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Knowledge, technology and nursing: The case of NHS Direct

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ABSTRACT

NHS Direct is a relatively new, nurse-based, 24-hour health advice line run as part of the UK's National Health Service (NHS). The service delivers health advice remotely via the telephone. A central aspect of the service is the attempt to provide a standard level of health advice regardless of time, space or the background of the nurse. At the heart of this attempt is an innovative health software called CLINICAL ASSESSMENT SYSTEM (CAS). Using a number of qualitative methods, this article highlights how the interaction between the nursing staff and this technology is key to the service. The technology is based on management's attempt to standardize and control the caller–nurse relationship. Thus the software can be seen as part of an abstract rationality, whereas how it is deployed by nurses is based on a practical rationality that places practice and experience first and sees the technology and protocols as tools.

KEYWORDS

autonomy ▪ forms of rationality ▪ NHS Direct ▪ nursing ▪ objectivity

Introduction

NHS Direct is a relatively new UK-based telephone health service that is staffed by nurses. It provides callers with health advice via the telephone, aiming to send them to the most appropriate care quickly, efficiently and

safely. It is significant because, along with NHS Direct Online, the provision of healthcare via interactive television, etc., it is one of a new bundle of pathways that will supposedly enable people to access healthcare more easily and conveniently (Gann, 2002). Increasingly, it is hoped that, for most people, NHS Direct will be their first access point to the wider UK health service, which will hopefully alleviate pressure on doctors and other providers, thereby making it key to the broader modernization of the NHS (Webster, 2002).

An important feature of this service is the way it utilizes technology. It delivers healthcare remotely in a non-face-to-face environment, which necessarily generates management tensions – for example, the difficult question of how you deliver quality health advice is made more difficult if it is to be delivered at a distance. Other problems also emerge – how can you achieve consistency across time and space in healthcare or how will nurses with very different backgrounds and specialities be enabled to deliver a consistent level of quality advice to the random queries that come in over the phone? Given that management is fundamentally built on the search for consistency and certainty (Townley, 2002), this service, like any other, raises difficulties. As the article highlights, the organization has centralized technology in its attempts to deliver certitude in the quality of advice offered, but this use of protocol-laden technology also generates management contradictions. As with all management, new difficulties are created via the solutions to current problems. As Hyman (1987) observed:

> . . . there is no 'one best way' of managing these contradictions, only different routes to partial failure. It is on this basis that managerial strategy can best be conceptualised: as the programmatic choice among alternatives none of which can prove satisfactory.
>
> (p. 30)

This use of technology is important for two reasons. First, NHS Direct is only one element in a strategy of using innovative health technologies to deliver remote healthcare, but it will increasingly act as an entry point to the health system as the software is rolled out to 'walk-in centres' and accident and emergency departments (A&E). Second, the service is acting as a model for the delivery of healthcare elsewhere – Italy and Australia are examining NHS Direct as a tele-medical model; similarly, tele-medicine has been used in Canada, Scandinavia and other places. Thus, in some respects, NHS Direct is a seminal organization for managing the delivery of healthcare and advice, and it is one about which we know very little (Wahlberg et al., 2003). What follows highlights some fundamental tensions between, on the one hand, the

rationality of management with its desire for consistency and the need to meet targets and, on the other hand, the rationality of nurses and their attempts to maintain autonomy and discretion which they see as essential to delivering quality healthcare. Finally, related to and shaped by these issues, is the very idea of quality in healthcare itself and how it is defined differently by different groups and in different contexts.

Controlling technology and NHS Direct

As an organization, NHS Direct raises a variety of issues that are central to late modernity. Late modernity is supposedly characterized by risk, distrust of expertise and professionals, citizens' desire for empowerment, increased anxiety, a rising individualism, a loss of faith in technology, etc. (see Beck, 1992; Giddens, 1991; Lash, 2000; Smith, 2002; Wilkinson, 2001). As such, the use of a non-face-to-face technologically mediated service in any sphere may prove problematic. However, given that health is supposed to be *the* new social or cultural value (Beck-Gernsheim, 2000), the push towards technologically mediated health services could prove a bridge too far for the citizens of late modernity. Indeed, quite how technology, expertise and professional labour interact in this arena is a core question both for the health service and for wider debates about what type of society we inhabit and are creating. These issues form the basis for our work on NHS Direct. They shaped how we carried out our research, what questions we asked, what topics were examined, why we prioritized certain issues and not others, etc. Given the constraints of an article we cannot address them all here. What we analyse here is how NHS Direct uses technology and nursing professional expertise to deliver healthcare remotely.

Our analysis highlights a number of tensions and contradictions within the service because the organization's management strives for predictability via the technology, whereas the nurses feel they require flexibility and autonomy in their efforts to deliver healthcare and advice to particular individuals (O'Cathain et al., 2003). In a world where the Health Secretary argues people should get individualized healthcare (Milburn, 2002), the nurses rather than the management of NHS Direct may appear to be closer to this goal; yet to allow nurses to individualize service raises (management) issues of knowledge, resource use, rationing, control and so on. This has significant organizational consequences in a public sector dominated by Key Performance Indicators, litigation, targets, etc. (Finch et al., 2003; Webster, 2002). In many ways what is occurring in NHS Direct is a struggle over what form of knowledge predominates in the organization. Townley (2002) argues

that management is based on an abstract, universalizing rationality. For her, one tendency in management is to take the specific and to abstract, standardize and universalize it in a bid to ensure consistency and control. Hence management systemizes, objectivizes and routinizes procedures. In short, it seeks to reduce the subjectivity of labour. She calls this an 'abstract rationality'. It is a form of knowledge that allows 'an abstract and generalized conception of management to be applied to any process. It is disembedded (Giddens, 1991), abstracted from a context, and presented as an homogenous and universal management for any organization' (Townley, 2002: 550). In contrast, the knowledge of labour is context specific, local, located in a social setting and built around a specific, not a generalized, other. This specific other is placed within a world alongside all their roles and obligations. Hence labour seeks to maintain subjectivity, autonomy and discretion. She refers to this as 'practical rationality'. Key to it is '(it) recognizes individuals as part of a set of social relationships and members of a social group; the importance of tradition and custom, of experience as being collective and cumulative' (Townley, 2002: 568).

Although they do not inform one another, Berg's (1997) article 'Problems and promises of the protocol' raises many similar themes to Townley. He suggests that protocols, guidelines, standards, etc. for medical work are increasing and are fundamentally reductionist because they seek the 'single answer' to what are often complex, multifaceted issues. Hence protocols impose a formally rational, individualist, structure on work that, in situ, is actually social, affective, hermeneutic and collectivist. Furthermore, they prioritize the quantitative and the measurable and deem this 'scientific'. The 'other' – the implicit, the qualitative, the immeasurable – are (deliberately or not) downgraded and rendered unscientific. Thus, for him, those occupations or professions that deal in these 'non-scientific' spheres often attempt to gain a veneer of 'science' by trying to make objective and explicit their implicit expertise. They do this in the mistaken belief that it will increase their status rather than open them to deskilling. This growing protocol activity is increasing the bureaucratization, regulation and control of healthcare practices, especially in the work of 'soft' healthcare professionals such as nurses or general practitioners (GPs). Again, there is an organizational desire to standardize and achieve consistency, whereas for Berg what should be celebrated is the variation of outcomes. These variations reflect individualized service rather than the limitations of an individual professional's cognitive abilities or the failings often attributed to these professionals (Berg, 1997).

This situation generates tension between what is 'objective' in medicine and how much 'variation' is acceptable. However, following Apel

(1972/1977), we suggest that the 'objectivism' proposed by protocols or technology is a chimera because what we are dealing with via protocols or technology is based on intersubjective understandings of illness, care requirements, language, etc. rather than the ostensibly subject–object relationship of scientism (see also Held, 1980: 296–329). This is not the same as saying we should never objectify human behaviour or treat it in a nomological fashion (Apel, 1972/1977). Rather, we are suggesting that to do so may be 'better' at times or provide socially beneficial outcomes or be more utilitarian, but these are subjective moral decisions not the objective ones claimed for them because medicine is both a human science and a natural science (Apel, 1972/1977).

Within a complex work environment one way that management can achieve consistency, can abstract and materialize employee skill and/or embed protocols into everyday practice is through technology[1] – a key element of NHS Direct. As Suchman (1987) has demonstrated, technology is often designed in ways that attempt to dictate how workers use it. Technology is thus often built on the abstracted and universalizing rationality preferred by management, which creates tension in the worker–technology relationship (Braverman, 1974). It often plays a key role in the separation of the conception and execution of tasks. However, this trend towards a managerial monopoly of knowledge and decision-making is always complicated because, ultimately, management can never entirely remove all discretion from work. At some point, management has to cede some control to labour (Cressey & MacInnes, 1980; Friedman, 1977; Hyman, 1987).

What these debates demonstrate is the complex and contradictory nature of managing labour processes. In NHS Direct, one feature of this relationship is the desire to use protocols embedded in technology to abstract, standardize and universalize knowledge. For example, the software training manual for nurses in NHS Direct states (emphases added):

> CLINICAL ASSESSMENT SYSTEMS (CAS) ensures a *uniform* approach to processing a call. This approach *minimises malpractice risk* as well as improving call centre performance. The decision support software is owned by the NHS and managed by AXA. Working collaboratively, both organisations strive to improve the software, thereby *enhancing* and *standardising* the delivery of nursing care nationally.
>
> (pp. 1–2)

Furthermore, Gann (2002) suggests ever more elaborately designed CAS programs and protocols can be developed to standardize the most esoteric

of calls or of individual contexts. Such a proposition means that for NHS Direct the relationship between the nurses and the technology is central. At the heart of this relationship is the attempt by senior management in the organization to use the technology to drive the nurse–caller interaction and to use the technology's abstract expertise, objectivity and protocols to ensure consistency and safety, to lessen risk and to standardize the level of service provision across the specific context of nursing background, space and time. This management position partly reflects the fact that they are tasked with the contradictory role of ensuring both service consistency and the delivery of an individualized service (Department of Health, 1997). In resolving this conflict, NHS Direct relies on the inanimate expertise of the technology to deliver safe and consistent health advice more than it trusts the individual and collective expertise of the nurses, and hence it attempts to control the way the nurses use this technology. Nurses, by contrast, trust their own practical rationality, their individual expertise and their colleagues' collective expertise to deliver an individualized, i.e. non-standard, and tailored service. This situation creates a tension in the nurse–technology relationship, one that is perhaps further exacerbated by the experienced and qualified nature of these nurses (see later).

In addressing this issue, we draw upon 33 in-depth interviews with NHS Direct staff, comprising 22 nurses, 2 nurse trainers, 1 team leader, 2 health information advisors, 1 health information trainer and 5 'call handlers'. These interviews were taken from two different sites covering a range of demographic areas – urban and rural, locations with and without large immigrant communities, different range of class backgrounds, etc. The research process also entailed non-participant and participant observation. One researcher completed the call handler training programme at one of the sites and formal and informal non-recorded interviews were held with trainers, lead nurses, managers and medical directors. The two sites had different organizational histories. One developed out of a Health Information Service and the other grew out of a GP co-op. This gives rise to differences in the managerial cultures of the sites which, given the spatial constraints of an article, we cannot develop here.

The nurse interviews were conducted between December 2001 and June 2002. The sample was drawn opportunistically according to call volumes, staff availability on particular days and staffing levels. However, efforts were made to ensure that we covered a range of staff in terms of length of experience with the service, gender, and full-time and part-time hours worked (for some of the part-timers, it was their only job; others continued to work part-time in another clinical setting). Nurses within NHS Direct have on average almost 10 years of nursing experience and a variety of educational

and professional backgrounds (Morrell et al., 2003) and our sites were no different. Lasting between 60 and 90 minutes, nurse and call handler interviews were tape-recorded, fully transcribed and analysed using Nud*ist. Senior management are present in what follows via non-recorded meetings, non-participant observation, participation in training programmes, research team presentations to managers and trainers, policy papers, etc. (see Hanlon et al., 2003).

Describing NHS Direct

NHS Direct aims to offer easier and faster advice and information to people about health, illness, and the National Health Service (NHS) thereby enabling them to better care for themselves and their families (Department of Health, 1997). Currently, it is the largest telephone healthcare advice line in the world. It received 3.5 million calls in 2001–2002 – a figure which was to double in 2002–2003 (National Audit Office, 2002). Callers access the service by dialling a single national number, for which they pay at local rates. At periods of high demand, staff may divert calls to less busy sites in other parts of the country but generally one is put through to a local site. The service has set a target of integrating all GP out-of-hours calls by 2004, which will increase its call intake by a further 10 million. All of this means that the service is of growing importance for the NHS as a whole, and if successful, it will increasingly mediate between citizens and their healthcare.

On ringing the national number an individual is directed to a NHS Direct site where the call is answered by a call handler. The call handler ranks the urgency of the call and depending on that ranking the individual is put through to emergency or placed in a queue by order of priority. If the call is for a medical problem rather than a request for information, a nurse will call the individual back. How quickly the nurse calls back is dependent on the volume of calls that day and the urgency of your situation. As stated, call handlers make initial decisions about the urgency of the call. These people are not medically qualified and their role is to get the biographical details of callers and to assess how a call should be ranked in terms of its urgency and type. Their work is controlled in a variety of ways via the technology as certain questions and details have to be answered. Call handlers are trained over a period of two weeks in how to use the software, the telephone system, various health information databases and in aspects of 'customer relations' to do with the specific client group of 'NHS patients'.

At the end of their training, call handlers have a period of 'preceptorship' before going it alone. They are managed on a day-to-day basis by call

centre supervisors, and are also, together with nurses, assigned to teams led by senior nurses – team leaders – for professional development purposes. As stated, callers with non-emergency symptoms are triaged by nurses in order of priority. All details are recorded, calls are themselves recorded and the system indicates levels of risk (the outcome of which is partly dependent on what the caller has said). Thus risk avoidance and an audit trail are built into the process.

The information from a call is electronically passed to a nurse by the call handler. This information will entail a brief description of the complaint and the caller's details. The nurse then telephones the caller and re-starts the interaction. Within the interaction nurses are assisted in their advice-giving by CAS. Initially, several different systems were used by individual NHS Direct sites, but CAS was selected primarily for its perceived safety, consistency and directiveness (Collin-Jacques, 2003). It is designed as a set of algorithmic questions organized around different symptoms (such as 'dizziness', 'cough', 'chest pain', 'urinary burning', etc.) as opposed to 'conditions' (such as 'diabetes', 'asthma', 'angina', 'cystitis', etc.). It is not supposed to be used as a diagnostic system, rather advice is recommended about the next step towards a diagnosis. Of course, often what callers want is a diagnosis of their ailments (Greatbatch et al., in press). Nurses read on-screen clinical information as they ask the questions the software prescribes – this information gives the 'rationale' behind the line of questioning. Callers' answers of 'yes', 'no', or 'uncertain' to questions guide nurses to further lines of questioning and eventually to a final 'disposition' on which s/he bases the advice given. Thus if your answer to a question on chest pain is 'Yes', the software begins to rule out other symptoms and hence callers' self-knowledge and ability to articulate their position are key and implicitly assumed. Options for advice given include: A&E, immediate or routine contact with a GP, advice on self-care at home, and information giving.

Although directed by the software, nurses are generally able to select a higher or lower disposition ('overriding' and 'underriding') than that recommended by CAS as long as they document their reasons for doing so. This need to document why the software's recommendation was not followed explicitly indicates the presumption that the abstract, universal advice of the protocol or algorithm within the technology is more trustworthy than the expertise of the nurse. Overriding and underriding are not always straightforward. Collin-Jacques (2003) describes how in some sites nurses need to request permission from team leaders to deviate from the software and these over- and underrides are then examined by a medical director. Similarly, O'Cathain et al. (2003) suggest that some sites within NHS Direct did not allow nurses to over- or underride. All of this indicates

a prioritizing of the expert system and management assumptions that abstract expertise is more reliable than that based in individual experts (Whalen, 1993) or, in a more critical vein, that technology's expertise dominates those subject to it (Marcuse, 1941/1982). Equally, it reinforces Berg's (1997) suggestion that protocols ignore the situatedness of healthcare in its particular context.

One element in the search for consistency is bound up with safety, which is supposedly encoded into CAS in two ways. First, it is encoded in terms of the faster speed at which calls are processed, thereby lessening the risk of callers' conditions worsening before they are assessed. Second, safety is ensured by starting with the 'worst-case scenario' ailment. The software brings up the worst-case scenario for a symptom to eliminate or deal appropriately with emergencies before proceeding with the assessment. The system is designed to offer both a minimum safe standard of assessment, regardless of the different nursing backgrounds or specialities, and a consistent service, regardless of the locality of the caller, the site answering the call or the time of day – in short, to eradicate social context. However, what follows demonstrates some of the tensions in the delivery of this healthcare.

Nurses, technology and non-face-to-face nursing

NHS Direct is an unusual type of nursing because it is non-face-to-face and it centralizes the use of the telephone and computer software. This is different to other areas of nursing such as A&E, GP surgeries, or community healthcare where face-to-face contact is normal. Indeed, for a profession whose work has historically: (i) centralized 'bodily care' (Mackay, 1992); (ii) involved a lot of emotional labour and the presentation of self (Bolton, 2001); and (iii) emphasized holism (having a knowledge of the 'whole individual' in his or her environment) (May, 1992), rather than concentrating solely on the medical disease (Williams, 2000), this form of nursing represents a significant shift. NHS Direct is also a challenge in another sense. Traditionally, much nursing has been concerned with non-technologically mediated 'dirty work' with technology being a preserve of a nursing elite (Lawler, 1991), thereby suggesting that nurses have had a hierarchical and ambivalent relationship with technology. Yet NHS Direct centralizes both bodily remoteness and technologically delivered healthcare. On top of this, the way the technology is to be used is seen as prescriptive by the nurses. Thus, it seems fair to say that NHS Direct challenges nurses in two ways. First, it separates the nurse from the patient. Second, it is technologically mediated. How do nurses grapple with these challenges?

Grappling with the challenges

Sandelowski (2000) argues that historically nurses have positioned themselves both with technology, in order to align themselves with science and progress, and against it, because technology is viewed as dehumanizing patient care. She argues that since the 1970s nurses have attempted to integrate technology as a component of care in terms of being technically competent but also being able to fit technology to care by treating activities such as touching patients, talking and listening to them, and 'being present' as technologies in their own right. One example might be nursing informatics which is depicted as a site where 'caring and technology meet' (Ball et al., 1995). The ultimate goal of informatics is to put the nurse back into the picture by 're-presenting the everyday, often tacit, but essential practices of nurses, in forms that will be recognised as scientific and as conforming to current imperatives of managed healthcare' (Sandelowski, 2000).

Yet Sandelowski questions how any rational language scheme can capture critical components of nursing care such as humour, intuition and tacit knowledge (see Bolton, 2001 for an analysis of emotional labour in nursing). Echoing Berg (1997), she argues that nursing knowledge has always been more important than hands-on care but that this knowledge may resist representation in these systems (Sandelowski, 2000). Although Sandelowski does not use the language – what she is resisting is the idea that a codified, abstract and universal knowledge can capture the context specific, tacit, unquantifiable, practical knowledge of nursing without doing violence to it. Furthermore, technology or protocols often increase the dangers of making nursing work more transparent and hence open to deskilling and dehumanizing, thereby damaging care (Berg, 1997; Leigh Star, 1996). Indeed these writers see nursing as a holistic rather than a purely medical exercise. Hence in the nurse–patient interaction, the nurse's task is one of interpretation wherein non-rationality, emotion and hermeneutics, as well as 'science' are needed and they question the traditional medical model which assumes 'rational' patients and 'rational' medical professionals (on the assumptions of the rational model see Zola's beautifully crafted article of 1973 and Berg, 1997). Thus one can see NHS Direct as a site of conflict and domination where the seemingly instrumental and objective medical knowledge of the technology is prioritized over subjective nursing knowledge. Of course, the supposed dominance of this technocratic consciousness hides class, gender and jurisdictional struggles (Held, 1980).

These discussions concerning nursing and technology demonstrate the tension that has run through nursing about how bodily contact, talk, caring, technology, and knowledge commingle and weaken or strengthen the

essential core of nursing. At the heart of these discussions are ambivalence about technology, the nature of nursing knowledge, attempts to codify this knowledge and a belief in the need for open communication and hermeneutic interpretation (either face-to-face or remotely). This is central to NHS Direct because CAS (more so than the telephone) attempts to embody nursing and clinical knowledge within its system. Indeed, in its efforts to deliver safety and consistency, NHS Direct is attempting to limit nurses' use of their own practical expertise in preference to the universal medical expertise embodied in the technology, its protocols and the science upon which it is premised. It is prioritizing abstract (medical) over practical (nursing) rationality. This is different from simply following established practices because, theoretically, CAS provides the questions, searches a database for the solution and provides the answer to an isolated individual nurse. This is unlike other nurse environments in which nurses may follow accepted procedures but use their knowledge and their colleagues to question, assess and explain.

CAS: The abstract and universal of knowledge of NHS Direct

In light of these challenges how do nurses perform non-face-to-face care and mediate it technologically? In short, what constitutes the body of nursing knowledge in NHS Direct? NHS Direct explicitly uses three forms of knowledge: (i) a number of datasets, e.g. electronic databases such as Mentor; (ii) the nurse's own experience or knowledge; and (iii) CAS. However, CAS is supposed to be the fundamental body of knowledge upon which judgements and explanations of patients' needs are based. As stated, when allowed, if nurses deviate from the prescribed CAS route they have to write up why they did so in order to document and justify their actions and in some instances seek permission from superiors (Collin-Jacques, 2003; O'Cathain et al., 2003). The assumption being that CAS's expertise is more reliable than that of the nurses, i.e. that CAS is an expert system which steers the process rather than a 'system for experts' (Whalen, 1993) to be used as a tool. As such, at face value, CAS appears to incorporate the standardizing fears of Berg (1997), Leigh Star (1996) and Sandelowski (2000) – it, rather than the nurse, appears to drive care, to dehumanize it and to deskill it.

The evidence-based, clinical information within the rationale behind CAS's algorithmic questions aims to offer nurses and patients a minimum level of safety and consistency across time and space – it aims for standardization. Interestingly, nurses often value this even if some feel it constrains the use of their own experience (see O'Cathain et al., 2003), as one nurse put it:

> I think the system is needed for the type of work that we're doing but I think it does place a lot of constraints on a nurse's experience because the guidelines are quite rigid.
>
> (I.1)

> Sometimes I feel with nursing expertise I shouldn't have to go through those algorithms, there is no need to go through them. They do say to you that you don't need to go through them as long as you write it all down, but to protect yourself safety wise, really you should go through them.
>
> (I.17)

However, the relationship between worker and machine has never been straightforward. Going back to Adam Smith, technology has been used to embody skill and lessen autonomy. Indeed, it has often structured social action by decreasing or making unpalatable certain options (Latour, 1991), and it has been used to discipline workers (Benyon, 1975). Thus, human–technological encounters have a chequered past – reflected in nursing's own ambivalence to it. In light of this past, a key question is how do nurses use and rely on CAS? Despite the fears of standardization, nurses use the technology in a range of ways. In practice, there is considerable diversity in the way nurses interact with the system, leading to variation in outcomes (Monaghan et al., 2003). This interaction, which they talk about in interviews, and which we have observed operating within the call centre, shows that they continue to value their own experiential knowledge as well as CAS's 'expert' knowledge. Indeed the reality of healthcare leads them to supplement CAS with their own psychosocial knowledge of individuals, knowledge about patients' family circumstances, knowledge of how local services operate, and their own and their colleagues' specialist clinical knowledge and experience. That is, they often reject the abstract and universal knowledge of CAS for the local, context, individually situated knowledge of their practical rationality. This is necessary for the service to function but it creates a number of tensions.

Achieving consistency?

The first tension between CAS's promise of safety and consistency and the nurse's delivery of holistic care is revealed right at the beginning of the assessment, where CAS is designed to eliminate conditions requiring emergency treatment. For nurses this generates an inverted logic, which feels opposite

to a more 'naturalistic' process of rapport-building and history-taking because CAS starts with the most serious outcome. The nurses feel this is counterintuitive. However, it would only be counterintuitive if the interaction were face-to-face. In face-to-face interaction nurses also use a 'worst-case scenario' approach in that, when they see cues suggesting things are serious, e.g. blood, expressions of pain, they take the appropriate action and assume the worst case until further knowledge leads to a reassessment of that view. In the majority of instances, this is not the situation so a worst-case scenario is ruled out in the light of the evidence presented, i.e. a decision (or perhaps more accurately a non-decision) that this is not a worst-case scenario is reached by the nurse.

On the telephone, the face-to-face cues are absent and the system, in a manner similar to the nurses in face-to-face encounters, operates in a cautious way by assuming the worst.

However, this creates difficulties because if this computerized process is made obvious to callers, nurses find it can sometimes provoke an 'alienated' response thereby hampering advice giving, i.e. people want tailored care and if a worst-case scenario is raised they are worried, they want their specific context recognized in non-face-to-face interactions. As such, in the interests of maintaining the nurse–caller relationship, nurses utilize their practical rationality and use CAS selectively:

> It starts off at the most serious scenario, and works its way down . . . I always think the patient will think I'm daft if I ask some things. I must admit I've had one where you get an old lady, 95, that's rung up with a viral sore throat, and then the next question down is 'Have you had oral sex?' How can you ask her that? Probably they'd say that you should ask that, but you can't, can you? There are some things that sound totally irrelevant. I'll say to the patient, 'Look, I'm working with a computer as well, I need to ask you this just to check it off my list. I know it sounds silly but . . .'. And then they are quite happy . . . A colleague of mine recently had somebody say to her 'I thought you were supposed to be a bloody nurse! I thought you knew these things! What have you got to tap it into a computer for?!'

Given these tensions, as with many IT applications (Berg, 1999), CAS appears inflexible and nurses feel the need to adapt it to suit the situation of individual callers in order to best deliver care. Indeed, by not recognizing the specific situation of the caller, the technology dehumanizes care and limits the scope for the interpretative labour and articulation work which is central to it (Berg, 1997; Bolton, 2001; Zola, 1973). This work is key to all

healthcare but Wahlberg et al. (2003) suggest it is even more imperative in remote care. Interestingly, in the past there were three systems in operation before NHS Direct finally settled on CAS. One of these systems operated on a picture-building model of health, which was closely aligned to the lay narrative, interpretative context-specific approach used by patients (see Bury, 2001). However, it led to longer average call lengths because of its picture building and CAS was seen as explicitly safer because it operated a 'worse-case', more universalizing and more tightly scripted approach. These management views (Gann, 2002) about the benefits of CAS are not completely shared by nurses who feel it is too inflexible, is best used selectively and can weaken the professional–caller relationship and hence healthcare.

In the light of this, nurses will sometimes override or underride the system when they disagree with its expertise or indeed are uncertain about their own. For example, nurses have commented:

> As I said earlier about my lack of paediatric knowledge, I feel as though there is a great big gap there. On occasion, I do tend to override.
>
> (I.6)

> Certainly with chests and heart, which I believe I'm strong in and I'm up to date in, I wouldn't rely very much on that [CAS].
>
> (I.8)

Nurses see the technology as a tool but it is one whose effectiveness relies crucially on their prior nursing knowledge. To reverse Marx's prognosis (Marx, 1976), here the machine is an appendage of the nurse.

> You're listening, and interpreting what they are saying. And then that has an influence within the rest of the assessment. You're actually using the algorithm, but to me that's there as a tool, and a tool only. It's not there to take away from me.
>
> (I.4)

> . . . it's a useful tool, but I don't think you can just use it blindly without using your knowledge as well.
>
> (I.14)

What nurses are stating is that healthcare – like other service work (DuGay, 1996) – is hermeneutic and interpretative hence they stress its contextualization rather than the 'objectivity' of the scientific–medical model embodied

in CAS. It requires the prioritization of practical, not abstract, rationality, it is situated labour. Individuals interpret their symptoms and healthcare professionals then interpret this interpretation and begin to categorize (see Lauritzen & Sachs, 2001 and Zola, 1973 for nice examples of this). This double interpretation means that intersubjectivity, empathy, emotional labour and tacit knowledge are key to nursing, but such skills are necessarily embedded in the specific, something a rigid adherence to the abstract CAS, with its prioritization of medical knowledge (Collin-Jacques, 2003), would miss. As Berg (1997) forcefully argues, these 'soft' traits are necessary even if not measurable or quantifiable and you cannot nurse without them. To downgrade these skills, as CAS does, may highlight the attempted colonization of this nursing knowledge by its biomedical counterpart. It is the further domination of an abstract and instrumental rationality (Adorno & Horkheimer, 1944/1997).

Healthcare is a joint production between the nurse and the caller within which nurses see CAS as a useful – if somewhat dogmatic – tool. None of this is new, at some level healthcare always entailed a joint interpretation of the body (Stimpson & Webb, 1975) (albeit one in which the professional took more of a dominant role) and humans have always manipulated and interpreted technological systems within certain confines (MacKenzie & Wajcman, 1999). Deery et al. (2002) demonstrate that emotional labour is an important feature of all call centre work. Yet in a contradictory manner, by giving pre-eminence to CAS and its protocols, management is attempting to standardize interpretation, thereby doing violence to the context and the individual. This highlights one of the central contradictions of protocols. By scripting the interaction, they necessarily constrain human possibility and yet people need and want to talk to an individual in healthcare (Bolton, 2001; Mechanic, 1968; Stimpson & Webb, 1975; Zola, 1973). Thus callers are actually seeking a non- (or loosely) scripted interaction from an environment that perhaps increasingly needs scripting if the limited resources for healthcare are to be delivered to all rather than to the vocal few (Department of Health, 1997). This is a central contradiction in NHS Direct (and the NHS more generally).

Technology managing or managing technology: Abstract versus practical rationality

Once nurses become technically accomplished they increasingly use the databases at their disposal, the knowledge encoded in CAS, and the way CAS

structures the encounter with the caller as *supplementary* elements of their own knowledge base and practice. Three examples of this are interpreting people, interpreting the NHS and valuing collegial labour.

Interpreting people

> It's things like if somebody phones up, the child's been vomiting, on CAS it doesn't say how many times has the child been sick, or how much have they been sick. It's all these sorts of things that might then lead you to think, 'Well if mum is downplaying it, or even if she's exaggerating, although the child has only been sick for 12 hours we might be looking at a fairly dehydrated little toddler here or something'. I found that was a big gap missing . . . I think it's where you can actually bring in your professional knowledge, and how you would treat, if you took a holistic viewpoint of the caller or the patient.
>
> (I.7)

As described earlier, the nursing knowledge involved in what nurses refer to as 'holistic practice' (May, 1992; Williams, 2000) is not confined to clinical knowledge nor is it 'objective'. Rather it encompasses knowledge of people and their behaviour (such as whether they are 'downplaying' or 'exaggerating' symptoms), their perspectives, anxieties, roles and obligations – it spans a range of rationalities (Berg, 1997). This is often not what senior management want (Collin-Jacques, 2003). They want the abstracted expertise of the technology to deliver standardized care to the generalized other and they want it to predominate over nursing expertise and practical rationality (Gann, 2002). For example, NHS Direct wants the nurses to use their practical knowledge to inform the Central Project Team responsible for upgrading the software of the system's deficiencies so these can then be remedied. However, while the system is being updated the nurses are still supposed to use CAS rather than their own knowledge and be driven by the software system even if it is incomplete and flawed. Thus in the sore throat algorithm, people were asked when was the last time they had oral sex regardless of whether or not the nurse deemed it appropriate. Nurses highlighted the lack of appropriateness to the software team but were still supposed to ask the question until the software was updated. They are not supposed to deviate from the expert system on the basis of their individual knowledge of the particular situation and if they do they need to document why or clear it with senior staff (Collin-Jacques, 2003).

The technology is not neutral in this process. It imposes a seemingly objective, medical and formally rational structure on the interaction between

the caller and the nurse. Yet healthcare is often peppered with non-rationality, with the hermeneutic, with the emotional, etc. (Zola, 1973) and this gets downplayed in this process. Implicitly, what management are doing is prioritizing the seemingly formal and neutral rationality of the expert system – its consistency, efficiency, its standard nature – so that this system is elevated to an end in itself, that is, to a substantive and seemingly objective rationality (see Apel, 1972/1977; Brubaker, 1984; Held, 1980; Marcuse, 1941/1982; Wrong, 1970). In this process, the value-laden substantive rationality of the nurses – placing the individual in their social context, achieving shared understandings, etc. – is allowed to be characterized as non-objective/subjective and hence downgraded to a supporting role. Thus, although both rationalities are non-objective, only one – practical rationality – is portrayed as such and can be downgraded. However, a (non-objective) intersubjective interpretation of people's responses to the location of pain, the description of pain, the presentation of symptoms, etc. is vital in healthcare (Berg, 1997), so in practice nurses need to bring their clinical knowledge, their experiential knowledge and their knowledge of CAS to bear on their use of the system.

> I had a man . . . he'd stopped taking his tablets to thin his blood, his Warfarin, and he had this pain, and it hadn't gone away. His girlfriend had just left to go back to Ireland and he didn't want to bother anyone. It took me a good ten minutes to talk him round . . . I knew he was worried but he didn't want to admit he was worried. But he was ringing up, so he'd made that call. It was like working with his personality and how he viewed health. So what is good is that you're looking at different people's perspectives of health and illness, so you're looking at how he perceived it . . . you look at the person holistically more. You look at them as a whole person, not just as a disease or an illness. You look at their lifestyle and the impact it's having on their lives.
>
> (I.21)

Accounts of nurse practice describe using not only nursing knowledge of individuals and how they behave in health and illness, but of patients' wider familial and social context and the wider NHS:

> . . . they 'phone up and they say 'Well the doctor says I've got scarlet fever. What is it? How long is it going to last? What's the effect on my wife who is pregnant? I've got two children, one's immuno-suppressed and the antibiotics are making me vomit' . . . It's about the nursing care involved after a diagnosis. Which is what we are good at, isn't it. It's

> how – now you know what you've got, how do you deal with it, or rather the consequences.
>
> (I.13)

Interpreting the NHS

Nurses describe using their non-CAS knowledge of the wider sociopolitical constraints to which professionals and patients are subject. Nurses have knowledge of the healthcare system as a whole, and how it works or doesn't work, and they draw on this in making their assessments and offering advice to patients.

> The algorithm comes up 'go to an A&E' because you've obviously got a nasty infection there. But doctors on the whole do not like teeth, especially not when dentists are available . . . unless they're oral, but then they're dual trained, they've done dentistry and gone on to do their medicine. So I was just trying to justify why I wanted him not to go to A&E because people don't give dentistry the speciality status that it deserves, they just lump it in with the rest of it . . . I can see it in my mind's eye, the case officers picking up the card and going, 'What's this, what are we going to do for this chap?' – 'Oh give him some Metronizole and boot him out', you know . . . It's all very blurred in A&E, you pitch up, you're not quite sure what time you're going to be seen, how long you are going to be waiting. And it all depends on what is going on in the main department. Whereas at the dentist, ok you might be ten minutes late, but you've got an expectation of when you are going to be seen.
>
> (I.23)

It is this situated expertise and everyday labour, which is necessary to making sociotechnical systems in healthcare work (Berg, 1999).

Valuing collegial labour

Another significant source of knowledge and expertise, which nurses see as invaluable, but which again contravenes the way CAS is supposed to be used, is that of their colleagues:

> You can give them the very basics with the computer backups if it's not your speciality, but if you've got somebody there that's a specialist, you can draw on their knowledge . . . I've learnt a lot since I've been here,

> my knowledge has greatly improved . . ., partly with what I've learnt from reading the rationales that's provided on the computer, but from other people that work here, the specialists that work here.
>
> (I.2)

> . . . however good your system is you can't take a break from the knowledge that you've got here. And 12 years of surgery, yes, the assessment on that's fine but it's not as good as what's in my head from years. And people will come and ask me 'Is this right? Is that right?'
>
> (I.4)

Nurses use colleagues' knowledge located in their immediate environment in ways that the organization formally prohibits (Collin-Jacques, 2003). In a world where the remote, abstract and universal CAS is supposed to drive the consultation and limit the individual nurse's autonomy, triaging 'second-hand' through the sharing of collegial knowledge is disapproved of because of its supposed negative implications for risk and accountability – it undermines managerial certainty. Also CAS is supposed to eliminate the differences between nurses so that their specialities and practical knowledge are made irrelevant. Furthermore, the technology appears to assume that healthcare is an individual activity wherein a single professional deals with a single caller, yet healthcare is usually a collective, intersubjective endeavour (Berg, 1997). Although the organizational wisdom is that consulting nursing colleagues involves greater risk and is unnecessary, the nurses value and use the specialist and experiential knowledge of other nurses. Thus if nurses feel CAS is wrong or they want a second opinion about a call they will ask their colleagues and perhaps override or underride the system on the basis of that advice. For management, this may present problems – who or what, for example, is responsible for the information eventually given to the caller – CAS, the nurse dealing with the call or the colleague who gave a second opinion? It introduces ambivalence and uncertainty around issues of accountability. However, for nurses this providing of advice and the use of colleagues' knowledge is an important part of being a nursing professional.

What the differences in the way management and labour use and envisage the technology highlight are some central differences about the role of rationality. These differences stem from management's desire to control and standardize, whereas labour, especially in spheres where interpretations are central, seeks to adopt protocols, technology and knowledge to specific situations. These differences create conflicts over technology's application. Furthermore, much of the above stresses the intersubjectivity of healthcare rather than its objectivity. Because the object of science in medicine can also

be a subject then a priori there is intersubjectivity not objectiveness (Apel, 1972/1977). As Held (1980) highlights, Habermas, in his critique of positivism, suggests that only the effects of forces beyond the knowledge and/or control of human actors can be studied objectively. This cannot be healthcare either via nursing practice or CAS despite the claims to the contrary which Habermas would have dismissed as based on class, expert and occupational attempts at domination.

Conclusion: Trust, technology and knowledge

NHS Direct highlights a number of tensions in late modernity. In a world that is supposedly less standardized, more individualized and postmodern, managing NHS Direct is still built on universalizing, abstract, knowledge. Indeed, it formally limits the kind of practical rationality that enables context-specific, tailored advice. Although controlling labour is not the only, or indeed, the most important aspect of management, this is not surprising given that the pursuit of certainty is central to management (Townley, 2002). However, this article also highlights the ways in which this reasoning is resisted by nurses and how technological and/or managerial control and certainty can never be total. Again, the article highlights the fundamental contradiction at the heart of managing the employment relationship (Cressesy & MacInnes, 1980; Hyman, 1987), wherein managers have to cede (even if only informally) some control back to labour for an organization to function. In many ways, all of this highlights the unfulfilled, unobtainable and contradictory nature of management.

The article aims to highlight two issues. First, practical and abstract rationalities clash within a work setting. Management desires certainty and control. It aims for a standardized and universalized knowledge because this limits the variability that stems from worker discretion and practical knowledge. Oftentimes it uses science and 'objectivity' to further these goals. This shapes management's eternal contradiction. Today especially, the rhetoric of management is often one of individualized service, non-standard products, etc. and key to this is the idea that management wants workers, particularly skilled ones, to use their knowledge to deliver these individualized goods or services. However, a preference for an abstract rationality and 'objectivity' means autonomy to use knowledge in an innovative, context-specific and hence somewhat unpredictable manner is downgraded and limited as management seeks ways of controlling production and gaining consistency. Fundamental to this is the type of rationality it uses. This struggle results in the portrayal of abstract rationality as objective and formal rather than as

the substantive rationality that it actually is. This objectivity is denied to the practical rationality of labour allowing their efforts to be characterized as subjective. The deployment of this abstract rationality in NHS Direct highlights this tension quite nicely. Indeed, it is a curious contradiction that at the very time when healthcare is supposed to be individualized, when the one-size-fits-all of healthcare and other services is disparaged, management is attempting to achieve consistency and a standardized service in a new and innovative part of the health system. And yet labour's practical rationality is central to the system's functioning. All of this suggests that management's unease with a practical rationality is still centrally important to the employment relationship and hence further questions some of the central tenets of much contemporary writing around labour management and the nature of work. We may still be careering towards an 'administered life' (Adorno & Horkheimer, 1944/1997: 38).

Second, healthcare is fundamentally about interpretation and intersubjectivity. It is about people interpreting their bodies and then health professionals interpreting both the body and the specific needs and interpretations of the individual, e.g. do they want information? If so, how much? Are they telling me everything? Do they need information or reassurance or both? Do they seek ignorance or knowledge about their condition? Do they want empowerment or not? Indeed, what is empowerment for this person? Reflexivity in terms of constant learning and adapting within the medical interaction by all parties is at the heart of healthcare. Central to this is emotional, individualized, humanized and scientific medical labour. Yet management (Townley, 2002), 'rationalists' (Berg, 1997) and technologists (Suchman, 1987; Whalen, 1993) still strive for universalized, rule-bound, certainty embedded in expert and control systems. And yet the reflexivity central to care continually complicates these attempts to manage through an abstract or instrumental rationality. This creates a fundamental contradiction in the health (and other) arena. NHS Direct neatly highlights this tension and it leads one to question whether or not an individualized healthcare system is possible given the current modernization programme of the NHS (Department of Health, 1997) and the more general lack of trust in the public sector professional (O'Neill, 2002).

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Note

1 In this article, we equate the protocols of CAS with the technology within which they are embedded but theoretically these are distinguishable. Protocols can of course also be paper-based but essentially, in either form, they indicate an attempt to standardize procedures. The authors would like to thank one of the referees for highlighting this issue.

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