deliberation and negotiation of new positions and values.

The texts co-ordinating teams' knowledge work

The knowledge work of multi-disciplinary teams is mediated by the shared responsibilities of reviewing, implementing, and updating various texts. Team meetings are often discursively structured around tasks such as updating patient charts, discussions of the contents of recently released reports on practice patterns of the teams across regions, and the ramifications of regulatory documents on their practices. Figure 1, below, depicts the various types of texts that circulate through the teams.

As an element of the system-level rationalisation in health care delivery, multi-disciplinary teams are increasingly required to conform to texts that are created at a distance from the local experience of the teams. The texts co-ordinate the knowledge work performed across multiple teams. These mandating texts, represented in Figure 1, are grouped here for analytical purposes into 1) health reform policy documents, 2) health service utilisation reports, and 3) regulatory documents.

Two examples of the first type of texts are explored in the subsequent paragraphs. These texts are of special significance to the study because they are most relevant to the new forms of social relations associated with the co-ordination of knowledge work within the teams.

Policy texts

The first of the policy texts, The Saskatchewan Action Plan for Primary Health Care (2002) mandates a course of institutional transformations to primary health care in the aftermath of the major downsizing and restructuring of the hospital sector in the early 1990s. One of the document's stated goals is to provide access to primary multi-disciplinary health teams for 100 per cent of its population by the end of 2011 (Saskatchewan Health 2002).

In its orientation to increased efficiencies through cost-containment, accountability, and continuous improvement, the text reflects the new managerialism in the public sector. The quality-improvement goal is made explicit in a list of clinical objectives. Accountability mechanisms are itemised, including performance indicators, and practice guidelines, and outcome measures (*e.g.* decreases in blood sugars of diabetics and mortality rates from cervical cancer). The first cost-containment strategy involves introducing NPs into the system as 'economically efficient health service providers'. The second cost-containment strategy is the promotion of alternative remuneration schemes for physicians. Although the text does not explicitly link these two cost-containment strategies to the goal of creating multi-disciplinary teams, they are inextricably coupled through funding structures.
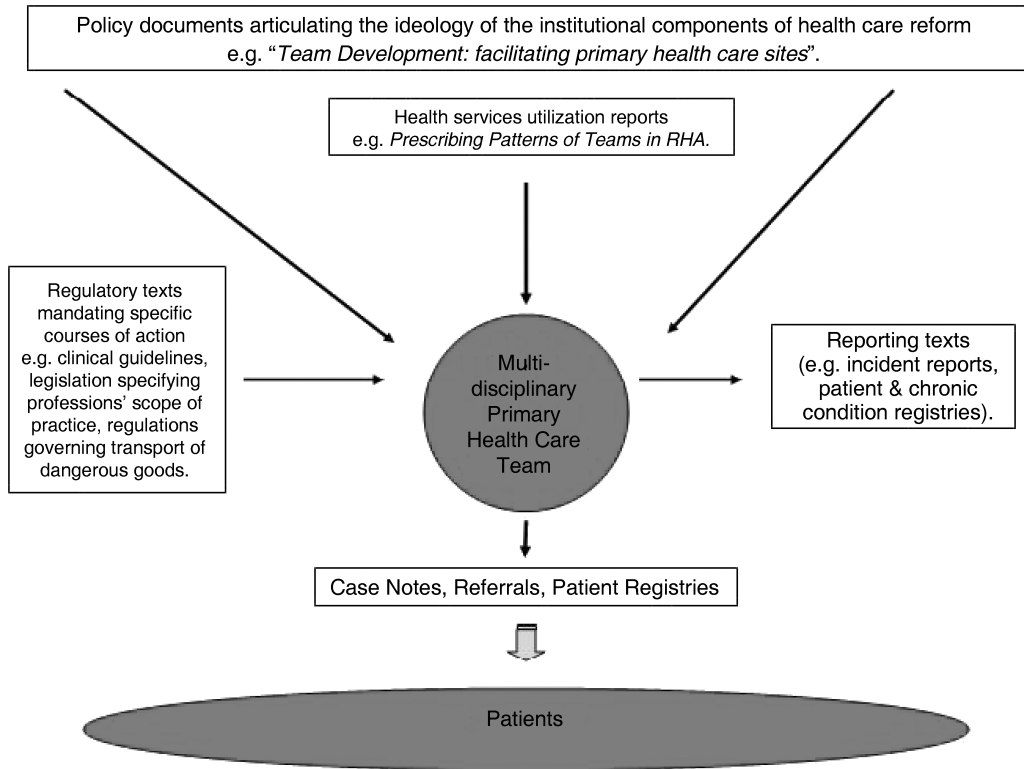
Figure 1 *Texts coordinating teams' knowledge work*

The second companion text, 'Team Development' (1999), mandates specific conduct and behaviours to regulate social interactions within teams. It explicitly expresses the intent to establish a communicative infrastructure within teams to support their creation, transfer and application of knowledge. The orientation of this second policy text is identifiable as a 'how to' manual for health professionals working in the newly established teams. Suggested ground rules are listed, including: consensus decision-making; leave titles/rank at the door; listen when others are talking.

The document attempts to formalise the relations of collective decision-making, but offers little more than a directive to team members to prevent their team functioning from being pre-empted by the force of historically secured hierarchical relations of knowledge. Consideration is not given to the contextual complexities of health care providers applying their practical and professional knowledge within a new, collective form of work organisation. The embedded tensions in the document are reflective of a system-level initiative to move towards a collective form of knowledge work without addressing the necessary conditioning of expectations of, and soliciting commitment from, those carrying out the work.

Knowledge work: an activation of texts
Knowledge work is co-ordinated through the activation of the texts illustrated in Figure 1. Teams activate the mandating texts by anchoring them in the teams' local conditions; in doing so, the texts co-ordinate the knowledge work performed across teams. Text activation

can serve as a launching point for the articulation of tacit knowledge and thereby the creation of new knowledge. Two illustrations of text activation involved in knowledge work follow.

Knowledge work: activating a provincial drug utilisation report

Pharmacist:	This report was done in October. It's community-based patients, not those in LTC. If you look at the '_' category, these are non-aboriginal. Remember that. Because the data are extracted from the SK Drug Plan and not those getting benefits from XX, or YY, or ZZ. [Team members spend some time looking over the report].
Pharmacist:	I'd like to see us do well on this. I think we've been doing well with patients in some ways and not others. There's only three drugs here that stand out in your communities. First is Drug A. It was a problem in Community X when it was the drug of choice of the doctors there. They gave it out for everything and everyone.
Pharmacist:	[lists the drugs that are alternative to Drug A.]
. . .	
Pharmacist:	I don't think we have a problem up here with Drug B.
RN(1):	Didn't we have someone on it? Was that Betty? [All four team members struggle to identify patient on Drug B.]
RN(1):	Is this information going to be shared with the Doctors?
Pharmacist:	Yes, I will be doing that at the PandT Committee this afternoon.
RN(1):	Is there willingness?
Pharmacist:	Yes, I think so. But, the problem is the itinerants. It's difficult when you have such turnover to keep that consistency in prescribing patterns.
RN(1):	Well, you're the specialist, so they're more likely to hear it from you.
Pharmacist:	But, you guys are on the front line. You're holding the hand of the physicians. With all the change going on with the physicians, you're the constants. And, with the physicians fighting each other, each time the patient comes in. [The RNs nod in agreement.]

The pharmacist is a spokesperson for the text, insisting that the team conform to the report's recommended prescribing patterns. That the text accurately reflects the teams' prescribing patterns and that those patterns need to accord with the recommendations is never challenged. These tacit understandings are not articulated and consequently they are not open for debate. However, after settling the question of which patient was on the Drug B, the RN(1) and the pharmacist articulate their tacit knowledge of the role of various members in the team's prescribing patterns. In asking the question if the information is going to be shared with the physicians, the RN lays responsibility for the prescribing patterns at the feet of the GPs. The pharmacist counters by proposing that because the RNs 'hold the hand' of the physicians, they play a role in the prescribing patterns of team. Through the articulation of their tacit understandings, it becomes evident that some team members hold different assumptions about the responsibilities of team members. From the discussion, new normative knowledge is acquired as role definitions are clarified. This example illustrates how the activation of texts opens up the communicative space for the team to reflect on its practice patterns and the role of team members in the formation of those patterns. The subsequent example of the activation of a mandating text provides a more striking illustration of how disagreement and alternative interpretations facilitates the creation of new knowledge.

Knowledge work: activating a regulatory text
At one of the team's weekly meetings, members were introduced to new regulations regarding the transport of dangerous goods. The manager from the governing clinic came to the meeting specifically to inform the team about the recently enacted federal legislation that regulates the work practices of workers who come in contact with dangerous goods, including contaminated blood products. The manager informs them that clinics such as theirs run the risk of losing their accreditation and being legally charged if there are enough violations of the regulations, *i.e.* incidents of unidentified specimens from patients with Hepatitis-C, HIV, or other blood-borne infections.

Almost immediately upon hearing this summary of the regulations, the physician points to the contradictions between this and another regulatory text.

Mgr: If they choose to charge, they don't charge the organisation, they charge the individual. And, it is up to a $50,000 fine.
GP: The individual? What individual?
Mgr: The individual who has done the work. So, whomever they can trace it back to . . . who didn't indicate the risk or chose to ignore the . . .
GP: So, whatever happened to Universal Precautions?
Mgr: Well, that's different. That is a separate issue. Universal Precautions . . .
GP: Well, I mean, part of our problem is that we know that we do blood specimens and other specimens on people that aren't Hepatitis C. And, there are the ones that are at far more risk of someone having a problem because of that. So, all of this that we hear about Universal Precautions all the time, it must be thrown out the door, if now they want us to do a separate thing because someone is Hep C positive or whatever.
. . .
GP: I mean what's this got to do with movement of dangerous products . . .
NP: That's right.
GP: Like uranium tailings and all that stuff . . . This has got nothing to do with Hep C! Give me a break!

At the end of the excerpt, the GP introduces uranium tailings as really dangerous products to point out the ludicrousness of the mandating text's focus on contaminated blood products. By giving expression to the tacit assumption that uranium tailings deserve a greater degree of system-level vigilance, the GP opens the floor for a critical discussion of the mandating text's normative assumptions.

Some time later in the meeting, the physician and the clinical administrator give expression to their tacit knowledge of their local conditions and the disconnection between the regulations and those local conditions.

GP: I don't know whose brilliant idea these regulations are, I mean they have nothing to do with reality. I mean, the chances . . . the number of people who get infected from blood products that are after the immediate withdrawal of the blood from that person are almost nil! The chances of getting HIV if you're down the line in the lab are next to none . . .
Mgr: yea.
GP: I mean, like what are we talking about?
Mgr: (defensively) Yea, well, I just felt obliged to inform you . . .
GP: Yea I know (sighs).

Mgr:	that the violations . . .
GP:	Jesus, it's the people like me that are doing the deliveries and the surgeon that's operating, or Dianne (the Clinic's RN) that's taking the blood, we're the ones that are taking the risk. Not some guy somewhere down the line and they're going to come back to us that we didn't mark or put a star on it?
Clinical Administrator:	It reminds me of that Dr. Zeus book and you know they put the stars on. And, then the other side gets upset because they don't have stars, so then they get stars. So, then the other ones go and then they take all the stars off. And, then at the end they can't tell who has the stars and who's got the. . . . (breaks down in laughter) I just love that book! And, then they realise that they all have stars, so then they all want them off, so they couldn't figure out the two sides any more in the end. (shared group laughter)

The physician's expression takes the form of citing evidence that those at greatest risk of contracting the infectious diseases are not lab workers, as the text implies, but rather the front-line of health services delivery. In contrast, the administrator uses metaphor and humour from a well-known child's storybook to expose the contradictions between the text and the characteristics of the team's patient population. As Nonaka and Takeuchi (1995) argue, tacit knowledge is difficult to articulate because of its taken-for-granted nature, and consequently, its expression often relies on metaphor. Using different strategies – logic and metaphor – the GP and the administrator both challenge the presumption of the text that practices regarding dangerous goods can be and should be standardised across teams.

At a later point in the meeting, the GP proposes a subversive strategy: to mark all the charts. When the nurse asserts that it is clear that the work entailed would fall disproportionately on her shoulders, the GP drops the suggestion because it contravenes the team-held norm that overburdening any one team member is harmful to the whole team. He concedes the necessity of identifying the charts of only Hepatitis C and HIV patients in co-ordination with the collection and transporting of specimens.

The example demonstrates a text activation that facilitates the articulation of tacit knowledge concerning the nature of the team's practice and the fault line between that practice and its representation in the institutional discourse of the text. By way of the activation of the text, the team was able to critically reflect on the larger set of institutional relations.

Through the team members' dialogical exchange, they collectively derive a strategy to abide by the text, minimise the amount of their additional processing, and still stay true to their shared practice principles of not compromising patient confidentiality. As the following excerpt illustrates, refining a new process to attend to the regulations involves posing and answering a series of questions:

RN:	I've got to fill each one out, 1 swab, 25 mls, four SSTs 10 mls . . .
Clinical Administrator:	yea, so you don't want to do everyone . . .
RN:	each time or each sheet.
NP:	So, where do we get those forms from? Where does the original come from?
Mgr:	I generate them.
NP:	well couldn't we, then couldn't we carbon copy?

Clinical Administrator:	yea.
NP:	Couldn't we make them like our lab reqs?
RN:	So that when I fill . . .
NP:	yea. And, then you're separating them off.
Mgr:	yup.
NP:	Cause if I could . . .
Clinical Administrator:	Cause then you'd only have to do it once at least rather than all separately
RN:	Yea, if I try, which I've done before, is a whole bundle. And, then I come back to it later, because there's a dressing over here, or this patient or that. And when I get back I (ahh!) somebody has moved it.
Clinical Administrator, NP, Mgr:	yea.
NP:	So, that's when errors are made.
Mgr:	Yea, and that's kind of my point is that you have to refine a process.

The ensuing hour-long discussion twists and turns and gradually the regulatory text becomes anchored in the local conditions as the team makes a series of action decisions that are rooted in the newly acquired knowledge. Eventually, they reach agreement on a new set of collectively formulated procedures.

Clinical Administrator:	then if we could get the req done initially.
NP:	yea.
Clinical Administrator:	with blood precautions.
NP:	Get the req done, have that chart, have that blood precautions . . .
RN:	then you'd know.
NP:	before I leave.
RN:	and every physician that comes to the SWAG knows.
Clinical Administrator:	yea.
NP:	and Natasha will know.
NP:	I think that's perfect.

Their tacit knowledge is made explicit through the formation of new practices and procedures. New knowledge is created throughout the process of the team's collective reflection on its local conditions and potential ways of co-ordinating the testing of bodily fluids to meet the text's requirements regarding transported blood products.

Conclusion

This study of knowledge work is set against the backdrop of the evolving order of a health care system in a province implementing a set of concurrent reforms, one being the development of a new form of work organisation, that is, multi-disciplinary primary health care teams. In the new form of work organisation, knowledge work is made collective and involves an interplay of talk and text.

The study finds that much of the knowledge work of the shadowed teams is organised around shared tasks involving documentary forms of knowledge. The exchange of practice-based,

tacit knowledge is a crucial component to teams' creation of new knowledge. This latter finding confirms a fundamental hypothesis of the knowledge management literature: that is, the importance of tacit knowledge in the creation, transfer, and application of knowledge. The dialogical exchange that is necessary to the collective clinical decision-making of teams facilitates the articulation of tacit knowledge and thereby opens up the potential for creation of new, communicatively achieved knowledge.

In addition to confirmatory findings, a second, and perhaps more significant contribution to the existing literature on knowledge management in health care is the study's illustration of the importance of the social, communicative aspects of the knowledge processes. The literature has traditionally reflected the assumption that knowledge creation, transfer, and application are technical, cognitive processes. Rather than investigating how contested knowledge claims are identified, evaluated, and settled, the characteristics of the practitioners are more commonly examined to identify barriers to and facilitators for converting knowledge into practice (*e.g.* Cronje and Fullan 2003, Funk *et al.* 1991, McCleary and Brown 2003, Micevski *et al.* 2004). The paper provides an alternative focus underpinned by the assumption that knowledge is a collective not a private good, embedded in a set of social relationships. As the paper illustrates, knowledge work is carried out in the context of collective decision-making and involves the negotiation of knowledge claims. Thus, knowledge creation, transfer, and application is best understood by considering the social organisation of power.

The study takes up this task by examining the relevant reports and regulatory and policy documents as constituents of the co-ordination of social relations within the institutional order of health care delivery. As the paper made clear, the aim of these system-generated mandating texts is to standardise and co-ordinate teams' knowledge work across multiple sites. Yet, because knowledge work, as performed by multi-disciplinary teams, is collective and communicative in nature, it has the potential to involve naming and challenging mandated courses of action and their associated assumptions in the texts. Mandating texts can be liberatory in the sense that in the course of activating the texts, individuals can critically reflect on the larger set of institutional relations, as illustrated in particular in the last example discussed in the paper. Thus, the study extends the theory/method of institutional ethnography, as originally conceived by Smith (2005), by pointing to a more nuanced, multi-dimensional understanding of how texts are implicated in the social organisation of power. Texts are both dominating in the sense of dictating action, yet they also carry liberatory potential. Moreover, by way of demonstration, the study directs attention to the capacity of study participants to contribute to IE's transformative project: the nature of the ruling relations can be made visible not only by institutional ethnographers, but also by those on the 'shop floor'. Further theoretical development of IE needs to be directed to deepening our understanding of the role of both IE and its informants in social transformation.

The study finds that the ongoing regeneration of the team's communicative infrastructure that supports the expression of tacit knowledge requires considerable time and energy on the part of the individuals. In the long term, we might speculate that the process of creating new knowledge through dialogical exchange could interfere with teams' efficiency to deliver care. Paradoxically, multi-disciplinary teams were established as a system-level strategy to contain costs by increasing the efficiency of clinical decision-making. With their communicatively co-ordinated ways of making clinical decisions, teams might be less efficient in performing knowledge work than prior forms of work organisation. However, this speculation needs to be subjected to further empirical test. Another plank of a future IE research on the topic would be to take up other standpoints within the same institutional order of the evolving health care system and knit together the resulting pieces to make visible the extended social relations of ruling and their intersections so that those relations of ruling might be reorganised.

Address for correspondence: Elizabeth Quinlan, Department of Sociology, University of Saskatchewan, 9 Campus Drive, Saskatoon, Saskatchewan, S7N 5A5, Canada
e-mail: quinlanl@sasktel.net

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Note

1 For example, Schultze's (2000) definition of 'knowledge work' as the production and reproduction of information by individuals. The social, communicative aspects, here again, are not emphasised.

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