This is to declare that the following thesis is my own work

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Communications in general practice and the domestication of ICT

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Abstract

The NHS is currently being transformed by the implementation of the National Programme for Information Technology (NPfIT). This thesis examines the use of Information Communications Technology (ICT) and its consequences for communications in general practice. While drawing on a range of social scientific approaches to ICT, this research explores the particular utility of the 'domestication' framework advanced by Silverstone and Sørensen. It considers how users in general practice 'tame' and use technology by incorporating its affordances into their work roles and communication practices.

Drawing on previous survey work, this research adopts a comparative, ethnographic approach, analyzing patterns of talk and writing in two general practices in London. Empirical work involved analysis of local and national policy documentation and two ethnographic studies that were designed to identify changes in attitudes and behaviours across a defined set of actors over time. Interviews generated preliminary evidence as to how multiple users in general practice communicated by a variety of means, including the problems/concerns they encountered or created in doing so. Observation was used to gather further direct evidence of those problems as they were negotiated and resolved.

Although the two cases were both of practices that had been identified in an earlier survey as 'paper-light' which might therefore have been assumed to make effective use of ICT, usage was uneven and sharp differences were noted in the way in which broadly similar technologies were domesticated by specific user groups. Analysis of these differences produced three key findings. Firstly, domestication of ICT in general practice is difficult. To be successfully domesticated, ICTs have to be locally negotiated both horizontally and vertically in order to connect with working practices of the individual users. Secondly, the struggle to 'tame' ICTs is shaped by the extent to which different groups of users perceive ICT as assisting or compromising their roles and responsibilities. This, in turn, increases the diversity between user groups. Thirdly, the research indicated the importance of local context and workplace cultures which facilitate or inhibit the negotiations or 'communications about communications' required to domesticate ICTs.

A concluding discussion reflects on the changing relationship between ICTs and communications in general practice and, in particular, the impact of ICT on face-to-face communications. The key contribution of the study lies in offering a theoretically-sophisticated framework in which to examine and explicate detailed patterns of communications in general practice. By addressing both electronic and paper-based communication as well as face-to-face interaction, it provides a basis for future research in this area as NPfIT develops.

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List of Abbreviations

A&E – Accident and Emergency

ANT – Actor Network Theory

BMA – British Medical Association

BNF – British National Formulary

CE – Chief Executive

CfH – Connecting for Health

CMCs – Computer Mediated Communications

DH – Department of Health

DHSS – Department of Health and Social Security

ECDL – European Computer Driving Licence

EHR – Electronic Health Record

EMIS – Egton Medical Information Systems

ERDIP – Electronic Record Development and Implementation Programme

ETP – Electronic Transmission of Prescriptions

FTs – NHS Foundation Trusts

GMS – General Medical Services

GP – General Practitioner

HISSI – Hospital Information Support Systems Initiative

ICT – Information and Communications Technology

IDPS – Desktop Pilot System

IM&T – Information Management and Technology

IMG – Information Management Group

IT – Information Technology

KCL – King's College London

MMR – Mumps Measles and Rubella

MREC – Multi-Research Ethics Committee

NCMCs – Non-Computer Mediated Communications

NCRS – NHS Care Records Service

NGMS– New General Medical Services Contract

NHS – National Health Service

NHSME – NHS Management Group

NICE– National Institute for Health and Clinical Excellence

NPfIT – National Programme for Information Technology

NUD•IST – Non-Numerical Unstructured Data – Indexing Searching and Theorising

PAC – Public Accounts Committee

PACS – Picture Archiving Communications System

PBC – Practice Based Commissioning

PCTs – Primary Care Trusts

PDAs – Personal Digital Assistants

PMS – Personal Medical Services

QOF – Quality and Outcomes Framework

RCGP – Royal College of General Practitioners

RCP – Royal College of Physicians

SCOT – Social Construction of Technology

SHAs – Strategic Health Authorities

Snomed CT– The systematised nomenclature of medicine

STS – Science and Technology Studies

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Chapter 1 Information and Communications – the impact and influence of ICT in the NHS and general practice

A significant development in the last 50 years has been the emergence and widespread deployment of information and communications technology (ICT). ICT is essentially concerned with the transfer, storage and retrieval of information to ensure that the right information is available at the right time in the right place, to improve the overall efficiency of the organisation. The so-called 'digital revolution' has transformed our everyday existence having a profound effect on industries and organisations and how we work and communicate with others.

The National Health Service (NHS) is no exception. Medical organisations and professional practice have been subject to sustained change over the past three decades, driven partially by central government policy, increasing patient expectations and the contribution and demands of ICT. The integration of ICT in healthcare has been a regular feature on the government agenda over the last 15 years, and has recently been elevated to a prime position with the introduction of the National Programme for Information Technology (NPfIT). Following the publication of *Delivering 21st century IT support for the NHS– A National Strategic Programme,*[1] NPfIT was established in October 2002 to procure, develop and implement integrated infrastructure and systems for all NHS organizations in England. Managed by NHS Connecting for Health (CfH) (which is responsible for the coordination all major national IT programmes within the NHS including NPfIT business critical NHS IT systems), NPfIT aims to improve patient care by enabling clinicians and other NHS staff to increase their efficiency and effectiveness by giving them access to patient information across all sectors the NHS, safely, securely and easily. The key components within NPfIT are:

- NHS Care Records Service (NCRS);
- *Choose and Book*;

[1] DH (2002) *Delivering 21st Century IT Support for the NHS- National Strategic Programme* London The Stationery Office.

- Electronic Prescription Service (EPS);
- Picture Archiving and Communications Systems (PACS); and
- National Network (N3)

As general practice comprises different occupational groups, ICT implementation presents a significant challenge in designing a system to meet the needs of a diverse range of users. The introduction of any new technology can be problematic as it has the potential to change how processes are performed and operate. There are also difficulties in handling and using new technology, the introduction of new concepts associated with it and importantly, new ways of and approaches to working, which all impact upon the adoption and domestication of that technology.

Yet, it can be argued that despite these issues, that if utilised appropriately, ICT offers:

Considerable scope for....improving links between all key players in health.[2]

The objective of my research is to examine ICT and its consequences for communications in general practice. While drawing on a range of social scientific approaches to ICT, my research explores the particular utility of the framework of *domestication.*[3] [4] It considers how the various occupational groups in general practice use ICT by incorporating its affordances into their everyday work roles and communication practices.

Consequently, I hope to identify how the introduction and use of ICT affects work processes, communication patterns and information flows (electronic, verbal and paper-based) in general practice and the experience of the multiple occupational groups. The very nature of medicine involves a number of embedded routines and hierarchies, such as the relationship between doctors and nurses, issues of patient

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[2] Welsh Office (1996) *Primary Care – The Way Forward in Wales.* Cardiff: Welsh Office.
[3] Silverstone, R., Hirsch, E. et al (1992) 'Information and Communication Technologies and the Moral Economy of the Household' in Silverstone R, and Hirsch, E. (eds), *Consuming Technologies*, London: Routledge
[4] Sorensen, K. H. (2006) Domestication: the enactment of technology in T.Berker et al (eds) *Domestication of Media and Technology.* Maidenhead: Open University Press p40-61.

confidentiality and the use of paper and electronic records. Therefore, the introduction/utilisation of ICT has the potential to disrupt and refine these routines and communications and consequently affect the transfer and translation of information. Berg has argued that any tool or technology introduced into a workplace will affect work practices, and stresses:

Seeing that different tools reshape practices in different ways, opens the way to a much more fruitful strategy. Breaking away from having to either embrace formal tools or denounce them by shifting the terms of the debate creates new space, new leverage, and new potentials for intervention, comparison, preference and maybe even choice[5].
For the purposes of this research, the following definitions are used:

ICT: All computerised data systems that are used within general practice to transfer, store, retrieve and communicate information, including computers, email, the internet, telephones, pagers, fax machines and personal digital assistants.

Occupational Groups: All individuals in the general practice setting, who utilise ICT and interact with each other, including, for example, General Practitioners (GPs), practice nurses, receptionists and practice managers.

Communication: The transfer/transmission, representation, interpretation of information via different methods of delivery including; electronic, verbal or paper-based methods.

This chapter outlines the rationale for my research and presents:

- a history of ICT in the NHS, including central government ICT policy in the NHS;
- a history of ICT in general practice;
- a literature review of the barriers to ICT implementation;
- an examination of the medical record as a key piece of technology; and

[5] Berg, M. (1997) *Rationalizing medical work – Decision support techniques and medical practices.* Inside Technologies. Cambridge: MIT Press.

- an overview of the management of public sector Information Technology (IT).

1.1 ICT in the NHS – Central Government Policy

Established on 5 July 1948 as an integral part of the post-war social contract between the state and its citizens, the NHS has traditionally been driven by the remit of good patient care, providing health care from cradle to grave. Increasingly, central government and the NHS have recognised that ICT has the capacity to help deliver this vision. The NHS is the largest employer in Europe,[6] employing approximately 1.5 million people, (four times as many staff as Tesco), third only to the Chinese People's Liberation Army and Wal-mart. However, the NHS is a much more complex and diverse organisation than a supermarket chain.

Before discussing the position of general practice in the NHS and how ICT in general practice has evolved, it is important to first consider not only central policy in relation to ICT in the NHS, but also how management strategies and changing policies in the NHS have impacted and arguably impinged on the development of ICT within the NHS.

The initial drive to utilise ICT within the NHS came in the late 1950s, with ICT developments outside the hospital setting emerging in the 1960s[7]; but until the mid 1990s ICT mainly focused on isolated developments, mostly in primary care, which have led the way in clinical computing. Indeed, developments in primary care computing are starkly advanced compared to those in secondary care. Initially, central government's reaction to the use of computers within the NHS was extremely cautious and centralist in its approach. The relatively sudden interest in ICT across the NHS was driven partially by a need for information management in hospitals finance departments (for example payroll systems) which were amongst the first to introduce computers into a clinical setting. This was followed by a general shift

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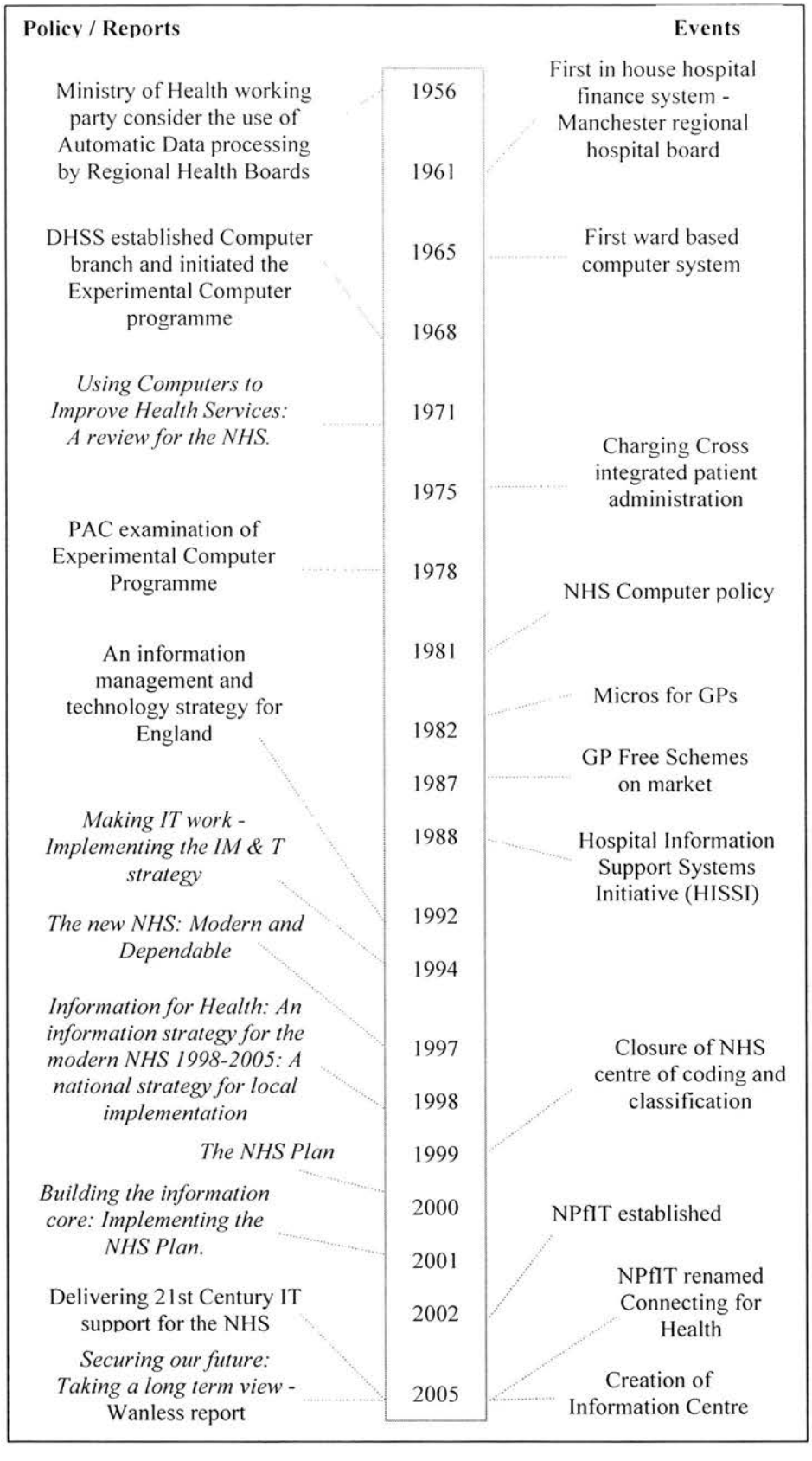
[6] NHS Employers (2008) www.nhsemployers.org [Accessed: 04-05-09].
[7] Barber, B. & Abbot, W.A. (1972) *Computing and Operational Research at The London Hospital;* 'Computers in Medicine' series. London: Butterworths.

towards better information management (including clinical information) to enable the provision of better patient care and more efficient and effective use of resources. This drive towards increased computerisation culminated in the introduction of the NPfIT in April 2002. **Figure 1** shows the key events and government policies in the development of ICT in the NHS.

The government's approach towards ICT in the NHS and its individual policies have had a significant impact on how ICT has developed and been domesticated in the various sectors of the NHS. However, those using these technologies are also partially responsible for driving their implementation, adoption and domestication.

Figure 1 Key policies/reports and events in the history of ICT in the NHS



Prior to the government ICT policies of the early 1990s, in 1968 the Department for Health and Social Security (DHSS) established and financed the *Experimental Computer Programme*:

With the objectives of determining what role computers should play in the future in the NHS.[8]

The programme consisted of 14 projects varying in scale and was predominantly aimed at exploring the role of computers in improving NHS patient care; improving clinical and administrative efficiency; providing facilities for management and research and giving NHS staff practical experience with computers. In 1965, Donald Lindberg produced the first ward-based computer system that supplied access to clinical test results.[9] A number of such projects produced impressive results, for example the Queen Elizabeth Medical Centre in Birmingham. However, echoing the government's wary approach in 1971, a DHSS report on the programme stated:

…the process of determining just what role computing should play in healthcare will continue to be lengthy and probably very expensive…some people think that, even in ten or 15 years, computing will benefit healthcare only marginally. Experience to date, here and abroad, has shown a large number of failures, and very few successes… and outnumbering both…are projects on which trial must continue for a considerable time before they can be judged as successes or failures.[10]

In 1975 London's Charing Cross Hospital had installed a fully integrated patient administration and results reporting system, demonstrating nearly 90% reduction in the turnaround of haematology results.[11] However, by the late 1970s the trend and interest in government-funded experimental computing programmes had come to an abrupt end. The 1977 DHSS report on the *Experimental Computer Programme* concluded that:

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[8] DHSS (1971) *Using Computers to Improve Health Services. A review for the NHS.* DHSS London
[9] Lindberg, D.A.B. (1990) 'In praise of computing' In Blum, B.I & Duncan, K. (eds) *A History of Medical Informatics* New York ACM Press 4-13.
[10] DHSS (1971) *Using Computers to Improve Health Services A review for the NHS.* DHSS London
[11] Benson,T. (1991) *Medical Informatics: A report for managers and clinicians* Harlow: Longman Health Services Management

...It has been established that computer systems perform various information handling activities competently, quickly and accurately...Better information is available...but the value of this information in its effect on NHS management decisions, and in the management of individual patients, or groups of patients has not been fully determined...Enough work has however been done to confirm that if large complex computer systems are to offer positive economic returns, these must come from significant changes in organisation made possible by the availability of up-to-date, accurate and relevant information to managers.[12]

The Public Accounts Committee (PAC), one of the most powerful government watchdogs, however, was not so enthusiastic about the programme, publishing a scathing report on the programme in 1978 and was largely responsible for its shutdown. It criticised the fact that not all 14 projects had succeeded and the programme had yielded few results.[13] Since the 1970s the PAC has produced many, mostly negative reports on ICT in health (most recently in January 2009 on NPfIT) and thus it could be argued that this early report set the tone of what would come later. Although PAC has often cited valid criticisms, the government of the day has more often than not reacted by dismissing entire projects, regardless of any desirable components they contain. This has essentially blighted future projects that consequently have had to start from scratch, instead of building on existing technological architecture and designs. The PAC has also been responsible for closing down the centrally-funded computer projects of the early 1990s and the NHS Centre for Coding and Classification in 1999.

In 1974 the NHS underwent a significant re-organisation, which included a review of how the DHSS worked by the chairman of the regional health authorities. It recommended that:

DHSS and NHS should study what data is collected for DHSS by the Service [NHS]: the use to which it is put: and what can be altogether abandoned.[14]

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[12] DHSS (1977) *Interim Report on the Evaluation of the National Health Service Experimental Computer Programme.* London: DHSS

[13] PAC (1978) Examination of Experimental Computer Programme.

[14] DHSS (1976) *Regional Chairmen's Enquiry into the Working of the DHSS in Relation to Regional Health Authorities.* London: DHSS.

The NHS/DHSS Steering Committee on Health Services Information (Körner Committee) was established in 1980 and by 1985 had published five reports analysing data collection. During this time, the focus on ICT and its costs became a significant issue in NHS policy and direction. Since 1972, the DH has classified ICT in secondary and tertiary care as a management and administration cost, and thus ICT in these sectors has always been considered when management issues are discussed. With the rediscovery of managerialism in the 1983 Griffiths report, the need for information became an increasing government priority. In 1984 the NHS Management Executive (NHSME) was created, introducing general management across the NHS. An executive-level-director was given the responsibility for NHS computing and planning and an Information Advisory Group was established. In 1986 the Information Management Group (IMG) (which was created from an alliance of various government bodies concerned with ICT in the NHS) published the *National Strategic Framework for Information Management in the Hospital and Community Health Services* which highlighted:

The key to success of these management systems lies in the more effective use of improved information... information systems must meet two equally important needs; the provision of support to clinicians, nurses and other staff in their day-to-day work; and the supply of valid and flexible management information, wherever possible as a by-product of these systems...In short, information must be managed.[15]

The government of the day wanted to know how clinicians exercised their clinical autonomy. They responded to the IMG report in1988 by introducing the Hospital Information Support Systems Initiative (HISSI) which used integrated computer systems in acute care, and later led to a Research and Development programme to develop an electronic patient record.[16] At its most basic level, HISSI could be seen as a system to manage information to show how ICT could bring about changes in hospital operation, especially when linked to resource management. Although there had previously been a number of very small-scale local initiatives, HISSI represented the first step by the government into the large-scale implementation of ICT in the

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[15] DHSS (1986) *National Strategic Framework for Information Management in the Hospital and Community Health Services* DHSS. London

[16] Freeman, R. (2002) The Healthcare State in the Information Age. *Public Administration* **80** (4) p758.

NHS. Alongside this, in keeping with the managerialist approach of the day, the NHSME Finance Directorate established the Resource Management Initiative which was designed to induct doctors and nurses into the NHS management processes and to help clinicians plan and monitor their performance. However, the government fundamentally changed the operation of the NHS by introducing the market and, furthermore, once again overhauled the structure of the NHS, by separating the providers and commissioners of healthcare. But such a structural separation would have a significant impact on information and data flows and also communications in the NHS. Consequently, the need for accurate information became inescapable if the government's policies for the NHS were to be realised.

In 1992 *An Information Management and Technology Strategy for England* was published. This had five main principles:

- information would be person-based;
- systems would be integrated;
- information would be derived from operational systems;
- information would be secure and confidential; and
- information would be shared across the NHS.

However, in the lead-up to the 1992 general election, the Labour Party identified that management costs in the NHS had doubled from1987 and 1991. The then Conservative government investigated these claims and discovered that the computing costs (due to the 1972 classification) had, not surprisingly, substantially contributed to these costs. To combat the escalating costs, the government utilised the PAC's negative reports on the Wessex Project and the HISSI, closing down four large DH initiatives and selling off 14 regional computer centres without ring-fencing their budgets, thus saving about £400 million a year. In addition, they stipulated that any future capital expenditure on computer systems should be accompanied by a full business plan, be tested for private finance capacity and be approved by the DH and HM Treasury. Unsurprisingly this sounded a death knell, albeit temporarily, for ICT in the NHS under the Conservative government; only one

scheme was approved in five years.[17] As a result, public investment in ICT fell sharply, to near non-existent; a burden that all but destroyed the healthcare computing business. After 1997, although the management costs were reduced, Labour triumphed in the election, an event which would signal a change in the use of ICT in the NHS.

The new Labour government saw the end of a formal attempt to run the NHS on a market approach, but the division between provider and commissioner and the associated information needs remained. The government's determination to improve healthcare was matched by its enthusiasm, and ICT has achieved a permanent status of recognition on their agenda. Building on the principles laid out in the *IM&T strategy for England,* the defining moment in the government's dedication to ICT implementation in the NHS came in 1997 when the new government issued its first White Paper, *The New NHS: Modern, Dependable.* This emphasised the need for ICT in the NHS, which featured in two of the paper's four themes. The White Paper promised a new ICT strategy would be published in 1998 to:

Harness the enormous potential benefits of ICT to support the drive for quality and efficiency in the NHS.[18]

This ICT strategy was published in the White Paper *Information for Health: An Information Strategy for the Modern NHS 1998-2005*. The main objectives of the strategy were to:

Deliver a lifelong electronic health record for every person in the country, online 24-hour access to records and information about best clinical practice for all NHS clinicians, full use of the NHS information highway for electronic communication between every general practice and every hospital, increased access to information and services through online or telephone service and new ways of delivering services through telemedicine/telecare. [19]

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[17] Benson, T. (2002) Why General Practitioners use Computers and Hospital Doctors do not- Part1: incentives. *British Medical Journal* **325** 1086-1089.
[18] DH (1997) *The New NHS: Modern dependable.* London: The Stationary Office **s.3.15.**
[19] NHS Executive (1998) *Information for health executive summary an information strategy for the modern NHS 1998-2005* London, The Stationary Office.p13.

Information for Health stated that:

Most of the NHS remains at the trailing edge of information technology.[20]

In response, it detailed the development of: both an electronic patient record and an electronic health record (EHR); *NHS Direct*, a nurse-led telephone-based advice service for patients across England, which aimed to prevent patients accessing healthcare unnecessarily; and the *National Electronic Library for Health,* an internet-based resource for both clinicians and patients. *NHS Direct* was launched in March 1998 and is currently the largest telephone-based healthcare provider in the world, handling an average of 22,000 calls a day.[21] In the future it is anticipated that *NHS Direct* will deal with 15-20 million calls per year. Promoting *NHS Direct* at a press conference, Alan Milburn, the then Secretary of State for Health said:

The government established NHS Direct to give patients instant access to healthcare advice round the clock...It is not a substitute for other NHS services, but it can help patients avoid unnecessary hospital visits and GP call outs - so helping the NHS...0845 4647 looks set to become as familiar as the 999 emergency telephone number...The development of NHS Direct shows how modernisation in the NHS is gaining momentum. After decades of neglect the NHS is now a service in transition. The extra investment and the reforms the government is making are beginning to pay dividends. There is a long way to go, but NHS Direct is a symbol that the government is determined to make the NHS faster and more convenient for patients.[22]

One element of *Information for Health* that was not well received was the patient-held smart card, similar in size to a credit card, which would hold all patient information and be kept by the patient rather than the clinician. However, this provoked concern given the possibility of loss or theft of the card and consequently the idea was abandoned, fuelled by the ongoing debates about data security in general.[23] The NHS however, does have staff smart cards which enable clinicians to

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[20] NHS Executive (1998) *Information for health an information strategy for the modern NHS 1998-2005* London: The Stationary Office.p.32.
[21] NHS Direct (2008) News Release http://www.nhsdirect.nhs.uk/media.aspx?id=1190 [Accessed: 05-04-09].
[22] DH(2000) http://www.dh.gov.uk/PublicationsAndStatistics/PressReleases/PressReleasesNotices/fs/en?CONTENT_ID=4007398&chk=J0vEUa [Accessed: 04-01-05].
[23] ICP (2006). *What Price Privacy? The Unlawful Trade in Confidential Personal Information*, London: Information Commissioner to Parliament, The Stationery Office, (10 May 2006), p48. [http://www.ico.gov.uk/upload/documents/library/corporate/research_and_reports/what_price_privacy.pdf].

log onto clinical systems and their ease of loss has been ably demonstrated- by February 2008, 4,147 smartcards had been reported missing.[24] The 'information highway' described in *Information for Health* was the NHS network system now known as NHSnet. This is an NHS-organised internet gateway, including NHS email addresses that attempts to have all internet users utilising the same facilities. However, NHSnet has not been well-received in the medical community, and many have cited its slow speed, propensity to crash and general lack of usability.[25] As Majeed wrote in regard to NHSnet:

The internet connection I have at home is quicker than the one in my practice, which has to serve six doctors, three nurses and several managerial and administrative staff, and any attached medical students. Inevitably if even a few of us try to use the practice's internet connection at the same time, it simply grinds to a halt.[26]

Nevertheless, it is important to note that this was the first real substantial government initiative that covered both primary and secondary care and that was close to addressing users' real needs. The needs, however, of the occupational groups in primary and secondary care are significantly different. In secondary care, that is hospitals, users are required to share information with other agencies particularly social care, for example, during the discharge of an elderly patient. In primary care however, this link – while potentially useful – is less vital than having a link to secondary care data, for example, access to a report on a patient's admission to hospital and treatment.

The strategy recognised the uneven base of achievement on which ICT operated nationally and, as such, proposed a step-by-step approach to the targets contained within the strategy. However, Frank Burns, primary author of *Information for Health*, raised a key issue that many have overlooked in relation to ICT:

An information strategy for the NHS must be driven primarily by a careful and comprehensive analysis of the information needed to support the service objectives of

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[24] Nowottny, S. (2008) Security fears on missing smart cards. *Pulse* February 6th. http://www.pulsetoday.co.uk/story.asp?storycode=4117088 [Accessed: 03-03-08].
[25] Keen, J. & Wyatt J. (2000) Back to Basics on NHS Networking. *BMJ* **321** 875-878.
[26] Majeed, A. (2003) Ten Ways To Improve Information Technology in the NHS. *BMJ* **326**

the NHS and the policy objectives of the government...not simply the technical possibilities.[27]

This highlighted the need to think beyond the pure technical elements of ICT and concentrate on the needs of the NHS and to a certain extent the users and their information needs. *Information for Health* made a strong case for the better use of ICT and has determined the broad approach to ICT and e-health strategy ever since. Nevertheless, it could be argued that this view is rather late in being articulated given the number of failed ICT projects across the public sector by the late 1990s and the large body of research available on the issue.

The publication of *The NHS Plan*[28] in 2000 outlined a ten-year strategy and reiterated the importance of ICT in facilitating the move towards patient-centred care through the use of information and its secure transferability. *Building the Information Core – Delivering the NHS Plan,* published in 2001 essentially confirmed the development of ICT as continuing centre-stage in the NHS stating:

There is much to do now in bridging the gap between the NHS now and a service shaped around the needs and preferences of individuals. There is an urgency to put workable and person-centred systems and solutions throughout the NHS and enable links with social services...For too long the NHS has thought of ICT projects in isolation...The better capture, management, & use of information analysed, communicated and shared through modern systems and networks – is central to managing change and modernising the front-line delivery of care, treatment and services to patients. It is central to improving the day-to-day working and skills of staff. It is about improving the very nature of care itself – information, communication and understanding.[29]

The concept of ICT being essential to the NHS is reflected in the content and structure of *Building the Information Core*. The planned use of ICT also corresponds directly with the focus of the *NHS Plan*, for example, the view of intermediate care to improve patients' transition between hospital and the home. *Building the Information Core* complements this by emphasising the potential impact of EHRs in

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[27] NHS Executive (1998) *Information for Health. An Information Strategy for the Modern NHS 1998-2005. A National Strategy for Local Implementation.* NHS Executive, London.para 1.22 p13.
[28] DH (2000) *The NHS Plan: A plan for investment, a plan for reform.* London: The Stationary Office
[29] Department of Health (2001) *Building the Information Core – Delivering the NHS Plan.* London: The Stationary Office.p.3.

this area, by enabling both health and social care to have access to patient records, thus sharing information across agencies and sectors. *Building the Information Core* provided not only a strong narrative regarding the ability of ICT to improve delivery in the NHS, but also the key objectives of the paper remained the same as those detailed in *Information for Health,* and thus contributed to consistency within the governments approach to ICT. Alongside this, in 2001, the government announced a raise in capital expenditure in computing from £65 million in 2000-1 to a staggering £317 million in 2002-3.[30] However, despite the plans contained within *Building the Information Core* and *Information for Health*, the implementation strategy and funding necessary for the success of these projects was notably absent, as highlighted by the Wanless Report.[31]

The 2002 Wanless Report was the most in-depth and highly critical report on ICT since those of the PAC in the late 1980s and ensured that the government could not ignore its findings. The report's remit was to review the long-term trends affecting the NHS and to address the cost projections required to secure long-term improvements in the nation's health. The report set out projections of how much it would cost to deliver high-quality services throughout the NHS, a cost of £2 billion in 2003-4. However, this excluded general practice computing, which was never classified as a management cost, for which services developed separately; a decision which would have substantial impact in future years. The 2002 review identified better use of ICT as key to potential productivity and health gains.The report stated that the very poor NHS record on ICT was attributable to ICT budgets, which had traditionally been allocated locally and were often being used to fund other areas of spending to relieve short-term pressures and also the inadequate setting of central IT standards, resulting in a series of incompatible systems across the NHS. Wanless further argued that, where money had been spent on ICT, it had involved isolated initiatives, thus contributing to poor integration within and across the NHS and associated organisations. As the report highlighted:

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[30] Benson, T. (2002) Why general practitioners use computers and hospital doctors do not – Part 1: incentives *BMJ* **325** 1086-1089.
[31] Wanless, D (2002) *Securing our future health: Taking a long term view: final report.* London: The Stationary Office

Without a major advance in the effective use of ICT, the health service will find it increasingly difficult to deliver the efficient, high-quality service which the public will demand. This is a major priority which will have a crucial impact on the health service in future years.[32]

The Wanless Report recommended doubling the ICT budget and ensuring it was ring-fenced to prevent funds being diverted to other projects. Wanless importantly outlined a plan for the future of the NHS including; EHRs, electronic appointment booking and prescriptions, an integrated ICT system, and the greater availability of health information for patients, all of which would form the basis of NPfIT.

In May 2002, the DH published *Delivering the NHS Plan*[33] and *Delivering 21st Century IT Support for the NHS — National Strategic Programme*[34] in response to the Wanless Report. Both documents had a more centralist approach and upheld the key principals of *Information for Health* but emphasised that a change in the government's overall approach to ICT was required. The change was radical. There would be increased funding for ICT, targeted on critical national services, improved central direction and performance management of ICT, streamlined procurement, closer working with NHS ICT suppliers and a more corporate approach overall to ICT in the NHS that would include the development of national standards and specification for ICT functionality. In a marked difference to previous approaches, a ministerial task force on ICT was established and Richard Granger was appointed to the newly created post of Director General for NHS ICT, the UK's highest paid civil servant, who would be responsible for NPfIT. *Delivering 21st Century IT Support for the NHS* described a £2.3 billion investment scheme to cover the NHS in England and marked a major change towards more centralised planning and provision of ICT – NPfIT.

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[32] Wanless, D. (2002) *Securing our future health: taking a long term view. Final Report.* London: HM Treasury

[33] DH (2002) *Delivering the NHS Plan: next steps for investment, next steps for reform.* London: The Stationery Office

[34] DH (2002) *Delivering 21st Century IT Support for the NHS- National Strategic Programme* London: The Stationery Office.

This analysis of national policy concludes with the introduction of NPfIT as the most recent and ongoing policy relating to ICT in the NHS. Nevertheless, it is clear from this analysis that the government, throughout the 40-year period of policy in this area, has had a very varied approach to the use of ICT in the NHS. This flux in attitudes will undoubtedly have had an impact on users, on both their perceptions and use of ICT.

In the 1960s and 1970s the government viewed ICT as something expensive and interesting but needing tight control; the early progress of the *Experimental Computer Programme* was cut short by the heavy-handed approach of the PAC. Consequently, central policy sought greater control over ICT developments. The managerialist approach of the 1980s saw a further change in policy. In all business spheres, management and information systems were acknowledged as being important and beneficial and the NHS was no exception. The use of the market in the late 1980s and the purchaser-provider split in 1990 provided further change and highlighted the need for information for the NHS to operate efficiently. From 1997, the Labour government's policies stressed the need for information systems, not only in the NHS but across the NHS and linking them to additional agencies. Developments on this scale, however, can not be obtained without considerable central investment, but these developments require user buy-in. Moreover, the systems have to be designed around user needs, and work in conjunction and not against them, if the NHS and specifically general practice is to harness the power of ICT and domesticate it into its daily life. The realisation of this now lies in the development and implementation of NPfIT.

1.2 National Programme for Information Technology (NPfIT)

NPfIT is the world's largest IT system. Although additional elements have been added to the programme since 2002, the core components of NPfIT, and the occupational groups in general practice affected by this are demonstrated in **Figure 2. Figure 3** shows the governance structure for the programme.

Figure 2 Core components of NPfIT

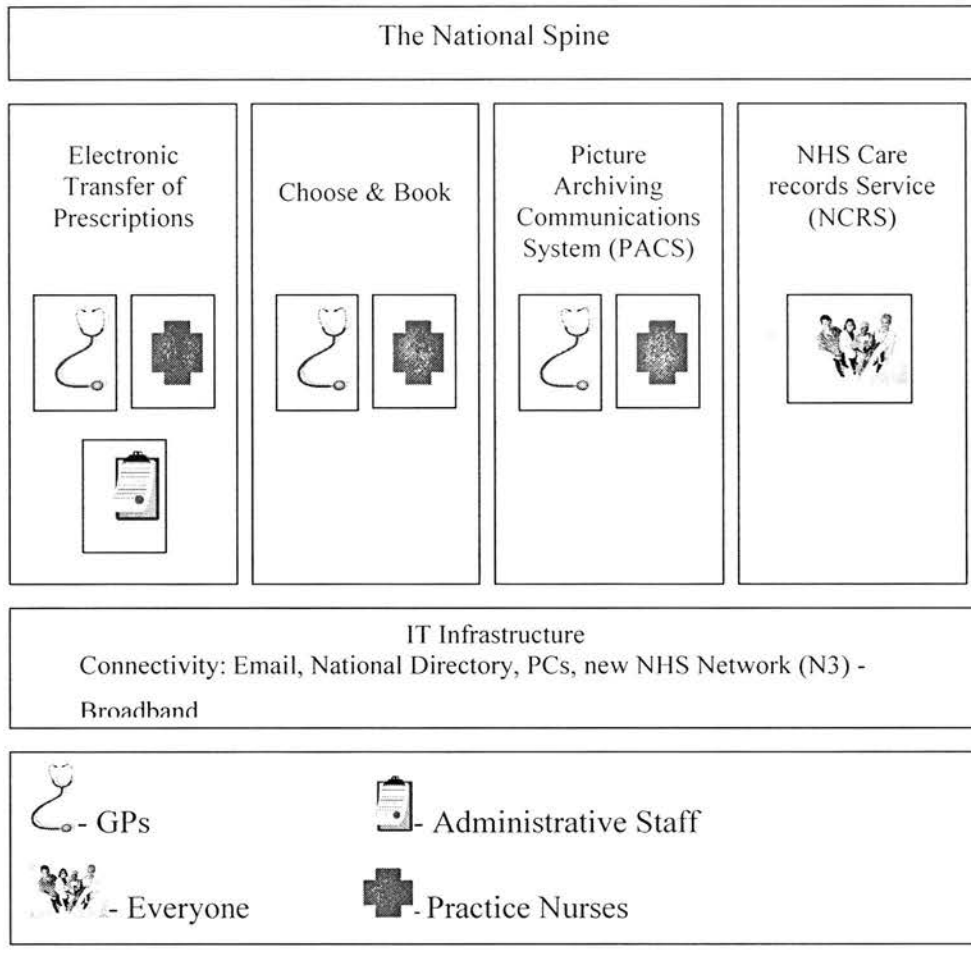
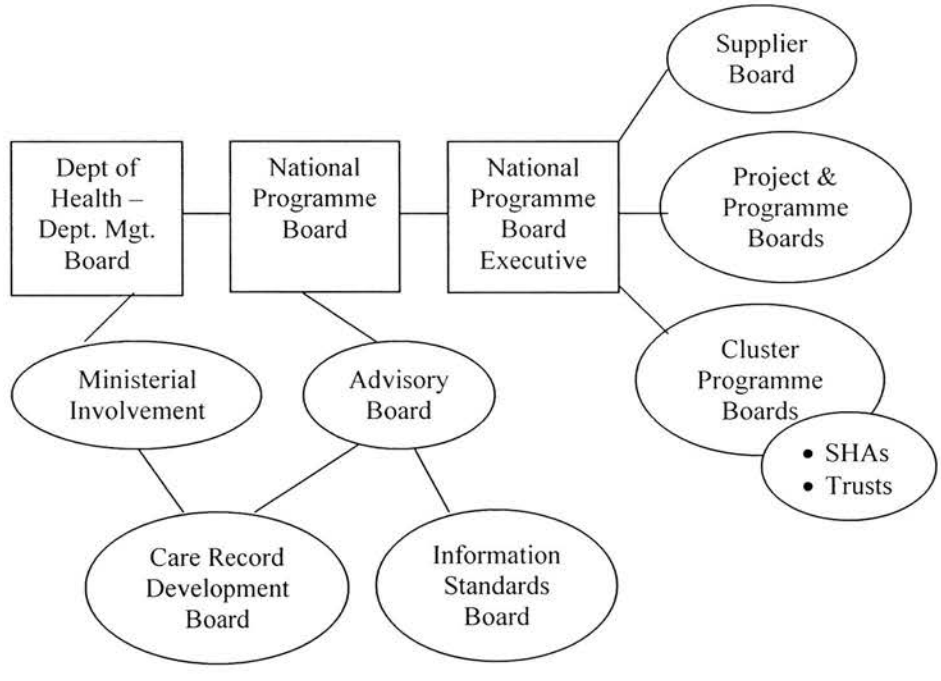


Figure 3 Governance arrangements for NPfIT



Electronic Appointment Booking – *Choose and Book*

Choose and Book is an electronic booking service that enables clinicians and other primary care team members to make initial outpatient appointments at a date, time and place of the patient's choosing, giving the patient choice over where and when they receive their treatment and removing the time spent waiting for a traditional paper referral.[35] In addition, patients may also amend their appointments via a call centre and online, giving the patient greater control over their healthcare. The first implementation of *Choose and Book* was due to be in place by the end of Summer 2004, with full implementation by the end of 2005. However, there has been significant slippage against this timetable. It was hoped, that there would be a reduction in the number of cancellations and missed appointments, by ensuring times and locations were convenient for patients. According to NHS Connecting for Health, more than 16 million bookings were made using the system by August 2009, and *Choose and Book* is being used for around 50% of NHS referral activity, from GP surgery to first outpatient appointment.[36] This includes some appointments made by telephone, using *Choose and Book*. Around a quarter of GP referrals using *Choose and Book* are made in the surgery at the point of referral.

NHS Care Records Service

Fundamentally, the NHS Care Records Service (NCRS) is the core component of the programme and will give authorised healthcare staff faster easier access to patient information. The intention is to digitise over 50 million patient records and enable the capture, management, sharing and use of patient and clinical information across all sectors of the NHS, providing a nationally held electronic NHS Care Record for each patient to include demographic, health and care details. Crucially this will be available to anyone treating the patient, across all health and social care sectors. Theoretically, this should save time when looking for patient data and ensure improved continuity of care as the patients' records will always be available. It has also been suggested that it will contribute towards patient safety with the increased

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[35] Connecting for Health (2007) *A practical guide to NHS Connecting for Health.* NHS Connecting for Health. London

[36] NHS Connecting for Health 2009 www.connectingforhealth.nhs.uk/newsroom/statistics/deployment [Accessed: 07-09-09].

availability of information and patient data. The NCRS will have three core elements:

- the summary care record - this will contain basic information such as allergies and current prescriptions;
- detailed care records - local NHS organisations which normally work together such as clinics, GPs and hospitals will have access to the same information rather than separate records; and
- health space - this will be a protected link to the summary care record for every patient who chooses to have one. This will enable patients to view their records.

Nevertheless, NCRS is a controversial element of the Programme as centrally-stored patient data raises considerable security and data protection concerns. To date, this element of the Programme is not yet available. Indeed, the Conservative Party recently announced, that if they were to come into power they would abolish this particular element of NPfIT amongst others. Instead, they have suggested that patient records would be held locally by the GP rather than centrally stored.[37]

Electronic Transmission of Prescriptions (ETP)

At present, prescriptions are largely printed out or hand-written by clinicians, and then taken to a pharmacy. ETP offers the capacity to automate a largely paper-based system that is used over 50 million times each month.[38] ETP will enable electronic prescriptions to be generated, transmitted, received and once dispensed, sent to the reimbursement agency. In essence, this should reduce both dispensing errors and the need for data duplication on behalf of the Prescription Pricing Authority and pharmacists. It will also hopefully go some way to tackling prescription fraud. It was anticipated that ETP would be fully implemented across the NHS by 2007, but again

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[37] The Conservative Party (2009) http://www.conservatives.com/News/News_stories/2009/08/Conservatives_will_end_Labours_costly_central_plans_for_NHS_IT.aspx [Accessed: 10-08-09].

[38] Prescription Pricing Authority (2003) *Update on Prescription Volume and Cost, Year to September 2003.* http://www.ppa.org.uk/pdfs/publications/volume_cost_year_sep03.pdf [Accessed: 12-07-04].

this timetable has slipped and only a small number of sites have implemented ETP. Roll-out is currently occurring in two phases. Release 1 enables those participating practices to generate paper prescriptions which feature a barcode with a unique patient identifier. This bar code is then scanned by the pharmacist dispensing the prescription. Release 2 will introduce electronic signatures and prescriptions will be sent directly to the patient's nominated pharmacy.

Coding and Standards

Another key area of development in ICT is the introduction of standardised coding – part of the wider NPfIT – which is required for the sharing of medical information and data. At present, doctors utilise Read Codes, a set of clinical terminologies which cover a structured list of terms used in clinical practice. These terms describe the care and treatment of patients covering areas such as diseases, operations, treatments, drugs and healthcare administration. This allows detailed recording of treatment, either a single incident or the patient's full medical record. The current system of Read Codes allows for a sizeable degree of interpretation and the system has been criticised for not being fully comprehensive to meet the needs of daily practice. Consequently, the government has sought to reduce the possibility of differing interpretation and medical error via the introduction of the Snomed CT (the systematised nomenclature of medicine) system across all NHS IT systems. Snomed CT is a computerised language that will be used by all computers in the NHS to facilitate communications between healthcare professionals in clear and unambiguous terms allowing for the sharing of information, which will be essential for the introduction of electronic medical records and healthcare communications. Using the terminology and a computer system, clinicians will be able to record the patient information in a consistent manner. The use of universal terminology also allows for the exchange and sharing of information worldwide that is universally understood by all parties, which will contribute towards efficiency and enhance the continuity of care.

Since 2002, the funding for NPfIT has steadily increased. However, it is important to note that initially no additional central funding was guaranteed after 2005/6;

therefore ICT has been in a vulnerable position at the local level in the last four years, particularly due to the inherent competition for NHS resources. Furthermore, government funding is only available for the creation and initial implementation of the four core components of NPfIT and will not cover such issues as training of staff, which will be a very costly exercise covering approximately 850,000 staff. This is of particular concern given the scale of the programme and the fundamental change that will subsequently occur throughout the NHS via implementation.

A further four minor components have been added to the NPfIT specification: PACS, General Practice IT systems, an email directory (to replace the existing system) and ambulance radio procurement amongst others. With the current level of ICT implementation in the NHS, NPfIT represents a very ambitious, costly and yet important move forward. Whether the programme meets its objectives remains to be seen. It can be argued that just as patient compliance is the final requirement of a successful healthcare intervention, so is acceptance of ICT by its intended users the final stage of successful implementation. As one cynical editor of a leading computer journal stated, the implementation of NPfIT:

Would be rather like trying to build a bridge across the Atlantic.[39]

The total cost of NPfIT is estimated at £12.7 billion (at 2004/5 prices)[40] which includes estimates of local costs incurred in deploying the systems. Given the well-documented delays that have beset the programme, the PAC[41] stated that:

The Department is unlikely to complete the Programme anywhere near its original schedule, and that *at the present rate of progress it is unlikely that significant clinical benefits will be delivered by the end of the contract period.*

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[39] Heath,C., Luff,P. & Sanchez Svensson,M. (2003) Technology and Medical Practice. *Sociology of Health and Illness* **25**, p76.
[40] NAO (2008) The National Programme for IT in the NHS: Progress since 2006. London: The Stationery Office.
[41] House of Commons Public Accounts Committee (2007) *Twentieth report- DH- National Programme for IT in the NHS* http://www.publications.parliament.uk/pa/cm200607/cmselect/cmpubacc/390/39002.htm [Accessed: 14-05-07].

Given the overarching context it is now important to consider the position of general practice within the framework of the NHS and discuss how ICT use has developed in this area.

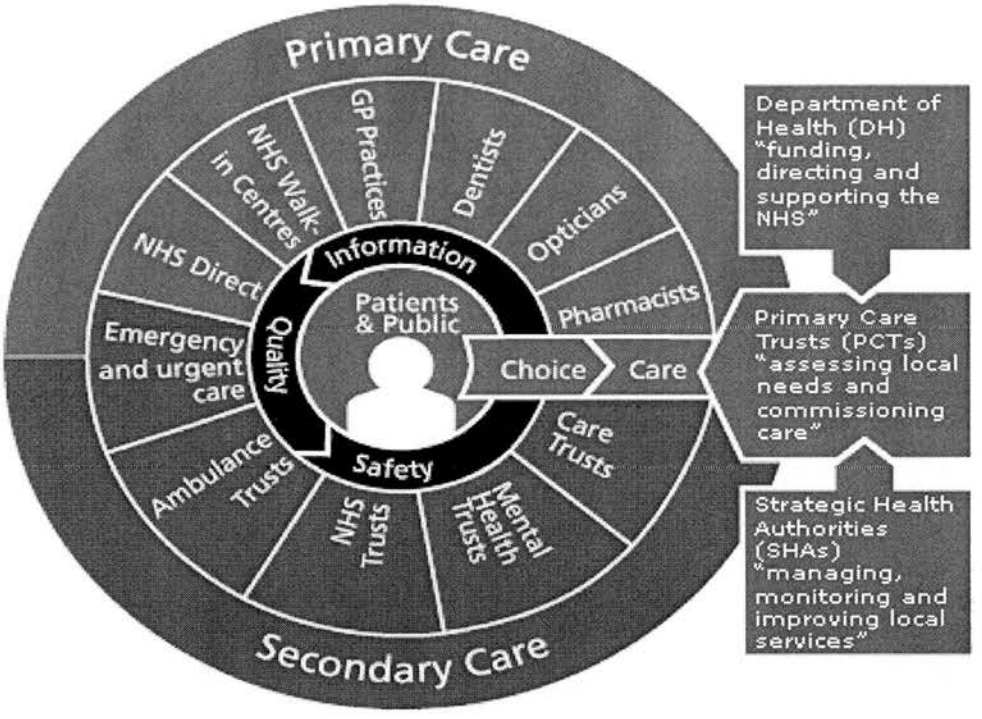
1.3 Governance Structures

The research design for this doctorate recognised the importance of understanding the NHS's national governance structure as it affected primary care, but also the local governance structures of the individual practices which are discussed in **Chapter 3**. It is necessary to understand these issues, prior to analysing the research findings, as the governance structures have an impact on the behaviour of users.

NHS Governance Structures- England

Figure 4 sets out the broad overall structure of the NHS, namely primary care (GP provision and non-urgent care) and secondary care (Accident and Emergency A&E).The governance and the delivery of care in these two sectors are controlled by three distinct organisations – the DH, Strategic Health Authorities (SHAs) and primary care trusts (PCTs). There are also other trusts such as Ambulance Trusts, Care Trusts and Mental Health Trusts which are smaller in number and provide specialist care, but are not discussed here.

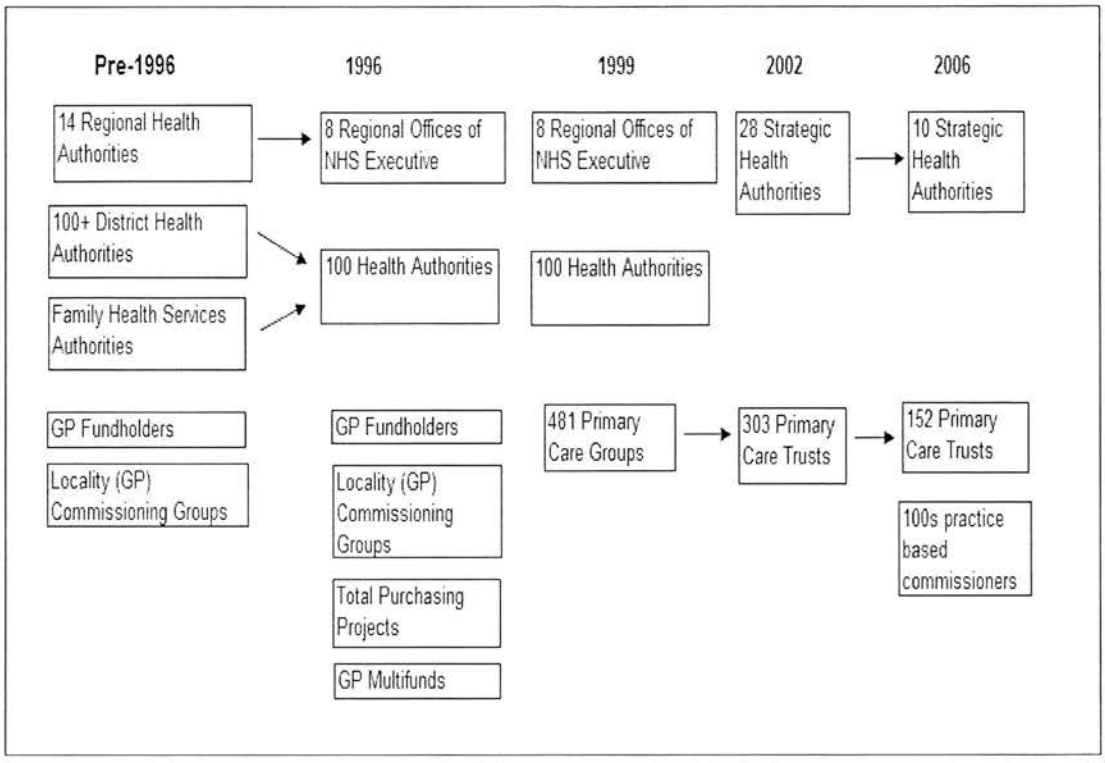
Figure 4 Structure of the NHS



Source: NHS UK

In recent years the national governance arrangements have undergone profound change in particularly in the last decade, as shown in **Figure 5.**

Figure 5 Changing national governance of the NHS



Source: *Is the treatment working? Progress with NHS system reform programme*- Audit Commission/Healthcare Commission

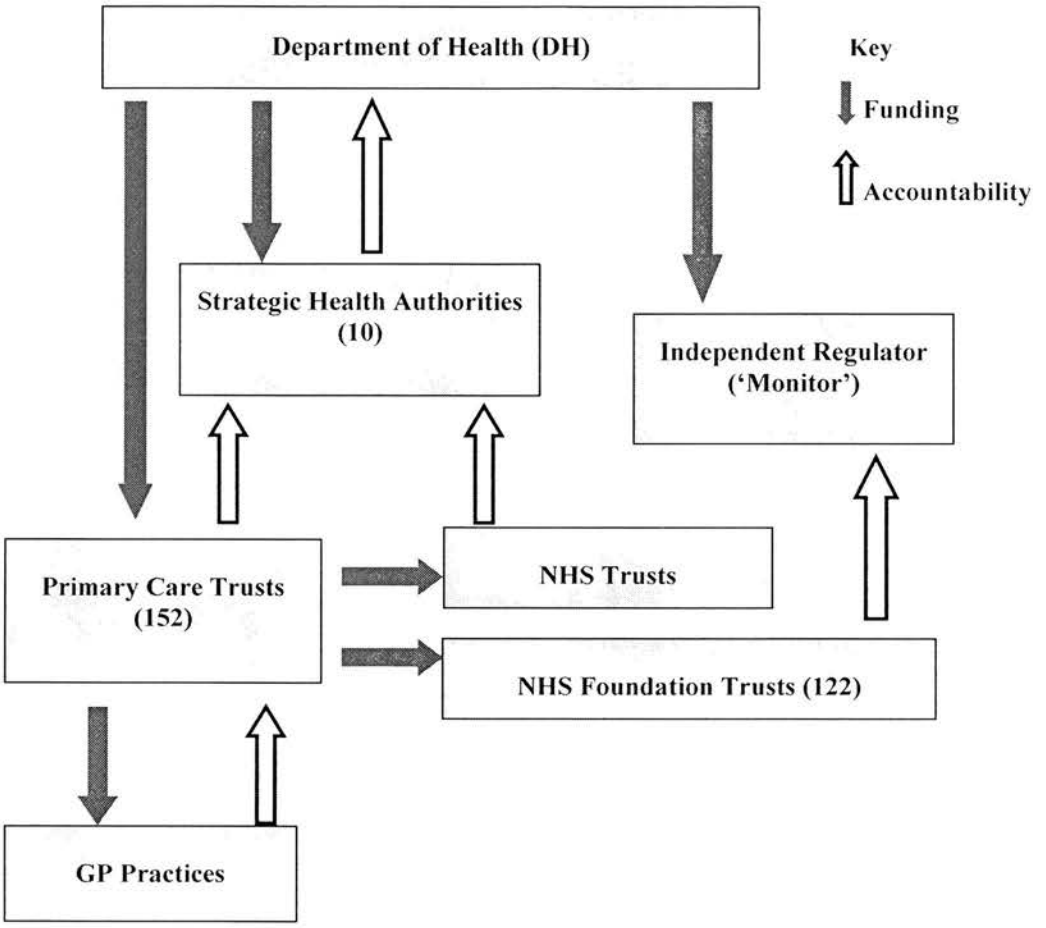
The national governance structures have been significantly streamlined to reflect the drive for greater efficiency in the provision of patient care but also to allow for greater co-terminosity between local NHS providers and local authorities who increasingly provide joint services. The rationale for this is simple. Central government has recognised that improvements in population health, particularly public health issues such as, obesity, cannot be delivered in isolation, but instead require greater partnership working across the NHS, local authorities and the voluntary sector in order to provide improved patient care. For example, services for diabetic patients may be provided across primary and secondary care, but may also involve the voluntary sector in providing support groups or the local authority which may provide services for those who may have mobility problems as a result of their condition.

The governance structures of NHS trusts have developed to reflect the approach of corporate business. NHS trusts have adopted and integrated corporate governance structures with relative ease, producing benefits. Over the last five years, this process has been facilitated by; the work of the NHS Appointments Commission[42] to increase the calibre and accountability of non-executives and generally to improve the way in which Boards within these organisations work; and by NHS-wide initiatives to strengthen controls and the analysis and management of risks.

Recent government policy has demonstrated a continuation of this process. Foundation Trusts, Patient Choice, Payment by Results, and the increased involvement of the independent sector in the NHS, will require NHS trusts to develop ever more sophisticated governance structures to deal with future challenges. The specific accountability and funding arrangements of the respective national components of the NHS are shown **Figure 6** and the specific component structures of the NHS are discussed in turn.

[42] The Appointments Commission is the independent organisation responsible, on behalf of the Secretary of State, for appointing chairs and non-executive directors to the following NHS organisations: SHAs, PCTS, Ambulance, Mental Health and Acute Trusts and DH Arms Length bodies.

Figure 6 Accountability and funding of the NHS



i) Some funding also goes from the DH directly to Trusts
ii) PCTs also commission healthcare from primary healthcare providers, and private sector healthcare providers

Department of Health

The DH provides the overall strategic direction for the NHS in England, namely setting central government policy, targets and objectives for specific sectors of the NHS to deliver high quality, cost effective patient care. This is achieved via:

- national strategy;
- national policy;
- national legislation and regulation;
- allocating resources;
- the NHS operating framework; and

- Local Area Agreements.[43]

The DH has responsibility for standards of healthcare England, which are assessed annually by the Care Quality Commission (formerly the Healthcare Commission, Commission for Social Care Inspection and the Mental Health Act Commission). The DH is also responsible for setting the strategic framework for adult social care and can influence local authority spending on social care. More widely, they set the direction on promoting and protecting the public's health, taking the lead on issues such as environmental hazards to health, infectious diseases such as HIV and malaria, health promotion and education, the safety of medicines, and ethical issues.

Strategic Health Authorities

SHAs were established in 2002 to manage the local NHS on behalf of the Secretary of State for Health. They are the key between the DH and the NHS and were set up to develop plans for improving health services in their local area and to performance manage local NHS organisations. Originally 28 SHAs were created, but on July 1 2006, this was reduced to 10 and these new SHAs are co-terminous with regional Government Offices. In theory, fewer, more strategic organisations will deliver stronger performance management, leading to improved services for patients and better value for money for the taxpayer. SHAs are responsible for:

- developing plans for improving health services in their local area;
- making sure local health services are of a high quality and are performing well;
- increasing the capacity of local health services - so they can provide more services; and
- making sure national priorities, for example, programmes for improving cancer services, are integrated into local health service plans.

Within each SHA area, there are various types of NHS organisations, outlined below, that are responsible for running the different NHS services in local areas.

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[43] Local Area Agreements set out the priorities for a local area agreed between central government and a local area (the local authority and Local Strategic Partnership) and other key partners at the local level.

Acute trusts

NHS trusts have evolved within a statutory framework as stand-alone organisations. Acute trusts are large, complex organisations, often with thousands of employees and budgets of many hundreds of millions of pounds.

Local hospitals are managed by acute trusts, which ensure that the hospitals provide high-quality healthcare, and that they spend their money efficiently. Acute trusts may manage more than one hospital, be regional or national centres for specialist care (such as cancer) or be linked to universities that train healthcare professionals. Acute trusts can also provide services in their local community, through health centres, clinics or in people's homes.

They earn their income through providing healthcare which is commissioned by PCTs, set out in service level agreements between the two organisations. They have a legal duty to financially break even, (although in recent years many have failed to achieve this), and achieve minimum quality standards. They must also work in partnership with other NHS organisations, local authorities and the voluntary sector to deliver services.

Although SHAs performance manage acute trusts' (who are not foundation trusts), the trusts are largely self-governing organisations whose Boards are responsible for the overall performance of the trust and its hospitals.

Foundation Trusts

NHS Foundation Trusts (FTs) are independent, not-for-profit public benefit corporations with accountability to their local communities rather than government control and thus have an entirely unique governance structure within the NHS.

FTs were introduced in April 2004, and there are now 122 FTs in England. They are a new type of NHS hospital run by local managers, staff and crucially members of the public. FTs are inspected by the Care Quality Commission for compliance with healthcare standards and targets in the same way as all other NHS trusts. They are

also overseen by Monitor[44] an independent regulator which has statutory powers to: authorise NHS trusts as FTs; oversee compliance by FTs with their terms of authorisation (like a 'licence' to operate) and intervene in the event of significant non-compliance with the terms of authorisation and other statutory obligations. It is anticipated that by 2011 all acute trusts will be FTs.

FTs have been given significantly more financial and operational freedom than other NHS trusts and represent the government's commitment to de-centralising control of public services. FTs remain within the NHS and its performance inspection system, but the Secretary of State for Health has no powers of direction over them. However, as part of the NHS they exist to provide and develop healthcare services for patients in a way that is consistent with NHS standards and principles - free care, based on need not ability to pay.

In line with the programme of reforms set out in *The NHS Plan*[45], FTs give more power and a greater voice to their local communities and frontline staff over the delivery and development of local healthcare. FTs have members drawn from patients, the public and staff and are governed by a Board of Governors comprising people elected from and by the membership base.

Primary care trusts

PCTs are the cornerstone of the NHS locally and are the key link to general practices. Primary care describes community-based health services that are usually the first, and often the only, point of contact that patients may have with the health service. This includes services provided by GPs, community and practice nurses, community therapists such as physiotherapists, which are managed by the local PCT.

PCTs provide some primary and community services, or they commission them from other providers, and are also involved in commissioning secondary care. PCTs are responsible for more than 85% of the NHS budget. They are free-standing NHS organisations with their own boards, staff and budgets. The performance of PCTs is

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[44] Monitor authorises and regulates NHS foundation trusts making sure they are well-managed and financially strong so that they can deliver healthcare for patients.
[45] DH (2000) *The NHS Plan: A plan for investment, a plan for reform.* London: The Stationary Office

monitored by their local SHA and they are ultimately accountable to the Secretary of State for Health. As local organisations, they are best positioned to understand the needs of their community, so they can make sure that the organisations providing health and social care services are working effectively.

PCTs work collaboratively, involving patients and the public as well as their own GP practices and partners, to deliver services. They must co-ordinate all agencies delivering healthcare in their area, and take responsibility for creating strong local partnerships to address the broader influences on health, such as smoking and obesity.

On 1 October 2006, the number of PCTs was reduced from 303 to 152, to bring health, social care and emergency services closer together, resulting in better service planning, as well as producing savings for frontline services.

PCTs are responsible for:

- developing programmes dedicated to improving the health of the local community;
- deciding what health services the local population needs and ensuring they are provided and are as accessible as possible. This includes hospital care, mental health services, GP practices, screening programmes, patient transport, NHS dentists, pharmacies and opticians;
- bringing together health and social care, so that NHS organisations work with local authorities, social services, and voluntary organisations; and
- ensuring the development of staff skills, capital investment in buildings, equipment and ICT, so that the NHS locally is improved and modernised and can continually deliver better services.

Although regulations exist that set boundaries for the board structure and membership of a PCT, its management still possess some freedoms to shape the organisation and work processes according to their own preferences and other local conditions.

Local governance structures in general practice

At the local level, GP practices are independent businesses (GPs themselves are independent contractors) with varying internal governance structures and limited accountability to their PCTs. Indeed, their status saw them profit from a contract change in 2004, which allowed them to opt out of out-of-hours provision. PCTs have a duty to secure primary medical services, through two main contractual routes: General Medical Services (GMS) which is the national contract for primary medical services agreed between the government and GPs; and Personal Medical Services (PMS) which are locally-negotiated contracts for primary medical services agreed between PCTs and providers. PCTs' ability to govern GP practices is quite limited, but can be achieved through clinical governance systems, monitoring clinical behavior through data on prescribing and referral rates, and PMS. Indeed, PMS contracts have been seen as more effective in strengthening accountability than the traditional GP contract (nGMS) given their local service component. But fundamentally, GPs are accountable to their patients and the General Medical Council, who authorise them to work, and not the PCT. This creates a somewhat loose relationship between GP practices and their respective PCTs.

GPs, in much the same way as consultants operate in private practice, are keen to retain their autonomy and are often the most vocal when changes threaten their status or changes to their profession. PCTs are financially responsible for clinical decisions taken by GPs. This division of responsibilities creates obvious financial risks, as PCTs cannot directly control one of the main elements that drive their expenditure, and the decisions taken by GPs may not always result in the best use of resources, as these decisions lack a financial component. A number of policies such as GP fundholding and more recently Practice Based Commissioning have attempted to manage these financial risks by aligning clinical and financial responsibility.

As well as specific financial responsibilities, PCTs have a significant strategic and operational responsibilities relating to primary medical services:

- ensuring that all patients can see a GP within 48 hours and a primary care professional within 24 hours;
- securing primary medical services out-of-hours that meet national quality standards;
- agreeing contracts with each practice;
- agreeing with each practice participating in the Quality and Outcomes Framework (QOF)[46] their planned achievement for the year;
- working with practices to avoid closure of their list to new patients and managing the consequences where closures are unavoidable;
- managing the prescribing budget;
- supporting practices to improve the working lives and skills of practices' partners and staff; and
- funding and managing practice implementation systems, including ensuring full implementation of systems procured by *Connecting for Health.*

Each year individual practices are subject to a review of the QOF by the PCT and their achievements against this. The framework measures practice achievement against a range of clinical-based evidence indicators and against a range of indicators covering practice organisation and management. Practices score points according to their level of achievement against these indicators, and practice payments are calculated from points achieved.

Despite this overarching agenda, practice engagement with PCTs is limited in reality, which is reflected in the differing local governance arrangements within the **Red** and **Yellow** practices which shall be discussed in greater detail in **Chapters 4** and **5**. Furthermore, these local governance structures may in part be responsible how NPfIT had been implemented in each practice and how the relationships and communications between staff had developed.

[46] QOF is a system of 146 evidence based standards, assessment and incentives relating to the quality of care delivered to patients by GPs.

1.4 General Practice

General practice holds a unique status and position in the NHS. When the NHS was established in 1948, general practice had a number of components including:

- independent contractor status: Each principal within general practice was paid according to a contract with their employer rather than as a direct employee, affording the GP a specific independent status as a salaried employee. Thus general practices were financially responsible for their own infrastructure as well as the success of their practices in the market economy;
- access to a general practice patient list: in order to access staff within the general practice, each person in the UK was required to register with a GP who would provide primary care and referral to secondary care where appropriate;
- capitation-based payment: The main basis for a GP's income was based on the size of their patient list;
- 24-hour responsibility: Each GP was to be responsible for delivering care to their patients 24 hours a day, 365 days of the year; and
- local management of services: Each GP was locally responsible to a centrally funded body, the Executive Council, for their standards of practice and for many of the conditions of their work.

However, despite this vision, in reality the first and second of these points have been difficult to maintain and control and indeed the registration of individual patients has been hard to achieve. However, the underlying premise of these key points has remained, although to reflect adjustments in general practice, the 1967 GP charter made the following changes:

- practice expenses: Support was provided to cover a number of areas including the partial funding of ancillary staff costs and the reimbursement of rent and rates. The rent reimbursement was configured in such as way that it encouraged the construction of purpose-built premises;

- group practice allowances to encourage the formation of group practices;
- item-of-service payments to cover a small number of public health activities such as contraception and cervical cytology;
- payments for post-graduate education: for attending a quota of lectures per year; and
- pay review: a notionally independent body was set up to annually review GPs' income.

1.5 ICT and General Practice

More than 20 years after the first computerised system was introduced in secondary care, the government's emphasis on the use of ICT in the NHS changed to include primary care, asserting the prevailing attitude that technology was seen as a good in itself. Given that 90% of patient contact with the NHS occurs in primary care, the need for good availability of information and communication is of utmost importance in order to provide the relevant healthcare.[47] Therefore, it could be argued that this policy shift began rather late. ICT, when utilised effectively in general practice, ultimately offers the potential to improve care via the use of electronic records, electronic communications between providers and the provision and access to fast and reliable health information. As Leaning has argued, general practice computing is now seen:

As an integral part of the NHS IT strategy.[48]

However, it should be noted that the use of ICT has not been defined in primary care in the way that it has been in medical specialties such as surgery, and yet, despite the problems that shall be discussed later in this chapter, the UK is the most extensively computerised primary healthcare sector in the world.[49]

The trajectory of ICT in primary care developed separately to the rest of the NHS ICT. Indeed, the implementation of GP computing, whilst supported by some

[47] Cleves, G (2004) Prime Mover. *Health Services Journal* **June 17th** 24-25.
[48] Leaning, M. (1993) The New Information and Management Strategy of the NHS. *BMJ* **307** p217.
[49] NHS Executive (1998) *Information for Health.* Leeds: NHS Executive

government and policy initiatives, has been largely driven by substantial, yet uncoordinated, isolated developments by individuals and commercial companies operating sometimes against the national policy. Like the early hospital-based ICT programmes, the history of GP computing can be traced back to the late 1960s. One of the first reports detailing the use of a computer in general practice, was by Dr Michael Abrams in 1968.[50] In 1971 Gene provided details of computer-generated patient recalls.[51] The first British GP to use a computer in general practice was John Preece in Whipton near Exeter in 1970, using a system that was created by IBM, as part of an exercise designed to demonstrate the potential of computer systems in general practice, at a reported cost of £250,000.[52] [53] The IBM Desktop Pilot System (IDPS) was the world's first real-time GP computer system and although basic and crude in its design, it used:

- GP summary records and problem-orientated records in an electronic format;
- cut and paste in GP records;
- an audit of workload from a GP computer system;
- tetanus recall from a GP computer;
- morbidity codes to standardise terminology in working GP; electronic records; and
- electronic back-up in a GP system.[54]

In 1975, the health centre at Ottery St Mary Practice, also in Exeter, became the world's first paperless general practice.[55] The then government financed the development of the initiative to design an electronic record and involved summarising 11,000 paper records in electronic format. Interestingly, for a few years in the late 1970s the Ottery system was fully operational and integrated with the local

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[50] Abrams, M. (1968) A computer general practice and health information system. *Journal of the Royal College of General Practitioners*, **16**, 27.
[51] Gene, J. (1971) Automated recall in general practice. *Journal of the Royal College of General Practitioners,* **21**, 352-5.
[52] Preece, J.F. (2000) *The Use of Computers in General Practice.* Edinburgh: Churchill Livingstone.
[53] Lippmann, E.O. (1971) A pilot online data system for general practitioners *Computers & Biomed Research* **4** 390-406.
[54] Preece, J.F & Lippmann, E.O (1971) Record design for the computer file in general practice. *Practitioner*, **August supplement,** 3-12.
[55] Bradshaw-Smith, J.H. (1976) A Computer Record-Keeping System for General Practice. *BMJ* i 1395-7.

hospital, which enabled information-sharing between staff across the two sites. This pioneering site was also responsible for the development of the FP10 – the computer-printed prescription form (which the DH later approved for general use in 1981) – and produced the world's first printed prescription.[56]

The Exeter Primary Care System, as it came to be known, provided the foundations for many of the standards which currently underpin GP record-keeping. An evaluation of the system in 1981 identified:

- the structure of the computerised record leads to improved quality of the record;
- it provides a more continuous picture of the patient's history;
- it is more legible and easier to search;
- computer records are easy to analyse;
- a fully computerised record system reduced receptionist workload by two hours per week per 1,000 patients;
- the cost, based on a mainframe system with remote terminals, was £1.44 per patient per year (1980 prices);
- the time to find information is almost halved;
- almost half (45.8%)of manual records caused difficulties in assimilating and correlating facts, problems which disappeared with computerization;
- referral and other practice communications should benefit from computerised information; and
- job satisfaction in the practice improves.

Building on the success of the Exeter Primary Care System, prominent members of the Royal College of General Practitioners (RCGP) with an interest in computing organised the first national conference on general practice computing, GP-INFO 80. The 1980 RCGP report *Computers in Primary Care*, which reviewed the function and potential of clinical computers in general practice, stated:

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[56] Bradshaw-Smith, J.H (1982) The role of the computer in general practice. *Practitioner* **226**, 1211-3.

The development of general practice computer systems and the parallel development of clinical standards to which the whole profession is already committed are closely interrelated.[57]

Clifford Kay summed up the enthusiasm surrounding GP computing in the foreword to the proceedings:

The success of GP-INFO 80 greatly exceeded our expectations…the conference was three times over subscribed.[58]

Given this enthusiasm and obvious demand, the RCGP joined with the British Medical Association (BMA) and formed the RCGP-BMA Joint Computer Group. The government responded by introducing the Department of Industry's subsidised computing scheme, *Micros for GPs* in 1982, which partially funded systems to GPs. At that time, it was estimated that about 50 practices in England were using computers. As many as 1,015 practices applied for a place on the scheme and over 140 systems were installed.[59] However, the scheme was short-lived, as the systems developed under the scheme were at odds with those favoured by GPs.

With the foundation laid for ICT implementation, the growth and interest in computers grew steadily between 1987 and 1991 including interest from the pharmaceutical companies who were able to supply a number of computer terminals. By 1990, approximately £40 million had been invested in GP computing systems by commercial companies. This increased interest in ICT was attributable to a number of factors. The widespread use of computers was still a novel phenomenon in general practice and as with any new product there was a degree of enthusiasm, excitement and curiosity surrounding them. Over a short period of time there was a decline in the cost of hardware and software, but an increased capability of the systems, contributing to a further interest in their use. It was also during this period (1987) that the concept of the 'free scheme' began. Two schemes were available: AAH

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[57] The Computer Working Party of the RCGP (1980) *Computers in Primary Care.* Occasional paper 13.RCGP London

[58] Malcom, A. & Poyser, J. (eds) (1982) *Computers and the General Practitioner: Proceedings of the GP-Info Symposium, London 1980*. Oxford Pergammon Press for the Royal College of General Practitioners.

[59] Project Evaluation Group (1985) *General Practice Computing: evaluation of the 'Micros for GPs Scheme'* London: HMSO.

Meditel and VAMP. Under this scheme, which covered approximately 20% of practices in England, GPs leased or rented a comprehensive multi-user system together with relevant training and support and received a payment approximately equal to the cost of the system. In return the supplier expected the formal collection of anonymised data on mortality, prescribing and side effects, which in turn they hoped to sell to leading pharmaceutical companies.[60]

During 1987 to 1990 each scheme had approximately 1,000 participating practices and in total they computerised between 1,500 and 2,500 new practices. This figure includes some practices that were already using ICT before switching to free systems. These are just two examples of a number of systems that emerged during this time. Both of the schemes were short-lived however, as the quality of the data collected was less consistent and complete than had been anticipated. This approach may have contributed to the schemes' failure, but may have also helped to shape the design of many systems and applications thereafter. As Sullivan and Mitchell have demonstrated:

The design of many existing electronic records derives implicitly or explicitly from support for the use of aggregated data for research, audit, finance or planning.[61]

This statement raises a key point in relation to system design which will be discussed later in greater detail, but essentially, ICT failure is often attributable to systems that are designed around technical capabilities rather than user requirements.[62]

In 1989 the new GP contract made it increasingly difficult for GPs to maximise their earnings without using a computer. Additionally, the publication of *Health of the Nation* (1991)[63] placed a strong emphasis on information collection and analysis, particularly in relation to health promotion targets. To gain control of the situation, the DH introduced the direct reimbursement for GP systems (tied to a scheme of

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[60] Benson, T. (2002) Why General Practitioners Use Computers and Hospital Doctors Do Not- Part 1: Incentives. *BMJ* **325** 1086-1089.
[61] Sullivan, F. & Mitchell, E. (1995) Has general practitioner computing made a difference to patient care? A systematic review of published reports. *BMJ* **311,** (7009) 848-852.
[62] Pagliari, C. (2005) Implementing the National Programme for IT: What we can learn from the Scottish experience. *Informatics in Primary Care* **13** 105-11.
[63] Department of Health (1991*) Health of the Nation*, London: Department of Health.

software accreditation), which was structured to deduct payments from any external reimbursement paid against the cost of purchasing and maintaining computers in general practice, and helped offset the initial costs of establishing systems in practices. However, the direct reimbursement also reduced the financial incentive to participate in free schemes. Nevertheless, the costs of ICT have in recent years been cited as one of the major barriers to ICT implementation. As the 2002 Wanless Report highlighted:

The health service's annual ICT spending per employee was lower in 2000 than in any other sector of the economy. The UK health service also spends a significantly lower percentage of its budget on ICT than the health services of comparator countries.[64]

However, following the introduction of the GP contract in 1989 and the reimbursement of general computing costs, not surprisingly, rates of computerisation increased from 10% in 1987 to 79% in 1993.[65]

Since 1990 the DH has undertaken five surveys to assess the growth of general practice computing. The first four included Wales and Scotland, but the most recent in 1996 only covered England. All five surveys demonstrated a steady growth in the use of computers in general practice, with figures substantially increasing over the last decade – from 79% in 1993 and 96% (England only) in 1996. The figures are similar to those of Scotland – 50% in 1992 and 90% in 1994.[66] Significantly, of the 10% outstanding in the Scottish survey, half said they were likely to be computerised in the near future.[67]

The software market has also had some impact on the uptake of technology. Like all operating systems such as Windows or Mac, the battle has been no less intense or

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[64]Wanless, D. (2002) *Securing Our Future Health: Taking a Long Term View*. London: The Stationery Office p.55.

[65] Watkins, C., Harvey, I., Langley, C., Faulkner, A. & Gray, S. (1999) General Practitioners' use of computers during the consultation. *British Journal of General Practice* **45,** (442) p381.

[66] Sowerby Centre for Health Informatics at Newcastle. (1996) *Computerisation in GP Practices 1996 Survey*. London: Department of Health

[67] Royal College of General Practitioners (2000) General Practice Computerisation http://www.rcgp.org.uk/rgcp/information/publications/information/rcf0007/Rcf0007a [Accessed: 02-06-03].

monopolistic in primary care. During the computer boom of the mid-1980s, there were over 150 systems suppliers in the medical market. The 1993 DH survey lists 103 systems and suggests that in addition an excess of 200 practices were using different systems they had written themselves[68] giving a total of over 300 different software packages. However, it should be noted that nearly half the suppliers listed in the survey were only mentioned by one respondent. Only 39 suppliers got more than five mentions in a 60% response rate. A more accurate figure is that at its peak, there were approximately 50 suppliers.[69] By 1996 the number of system suppliers had drastically reduced to three suppliers who had 70% of the market; EMIS (28%), VAMP (22%) and AAH Meditel (20%).[70] All of these systems have their own unique features, but they represent a substantial move away from the old text-based systems towards Graphical User Interfaces, therefore enhancing the GPs' experience of computing. However, all of these systems are stand-alone and with a number of systems on the market, this presents substantial problems in daily practice. Stand-alone systems cannot communicate with each other and consequently there are problems of interoperability, standards and coding. Without improved interoperability, it becomes very difficult to share and transfer information such as discharge letters and records between practices, which is one of the main requests from GPs.[71]As PAC noted:

It is vital that project plans are sufficiently flexible to allow for the insertion of technological advances where relevant.[72]

This somewhat ongoing vicious circle has contributed to the slow uptake of full computerisation in primary healthcare.

By 1997 the landscape was starting to change significantly. The end of the GP fundholding[73] scheme removed an important source of revenue for GP suppliers and

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[68] DH (1993) *Computerisation in GP Practices.* 1993 Survey DH
[69] General Medical Services Committee (1992) *Developing a Practice Record Computer System* British Medical Association. London
[70] Sowerby Centre for Health Informatics at Newcastle. (1996) *Computerisation in GP Practices 1996 Survey*. London DH p16.
[71] Majeed, A. (2003) Ten Ways to Improve Information Technology in the NHS. *BMJ* **326** 202-206.
[72] Public Accounts Committee, (2000) *Improving the Delivery of Government IT Projects* (HC 65, Session 1999-2000); *Successful IT: Modernising Government in Action*, Cabinet Office Central IT Unit.

led to a consolidation of suppliers. By July 2002 there were nine suppliers with 14 RFA99 accredited systems, but this landscape changed even more radically with the introduction of NPfIT.

1.6 Use of Computers in General Practice

Prior to the introduction of NPfIT, the occupational groups within general practice had varying experiences of using ICT and much of this was driven by their jobs requirements. For example, the administrative staff on the whole had greater exposure to ICT through the use of basic computer packages required for typing referral letters or the use of spreadsheets in Excel. While many users were aware of email and the internet, this was largely used for personal purposes rather than work-based activities. Interestingly, NPfIT was introduced at a point when the user experience of ICT was very diverse. NPfIT was, it could be argued, meant to provide a level-playing field for ICT in the NHS – that is that all users in the NHS, in this example general practice, would be using ICT in their everyday working lives. However, in reality as demonstrated earlier (**Figure 2**) - NPfIT did not and future components of it, will not affect all occupational groups equally. Thus, NPfIT is not a leveller in regard to ICT use. Indeed, as shall be discussed, it has had a more significant impact and, in some cases, upset the social relationships and hierarchies within general practice.

The implementation of NPfIT provides further material for discussion in regard to the domestication of ICT within practices. The very nature of general practice involves a number of embedded recurrent routines and tasks, such as the booking of patient appointments and the use of the medical record, but it also has a number of implicit structured hierarchies such as the relationship between GPs and nurses. The introduction and use of ICT has the potential to disrupt and refine these routines and relationships, which can impact on communications. **Figure 7** below shows

[73] GP Fundholding enabled practices to negotiate heir own secondary care contracts, decide which providers, services, and patients would benefit from their funds, andkeep any surpluses that they generated.

communications from the GPs' perspective, although this is interchangeable for practice nurses and other clinical professionals in general practice.

Figure 7 GP use of communications channels

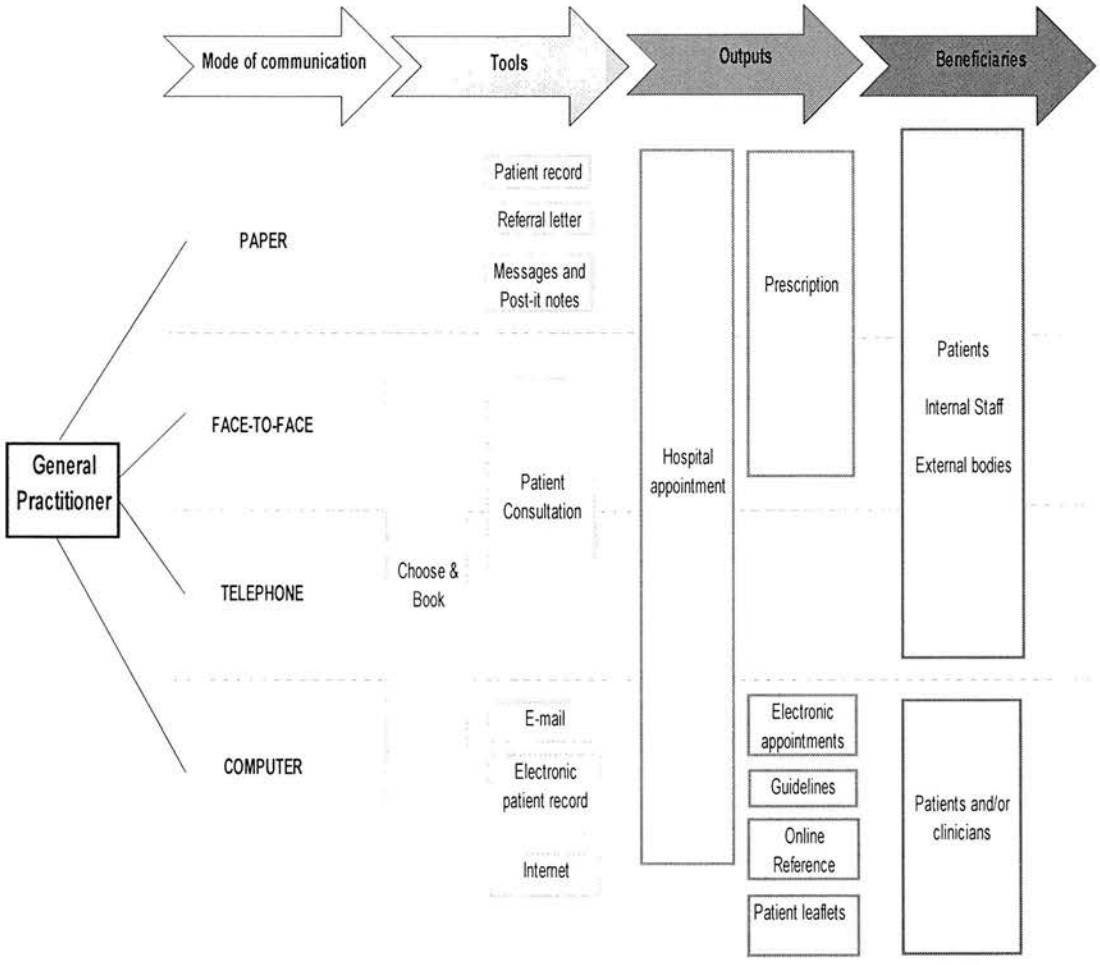

Figure 7 illustrates the multiple modes of communication identified during this research (many of which were used in parallel), the tools that are used, the outputs and the beneficiaries of these communications and information flows.

According to the 1996 DH survey, GP systems in England were primarily used for three specific tasks: repeat prescribing, partial entry clinical records and entry of data in consultation.[74] From its early introduction, Hayes has argued that prescribing was

[74] Sowerby Centre for Health Informatics at Newcastle. (1996) *Computerisation in GP Practices 1996 Survey*. London: Department of Health p33.

recognised as the most significant advantage of computerising a practice,[75] essentially because the drugs being prescribed could be chosen from a standardised list contained with a database, as opposed to manually creating the prescription. This benefit was most obvious when it came to repeat prescribing, as the results of the 1996 survey indicate. Prior to computerisation this was a labour intensive task involving clinical and administrative staff. Indeed, approximately 60% of prescriptions issued in general practice are repeat scripts. Computerisation now allows for automatic checks on the patient and the prescription before it is generated.

A further benefit is the accessibility to data. Prior to the advent of computers in general practice, practice staff had no way of completely knowing the breakdown of their patient list and thus the health issues facing their local populations. But with the introduction of ICT this was soon available to all practices. This has been an advantage for many practices that are able to now search databases and recall information which is particularly useful for immunisations such as MMR (Measles, Mumps and Rubella) for young babies and influenza jabs for the elderly.

The DH have not undertaken any further surveys since 1996, but work by Watkins and Richards has identified that although many consultations are computerised, there is in fact limited use of computer applications by GPs, rather than the full EHR and paperless practice desired by the government.[76] [77] Despite the DH 1996 survey findings, Richards' observational study noted that although most GPs in Scotland claimed to use computers, only 51% actually used them in anything other than a very limited capacity. He further argued that this could be attributable to some negative effects of ICT. For example, the use of ICT has been found to increase the length of consultations by 48-54 seconds, which in any given day can contribute seriously to a time-lag in consultations.[78]

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[75] Hayes, G.M. (1985) 'Prescribing systems'. In: Sheldon, M.G. & Stoddart, N (eds) *Trends in General Practice Computing* p 18-27. London: RCGP Books.
[76] Watkins, C., Harvey, I., Langley, C., Faulkner, A. & Gray, S. (1999) General Practitioners' use of computers during the consultation. *British Journal of General Practice* **45,** (442) 381-3.
[77] Richards, H.M., Sullivan, F.M., Mitchell, E.D. & Ross, S. (1998) Computer Use by general practitioners in Scotland. *British Journal of General Practice* **48,** (433) 1473-6.
[78] Sullivan, F. & Mitchell, E. (1995). Has General Practitioner Computing Made a Difference to Patient Care? A Systematic Review of Published Reports. *BMJ* **311** p848-852.

Nevertheless, ICT is now a fundamental part of primary care, yet with the imminent implementation of NPfIT there is still a concern that:

Expensive computing systems are developed and installed in healthcare institutions without sufficient healthcare improvement.[79]

By 2001 it was estimated that 70% of practices in England had been computerised for over ten years, although that was simply an indication that they used a computer. At that time over 95% of practices had EHR capability, but estimates varied that between 30% and 50% of practices had given up using paper records – although this figure is more likely to be closer to 30%. However, 90% of prescriptions were being produced electronically. The basic data and administrative functions that were required by day-to-day operations in general practice were largely used across most practices by the mid-2000s, although they were not necessarily being used consistently and the more complex ICT such as the EHR was proving more difficult to domesticate.

1.7 Literature Review of Barriers to ICT in Primary Care

Much of the current research literature on ICT in primary care focuses on electronic evidence-based guidelines,[80] [81] [82] decision support systems[83] and the barriers to ICT implementation[84] in particular, the effect of ICT on the doctor/patient relationship.[85] [86] But this is only one of a number of frequently-cited barriers to implementation,

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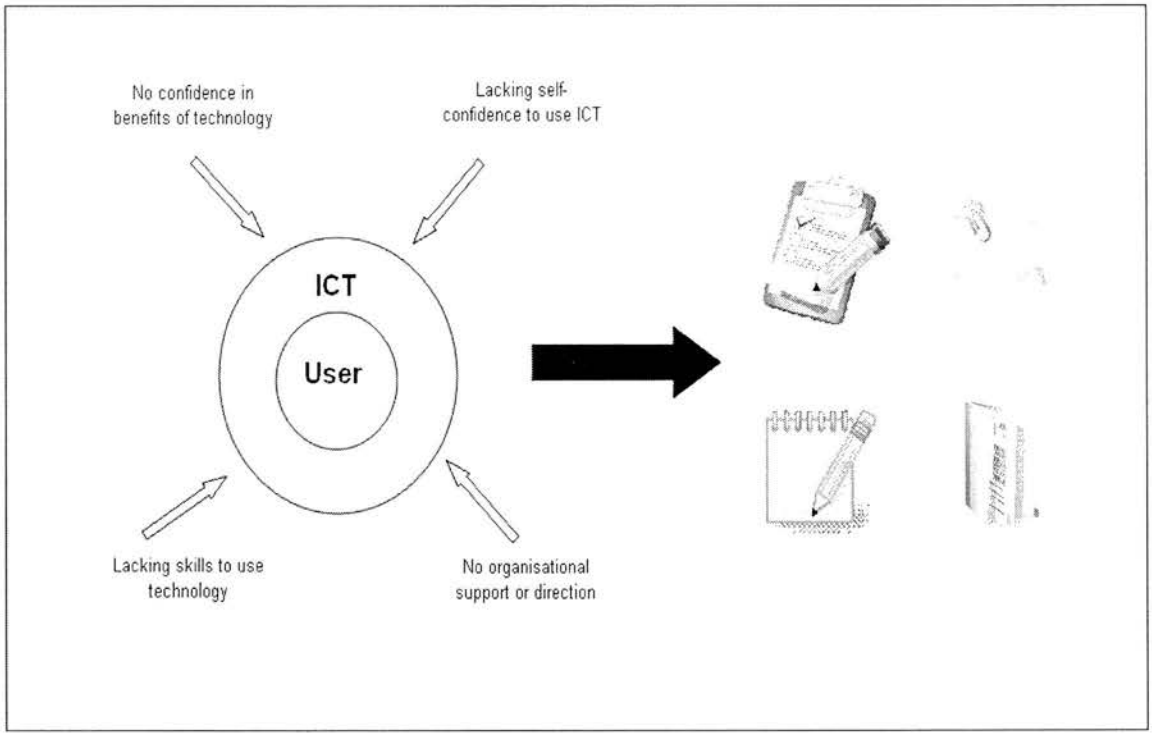
[79] Wyatt, J.C. (1994) Clinical Data Systems, Part 1: data and medical records. *Lancet* **344** 1543-7.
[80] Feder, G., Eccles, M, Grol, R., Griffiths, C., & Grimshaw, J. (1999) Using clinical guidelines. *BMJ* **318** 728-730.
[81] Grimshaw, J.M. & Russell, T.I (1993) Effect of clinical guidelines on medical practice: a systematic review of rigourous evaluations. *The Lancet* **342** 1317-1322.
[82] Purves, I.N. (1998) PRODIGY: Implementing computerised guidance. *British Journal of General Practice***48** 1552-1553.
[83] Delaney, B.C., Fitzmaurice, D.A., Riaz, A, & Hobbs, R.D.R. (1999) Can computerised decision support systems deliver improved quality in primary care? *BMJ* **319**
[84] Heathfield, H., Pitty, D. & Hanka, R. (1998) Evaluating information technology in healthcare: barriers and challenges *BMJ* **316** 1959-61.
[85] Greatbach, D., Luff, P., Heath, C. & Campion, P. (1993) Interpersonal Communication and Human-Computer Interaction: An Examination of the Use of Computers in Medical Consultations. *Interacting with Computers.* **5** (2) 193-216.
[86] Als, A.B. (1997) The Desk-top Computer as a Magic Box: Patterns of Behaviour Connected with the Desk-top Computer; GPs' and Patients' Perceptions. *Family Practice* **14** 24-28.

which goes some way toward explaining why clinicians do not readily utilise ICT. Some of the common barriers to implementation are shown in **Figure 8**. This demonstrates that where factors such as a lack of ability or confidence to use ICT are present, the individual may revert to using more traditional paper-based communications.

Figure 8: Barriers to ICT implementation



Mitchell and Sullivan cited five main barriers to ICT implementation: privacy and the potential of unauthorised access to electronic records, the cost of new ICT, time taken to implement ICT, training of staff to utilise ICT effectively and the doctor/patient relationship.[87] Booth et al interestingly cite the new communication skills that clinicians require in order to use ICT, together with the time required to develop ICT skills, as the major barriers to implementation.[88] The Electronic Record Development and Implementation Programme (ERDIP) highlighted clinicians'

[87] Mitchell, E & Sullivan, F. (2001) A Descriptive Feast but an Evaluative Famine: Systematic Review of Published Articles on Primary Care Computing 1980-97. *BMJ* **322** 279-82.
[88] Booth, A., Kohannejad, J. & Robinson., P. (2002) *Information in the Consulting Room (iiCR) Final Report.* University of Newcastle Upon Tyne/Department of Health.

attitudes to ICT and organisational norms as posing a major obstacle to ICT implementation.[89] [90] For some clinicians, there exists an attitude of *if it's not broken why fix it?* As Young has argued:

The nature of a doctor's work, his attitudes, interests and enthusiasms are the major reasons for the non acceptance of computer systems. [91]

One barrier that has gained momentum in recent years is ICT security regarding patient consent, data protection and patient confidentiality, particularly in regard to NCRS and the transfer of sensitive patient information via email. It can be cited as one of the major reasons inhibiting the exploitation of computers in healthcare.[92] The relationship between doctor and patient is characterised by intimacy, trust and confidentiality. In 1997 the Caldicott Committee established recommendations on patient-identifiable information in healthcare and the legal requirements were subsequently enshrined in the 1998 Data Protection Act.[93] There are serious, and very real, concerns surrounding the ability of unauthorised personnel to access patients' medical histories and in some unfortunate cases, this has proved to be a reality.[94] Tonnesen et al identified staff concerns regarding loss of data when using EHRs and general data security.[95] These concerns may not only impact on the delivery of care but also on the relationships between staff in general practice.

However, this concern is not just restricted to the medical profession. Patients are also concerned about the access that general healthcare professionals will have to their EHRs, thus allowing anyone who treats the patient to view potentially sensitive

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[89] Foord, Mathisen,Kolind, Owens, (2003) *Core National Evaluation of the Electronic Records Development and Implementation Sites Final Report (N2/P4)* NHSIA http://www.nhsia.nhs.uk.uk/erdip/pages/docs_egif/evaluation/technical/erdipcoreevaluationfinalreport.pdf [Accessed: 25-05-04].

[90] Markus, M.L. (1994) Electronic Mail as the Medium of Managerial Choice. *Organisational Science* **5** (4) 502-507.

[91] Young, D.W. (1984) What Makes Doctors Use Computers? *Journal of the Royal Society of Medicine* **77** (8) 663-7.

[92] NHS Executive (1998) *Information for Health. An Information Strategy for the Modern NHS 1998-2005. A National Strategy for Local Implementation.* NHS Executive, London.

[93] Her Majesty's Government (1998) *Data Protection Act* Chpt 29. Stationary Office, London.

[94] Chin, T. (2003) Searchers May Google Your Patient Records. *Amednews.Com* *http://www.ama.assn.org/sci-pubs/amnews/pick_03/bisb0407.htm* [Accessed: 23-04-03].

[95] Tonnesen, A.S., LeMaistre, A. & Tucker, D. (1999) Electronic Medical Record Implementation Barriers Encountered During Implementation. *Proceedings AMIA Annual Symposium.* 624-626.

information such as HIV and mental health status. At present the security and legal status of access to patient information is essentially a black hole. If an email is intercepted or is delivered to the wrong recipient, whose responsibility is it? If patient information is illegally accessed from the proposed national spine in NPfIT, will the government accept responsibility? Also, what happens if the system crashes and the information is not available at the point of care or the data is subsequently corrupted? All these questions have yet to be adequately answered in a way that will alleviate user concerns. The exact details such as what information will be held on the data spine and who will have access to which areas of patient information, are yet to be finalised and have been subject to continued amendment throughout NPfIT's development. It is proposed that current confidentiality levels will be preserved under a system of sealed electronic envelopes that would hold patient sensitive data and, once opened, it would be possible to track when it was opened and by whom. Nevertheless, until such details can be clarified, and more importantly reliably tested, clinicians will be unwilling to utilise some forms of ICT and will be less likely to convince patients that their data is being held securely. Every industry can speak of attacks on their IT system where personal information has been accessed. This is particularly true of the banking industry in recent years, and could just as easily happen in the NHS.

A further element to be considered is that of cost. Until NPfIT is implemented in its entirety doctors will be responsible for their own sometimes fragmented IT systems and in-house security, which is a costly exercise. Within many individual practices, there may be many operating systems, some with additional functionality usually customised by the individual. This presents a problem of in-house interoperability, but also presents substantial security concerns. It is difficult to prevent security breaches if systems are not unified, and given the size of practices and the cost of ICT, it is unlikely that new systems will be present throughout a practice. Consequently, clinicians may be unwilling to utilise ICT to its full capacity for fear of security breaches, or be unwilling to spend the money to secure ICT systems due to lack of knowledge or lack of priority in already stretched budgets.

The design of ICT systems has also been cited as a key barrier to implementation and user acceptance. Medical informatics is littered with stories of systems failure and poorly designed systems. As Shortliffe has argued:

Early enthusiasm can rapidly turn sour if the products of research are not responsive to real-world needs and sensitive to the logistical requirements of the practice settings in which clinicians work. [96]

It has also been demonstrated that users will not change their behaviour and embrace technology unless they are convinced of the benefits that such a change would bring.[97] This highlights the need for the push for change to be all-encompassing. In practice, all potential users need to be convinced of the benefits of ICT. Research has found that users are unlikely to adopt ICT without support from senior team members of a team.[98] Heathfield and Wyatt have argued that the lack of user involvement is a major factor in ICT failure; a finding also cited in recent discussion surrounding NPfIT.[99] Research has also identified that user satisfaction with ICT and consequently utilisation is correlated with user perceptions regarding a systems effect on productivity rather than its effect on the quality of care.[100] [101] [102] However, despite the available literature on ICT in primary care, there appears to be a gap in the literature regarding the flows of information in primary care and the modes of communication within practices as a whole.[103] [104] Much has been made of individual ICT systems or applications but, to date, communication within general practice remains a relatively under-researched area.

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[96] Shortliffe, E.H. (1987) Computer Programs to Support Clinical Decision Making. *JAMIA* **258** p62
[97] Marco, A.P. & Buchman, D. (2003) Influencing Physician Performance. *Quality Management in Healthcare.* **12** (1) 42-5.
[98] Reeve, R. & Rose, G. (1999) The Role of Top Management in Supporting the Use of Information Technology in Australian Hospitals. *Australian Health Review* **22**, 151-160.
[99] Heathfield, H.A & Wyatt J. (1993) Philosophies for the Design and Development of Clinical Decision Support Systems. *Methods of Information in Medicine.* **32** (1) 1-8.
[100] Kaplan, B. (1995) Information Technology and three studies of clinical work. *ACM SIGBIO Newsletter***15** (2) 2-5.
[101] Igbania, M., Livari, J. (1995) Why Do Individuals Use Computer Technology? A Finnish Case Study. *Information Management* **29** 227-238.
[102] Lee, F. Teich, J.M., Spurr, C.D., & Bate, D.W (1996) Implementation of Physician Order Entry: User Satisfaction and Self Reported Usage Patterns. *JAMIA* **3** 42-55.
[103] Griffin, E.M, Vidgen, G.A. & Hepworth, J.B. (1994) Information Use, Information Perceptions and Information Flows in Primary Care Medical Practice. *Computer Methods and Programs in Biomedicine* **43** 207-11.
[104] Coiera, E. (2000) When Conversation is Better than Computation.*JAMIA* **7** (3) 277-286.

It can be argued that to some extent technology is self-perpetuating, and has created as many problems as it has solved and attempted to solve. This, as already mentioned, is particularly true in medicine. ICT to a certain extent has been seen as a panacea for all organisational problems, but it can be argued that ICT is not the magic bullet for all such problems. If ICT is not implemented in an acceptable way, then an inefficient old process + an expensive new ICT only = an expensive inefficient new process. But ICT has also increased issues of risk. For example, as the electronic record replaces the paper record, the level of risk increases. At the most basic level, if a clinician uses a paper record it is possible that their pen may run out or that may they spend a few extra seconds deciphering a colleagues' handwriting. An EHR, on the other hand, carries with it the possibility of a computer crash and the loss of valuable clinical data and time. The issues of interoperability have been briefly mentioned earlier, but essentially there are a number of individual systems in use in general practice that do not allow for interaction between systems, thus limiting communication flows and information sharing across NHS sectors. Under NPfIT, standard clinical systems are to be provided to address this. However, the scale of this task has been somewhat under-estimated and the diversity of systems already in place, together with the enormity of the task in moving a practice to a new system (and to some degree user resistance) has contributed to delays in delivery of the programme. As a result, other systems, often in-house developments have continued to be developed and introduced by individual practices to fill this delivery gap as other components of NPfIT are introduced. However, as Majeed has argued, neither the government nor the system suppliers have yet created a system whereby discharge letters, clinical records and letters can be exchanged between users. It is anticipated that this will be addressed by the introduction of NCRS and other parts of NPfIT.

At present, this creates a substantial workload, particularly pronounced in larger cities such as London. In a practice of 9,000 patients (marginally above the average size of a London practice), approximately 20% leave and join each year, which translates as 40 sets of notes to be sent out and received each week.[105] It is not my

[105] Majeed, A. (2003) Ten Ways to Improve Information Technology in the NHS. *BMJ* **326** p202-204.

intention to address all of the barriers to ICT implementation, but merely raise awareness, as it is evident that primary care is at a crossroad; there is an attempt to fulfill government directives of computerisation and NPfIT, but to date, the tools provided by the government and systems suppliers alike have not made this possible.

1.8 The Medical Record: A Key Communications Technology

One has reached the conclusion that the key to good general practice is the keeping of good clinical records. Time and again one has seen that a quick glance through a well-kept record provides either the diagnosis or an essential point in the treatment.[106]

Medicine is a complex profession characterised by uncertainty. Every patient and clinical encounter is unique and although disease trajectories may often have similar inherent clinical characteristics, the actual presentation is never truly accountable or predictable. For this very reason, the individuality of the patient encounter needs to be documented in the form of the medical record, which is an established artefact in the delivery of efficient and effective healthcare, containing the details of the doctor/patient interaction and past medical history. As Weber highlighted in his theory of bureaucracy, files and documents are an essential part of the modern organisation, in both the public sector and the advanced institutions of capitalism. The modern medical organisation, in this sense is no exception. Both time and money are dedicated to documenting information regarding patients and medical records are at the centre of good medical practice. As argued by Levinson:

The physician is an information manager who acquires, processes, stores, retrieves and applies information related to 1) individual patient history and clinical course, 2) diagnostic and therapeutic protocols, 3) disease patterns in patient populations, 4) functioning of the healthcare system and 5) the vast store of published knowledge. Little occurs in the clinical encounter that is not in some way related to obtaining, processing, or applying information. Optimal performance of clinical information tasks has for years exceeded the cognitive capability of the human mind. [107]

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[106] Taylor, S (1954) *Good General Practice*. Oxford. Oxford University Press.
[107] Levinson, D.J. (1983) Information, Computers, and Clinical Practice. (Commentary) *JAMIA* **249** (5) 607-9.

Therefore, the medical record is a crucial artefact required to carry out these processes. Furthermore, records are multipurpose. They serve as an aide memoir and as an essential means of communication between healthcare professionals. It is a legal document that also serves as a monitoring, research, audit and financial planning tool. The record contains essential information and communications such as the notification of discharge from hospital, prescriptions dispensed and a record of symptoms. Data contained within the record is constantly interpreted, reinterpreted, conceptualised in the context of its production and communicated between members of the general practice. As such, Heath has argued that the medical record works to preserve the consultation in general practice.[108]

Nevertheless, given the transient and highly mobile nature of traditional, paper-based records, this documentation has the potential to go astray and thus the paper record has the potential to be an incomplete document and therefore facilitate incomplete communication and information. As already discussed, over the past decade there has been an increasing focus on the EHR. The *NHS Information Strategy, National Service Frameworks* and the *NHS Plan* have all promoted the use of EHRs. However, as shall be discussed, the record in any format is limited in its effectiveness unless it is accessible and usable by those who interact with the patients. The purpose of patient records is simple: to provide the right information, to the right person, at the right time and place. The patient record, be it electronic or paper, is a contemporaneous list of entities about an individual's health, consisting of text and read codes forming an individual narrative. Given the importance of the medical record as a key piece of technology in primary care, with information storage, retrieval and communication capacity, a discussion of the paper and electronic record is required. As Berg has argued:

The medical record figures as a fundamental, constitutive element of medical practice.[109]

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[108] Heath, C. (1982) Preserving the consultation: medical record cards and professional conduct. *Sociology of Health and Illness* **4** 56-74.

[109] Berg, M (1996) Practices of Reading and Writing: The Constitutive Role of the Patient Record in Medical Work. *Sociology of Health and Illness.* **18** (4) 499-524.

The Paper Record

The GPs' Terms of Service (the details of the contract held by GPs with the NHS) originally stated that GPs would keep records on forms provided to them by the Secretary of State. Therefore all GP records were supposed to be kept on the traditional paper-based record, the 'Lloyd George' introduced by Lloyd George in 1912.[110] This is an A5 envelope (7" x 5") containing a number of cards and various paper documents such as referral letters and lab test results. However, it is worth noting that given the Terms of Service, initially any GP keeping records on a computer and not in possession of an additional paper copy was in breach of this contract. It was not until 2000 that the Terms of Service were changed and GPs could keep electronic records without the need for a paper copy[111] subject to them being compliant with conditions that were established by their local health authorities.

The front of the paper record contains basic patient information: the patient's name, address, date of birth and NHS number. Each consultation is documented as a single entry in the record. The record then follows the patient wherever they move within the UK and can only be deleted upon the patient's death. However, it can be argued that, to a certain extent, the record actually dictates the structure of the consultation. At the start of the consultation, the doctor consults the most recent entry in the medical record, allowing them to assess whether the patient is presenting with the same illness or a new condition. Traditionally, the paper-based record has allowed for clinicians to document a rich narrative of patient care without restriction, allowing for formal or informal notes and diagrams to be documented. The paper record also facilitates the inclusion of diagrams/drawings/x-rays, which is something not yet fully achievable in an EHR, where they currently have to be scanned in separately. The paper record through pattern recognition and its inherent structure may help the doctor recall more about the patient than can be ascertained from a computer screen. As it has been suggested:

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[110] Honisgsbaum, F. (1979) *The division in British Medicine. London Kogan Page p94.*
[111] NHS Executive (2000) *ElectronicPatient Medical Records in Primary Care. Changes to the GP Terms of Service.* NHS (General Medical Services) Amendment (No.4) Regulations 2000- Statutory Instrument No.2383. NHS Executive Leeds.

To use a paper-based patient record, the reader must manipulate data, either mentally or on paper, to glean important clinical information.[112]

The very real and tangible nature of the paper record affords it a status and familiarity that can not be achieved through an EHR. The paper record also can present much more information and communicate in extremely subtle ways. For example, the relative thickness of a file can indicate: a new patient, elderly patient or extensive medical history. This can not be easily gauged from the front page of an EHR. The use of different colour pens, different handwriting and the positioning of entries on the paper can all serve as useful tools when reading/interpreting or adding to a paper record. As Heath and Luff have summarised, paper is:

Manipulable, portable, dismantlable, ecologically flexible and tailorable.[113]

Nevertheless, the paper record has some very well-documented weaknesses such as lack of durability, haphazard and illegible handwriting, loss, and inaccurate recording/interpretation of data.

An audit by the Royal College of Physicians (RCP) looked at 2292 entries from paper records of 149 admissions in five hospitals in 2002. The findings were somewhat disconcerting: 9% of records had no list of admission medications, 35% had no problem list (symptoms) and 17% of discharge summaries had no record of diagnosis. It is even more worrying when we consider the paper record as a legal document. In the same study, 22% of records had pages without patient names, 8% of entries were unsigned and 11% were undated (including 23% in one hospital). With such a high potential error rate it is perhaps not surprising that the government and the ICT industry are promoting the EHR. Although this study focused on hospital records, it more than adequately identifies the potential limitations and hazards of the paper record.

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[112] Tang, P.C. & McDonald, C.J. (2001) 'Computer-based Patient-Record Systems' In: Shortcliffe, E.H & Perreault, L.E. (eds), *Medical Informatics and Computer Applications in Healthcare and Biomedicine.* New York. Springer. 327-358.

[113] Heath, C & Luff, P. (1998) Mobility in Collaboration *CSCW Proceedings* Seattle, ACM Press 305-314.

One of the most problematic and dangerous facets of the paper record is the requirement of handwriting. A record written by one clinician and read by another can potentially lead to misinterpretation and if a history, particularly prescription history, is misread it can lead to fatalities. As one clinical risk manager argued:

Patient records are not just for individual doctors, but are a way of communication with other doctors and healthcare professionals. If they can't be read then the doctors are failing in their duty to communicate effectively.[114]

Korpman's view that: *the paper record is obviously a poor tool for patient care delivery*[115] is also echoed by others.[116] However, others including Suchman have explored the affordance of paper in the workplace.[117] In the past 15 years the government has focused on the introduction of electronic records and the possibility of the paperless consultation/office. Nevertheless, the paperless office that was foreseen by *Business Week* in 1975 and the Ottery St Mary Practice in Exeter now appears to be an urban myth and instead the drive is for paper-light practices, recognising that to some extent paper is all pervasive and that despite the shortcomings of the paper-based record, it continues to be a highly useful tool in general practice.

In any given day a GP spends a considerable part of their working day communicating and documenting information and, despite the apparent weaknesses of paper records, studies have shown that more information is recorded and quantified when paper records are used as opposed to computers. In fact, it can thus be argued that electronic records lead to minimalist record keeping which presents problems in itself.[118] The very resilience of the paper record despite the inherent weaknesses described, and the fact that it is pervading in many practices where

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[114] Hughes, C. (2003) *BMJ Careers* 30-08-03 s67-68.
[115] Korpman, R.A (1990) Patient Care Automation: The Future is Now; Part 2. The Current Paper System – Can it be made to work? *Nursing Economics* **8** (4) 262-267.
[116] Dick, R.S. & Steen E.B (1991) *The Computer-Based Patient Record: An Essential Technology for Healthcare.* Washington DC: National Academy Press.
[117] Suchman, L. (1987) *Plans and situated actions: the problem of human-machine communication.* New York: Cambridge University Press.
[118] Hamilton, W.T., Round, A.P, Sharp, D., & Peters, T.J. (2003) The Quality of Record Keeping in Primary Care: A Comparison of Computerised, Paper and Hybrid Systems. *British Journal of General Practice* **53** 929-933.

EHRs have been established, introduces a very interesting area for study, demonstrating the importance of the socially organised practices and habits that surround the use of the medical record.[119]

The Electronic Health Record

Computer-based records have been viewed as a long-term goal in healthcare for the last 15 years but, until the introduction of NPfIT, their widespread implementation in reality has proved to be elusive. For many years, the technology relating to patient records has been remarkably stagnant. The *Information Management and Technology Strategy* in 1992 and *Information for Health* in 1998 both argued that the EHR was achievable in the early future. However, the reality was that the software to support the proposed electronic architecture did not exist and neither did the hardware in either primary or secondary care. As discussed earlier, the Terms of Service for GPs also made the transition to EHRs difficult, as it was not until 2000 that the government removed the legal requirement for paper-based records, allowing general practices to legitimately become paperless.[120] The beginnings of the EHR can be seen as far back as the early 1970s, but it is only in the last ten years that serious inroads have been made towards their widespread implementation.

The EHR was in theory designed to replicate the functions of the paper-based record, to provide timely and location-independent access to comprehensive patient data which could include all patient clinician encounters. However, most EHRs, due to their interface design, require that clinicians record the clinical encounter in a different way compared to the traditional paper record. The different types of information such as prescriptions, diagnostic and prognostic information are recorded in separate sections of the structured electronic record. It could be argued that this leads to a loss of an overview of the record as information is stored in separate sections of the record. In the paper record, these details will all be recorded in a singular space as the last documented entry. This separation of information, it

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[119] Fitzpatrick, G (2000) Understanding the Paper Health Record in Practice: Implications for EHRs. *Proceedings of HIC 2000,* Canberra Australia.
[120] Shaw, N.T. (2001) *Going Paperless: A Guide to Computerisation in Primary Care.* Oxford: Radcliffe Medical Press.

can be argued, makes comprehension of the electronic record easier, but only to a skilled navigator. Nevertheless, a small but simple change in the method for recording data can impact heavily on the way healthcare professionals carry out their daily working practice. Individuals have to learn new skills in order to navigate the record efficiently, which are compounded when under pressure in the time-limited consultation. Therefore, it can be argued that the EHR provides the conditions for the imposition of greater discipline and an enforced structure on record-keeping practices.[121]

A key weakness of most EHRs is that of character restriction. That is, the amount of free text that can be recorded is limited, unlike the paper record, and this curtails the discursive capacity of the record, which can be particularly useful when recording a patient's psychological and social issues.[122] This in itself is a particularly powerful, informative communication element of the record. Thus, the information that is stored and communicated on the EHR has to be carefully chosen to ensure optimum communication capacity. Therefore, it can be argued that the computer system to a certain extent removes the clinician's freedom and power to document information, and removes the individual character of the record and the inherent ability to tailor it to the patient, that can be found in a paper record. Indeed, Coiera has argued that:

The result [from the creation of EHRs] has sometime been that systems have been designed primarily for data collection rather than for use by healthcare workers in daily clinical practice.[123]

Furthermore, this new system of documenting information affects the general use of a computer and the electronic record in consultation and thus changes the relationship between the clinician and the technology. The record becomes two-dimensional compared to the multi-layered storytelling version of the paper record. This fundamentally affects the knowledge retrieval process from the document and

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[121] Stein, L. (1997) The Electronic Medical Record: Promises and Threats. *World Web Journal* **2** (3).
[122] Greatbatch, D., Heath, C., Campion, P. & Luff, C. (1995) How do desk-top computers affect the doctor-patient interaction? *Family Practice* **12** (1) 32-36.

[123] Coiera, E. (1997) *Guide to Medical Informatics, the Internet and Telemedicine.* London, Chapman and Hall, p282.

the overall navigation of the record, and the descriptive ability of the record can become undermined. There is also the problem that the detailed narrative and data previously available in the paper record cannot necessarily be recorded in the EHR either due to the lack of adequate computer training, which is particularly common, or from the inherent software limitations built into the system. The system therefore has the power to determine the information that the doctor requests from the patient and thus curtails the freedom and professional power of the doctor to explore and document the clinical narrative. Whereas once the clinician controlled the medical encounter and had the freedom to choose what knowledge to store, recall and apply, technology it can be argued through the use of the electronic record and its specific modalities controls the development and progression of the clinical encounter. In this sense, it is possible to argue that ICT has de-personalised medicine and that the power lies with the technology, which consequently can affect healthcare communications and information flows.

It can further be argued that the systems design formalises a once informal procedure, ultimately reshaping the clinician's actions and the traditional ways of socially organised working. Technology is therefore insensitive to the contextual reasons for the existence of those practices. Systems designed and implemented by governments, it can be argued, do not necessarily have the user's context in mind, but rather provide a modality of control for the government and therefore are likely to be met with resistance. This will be a key area of interest to watch as the NCRS and other components of NPfIT are implemented.

The location of information relevant to an individual patient is also a factor for consideration. Currently a patient's health and treatment information is, more often than not, fragmented across several locations and is stored differently in different organisations. Some data will be stored on paper, some held electronically but crucially, electronic systems are on the whole not capable of sharing that information due to the issues of confidentiality, data protection and security. At present, there is no guarantee that any clinical information disclosed electronically will only be

accessed by those authorised personnel and this presents serious consequences for the future of the EHR.

When the EHR was suggested, a number of substantial potential benefits were outlined. By storing all a patient's data electronically, this would be of greater convenience to those delivering care, but would also foster a confidence in both the patient and the clinician that all the information was available to anyone treating the patient. It would also lead to increased efficiency across the various sectors of the NHS, as users would be able to share information with greater ease and this would lead to considerable time savings, improved care and the reduction of medical error as all information and treatment history would be accessible.[124] It was also suggested that the use of an EHR would lead to less time being spent collecting and using information. This intra-agency accessibility would allow for anyone treating the patient to access the relevant health information and in theory allow for the provision of seamless care. However, as previously discussed, there exist substantial concerns regarding all parties having universal access to all patient data. Despite the proposed benefits of the EHR, this is not to suggest that the 'reading' or 'interpretation' of the EHR will be superior to that of the paper record, but rather that information will be instantly available to those who require it. Nevertheless, how that information is interpreted is entirely at the individual's discretion.

In April 2000, the pilot ERDIP was established. The aim of this programme was to *provide the opportunity for in-service development and demonstration of best practice and progress towards shared EHRs.*[125] The programme focused on four key Demonstrator Communities (County Durham, Tees Valley, Cornwall and South Staffordshire) to demonstrate the use of EHR and information-sharing across health and social care. A further 13 communities were added in June 2000. Each of the communities focused on a different area of EHR, and utilised a different approach to the design and implementation of EHR, including patient access and work around *National Service Frameworks* and access out of hours. However, it should be noted

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[124] NHS Executive (1998) *Information for Health. An Information Strategy for the Modern NHs 1998-2005. A National Strategy for Local Implementation.* NHS Executive London. p24.
[125] ERDIP http://www.nhsia.nhs.uk/erdip/pages/backgroundtoerdip.asp [Accessed 01-08-04].

that ERDIP was never intended to present a national solution, but rather it was developed to explore and test different approaches to developing electronic records systems. Nevertheless, some of the findings from the ERDIP study are being used to inform NPfIT and the development of NCRS.

There is substantial pressure from both clinicians and the government to create more user-friendly EHRs, driven by issues of cost-effectiveness, efficiency and the reduction of medical errors that often arise from illegible medical records. The Chief Medical Officer of the National Patient Safety Agency estimated that:

850,000 incidents and errors occur in the NHS each year.[126]

Consequently, the government has been very keen to implement EHR technology on the grounds that this, they believe, would not only reduce errors within the NHS but would also reduce overall costs. In the ideal world of a paper-light or paperless office, EHRs would allow an interface with laboratory systems, secondary and tertiary care providers and pharmacies. The EHR offers the promise of convenience, accessibility and most importantly, accuracy.

It has been suggested that paper records are:

...a dinosaur long overdue for extinction...by far more useful and reliable automated systems.[127]

It can be argued that in many ways paper no longer meets the needs of modern clinical practice, but the traditional method of the paper record brings with it trust and accountability in an existing system. Despite the government's focus on ICT and the introduction of EHR technology, the paper record continues to be a very real and possibly dominant mode of communication, information storage and retrieval. The interface between paper and electronic records, their dual or singular use, the storage and retrieval of data will potentially provide rich data for this study.

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[126] NHS Magazine (2003) http://www.nhs.uk/nhsmagazine/story316.asp. [Accessed 15-07-04].
[127] Grimson, J. (2001) Delivering the electronic healthcare record for the 21st century. *International Journal of Medical Informatics* **64,** 111-127

1.9 Management of ICT

The final area to consider is what ICT has not delivered. Or rather, what has been promised and not delivered. As briefly mentioned earlier in this chapter, central government does not have a good record of ICT delivery across any sector. At present the NPfIT is at least four years behind schedule. It was originally planned to be fully implemented by 2010 and has been severely criticised by the National Audit Office, PAC, and the joint Wanless King's Fund report [128] which stated:

The first is the failure [of the programme] to develop an ICT strategy whose benefits are likely to outweigh costs.

A serious criticism is the failure to produce a business case showing benefits outweighing costs:

Implying either the absence of an original business case for investment or investment made in spite of a business case that did not justify the spending.

A further criticism, which the report says may turn out to be the most important:

Is that the NPfIT contracts risk creating monopolies in various areas of the programme.

The report highlights that the awarding of contracts to a handful of exclusive consortia, and the heavy reliance on just two clinical software suppliers, may have a significant bearing on future delivery and the report warns that NPfIT looks to have sacrificed future market competition and choice.

Connecting for Health chose to award a small number of large contracts to consortia charged with designing and implementing the technologies. But they could instead have set out to create a competitive market for IT goods and services.

Furthermore, it continues to highlight the lack of evidence provided for the ICT investments made by NPfIT in particular technologies, quoting British Computer Society concerns about poor value for money from the project. The report concludes:

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[128] Wanless, D., Appelby, J., Harrison, A., & Patel, D. (2007) *Our Future Health Secured? A review of NHS Funding and Performance.* p129.

It is difficult to understand why Connecting for Health is being allowed to pursue a high-cost, high-risk strategy that cannot be supported by a business case.

It is difficult to tell whether NPfIT will deliver usable systems as expected or envisaged by the various users in general and, in particular, whether it will achieve what many perceive as the Holy Grail, namely the electronic transfer of significant patient data – the electronic record. However, given user experience to date, the signs are not overwhelmingly positive at this stage.

However, by understanding how occupational groups are currently affected by ICT, how they communicate and how they domesticate these technologies may provide some insight into ensuring that, technology permitting, the developments of the programme are utilised by all members of general practice and the NHS.

The NHS in undergoing pronounced technological change with the introduction of NPfIT and general practice represents a contained setting in which to explore these developments. In particular, to examine how the various users in general practice communicate and how these communications are affected by the introduction of ICT which ultimately has the potential to disrupt and reshape existing social process, communications and work processes. At a national level, there is significant literature as to the progress of ICT developments in the NHS, but there is little that seeks to understand how individual users at the local level or on a small scale, are experiencing ICT or interact and communicate with each other in the workplace. As such, this thesis seeks to explore the local users' experience of ICT as they domesticate ICTs in general practice. The following chapter examines the theoretical framework for this thesis.

Chapter 2- Theory

2.1 Introduction

ICT has become an integral part of daily life and operations in the business world. In the last 25years it has become an important development within the NHS. But implementation and use of ICT is a complex area. There are many impacts on the user, communications and on the business, some of which are not easy to predict. The research literature in this area examines ICT from a number of varying standpoints, which will be discussed in this chapter. However, the main focus of this chapter will be to review the literature on ICT within general practice using the theoretical framework of the domestication of technology perspective[1] to understand the implementation, consumption and outcomes related to the use of ICT and how it can be applied to my research on two general practices in London. Domestication is the process by which ICTs become fully embedded and accepted within everyday life. Or as Sørensen and Berg have described the framework:

How technology is adapted to every day life and the every day to technology.[2]

This chapter addresses the following:

- communities and communications;
- the role of ICT and information systems;
- the general theory of technology and social relationships –Technological Determinism/Social Construction of Technology/Actor Network Theory;
- research literature on ICT in the NHS and general practice;
- domestication theory; and
- a summary.

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[1] Silverstone R, Hirsch, E et al (1992) Information and Communication Technologies and the Moral Economy of the Household, in Silverstone R, and Hirsche E (eds) *Consuming Technologies*, Routledge London

[2] Sørensen, K.H. & Berg, A-J. (eds), (1992) Technologies and Everyday Life: Trajectories and Transformations, Proceedings from a Workshop in Trondheim, May 28-29 1990, Report No. 5, Oslo: Norwegian Research Council for Science and the Humanities.

2.2 Communities and Communications

Communication processes are all-pervasive in general practice and attempting to re-organise these processes by the introduction of ICT invariably affects one or more of these communication processes. General practice is increasingly made up of a multidisciplinary team, together with a fall in the number of single-handed practices. Nearly a third of general practitioners now work in groups of six or more people.[3] GPs, nurses and other members of the general practice team rely on a body of socially organised tacit practice through which they document information in the patient record, interact and make sense of materials written and communicated by others. But no two people carry out this process in the same way and this, it can be argued is true across the different occupational groups such as doctors and practice nurses.

The ways in which technology and healthcare professionals interact involves complex social arrangements which surround and inform the use of the most basic, mundane artefacts and, consequently, procedures such as documenting patient information are embedded in socially organised procedures and conventions. To put the work of those involved in general practice in its simplest form, there is a reliance on the patient record and an established body of knowledge and communications to accomplish their day to day work. Medical communications are written and assimilated in such a way as to be read and understood by 'insiders', or in other words, those in the medical profession. All codes, abbreviations, and jargon used are in a language understood by those in the community. Therefore, this process of documentation is a socially constructed one, agreed on by the community, for communication within the community.

Theory of Technology and Organisation

Within this community of general practice, members discuss and disclose case details between colleagues and, in this sense, exchange and gain knowledge. To be a member of a community is to essentially engage in the practice of that community.

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[3] DH (1994) *Department of Health and Personal Social Services Statistics for England.* London: HMSO

This is a theory that was first explored by Lave and Wenger, who suggested simultaneous working, learning and communication in terms of both the practice and the community. In learning a practice, by process of involvement, an individual becomes a member of a community of practice, thus understanding the inner workings and talk/language of that community from the inside. In becoming a member of a community, an individual develops a social identity of say a doctor and this in turn shapes the assimilation and application of knowledge. For example, GPs and nurses may share a degree of common knowledge, but they have different attitudes towards that knowledge, shaped by their practice and identity. This will be a valuable difference to explore and analyse in this study.

The idea of situated learning was also explored by Brown et al in 1996 in which they asserted that:

Conceptual knowledge can be abstracted from the situations in which it is situated and learnt.[4]

Such a statement is primarily associated with learning in the classroom. They further argue that:

The activity in which knowledge is developed and deployed, it is now argued, is not separable or ancillary to learning and cognition. Nor is it neutral. Rather it is an integral part of what is learned. Situations might be said to co-produce knowledge through activity. Learning and cognition it is now possible to argue are fundamentally situated.[5]

Yet the idea of learning (and perhaps to boldly say including knowledge acquisition) was exemplified in Lave and Wenger's work, *Situated Learning: Legitimate Peripheral Participation.*

In our view, learning is not merely situated in practice - as if it were some independently reifiable process that just happened to be located somewhere; learning is an integral part of generative social practice in the lived in

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[4] Brown, J.S. & Duguid, P. (1989) Situated Cognition and the culture of learning in McLellan,H. (ed) *Situated Learning Perspective.*New Jersey, Educational Technology Publications, p.19.
[5] ibid

world...legitimate peripheral participation is proposed as a descriptor of engagement in the social practice that entails learning as an integral constituent.[6]

Lave and Wenger further argue that learning is an integral part of *all* situated practice. Learning, it can be argued, is achieved through co-participation and is not based solely in the heads of the individuals, but it is the relationship between learning and the social situations in which it is situated. In such environments we see the increase of tacit knowledge and the formation of Communities of Practice, which are:

Groups of people bound together by shared experience and passion for joint enterprise.

Such communities, it is argued:

Galvanise knowledge sharing, knowledge and change.[7]

This knowledge sharing happens through communication.

Medical Practice

The mainstay of medicine is not the production of knowledge, but its application and communication. Medicine is said to suffer from information overload, and that even the most accomplished doctor suffers from the inability to separate knowledge from information and apply it.[8] This is compounded by the theory of 'bounded rationality', where humans have difficulty making decisions in conditions of limited/imperfect information.[9] However, despite the limiting factor of imperfect information, every-day complex communications are constructed and individuals can thus make decisions. Clinicians work under conditions of uncertainty, a patient may not fully disclose their full history and thus healthcare professionals work with imperfect information and clinical uncertainty and therefore communication and the

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[6] Lave, J. & Wenger, E. (1991) *Situated Learning: Legitimate Peripheral Participation.*Cambridge University Press p.35.
[7] Robinson, P & Heywood, P. (2000) What do GPs need to know? The use of knowledge in general practice consultations. *British Journal of General Practice.* **50** p.56.
[8] Wilson, T.D. (2001) Information overload: Implications for healthcare services. Health Informatics Journal **7** (2) 112-117
[9] Simon, H.A. (1984) *Models of Bounded Rationality and Other Topics in Economics: Economic Analysis and Public Policy Vol 1.* Cambridge Massachusetts: MIT Press

availability of information is crucial. The development of clinical practice guidelines, clinical decision support systems and protocols has gone some way to overcoming this and to enable, to a certain extent, effective decision making.

Within any profession there are varying levels of expertise and with these come varying levels of cognition and different patterns of reasoning and communication. Experts such as those who specialise in urology, and non experts (GPs), group their knowledge differently and have different patterns of reasoning. Experts tend to formulate their knowledge into manageable chunks, but are also more likely to make omissions in knowledge processing, many believing that experience (tacit knowledge) is more important than scientific fact.[10] Grant and Marsden also found that different clinicians used different items of knowledge to solve the same clinical problem.[11] Thus, knowledge is not always applied and/or communicated in any uniform fashion and therefore will provide rich data for analysis in my research. The different members of the general practice team will also interact in different ways and deploy the available ICT and communication channels in different ways and thus their methods of learning and information exchange will be different.

It can be argued that healthcare is collaborative in nature and general practice is no exception. Clark argues that healthcare professionals are engaged in joint activities and in this sense

Two or more people cannot carry out a joint activity without communicating.[12]

Communication accounts for a major part of the information flow in healthcare and a growing body of evidence indicates that errors in communication account for a substantial number of clinical morbidities and mortalities.[13] In a study of Australian general practitioners, 50 per cent of all identified adverse events were associated with

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[10] Patel, V.L., Arocha, J.F., Diermeier, M., How, J. & Mottur-Pilson, C. (2001) Cognitive psychological studies of representation and use of clinical practice guidelines. *International Journal of Medical Informatics.* **63**

[11] Robinson, P & Heywood, P. (2000) What do GPs need to know? The use of knowledge in general practice consultations. *British Journal of General Practice.* **50** p56.

[12] Clark, H.H. (1996) *Using Language* Cambridge University Press, p29.

[13] Coiera, E. (2000) When Conversation is better than computation. *JAMIA* **7** (3) 277-286

communication difficulties.[14] Much of the work surrounding communications in multidisciplinary teams has identified that some communication/information needs are best served by computation and others by verbal communications.[15] [16] Work by McKnight et al has also addressed the perceived information needs and communication difficulties among physician and nurses and highlights the importance of communication in preventing medical errors.[17]

Whilst much work has been done on the doctor/patient communications, little is known about how healthcare professionals communicate with each other and even less is known in regard to communications in the context of general practice. It can be argued that ICT allows users to give different values to different communications. For example, users can decide on the time and place of the communication such as the use of email rather than face-to-face contact. In doing so, they can decide the time and from what location they engage in the communication. This can be thought of as asynchronous communication which includes note writing, voice mail, where the individual can deal with the communication at a time of their convenience. Interruptive or synchronous communication, on the other hand, is verbal, which requires the interaction of two parties via telephone or face-to-face. Interruptions, however, can lead to diversion of attention, forgetfulness and errors. It has been argued by Coeira, that clinicians have a preference for information through conversation rather than from printed materials and that there is a synchronous bias to communication.[18] Furthermore, a study by Tang et al, found that 60% of clinician time in practice is devoted to talk.[19]

Other work that has been undertaken on communications has identified a number of factors that can influence communication including: the nature of communication

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[14] Bhasale, AL Miller, GC, Reid, SE et al (1998) Analysing potential harm in Australian general practice: an incident monitoring study. *Medical Journal of Australia* **169** 73-6.
[15] Coiera, E. (2000) When Conversation is better than computation. *JAMIA* **7** (3) 277-286
[16] Parker, J & Coiera, E. (2000) Improving Clinical Communications: A View From Psychology. *JAMIA* **7** (5) 453-61.
[17] McKnight, L.K., Bakken, S. & Cimino, J.J. (2002) Perceived Information Needs and Communication: Difficulties of Inpatient Physicians and Nurses. *JAMIA* **9** (6) S64-S69.
[18] Coiera, E & Tombs, V. (1998) Communication Behaviours in a Hospital Setting: An observational Study. *BMJ* **316** 673-76.
[19] Tang, P., Jaworski, M.A., Fellencer, C.A., Kreider, N., LaRosa, M.P. & Marquardt, W.C (1996) Clinical Information Activities in Diverse Ambulatory Practices. *Proceedings AMIA Annual Fall Symposium.*

infrastructure, nature of work being undertaken and the practices that are routinely applied by individuals. A limiting factor in any communication is the cognitive capacity of individuals to undertake their work and studies of high cognitive workload have shown that error or inefficiency occurs when cognitive limits are exceeded.[20] Therefore, these variations in communications, interactions between the various actors and differing information flows will provide valuable data for this research.

2.3 The Role of ICT and Information Systems

ICT encompasses a wide range of technologies including telephones, mobile phones, pagers and computers, as well as the applications associated with them such as voicemail, electronic mail and the internet. The so-called 'digital revolution' has transformed our everyday existence and society as a whole, whether that is the business world or the home. The functions and capabilities of ICT are rapidly changing to meet the needs of current users, but they also developing to meet the demands of future users, such as faster connection speeds to the internet and increased functionality of ICTs. In particular, they have had a profound effect on the work place and on the ways in which we work[21] and communicate with others. Indeed, as Silverstone has highlighted:

Our century has seen the telephone, film, radio, television become both objects of mass consumption and essential tools for life.[22]

In every day life, in the broadest sense, we as individual users have a choice about whether we use and interact with ICTs. For example, it is largely a user's choice whether they own a mobile phone, or a computer at home. But in the business world, this choice is not so evident or free. Largely ICTs will be adopted on behalf of the user, and the user is then obligated to learn skills (if required) to interact and utilise the technology. Of particular interest and relevance to this research, is that not only is

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[20] Reason, J. (1990) *Human Error* Cambridge University Press: Cambridge.

[21] Mansell, R and Silverstone, R. (1996) *Communication by Design: The politics of information and communication technologies.* Oxford: Oxford University Press

[22] Silverstone, R. (1999) *Why study the media.* London: Sage publications p4

the ICT used in general practice being appropriated and adopted on behalf of the user, but the introduction of the ICT and its various components is being carried out under the direction of central government. The domestication perspective is critical of discourses of transformation, which de-emphasise the issue of choice in the appropriation of technology. This raises some interesting questions regarding how these ICTs are domesticated, which will be discussed later in this chapter.

However, using the examples of the mobile phone and the computer, an important element of ICT becomes evident. In short, these technologies are no longer necessarily specific to an individual domain. Where once the computer was seen as a tool of business, it is now present in a large number of homes within the UK. Given the lack of designation of such ICTs to any one environment, this can lead to an increased blurring between the home and the office, particularly with the advent of home working. This raises the question as to what is considered the home and what is considered the office and whether ICTs are really specific to either domain.

ICT is also credited with reducing the constraints of time and space in daily working practice, allowing for greater interdependence and faster exchanges between workers and organisations and leading gradually to increased efficiency and accountability.[23] Modern industries have clear communication systems regardless of their structures and complexities. Yet, it can be argued that despite the advances in ICT, communications and information flows in primary care are lagging behind.

A considerable facet of the use of ICT is related to communication in one form or another. But communication is itself a feature of all social interactions, and increasingly computer mediated communications (CMCs) as well as non-computer mediated communications (NCMCs) are present in all social interactions. The literature on CMCs suggests that CMCs can increase the range, capacity and speed of

[23] Cairncross F. (2001) *The Death of Distance: How the Communications Revolution is Changing Our Lives*. Boston, MA: Harvard Business School Press.

organisational communication.[24] [25] Nevertheless, despite the increased and continued investment in ICT, Landauer has argued:

The fact that many serious and competent scholars can conclude that there has been little net productivity gain attributable to this technology seems enough proof that something is wrong. [26]

However, information systems and technology also function in diverse ways related to political and social processes that exist in the organisation.[27] Information systems in the workplace in particular, have considerable influence as objects of control which not only facilitate co-ordinated action, but also constrain the outcomes of individuals' actions. As Orlikowski has argued, ICT structures actors' daily work:

Through information storage, retrieval and transmission capabilities, through providing means to accomplish tasks, through imposing a rhythm and schedule on the flow of computer-based work, through providing technical vocabularies to mediate meanings ascribed to objects and relationships, and through coordinating activities over time and space.[28]

Furthermore, ICT becomes the mechanism around which interests are negotiated, counter claims articulated and political processes explicated.[29] However, the specific control that an individual ICT can exert is dependent largely on its interaction with the user and their understandings and perceptions of that technology.[30] In order to understand the full potential of ICTs, it is not only necessary to understand the ICTs themselves, but also the people, the environment, social issues, professional values and jobs and daily processes of those who are expected to use the ICT. There is a wide body of research that looks at factors such as age, gender and economic

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[24] Culnan, M.J. & Markus, M.L. (1987) 'Information Technologies' In: Frederic, M. et al (eds), *Handbook of Organisational Communication: An Interdisciplinary perspective.* Newbury Pak. Sage p 420-443.
[25] Sproull and Kiesler 1991
[26] Landauer, T. (1995) *The Trouble with Computers: Usefulness, Usability and Productivity.* Massachusettes: MIT p14.
[27] Markus, L.M. (1983) Power Politics and MIS implementation. *Communications of the ACM* **26** (6) 430-44.
[28] Orlikowksi, W.J. (1991) Integrated information environment or matrix of control? The contradictory implications of information technology. *Accounting, management and Information technologies.* **1** 9-42.
[29] Burchell, S & Clubb C, et al (1980) The roles of accounting in organisations and society. *Accounting, Organisations and Society* **5** p5-27.
[30] Zuboff, S. (1988) *In the age of the smart machine: The future of work and power.* New York: Basic Books.

circumstance, all of which have an impact on the way that ICT is used, but these elements are not considered directly in my research. This thesis concentrates on members of two general practices from the perspective of individuals and as members of occupational groups, and, as such, having a specific role in that practice in which age, gender and economic circumstance are not directly applicable or appropriate to consider.

2.4 General Theoretical Approaches to Technology and Social Relationships

This section explores the outcomes of technological change on work practices and communications, and how the implementation of technology influences and interfaces with external parties, which in the case of general practice is considered to be day-to-day tasks and business processes. Traditionally, the use of ICT has focused on work-orientated and related practices, which have led to frameworks that identify the use of ICT characterised by the work place and the specific work-related tasks. In this sense, ICT could be viewed as being outcome or goal orientated. But with the increasing use of ICT in different spheres, (both in the domestic and work domain), and the increasing daily presence of ICT, the frameworks for analysing ICT have changed and developed accordingly. It would be tempting and, in many cases familiar to analyse the implementation of ICT in general practice, for which there is considerable literature.[31] [32] However, my area of interest goes beyond the basic premise of implementation and the well-documented pitfalls associated with this.

The interaction between technology and general practice, which is the central empirical theme of this thesis, and the processes by which ICT is embraced and becomes embedded in the lives of individuals and groups has been the focus of considerable research, from a number of different theoretical viewpoints. Some

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[31] Toth-Pal, E., Wardth, I., Strender, L-E. & Nilsson, G. (2008) Implementing a clinical decision-support system in practice: A qualitative analysis of influencing attitudes and characteristics among general practioners. *Informatics for Health and Social Care* **33** (1) 39-54.

[32] Crosson, J.C., Stroebel, C. Scott, J.G. Stello, B. Crabtree, B.F. (2005) Implementing an electronic medical record in a family medicine pratice: Communication, decision making and conflict. *Annals of Family Medicine* **3** (4) 307-311

research has concentrated on the marketing, consumption and design of products, focusing on early adopters or laggards.[33] Other approaches have concentrated on user involvement in their design or the sociological processes of their daily use, including a number of different political, sociological, economic and managerial perspectives. The structural context of healthcare organisations can also influence the adoption of ICT into clinical practice.[34] Other factors such as the participation of professions into the decision making and design of ICT and the management support have also been identified as having an impact on the adoption of ICT.[35] [36]

However, a growing area of research, and of particular interest to this thesis, is both the domestication and how users make sense of ICT within their organisations and their associated professional action.[37] [38] [39] Before examining the domestication framework in detail, it is necessary to consider alternative theoretical frameworks. There are a number of theories and approaches that could be considered appropriate as a theoretical framework for this thesis. The relationship between ICT and society and in particular the introduction of new ICTs, is often assumed to be of a deterministic nature, that is, the introduction of a new ICT will result in social change. Indeed, the majority of the time we take technology for granted. When an individual acquires a new piece of technology, particularly in the home environment, it is generally assumed to meet a set of needs and provide benefits for that individual. Nevertheless, the full potential of that technology will largely be limited to a small group of experienced users and, as such, the introduction of any new and unfamiliar technology can often be met with some resistance from the user. This is a behaviour commonly demonstrated in the work place. As a result, there have been several

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[33] Rogers, E.M. (1995) *Diffusions of innovations.* New York

[34] Kimberley, J.R. & Evanisko, M.J. (1981) Organisational innovation: The influence of individual, organisational and contextual factors on hospital adoption of technological and administrative innovations. *Academy of Management Journal* **24** (40) 689-713.

[35] Gagnon, M.P. et al (2005) Telehealth adoption in hospitals: An organisational perspective. *Journal of Health Organisation and Management* 2005 **19** (1) 32-56.

[36] Lapointe, L. & Rivard S. (1999) Implementation of clinical systems. *ASAC Conference.*

[37] Orlikowksi, W.J. (1991) Integrated information environment or matrix of control? The contradictory implications of information technology. *Accounting, management and Information technologies.* **1** 9-42.

[38] Orlikowksi, W.J. & Robey, D. (19911) Information technology and the structuring of organisations *Information Systems Research* **2** (2) 143- 169.

[39] Prasad, P.(1993) Symbolic processes in the implementation of technological change: A symbolic interactionist study of work computerization. *Academy of Management Journal* **36** (6) 1400-29.

technologies and applications designed which have subsequently been abandoned or modified due to poor uptake by users.

However, before the possibility of user rejection of the technology, it is very common for users to modify their technology to fit their individual needs. For example, where possible, they may add new functionality by downloading additional software and customise the technology to suit their needs. Nevertheless, this feature is not true of all technologies, for example televisions. Technologies however, it can be argued, mirror social relations and reproduce and embody a complex set of heterogeneous elements that contribute to the way we live and organise our lives. Winner articulates that technology is not neutral and thus goes against those who advocate that all that matters is how technology is used.[40] Fundamentally, he argues that technology can be political in two specific ways. Firstly, technologies can be designed consciously or unconsciously, to open or close certain social options, such as the design of the overpass on the road to Jones Beach in New York, which prevented buses reaching the beach due to height restrictions and thus ensured that only the upper classes who didn't rely on public transport could reach the beach. In this sense, certain assumptions about users and society can be built into technology and that these assumptions can create constraints on the ways in which users can interact with the technology and society. Winner further argues that although technologies vary in the degree to which they are political, some technologies are intrinsically political. It may be a mistake to view technologies as requiring particular patterns of social relations to go along with them, but some technologies are in given social circumstances, more compatible with social relations than others. Therefore, when we adopt a technology we are adopting a lot more than just a technical artefact. Technology embraces social, cultural, economic and political contexts. This in itself provides very rich data for analysis.

In the past, many have pointed to the power of technology as something that would dominate our everyday lives and to an extent control our very existence. In this

[40] Winner, L. (1999) Do artefacts have politics? In: MacKenzie, D. & Wajcman, J. (eds), *The Social Shaping of Technology*. Buckingham: Open University Press.

sense, technology was viewed as all powerful and oppressive. But this has yet to become a reality. As Bloomfield and Coombs have argued:

If having a computer was equated with power, then the proliferation of computers through organisations could indicate a decentralisation of power. [41]

It can also be argued that ICT is both a condition and a consequence of power relations in organisations and society at large. Therefore, practices that surround and involve ICT need to be analysed in the context of a wider set of social and political relations. But the extent to which ICT has become part of our daily lives cannot be underestimated, as Latour explains:

It is no longer clear if a computer system is a limited form of organisation or if an organisation is an expanded form of a computer system. [42]

Winner also advocates this position, observing how technology becomes so woven into the texture of everyday being, that it ultimately becomes indivisible from social life.[43]

Science and Technology Studies (STS) have been the starting point for a number of theoretical approaches to ICT. STS assert that no neat distinction can be drawn between the social and the technical aspects of change; hence the concept of socio-technical change, but rather that technology is a carrier and mediator of social relations, meanings and interests. There are three significant standpoints in regard to ICT: positivist, interpretive and critical research. Myers describes the positivist approach as reality that is objectively given and that it can be described by reference to measurable properties that are independent of the researcher. Interpretive research considers that reality can only be accessed through social constructions such as language, consciousness and shared meanings. The interpretive approach argues that human beings interpret the world in which they inhabit and that the social world is

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[41] Bloomfield, B & Coombs, R. (1992) Information Technology, Control and Power: The Centralisation and Decentralisation Debate Revisited. *Journal of Management Studies* **29** 459-484.
[42] Latour, B. (1996) Social Theory and the Study of Computerised Worksites in *Information Technology and Changes in Organisational Work,* Orlikowski,W.J, et al (eds) Chapham and Hall, London. 295-307.
[43] Winner, L. (1999) Do artefacts have politics? In: MacKenzie, D. & Wajcman, J. (eds), *The Social Shaping of Technology.* Buckingham: Open University Press.

pervaded with meanings in a way that the natural world is not. Finally, critical research makes the assumption that social reality is historically constituted and that people are constrained by their action by various forms of cultural and political domination.[44]

Technological Determinism

A common approach to ICT and information systems has been to focus on the technical aspects and treat social elements as the context in which its development and adoption take place. Technological determinism is the theory that technology is an autonomous force that changes society and argues that the application of technologies will lead to specific uses and outcomes.

This approach contends that only the most appropriate technology is adopted and that those who choose to adopt this will prosper and assumes that all outcomes of technological change are attributable to the technological rather than the social.[45] The technological determinist view is a technology-led theory of social change: technology is seen as the prime mover in history. Furthermore, this framework contends that the development of new technologies dictates the directions of social and organisational change. It assumes that technological change is an independent factor, impacting on society from outside of society.

Bimber, however, argues that technological determinism:

Exists in enough different incarnations that the label can easily be attached to a range of views.[46]

He further distinguishes three interpretations of technological determinism. First is the normative interpretation, concerned with how norms of technological practice,

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[44] Myers, M.D. Qualitative Research in Information Systems, MIS Quarterly. http://www.misq.org/misqd961/isworld/

[45] Grint, K. & Woolgar, S. (1997) *The Machine at Work: Technical work and Organisation.* Cambridge: Polity Press.

[46] Bimber, B. (1994) 'Three Faces of Technological Determinism' In: Smith,M.R. & Marx, L. (eds.), *Does Technology Drive History?: The Dilemma of Technological Determinism.* Cambridge, MA: MIT Press pp. 79-100

such as efficiency and productivity, have become independent from political and ethical values. Second is the nomological interpretation, in which technology is seen as the cause of social practice. Third is the unintended consequences interpretation, concerned with the problem that the effects of technology can't be foreseen. He asserts that only the nomological interpretation is both technological and deterministic.[47] Furthermore, only within a narrow definition of technology, namely as artefacts, can there be true technological determinism, since broad definitions of technology, including production processes for example, bring society back into the picture. In its most extreme model, the entire form of society is seen as being determined by technology: new technologies transform society at every level, including institutions, social interactions and individuals. At the least a wide range of social and cultural phenomena are seen as shaped by technology. Human factors and social arrangements in this framework are seen as secondary to development. But this is a flawed statement and arguably passive approach, which has been criticised by Wyatt, who advocates an approach of soft determinism.

Technological determinism assumes that technological development takes place outside society, but it also presupposes that the technological artefacts determine the social consequences of their application. The 'technology as neutral' concept does not assume that technologies have straightforward social effects; leaving space for human choice and intervention. According to the 'social shaping approach', there are always options to decide differently. The 'technology as neutral' approach, however, only considers the second part of 'technological determinism' argument. The 'social shaping' approach also argues that technology itself is not neutral.

Technological development, according to social shaping, however, takes place within society; it is shaped by social, ecological and political factors. Furthermore, new technologies do not develop according to an inherent technological logic; they do not

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[47] Bimber, B. (1994) 'Three Faces of Technological Determinism' In: Smith,M.R. & Marx, L. (eds.), *Does Technology Drive History?: The Dilemma of Technological Determinism*. Cambridge, MA: MIT Press pp. 79-100

follow a predetermined development path but are constructed by humans and are influenced by their needs and interests. This point is demonstrated by Wyatt:

Technologies are social constructions, the outcome of negotiations between relevant social groups. To explain technological developments we need to identify who is involved and what their interests are...Often there is a key actor/entrepreneur who is instrumental in enrolling other actors and defining the scope of the technological frame. A successful mobilisation of arguments, interests or resources may result in closure; the artefact becomes stable and enters a wider world. But users of technical artefacts and systems also possess a degree of what could be described as interpretative flexibility...New artefacts may or may not work, and may or may not be used. Some might fail or be used in unforeseen ways. If the technology fits within the technological frame of its wider community of users, it might acquire momentum. In this way, successful technologies give the appearance of autonomy.[48]

Wyatt therefore suggests extending the approach to the question of how people actually use technological artefacts and how artefacts are involved in the creation of social structures and relationships.

By ignoring the social factors involved in technological change, the result is fragile opaque technologies. Indeed, despite the vast amount of money that has been spent on ICT in the last 10-15 years, there have been a number of well-documented ICT failures that have included: the loss of electronic records, loss of personal data, hardware failure and even fatalities. One such well-documented failure is the official report into the London Ambulance Service Computer Aided Dispatch System which attributed the failure of the dispatch service to the ICT system and the designer's failure to understand the practicalities and constraints of the dispatchers work.[49] If we are to design systems to be used by humans then we need to shape the design of these systems with users' needs in mind and this must include the social elements involved with technology. This argument is further highlighted in a recent report by the Parliamentary Office of Science and Technology, which stated that users' needs needed to be taken into account when designing systems if ICT was to be of benefit

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[48] Wyatt, S. (1998) *Technology's Arrow. Developing Information Networks for Public Administration in Britain and the United States.*

[49] Page, D., Williams, P. & Boyd, D. (1993) *Report of the Inquiry into the London Ambulance Service.* Communications Directorate, South West Thames Regional Authority

to users and it would only be possible to alter ineffectual working practices if systems were based on sound understanding of their needs.[50]

To date, central government and other official bodies have not been proficient at systematically gathering evidence in regard to the benefits of ICT or the diverse needs of users for whom they are trying to develop information systems and ICT. As a result, ICT projects have often gathered more attention when they fail rather than when they succeed, as can be documented by the PAC report in 2000 in which it expressed serious concern at:

The number of government IT projects that are not delivered on time or at all, are completed over budget, and either fail to match specifications or require significant changes before they are satisfactory.[51]

NPfIT is at present demonstrating some of these traits and alongside other government-led ICT programmes has led to a shift in the political agenda, from where the use of new technology was generally viewed as a good in itself to one where ICT projects are treated with caution, scepticism and suspicion.

Social Determinism or Social Constructivism

The social determinist or constructivist approach is the opposite of technological determinism and argues that technology can be understood as an expression of social relations – namely, that technologies are socially constructed by the broader political, economic, cultural and social context.[52] There is also an affordance of technology in its use and through its use and innovation there is interpretive flexibility. This approach suggests that relatively stable social categories explain technological change and concentrates on the investigation of social interactions where technology is purely context for the bigger picture. Social determinism posits the theory that society is an autonomous force that changes technology. This framework involves all

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[50] Parliamentary Office of Science and Technology (2004) Postnote 214: New NHS ICT http://www.parliament.uk/documents/upload/POSTpn214.pdf [Accessed: 28-07-04].
[51] House of Commons Public Accounts Committee. (2000) *Improving the Delivery of Government IT Projects HC65*. London
[52] Bijker, W.E, Hughes, T, & Pinch, T. (1987) *The Social Construction of Technological Systems: New Directions in the Sociology and History of Technology*. MIT Press: Cambridge.

social elements, including political and economical, but does not suggest there is any one dominant social force. Both the social determinist and the technical determinist approach have clear distinctions between technology on one side and society on the other, but the essential argument between them is whether technology is constructed of society or whether society is made up of technology?

Bijker and Pinch, developed the idea of the social construction of technology (SCOT), arguing that there is an inherent interpretive flexibility in technology, referring to the way in which *relevant social groups* have differing understandings of technology. Therefore, ICTs are given different meanings and used differently by different groups. Moreover, these meanings are not static, but rather are fluid and change over time. Thus, in this approach, technical artefacts are described through the eyes of the members of relevant social groups. However, SCOT *points to technology as being through and through social.*[53]

The value and benefit of using SCOT is that it provides a model by which to examine the roles of social groups in determining the choice and forms of technology via different interpretations of different social groups. This framework, however, stops short of total analysis of the situation as it does not include all social groups, but only considers what it describes as relevant social groups. Utilising the SCOT approach of focusing on the interpretive flexibility of artefacts by social groups ignores some of the possible social influences of economic behaviour, socioeconomic factors and gender issues and therefore would be a very limited approach to utilise as a theoretical framework in this study. But the construct of users having different understandings of ICTs, and consequently different meanings and values attached to them, is a valuable angle to consider as a strand of research and indeed is useful when considering the domestication framework as shall be discussed later in this chapter.

[53] Bijker, W.E, Hughes, T, & Pinch, T.(1987) The Social Construction of Technological Systems: New Directions in the Sociology and History of Technology. MIT Press: Cambridge.

Diffusion of innovation Theory

Diffusion of innovation theory was advanced by Rogers who defined diffusion as:

The process by which an innovation is communicated through certain channels over time among members of a social system.[54]

The diffusion of innovation theory seeks to explore patterns of adoption and it is essentially a descriptive tool that has been widely used as a theoretical basis for information systems research. The theory examines the characteristics of individuals and communities, the social factors, and the process of adoption and decision making within the context of the introduction of new products and their diffusion over time.

Rogers argues that a number of key issues influence the diffusion and adoption of innovation: the concept of innovation, its diffusion over time, personal influence and opinion leadership, the adoption process, the roles of the adopters categories, and the role of the social system. Given that decisions are not authoritative or collective; each member of the social system faces their own innovation-decision which is framed by the innovation, the types of communication channels, time or the rate of adoption and the social system. The innovation-decision then follows a five step process, although an individual may reject and innovation any time during this process:[55]

1) Knowledge – the individual becomes aware of an innovation and has some understanding of how it functions;
2) Persuasion – the individual forms a favorable or unfavorable attitude toward the innovation and actively seeks information about the innovation;
3) Decision – the individual engages in activities that lead to a choice to adopt or reject the innovation;
4) Implementation – the individual employs the innovation;
5) Confirmation – the individual finalises their decision to use the innovation and evaluates the results of an innovation-decision already made.

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[54] Rogers, E.M. (1995) *Diffussion of Innovations* Glencoe: Free Press New York
[55] Ibid. p162.

Within this process, individuals will adopt an innovation at varying speeds. As demonstrated by Rogers in studying the diffusion of innovations within communities, the most striking feature of diffusion theory is that, the social nature of adoption, namely that for most members of a social system, the innovation-decision depends heavily on the innovation-decisions of the other members of the system and thus individual adoption is only part of a broader community adopting. In relation to the application of this theory to medicine, Gagnon et al[56] have reviewed the barriers and facilitators to the implementation of EHRs and the interventions for promoting ICT adoption among healthcare professionals- the diffusion of innovations. Their findings identified that:

There is very limited evidence on effective interventions promoting the adoption of ICTs by healthcare professionals. Small effects have been reported for interventions targeting the use of electronic databases and digital libraries. The effectiveness of interventions to promote ICT adoption in healthcare settings remains uncertain, and more well designed trials are needed. [57]

As theoretical framework, diffusion of innovation theory is at best a descriptive tool and thus for the purposes of this thesis, other frameworks need to be considered.

Actor Network Theory

Perhaps one of the most significant approaches to society and technology, and which is perhaps is one of the most encompassing of all foci of technology and society is the Actor Network Theory (ANT) as developed by Latour, Callon and Law. ANT advocates that the world is made up of hybrid entities, perceiving contemporary society as constituted by heterogeneous collectives of people but always together with technology, machines and objects. Thus, these entities are both human and non-human in their context. It can be argued that this is a useful approach where separation of these two elements is difficult. For example, it is difficult to

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[56] Gagnon, M-P. et al. (2009) Users' perspectives of barriers and facilitators to implementing HER in Canada: A study protocol. *Implementation Science.* 4 20.

[57] Gagnon,M-P et al (2009) Interventions for promoting information and communication technologies adoption in healthcare professionals (Review) Cochrane Collaboration, Cochrane Library **4**

differentiate the technical aspects of an EHR from the influence exerted by the socio-cultural background of the EHR development team. Advocates of ANT argue that intricate inter-relations among the heterogeneous elements of techno-science make up our society and organisations. These inter-relationships are theorised as networks of human and non-human actors, each of which is itself a network of heterogeneous elements. A network is formed because people interact with other people and endless other materials such as text documents and machines. In short, technical change is linked to social change and the use of ICT (non-human actors) can only be understood in the context of social relationships (human actors) their position, power and knowledge.[58]

With this all-encompassing approach to both the technical and social elements, ANT challenges the socio-technical divides and argues that neither purely social nor purely technical relations are possible. It should be noted that neither the social nor the technical position are seen to be privileged, as Latour has argued:

Contrary to the claims of those who want to hold either the state of technology or that of society constant, it is possible to consider a path of an innovation in which all the actors co-evolve. [59]

Therefore, it can be argued that, in some circumstances, social relations will shape technologies and, in others, technologies will shape social relations. ANT is based upon three key principles: agnosticism, generalised symmetry and free association. Agnosticism requires that analytical impartiality be given towards all actors involved in the area under consideration, whether they are human or non-human actors. Generalised symmetry, on the other hand, is used to explain the conflicting viewpoints of the various actors in the same terms by use of a neutral vocabulary that works the same way for both human and non-human actors. Thus, neither the social nor the technical elements in these *heterogeneous networks* should be given any

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[58] Latour, B. (1987) *Science in Action: How to follow scientists and engineers through society* Cambridge: Harvard University Press.
[59] Latour, B. (1991) Technology is Society made durable. In Law, J. (ed), *A Sociology of Monsters: Essays on Power, Technology and Domination.* p.117.

special explanatory status.[60] As a final principle, free association requires the elimination of all *a priori* distinctions between the technological and the social.[61] Therefore ANT assumes impartiality towards all actors under consideration. As Callon summarises:

The rule which we must respect is not to change registers when we move from the technical to the social aspects of the problem studied.[62]

ANT as a framework places a strong emphasis on empirical inquiry and therefore is well suited to the medical profession as it is consistent with the generation of detailed empirical knowledge that is both local and contextual. It has been suggested that ANT is the alternative reading of social interactions within an organisation with an emphasis on empirical enquiry and a lack of constraining structure and ontology. ANT argues that power is all persuasive, and is an elusive, multi-faceted phenomenon that has power over and power to. ANT is also known as the *sociology of translations*[63] and is concerned with studying the mechanics of power as this occurs through the construction and maintenance of networks made up of both human and non-human actors. It is concerned with tracing the transformation of these heterogeneous networks that are made up of people, organisations, agents, machines and the adoption of ICT and uses of them are examined within the contexts of power relations, explicit and tacit rules, organisational structure and departmental agendas, and knowledge and information flows. Thus, the way we work has everything to do with the non-human presences we construct (technology, tools etc) and with whom we are in constant dialogue. Therefore the objective of ANT, it can be argued, is to explore translation and social orchestration, ordering and resistance. Using ANT, how professionals and professional groups respond to ICTs is not pre-determined and not determined by the ICT[64] rather, it depends on the interaction between groups and other actors as they negotiate the relationship between the ICT,

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[60] Callon, M (1986) Some Elements of a Sociology of Translation: Domestication of the Scallops and the Fishermen of St Brieuc Bay. *Power, Action and Belief. A New Sociology of Knowledge?* Law, J (ed) London: Routledge and Keegan Paul. 196-229.
[61] ibid
[62] ibid p200.
[63] Ibid.
[64] Grint, K. & Woolgar, S. (1997) *The Machine at Work- Technology, Work and Organisation.* Polity Press, Cambridge

and their individual knowledge and informational needs. Not all groups have the same needs and this may weaken the social position of some groups and therefore, boundaries may be disrupted.[65]

ANT has been utilised to investigate a number of successful technological innovations and a number of spectacular failures such as Grint and Woolgars' work on the Luddite movement;[66] Vidgen and McMasters work on car parking systems;[67] and Latour's work on Aramis, the Parisian public transportation system.[68] The framework draws on the strengths of qualitative research, but by allowing all actors to be considered equally, it allows for a more rounded approach to the area of study. The inherent impartiality of ANT embraces ethnography and allows for an analysis of both human and non-human actors via a single register of analysis, avoiding the need to consider one as context for the other. ANT could be applied to this thesis to explore and provide data surrounding the possible success or failures of ICT in general practice and how ICT has become embedded in general practice and develop a holistic narrative to the study.

Whilst it may be considered that ANT would be a suitable theoretical framework to apply to this thesis, there are a number of reasons why I have not chosen to utilise it. Firstly, while ANT has a strong emphasis on empirical enquiry and therefore ideally suited to medical work, it has been widely used to carry out research in this area. Therefore, I considered it important to utilise a different theoretical framework which would potentially contribute a new understanding to existing debates in this area.

Secondly, ANT assumes/implies an equality of all actors within a network. Consequently, it does not account for pre-existing structures, such as power, but rather sees these structures as emerging from the actions of actors within the network

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[65] Bloomfield, B.P. Coombs, R and Owen, J. (1994) 'The social construction of Information systems' In Mansell, R (ed), *The Management of Information and Communication Technologies: Emerging Patterns of Control.* London: Aslib p 143-157.

[66] Grint, K. & Woolgar, S. (1997) *The Machine at Work- Technology, Work and Organisation.* Cambridge: Polity Press.

[67] Vidgen, R.T. & McMaster, T. (1996) Black Boxes, Non-Human Stakeholders, and the Translation of IT Through Mediation. *Information Technology and Changes in Organisational Work* Orlikowski et al. London: Chapman and Hall. 250-71.

[68] Latour, B. (1996) *Aramis or the Love of Technology*. Cambridge: Harvard University Press.

and their ability to align in pursuit of their interests. ANT therefore can be considered managerial in its approach, and does not fully account for power imbalances that could be attributed to different occupational groups or individuals within general practice.

Finally, I considered that ANT would not take account of the wider social and political context of general practice, which I considered particularly important given the development of NPfIT.

As a result, given the overtly hierarchical nature of medicine, and that I wanted to examine the communications of both individuals and occupational groups, the use of ANT in my research would minimise the richness of the data that could potentially be collected and could be further constrained by requiring a focus on networks and those actors considered to be part of a network.

Therefore, in order to truly understand how ICTs are adopted and embedded and what this means for users, the theoretical framework of domestication must be considered.

2.5 Domestication Theory

Domestication was introduced by Silverstone in the early 1990s to explain the trend in consumption in modern society, in particular how ICTs became integrated into everyday family life and became domesticated within the home. This concentrated on the identity and autonomy of the family and the composite members of the family. This theory was then applied latterly by others specifically to ICT – for example, Haddon and Silverstone[69] examined how the use of the computer became a technology that was used by everyone in the household. Research on the introduction of the household computer initially focused on the specific tasks such as playing games or using specific applications such as word processing, or using the internet.

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[69] Silverstone, R. and Haddon, L. (1996) 'Design and the domestication of ICTs: technical change and everyday life' In: Mansell, R & Silverstone, R. (eds), Communication by Design. *The politics of information and communication technologies*. Oxford University Press p 44-74.

But the potential of computers and their numerous uses and applications has increased considerably and thus the concept of domestication has expanded accordingly.

Literature on domestication has traditionally focused on the ability of the individuals, households and families to make ICTs their own or, in other words, the adjustment or naturalisation of artefacts into the everyday lives of individuals or groups. As Lie and Sørensen have argued, in this framework, ICT is non-standardising; it does not drastically change our lifestyle patterns but rather fits in with them. It is appropriated and re-embedded in local context.[70] Where Sørensen and Silverstone differ is that Sørensen refers to domestication as technology coming 'out of the wild' and is tamed, and thus does not specifically refer to the home as a setting. Domestication in regard to ICT is a concept that has been developed to describe and examine the process of ICT acceptance, rejection and utilisation. But as a theoretical approach, it represents a move away from other theoretical models described in this chapter which assume the adoption of ICT to be rational and technologically determined.

In order to understand how ICT influences the behaviour of users and overall social change, it is necessary to understand how ICTs are integrated and appropriated into the everyday life of users, and in the context of this research, users in general practice. This research does not attempt a direct application of domestication theory, but rather it utilises the domestication framework by exploring the strengths and limitations of the theory within general practice, which itself provides a new setting in which to study the framework. Therefore, the research examines how individuals and occupational groups adopt ICT within their professional practice and organisation and the affects that this has on their communications, be they verbal, computerised or paper-based.

At first glance this may not seem like the most obvious theoretical framework to apply to research in general practice, given its traditional focus on the home. Indeed,

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[70] Lie, M and Sorensen, K (eds) (1996) *Making Technology our own. Domesticating technology into everyday life.* Oslo Scandinavian University Press.

as discussed earlier, ANT could provide a suitable framework for this thesis. However, as shall be discussed, the principles of the domestication framework can be transferred with ease to the work place although, to date, little research in this area has focused on this area. By examining how ICT is domesticated within a particular setting, we can identify factors specific to the home, workplace, community or the relationships of people within that specific environment, and their relationships with those outside of it.[71] Furthermore, general practice, similar to the home, is a place of routine and ritual and, in this sense, by examining everyday life in general practice and the use of ICT, as Sørensen and Berg have argued:

Technology in everyday life is looking at it as personal and familiar.[72]

Domestication as an analytical concept allows for the examination of the user as an active participant in their relationship with ICT but, further, it allows for the identification of actions enabled directly as a result of the ICT. As a framework, it demonstrates the potential diversity of users and how technology is immersed into individuals' and groups' values and cultures.[73] Using the domestication framework and focusing on the everyday life of general practice, not only demonstrates the relationship between users and their relationship with ICT, but also the diversity of the users' and their respective professional groups' (GPs, nurses, administrative staff) behaviours.

Before exploring the framework in any detail, it is worthwhile to consider what we mean when we think of domestication. Domestication is perhaps more frequently thought of as applying to animals rather than technology. However, consider the definitions provided by the Oxford English dictionary which cites the verb domesticate as:

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[71] Silverstone R, Hirsch, E et al (1992) Information and Communication Technologies and the Moral Economy of the Household, in Silverstone R, and Hirsche E (eds) *Consuming Technologies*, Routledge London.

[72] Sørensen, K., H.& Berg, A-J (eds.) (1992) Technologies and Everyday Life: Trajectories and Transformations, Proceedings from a Workshop in Trondheim, May 28-29 1990, Report No. 5, Oslo: Norwegian Research Council for Science and the Humanities.

[73] Hynes, D and Rommes, E (2005) 'Fitting the internet into our lives: IT courses for disadvantaged users' In: Berker, T et al (eds), *Domestication of Media and Technology*. Berkshire: Open University Press.

1- To make or settle as a member of a household; to cause to be at home; to naturalise.
2- To adopt or make fit for domestic use or life
3- To make be or to feel at home; to familiarise.

As the focus of this thesis is on general practice, it is through the lens of this second definition of domestication that general practice has been studied, using the theoretical framework developed initially by Silverstone. To this end, the concept of the 'home' is replaced by general practice and thus domestication for this research uses the idea of feeling at home and familiar with ICT within the context of general practice. Domestication as a metaphor can be applied to ICT, in so much as the technology or the applications associated with it are new, strange, unfamiliar and to some degree wild, as the user may not necessarily be able to get the technology to behave as they would like. Instead, the technology has to be 'tamed', cultivated and understood in order to fit into the structures and routines of the users. When domestication is successful, the technology is no longer considered to be an imposition on the environment in which it operates, but rather it seems a comfortable, trustworthy and reliable tool, as can be demonstrated by the adoption of the television. In under going this process, users and their every day life and practices are experiencing changes when the ICTs are put to use.[74] But the technology present in general practice, namely the computer, is constantly evolving and as such, its acceptance as an every day ICT is harder to realise.

The earliest and most cited reference to domestication as a theoretical concept is that introduced by Silverstone, Hirsch et al in 1992, which appeared in a collection of empirical studies on ICTs.[75] This framework used studies of different ICT use in different households to understand the private household and the public sphere and the role of ICT in this relationship and specifically the introduction of ICTs into the

[74] Silverstone, R. & Haddon, L. (1996) 'Design and the domestication of ICTs: technical change and everyday life' In: Mansell, R & Silverstone, R. (eds), *Communication by Design. The politics of information and communication technologies*. Oxford University Press p60.
[75] Silverstone, R., Hirsch, E. et al (1992) 'Information and Communication Technologies and the Moral Economy of the Household' in Silverstone R, and Hirsch, E. (eds), *Consuming Technologies*, London: Routledge

domestic home. Domestication as a framework is largely applied through qualitative research in order to gauge the value, significance and meaning given to ICTs and their relation to users, which encompass the nuances of consumption and the way that users inscribe artifacts with meaning to give them a place in the network of the home or workplace.

Domestication has three key stages – commodification, appropriation (which includes objectification and incorporation) and conversion.

Commodification: This is what links domestication with the design of the ICT, the design and marketing of a product and the construction of a product by consumers. ICTs emerge in a public space of exchange value and in a marketplace of competing images and functional claims and counter claims. This process has two distinct components – the design and marketing of the product and then the 'construction' of the product by consumers.

Appropriation: The technology is brought into the 'home' resulting in the possession or ownership of the technology. At this point the ICT moves from being a commodity that is exchanged to the owner's possession thus giving it significance. The owner takes the ICT *home or into other private cultural spaces* and makes them *acceptable or familiar* or, as has been the case in many large scale ICT implementations, does not make them acceptable. Appropriation has two specific facets. In making ICT the user's own, this leads to *objectification* where technology finds a space or place in the daily life of the user. It is utilised and displayed and in the traditional domestic domain, it defines the household status. The second component of appropriation is *incorporation,* which concerns the function of the technology and its place in the pattern of daily life. In short, the ICT is used in everyday life and its functionality depends on how it is incorporated in everyday life.

Conversion: This is how the ICTs fit into wider social and cultural surroundings and are presented in the domestic sphere and the meanings and uses they hold fit into wider spaces. This specifically involves *the various things that consumers do to*

signal to others their participation in consumption and innovations and provides feedback to the producers of the ICT who study the lifestyle of the product.

Domestication is also considered to be a two-way process.[76] Silverstone argued that media, which are often represented and facilitated by ICT, are so intrinsically embedded in everyday life that it is difficult to talk about our home without mentioning them. In this sense, technological determinism is opposed in favour of the social and economic dimensions which allow the user to feed into the design.

Much of the literature[77] [78] [79] has argued that technological innovation cannot be viewed from the simple perspective of producing an artefact. But instead, there is a need to consider the consumption and the use of the ICT in order to truly understand the concept of ICT innovation. Thus, innovation is not simply as a result of engineering, but rather many activities inter acting – those of the designer, the consumer and others who participate in the acquisition and consumption of that ICT. As Silverstone and Haddon have argued ICTs are: *symbolic and aesthetic as well as material and functional.*[80]

The domestication framework considers ICTs and innovation as a process and not an event. By this, Silverstone and Haddon[81] have argued that it is not enough to examine the production of technology but rather there are other important factors which must be considered, namely cultural, economic, and political factors and the

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[76] Silverstone, R. & Haddon, L. (1996) 'Design and the domestication of ICTs: technical change and everyday life' In: Mansell, R & Silverstone, R. (eds), *Communication by Design. The politics of information and communication technologies*. Oxford University Press. p 44-74.
[77] Akrich.M (1992) The description of technological objects in Bijker,W. & Law.J. (eds) *Shaping Technology/Building Society.* Cambridge,MA: MIT Press p205-24.
[78] Haddon, L (2003) Domestication and mobile telephony. In Katz J.E. (ed) Machine that becomes us: The social context of personal communication technology. New Brunswick. Transaction Publishers.
[79] Silverstone, R. and Haddon, L. (1996) Design and the domestication of ICTs: technical change and everyday life in Mansell,R & Silverstone R (eds) Communication by Design. The politics of information and communication technologies. Oxford University Press p 44-74
[80]Silverstone, R. and Haddon, L. (1996) Design and the domestication of ICTs: technical change and everyday life in Mansell,R & Silverstone R (eds) Communication by Design. The politics of information and communication technologies. Oxford University Press
p 45
[81] Silverstone, R. and Haddon, L. (1996) Design and the domestication of ICTs: technical change and everyday life in Mansell,R & Silverstone R (eds) Communication by Design. The politics of information and communication technologies. Oxford University Press p 44-74

individuals themselves must also be considered. Domestication acknowledges the ability of ICT to affect and reconstruct the social context in which it is placed but also acknowledges the human potential to shape and conceptually reshape their understanding and use. Feenberg has called this process *democratic rationalisation.*[82] This is the user's potential and ability to shape and reshape technology through its use. As a result, users have direct and implicit awareness of the meaning of different ICTs. The domestication framework considers the interaction between social and technological changes and, as such, is related and contributes to the social constructivist approaches, namely that advocated by Bijker, Hughes et al[83] discussed earlier in this chapter. Furthermore, the interaction between the social and technological change is also related to user-focused approaches identified in media studies.

Research on the domestication of ICT has two distinctive approaches – media studies, such as the role of television in the lives of housewives[84], and technology studies.[85] Since the initial publication of Silverstone's framework, the majority of subsequent literature has concentrated on the concept of domestication occurring in the home, as the term domestication in its purest form refers to literally *bringing the technology home.*[86] [87] [88] Domestication focuses on how ICTs are integrated into individuals' daily lives or, as Haddon has described, how *ICTs find a place in our lives.*[89] But there is increasingly a blurring or convergence of the boundaries between the home and the outside world and indeed many homes are now offices. However, as shall be discussed in **Chapters 4** and **5** the introduction of complex ICT into

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[82] Feenberg, A. (1999) *Questioning Technology* Routledge. London

[83] Bijker, W.E, Hughes, T, & Pinch, T. (1987) The Social Construction of Technological Systems: New Directions in the Sociology and History of Technology. Cambridge: MIT Press.

[84] Hobson, D (1980) 'Housewives and the mass media' In Hall S, et al (eds) *Culture Media Language.* London: Hutchinson p 105-14.

[85] Sørensen, K.H. (2005) Domestication: the enactment of technology in T.Berker et al (eds) *Domestication of Media and Technology.* Maidenhead: Open University Press. p40-61

[86] Cawson, A., Haddon, L. and Miles, I.(1995) *The Shape of Things to Consume: Bringing Information Technology into the Home*, Avebury, London

[87] Cummings, J.N.& Kraut, R. (2002) Domesticating computers and the Internet *Information Society* **18** 221-231

[88] Aune, M. (1996) 'The Computer in Everyday Life: Patterns of Domestication of a New Technology', in Lie, M and Sørensen (eds) *Making Technologies Our Own? Domesticating Technology into Everyday Life*, Scandinavian University Press, Oslo, pp.91-120

[89] Haddon, L. (2001) Domestication and mobile telephony. Paper presented at the conference *Machines that Become Us* Rutgers University,New Jersey: USA

general practice has been for some users, similar to that of bringing ICT out the wild and, for others, their experience has been more straightforward – simply bringing the technology home, in this case general practice. Therefore, it is no longer appropriate to consider using domestic households as the only unit of analysis within domestication studies.[90]

Sørensen examined the domestication of society, for example the domestication of the car in Norway[91] and the use of mobile ICTs which [92] which has also been explored by Ling[93] Some literature has focused on specific technologies such as the internet[94] , whilst others such as Frissen and Punie[95] have expanded the concept of domestication beyond the home to include how ICTs are embraced in cultures and how these cultures make them their own and, as such, embracing them is contextualised within everyday life and domestication can be seen as a multi-site process, involving the home, work, and other institutions.[96] Domestication outside the home was also further explored by Haddon.[97] [98]

Domestication therefore has an impact outside the domestic sphere and instead also inhabits the work or business sphere of an individual, reflecting the definition in the Oxford English dictionary – *to adopt or to make fit; to make be or to feel at home; to*

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[90] Stewart, J. (2003) The social consumption of information and communication technologies *Cognition, technology and work* **(5)** 4-14.
[91] Sorensen, K. H. (2006) Domestication: the enactment of technology in T.Berker et al (eds) *Domestication of Media and Technology.* Maidenhead: Open University Press. p40-61.
[92] Lie, M and Sørensen, K (eds) (1996) *Making Technology our own. Domesticating technology into every day life.* Oslo Scandinavian University Press.
[93] Ling,R. (2001) The diffusion of mobile telephony among Norwegian teens – A report from after the Revolution, presented at International Conference of Uses and Services in Telecommunications. Paris: France.
[94] Thomas, G. and Wyatt s. (2000) Access is not the only problem: using and controlling the internet. In Wyatt,S et al (eds) *Technology an in/equality: Questioning the information society.* London Routledge.
[95] Frissen, V. & Punie, Y. (2001) Present users, future homes: A theoretical perspective on acceptance and use of ICT in the home environment.
[96] Sørensen, K. H (2006) 'Domestication: the enactment of technology' In: T.Berker et al (eds) *Domestication of Media and Technology.* Maidenhead: Open University Press. p40-61.
[97] Haddon, L. (2003) 'Domestication and Mobile Telephony', in Katz, J. (Ed.) *Machines that Become Us: The Social Context of Personal Communication Technology*, Transaction Publishers, New Brunswick, New Jersey, pp.43-56
[98] Haddon, L. (2006) *ICTs and Social Change: Three Examples from Everyday Life,* Paper for the Panel 'Information and Communication Technologies and Social Change', 9th Forum of Social Trends, Madrid, November 22nd-24th

familiarise. In more recent times, domestication has been applied as professional domestication[99] but there has been little (if any) research in general practice which uses domestication as its theoretical framework.

2.6 Domestication and General Practice

It is important to empirically examine the ways in which people attach meaning, value and significance to ICT. The ICTs utilised in general practices are largely the same as those used in the home – the telephone, the computer, and the internet (although they may have different applications and capabilities) – and thus they can be considered domesticated technologies and not exclusive to either domain. As Dholakia, Mundorf et al argue:

Once a technological system, gets established in one life sphere, it has the potential to migrate to the other connected spheres. [100]

However, as shall be discussed later, there is one significant difference which must be considered. Although the ICTs are largely the same as those used the domestic sphere and the applications that are attached to them such as the electronic record are claimed to have the same function as their predecessor (the paper record), they require the user to interact with the technology in a new way.

In applying the domestication framework to general practice, the domestication framework can be summarized – as appropriation occurs, local routines relevant to that organisation are constructed and ways of doing things are transformed as the technology creates new or additional opportunities as it imposes itself on the organisation. This is a dynamic, two-way process however, as the creators and designers of the ICT attempt to instill and promote certain uses and meanings, whilst the users appropriate the ICT within their local context and in this sense redefine the ICT not only in relationship to the technology but also between each other. Therefore, the domestication framework will show how: general practice adopts

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[99] Pierson, J. (2005) 'Domestication at work in small businesses' In: Berker, T., Hartmann, M., Punie., Y. & Ward, K. (eds) *Domestication of Media and Technologies*. Maidenhead: Open University Press. p205-26

[100] Dholakia, R. R., & N. Mundorf, et al., (eds), (1996). *New Infotainment Technologies in the Home, demand side perspectives*. New Jersey, Lawence Erlbaum Ass.

technology; demonstrate the managerial intent involved in its implementation; the different interpretations and levels of engagement that different occupational groups have with a technology, thus highlighting the importance of users to the effective use of ICT; and how and the degree to which it becomes integrated within that practice or occupational group. The various occupational groups will generally have different degrees of use and control of a technology, from those who have little use to those who are highly resistant. The framework will also identify the strategies that are used to resist and control adoption, innovation of technologies and the activities associated with them, and the communications occurring as a result of these technologies being domesticated.

In general practice, or indeed in any group of professional practice, similar practices of incorporation and appropriation outlined in the domestication framework occur. Indeed, the adoption processes of ICTs in the work place have demonstrated some considerable similarities with adoption processes in the home. In the case of the adoption of the EHR, it is possible to identify commodification, appropriation and conversion. The ICT, the EHR in this instance, is designed and produced for a specific industry – the medical profession. Secondly, there exists the mutual shaping between the professional in general practice and the ICT. Thirdly, in the final stage of domestication, the ICT becomes part of the everyday professional life or culture. However, it should be noted this process is often iterative in behaviour, and not always sequential, but crucially the key stages can be identified. An additional dimension that requires consideration in this study is that largely the ICTs in question have been appropriated on behalf of the user, either by the practice or imposed or introduced by central government, which will ultimately have an impact on their appropriation.

Within domestication theory, the focus is on social constructive theories. Bijker highlights the importance of symbolic values of artifacts that fit or do not fit with the values and expectations of the group, which consequently may assist or impede adoption. This is particularly true of government designed IT systems, which are often claimed to not meet the needs of the user.

However, there are interesting dimensions and practices to observe which may affect the adoption of ICT within general practice and which are not directly comparable with the domestic home. For example, in the workplace a number of extrinsic incentives may exist, such as, legislation or monetary incentives which may stimulate individuals to use new ICTs. Such incentives are largely not found in the domestic sphere. This is particularly true of the introduction of NPfIT, where central government set targets for the implementation of core components of the programme. Other factors commonly found in general practice such as monetary incentive schemes like the QOF may also impact on the adoption of new ICTs. Therefore, there are a number of factors which may impact on the domestication of ICTs in general practice which need to be considered – cultural, sociological factors including the opinions of respected individuals, national legislation and accountability and the collective attitudes of the occupational groups and the individual.[101]

The characteristics and personalities of occupational groups, organisations and context all have an impact on the success of an ICT and the extent to which it is embraced and utilised in daily life. In particular, the attitudes of the individuals, key players, and the identity of the professional groups will influence each other and their actions within the organisation. In the two practices involved in this research there are approximately 17 individuals in each practice, but there are five distinct groups – GPs, practice nurses, administrative staff, receptionists and other healthcare professionals such as counselors who will all exercise distinct appropriation and domestication of ICTs. There is also a body of literature that has focused on the interaction between ICTs and group and individual interactions[102 103 104] which is particularly relevant to my research. At the group level, the introduction of new ICTs can result in modifications to roles and responsibilities, which can be a potential

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[101] Grol, R. & Wensing, M. (2004) What drives change? Barriers and incentives for achieving evidence based practice. *Medical Journal of Australia* **180** (6) s57-60

[102] Orlikowksi, W.J. & Robey, D. (19911) Information technology and the structuring of organisations *Information Systems Research* **2** (2) 143- 169

[103] Poole, M.S. & De Sanctis, G. (1990) 'Understanding the use of group decision support systems: The theory of adaptive structuration' In Fulk, J (ed), *Organisations and Communications Technology*. Newbury Park: Sage p173-193.

[104] Zack, M.H.& Mckenney, J.L. (1995) Social Context and Interaction in ongoing computer-supported management groups in *Organisation Science* **6** (4) 394-422.

source of resistance to ICT adoption[105] As has been discussed in the previous chapter, the introduction of NPfIT has to date not affected all groups equally.

Conflicts between groups can also arise as a result of the delimitation of professional boundaries, which can have a significant impact on ICT use.[106] [107] There has also been some literature that has sought to understand how managers attach themselves to particular practices and social constructions of ICT, markets and organisations and consequently, local ICT strategies are often accidental in their creation and are the result of political struggles and unforeseen circumstances.[108] Also the implementation of such strategies is often motivated by the specific career prospects of individuals and groups seeking to secure their own interests.[109] This is a key theme in much social shaping of technology literature, which emphasises the interface with technology and the implementation of it.

Further literature has identified that to avoid user resistance users and groups need management support and managers must obtain user involvement in the process if adoption is to be successful. If ICT is forced upon the user, they may resist or have identity conflict as to what it means to use or own that technology, implying a tension and a need for control. For example, is their status as a GP diluted if they consult online guidance? Such potential resistance and concepts of what it means to do their job is particularly relevant with government implemented ICTs, over which, at a broad level, the user has no control. The process by which users claim or find ways in which to cope with the technology is through domestication. As a result, some users embrace technology within the defined parameters, some may resist and others may be more open and adventurous and seek to utilise all the functionality of the technology. This provides a rich basis for looking at the roles and levels of

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[105] Markus, M. L. (1983) Power, Politics and MIS Implementation. *Communications of the ACM* **26** (60 430-44.

[106] Massaro, T. (1993) Introducing physician order entry at a major academic medical centre: Impact on organizational culture and behavior. *Academic Medicine* **68** (1) 20-5.

[107] McLaughlin, J & Webster, A. (1998) Rationalising knowledge: IT systems, professional identities and power. *Sociological Review* **46** 781-802.

[108] Swan, J.A. & Clark, P.A. (1992). Organisational decision-making in the diffusion and appropriation of technological innovation: cognitive and political dimensions. *European Work and Organizational Psychologist*, *2*, 103-127.

[109] Knights, D. & Murray, F. (1994) *Managers Divided: Organisation politics and information technology management.* Wiley: Chichester.

engagement of the various users in general practice and the leadership displayed within each practice.[110]

However, it can also be argued that there are also limiting factors of domestication,[111] which include money to buy or the ability to access the ICT,[112] the physical space to accommodate it, the time to understand and 'tame' it and ICT capability, the skills required to proficiently use it, the knowledge about how to use and when to use it[113] in order to truly domesticate it. But it can also be argued that these factors alone do not limit domestication or adoption, but rather these are some of the factors that shape it in the local context.

The dynamic process of technology domestication, the assumptions underlying it and the factors affecting it, is perhaps best summarised in the following way:

1- When analysing ICT, the emphasis should go beyond the immediate function of the technology, but the social symbolic identity should be also be considered including issues of identity and status.
2- When adapting technology the following happens:
    - imagination – users hear about the technology;
    - appropriation – actual presence/purchase of the device;
    - objectification – using the technology. Users design ways of using the technology based on their own preferences and fit them into their local context; and
    - conversion – the technology becomes part of the users identity and daily life.
3- The process of domestication reflects the overall tendency of technology adaptation.

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[110] Lucas H (1975)- Why Information systems fail- Columbia univerity press- newYork
[111] Dholakia, R. R., & Mundorf, N. et al., (eds). (1996). *New Infotainment Technologies in the Home, demand side perspectives*. New Jersey: Lawence Erlbaum Ass.
[112] Thomas, G. and Wyatt, S. (2000) Access is not the only problem: using and controlling the internet. In Wyatt, S et al (eds), *Technology an in/equality: Questioning the information society*. London: Routledge
[113] Faulkner, W. & Kleif, T. (2005) One size does not fit all! Digital in/exclusion in a rural community' *Journal of Adult and Community Learning* **11** (1) *43-61.*

4- Finally- individuals have an influence on how the technology is used.

To further demonstrate the application of the domestication framework, the phases of domestication are shown in **Table 1** as applied to general practice through the application of the NPfIT.

Table 1 Domestication of NPfIT

	The general practice- the consumer	**Creators/producers of the artifact- holders of the contract for NPfIT**	**Policy makers**
Commodification	The players within general practice imagine the product or hear about it through the media, colleagues or central policy communication.	Designers and engineers create an artifact, which is marketed with a specific purpose, function and identity. In the case of NPfIT to increase clinician efficiency and effectiveness and deliver improved patient care.	Central government provide a framework which may influence the way that the artifact is built, (the incentive contracts for NPfIT) marketed (the involvement of users) and consumed (implementation is mandatory) by the users.
Appropriation	The artefact is accepted into the domestic environment– general practice	Designers and engineers heavily promote the artefact	Policy makers oversee the appropriation- target setting. E.g. the % of outpatient appointments booked through *Choose and Book.*
Objectification	The artefact embeds in a physical space within the domestic environment of the user – general practice	Monitor, its use and uptake in case of amendments to the overall design	Policy makers promote or encourage uptake of the artifact which may include financial incentives if uptake is low

Incorporation	Active use of the artefact is fitted into the users (all groups) 'domestic' time, every day use	As above	As above
Conversion	The user demonstrates consumption of the artefact to others – ownership, display of ability and competence	Acknowledge patterns of consumption either directly or indirectly and locally and nationally. May alter products, their functionality and the production of associated ICT, *if* instructed to do so by government who control the NPfIT contract	Acknowledge patterns of consumption either directly or indirectly. Possible alterations *may* be made subject to information gathered indirectly or directly

It is not my intention to go through how these phases relate to general practice in detail, as this will be the focus of later chapters, but it is important to link the basic principals of domestication to the sphere of general practice.

The domestication framework applied to general practice through the implementation of the NPfIT is particularly interesting in the commodification phase as occupational groups have expectations and preconceptions about the ICT, namely as it is supposed to enhance and replace their current ways of working. For example, at the commodification stage the electronic record is purported to replace the paper record. In this sense users in general practice will have a preconception of what the product or artefact will do, based on not only the fact that it will replace the paper record, but also drawn from the information disseminated to them by the designers and those in charge of dissemination of policy – the government. This is a very powerful lever to be used by both policymakers and users, as in the past government-led ICT programmes have been very unsuccessful and have led to much cynicism amongst users. The internal leadership displayed within the organisation, in this case the primary care trust (PCT) or the general practice may also play a part in commodification. Successful government policy and how it is embraced by key management demonstrates that it is the opportunities presented by ICT that drives

domestication. That is, improved patient care, leading to more efficient work processes.

Given the strong occupational group identity present in general practice, the opinions of key members of the group will also be important in shaping the views and perceptions of others in the organisation. Livingstone[114] examined the meaning of domestic technology and how this affects engagement. She identified four phases in which people attribute meaning to domestic technology – necessity, control, functionality and sociality. Therefore, ICT is seen as a necessary or essential a tool that allows people to control their situations, may have a number of functions and may facilitate or allow for enhanced sociality and privacy. These phases can equally apply to general practice. Users will form an opinion based on information from a number of sources (including the media and colleagues), the reputation of those charged with design and delivery and the functional and symbolic claims of the artefact.

The appropriation of ICTs examines how users adopt ICTs into their own spaces. So, in this example, it is how the computer and its applications are adopted within the consultation room or the reception area. But this is not simply a technology. With this there are also supporting materials, manuals and documentation which must also be located in the domestic sphere. This is perhaps the one area where users have the greatest power in general practice in relation to ICT. As Poole and DeSanctis have argued:

No matter what features are designed into a system, users mediate technological effects, adapting systems to their needs, resisting them, or refusing to use them at all.[115]

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[114] Livingstone, S. (1992) 'The meaning of domestic technologies: A personal construct analysis of familial gender relations' In: Silverstone, R and Hirsch, E. (eds), *Consuming technologies: Media and information in domestic spaces*. London: Routledge

[115] Poole, M.S. & De Sanctis, G. (1990) 'Understanding the use of group decision support systems: The theory of adaptive structuration' in Fulk, J. (eds), *Organisations and Communications Technology*. Newbury Park: Sage p 173-193.

Such power has resulted in ICTs and those connected to NPfIT being appropriated in a local context, working to local timelines and local needs as will be discussed in **Chapters 4 and 5**.

Summary

This chapter began with an overview of communications and communities, of the role of ICTs and information systems in daily life and their position in the NHS. The adoption and use of ICT is both a technical and social process, afforded by the meanings and values given to the various ICTs by users in their local contexts. A select number of theoretical frameworks were presented as possible approaches to analyzing ICTs and communications in general practice to demonstrate this, such as the technological relativism as advocated by Woolgar, and technological determinism which argues that technology is an autonomous force that changes society. Other approaches have included ANT, as suggested by Latour and Callon, and finally, the theoretical framework of domestication whereby ICTs are embedded in the every day live of the user. I have applied this final framework to general practice. This framework considers ICTs and innovation as a process and not an event and that it is not enough to examine the production of technology, but rather there are other important factors which must be considered, namely cultural, economic, political factors and the individuals themselves must also be factored in. Domestication acknowledges the human potential to shape and conceptually reshape their understanding and use of ICT based on their own perceptions such as identity and status and their individual needs. As such it is a valuable approach by which to examine ICT and communications amongst individuals and groups. Furthermore, the diversity of users in general practice provides a rich group of users for analysis.

Additional empirical evidence and arguments were also presented to demonstrate the various elements affecting domestication and the adoption of technology and how this maybe shaped by individual users – such as the role of central government, managers and key individuals in general practice. Brief discussion also concentrated on the resistance or non-adoption of ICT, but largely this is viewed as secondary, as the focus of this thesis is to examine the use of ICTs and communications and not

explicitly why ICTs are not used. The following chapter discusses the methodological design of the research for this thesis.

Chapter 3 Research Design

3.1 Aims of the Research

The purpose of this research was to explore communications and information flows in general practice in relation to the use and domestication of ICT. In particular, how processes, communications (verbal and non-verbal), individuals and occupational groups and information flows were affected by the introduction and use of technology. General practice, involves a number of embedded, recurrent routines and tasks, such as the booking of patient appointments and the use of the medical record, but it also has a number of structured hierarchies, such as the relationship between GPs and nurses and that between GPs and patients. The introduction and use of ICT therefore has the potential to disrupt and refine these routines and relationships and ultimately impact on the transfer, translation and use of information.

This research uses the domestication framework (the process by which ICTs become embedded in everyday life) as the chosen methodological approach to understand the complex effects of ICT in general practice and seeks to identify the factors driving the domestication of ICT and its effects. The research takes a comparative approach, using two general practices in London, which demonstrated near-identical basic characteristics such as the size of their practice staff and size of their patient list. Both practices were also considered to be 'paper-light' which was considered the 'average' status of most general practices at that time, and thus the practices could be seen as representative of general practice overall.

Therefore, the primary aim of this research was to examine: how the various occupational groups (GPs, practice nurses and administrative staff) in general practice in England used ICT within their daily work; how and why the technologies were domesticated within their daily work; and how the various groups used CMCs and NCMCs in their work and communications and information sharing with others. Of particular interest were the different roles that the users within general practice fulfilled and how these impacted on their use of ICT and their individual

communication strategy and domestication of ICTs. Broadly, the research also addresses the wider issue of ICT dissemination, implementation and overall appropriation within general practice.

3.2 Initial Background Research

The premise behind this research stemmed from an initial research project that I undertook for the DH conducted at the Department of General Practice, Kings College London (KCL)[1]. This project examined the proliferation of ICT within 996 general practices within London. It concentrated on what ICTs were available and were being used in general practices (from a GP perspective) in order to move towards the government's proposed policy objective of the paper-light general practice and increased use of ICT within the NHS as part of the NPfIT. This initial research identified that many general practices were still heavily reliant on paper-based communications and that ICT was often difficult to use. At the time of this initial research (2003), NPfIT had been in existence for less than two years and the government-led computerisation of general practice was viewed with scepticism by participants in the study, especially given central government's poor record of ICT implementation across a variety of areas. For example, the failed unification of the welfare computer systems in the 1980's and the Ministry of Defence system to manage the pay, pension and human resources services for all armed forces staff. Indeed, by 2001 the PAC had identified 25 government ICT failures.[2]

The main focus of the KCL study was: to investigate the prevalence and pattern of ICT use in general practice in London: to identify 'best practice' and innovative use of ICT; and to derive guidance and recommendations for practices in relation to paper-light working that were consistent with UK and European Union data protection legislation, and were in-line with the recommendations of professional bodies, such as the General Medical Council. The research questions I sought to answer in the KCL study were:

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[1] Keddie, Z. Jones, R. (2005) I nformation communications technology in general practice: cross-sectional survey in London *Informatics in Primary Care*, **13**, (2), p113-124

[2] House of Commons Parliamentry Accounts Committee (2000) Third Report. London

- to what extent are general practices in London paper-light?
- to what extent are general practices in London paperless?
- what administrative tasks were carried out by GPs via ICT?
- what innovative technologies were being utilised successfully within general practice?
- what factors were associated with the uptake and effectiveness of ICT?
- what were the barriers to the successful implementation of ICT in practice?
- to what extent were GPs interested in utilising ICT in the future?

This was essentially a descriptive study examining the uptake and implementation of ICT but it stopped short of an in-depth analysis into causal factors for this uptake. A postal questionnaire was developed from discussion with colleagues in general practice and was piloted in six local practices. I studied a cross-sectional, random sample (approximately 1:4) of GPs across the then 32 London PCTs. The population of London GPs at the time of the fieldwork was approximately 3,962 (September 2001). The questionnaire was sent to 996 individual GPs. On a small number of occasions, as a result of the random sampling, the survey was sent to more than one GP in an individual practice. Where possible, this was used to identify not only variations in practice, but also variations within individual practices. This method of sampling allowed for analysis across a wide range of practices within London and for follow-up in a number of geographically diverse practices. The questionnaire itself was a simple folded A3 sheet arranged as a three-page questionnaire and covering letter, and was accompanied by a self-addressed freepost envelope. The questionnaire covered ICT utilisation rates, interest in and use of 'innovative' ICT such as electronic signatures and smart cards in daily practice, experience of ICT and barriers to its use, as well as general demographic data.

Within the KCL study a number of definitions were used:

Computerised system: where a computer is used to carry out tasks within the general practice consultation. For example, to produce electronic prescriptions, to access patient records and the use of templates.

Paper-light: The use of technology to carry out many but not all tasks that are traditionally paper based, including computerised practice management and the use of EHRs in the consultation, sometimes augmented by paper records.

Paperless: No use of paper-based applications or retention of paper-based documents except those required by law. In practice this means having no written patient information or records in the consultation.

Innovative technologies: Any piece of ICT used in general practice that is not a desktop computer, such as personal digital assistants (PDAs) tablet computers and speech recognition software.

3.3 Summary of KCL Results

The questionnaires were sent out in hard copy between June and October 2003, during which time two reminders were sent to non-respondents. I obtained a response rate of 52% (n=520), which was considered an acceptable level of response for a postal questionnaire. 56% of respondents were male, with an average age of 47 years. The average practice patient list size was 7,388 and the average number of principals, (whole time equivalents) per practice was four. All questionnaires, with three exceptions (which were completed by practice managers and were excluded from the analysis) were completed by GPs. Following analysis of the questionnaire, selected consenting practices who demonstrated best practice, utilised innovative technologies or those with little or no utilisation/experience of ICT were interviewed via either personal visits or telephone calls, in order to obtain a richer picture and greater understanding of the data analysis.

The results of the questionnaire found that:

- 95% of London GPs used a computer in clinical consultations;
- 69% operated paper-light consultations;
- 58% considered their practice to be paper-light;
- 41% operated paperless consultations; and
- 22% considered their practice to be paperless.

The identified level of paper-light practices was both encouraging and exciting. It demonstrated that ICT had most certainly gained a firm foothold in primary care. At 22%, the level of paperless practices was relatively low but was a substantial increase compared to previous studies.[3]

Of particular relevance to my research were the questions that the KCL study asked regarding paper and electronic records. The KCL study found that:

- 76% of GPs always used electronic records in the consultation;
- 28% always used paper records in the consultation;
- 42% sometimes used paper records in the consultation;
- 19% never used paper records in the consultation; and
- 5% never used electronic records in the consultation.

This data is of particular interest from both a communications and domestication perspective as it shows a high number of GPs that use both paper and electronic records, often concurrently. This dual record keeping could be attributable to a number of factors. As discussed earlier, the GPs' *Terms of Service* only changed in 2000, which allowed practices to keep electronic records without a paper copy, and therefore as the study was only undertaken in 2003 and NPfIT introduced in 2002 it is perhaps not unusual to see high levels of paper records still being used at this time. But there are also other factors to consider. For example, when a new patient joins a practice, his or her previous paper records are sent to the practice as currently patient records are not transferable electronically. Alternatively, outdated computer systems may prevent the desired level of clinical/narrative data being recorded electronically and/or a lack of familiarity with the computer system may all contribute to the continued use of the paper record to name but a few examples.

Another area of the KCL study which is of direct relevance to my research is that regarding the barriers to ICT implementation (and their consequent impact on

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[3] Waring, R. (2000) To what extent are practices 'paperless' and what are the constraints to them becoming more so? *British Journal of General Practice* **50** 46-7.

domestication). In the KCL study, participants were asked to identify the biggest barriers to the implementation of ICT from a list of six options. Findings identified that there were four main barriers to successful IT implementation: the time required to implement it (68%), the lack of technical support (63%), finance (60%) and the lack of training (59%). However, the issue of barriers to implementation was only addressed by one question in the survey and thus this issue was explored only minimally in the KCL study.

At the time, the KCL study was one of the largest studies into the use of ICT in general practice and provided a valuable overview to the use of ICT in primary care in London. The high utilisation of both paper and electronic records provided scope for further research into why this is was occurring and thus my research for this thesis builds on these initial findings.

However, the KCL study also posed a number of questions which were left unanswered and therefore not only provided a foundation but also a catalyst for the research for this PhD. The KCL study was on a large scale but relatively superficial and lacked a level of detailed scrutiny needed to explain the reasons for the identified behaviours. While valuable, it stopped short of answering the bigger and more pertinent questions of:

- which groups in general practice used ICTs?
- how ICTs were used and domesticated by individuals and groups?
- why they were used (or not)?
- how did ICT impact on the daily working and communications patterns of the individuals and occupational groups within general practice?

As such, this provided the starting point for my research and an additional, detailed study was therefore required to examine ICT domestication and utilisation.

3.4 Summary of Research Aims

The research design of the KCL study did not take account of the variation in ICT use by different occupational groups which could be affected by: their skills, their job or other factors within the practice, such as national and local policy. Furthermore, it only explored the general use of ICT and regularity of use from the perspective of one GP within the practice. Given that general practices vary considerably in size, the KCL study did not examine the variations within these groups, nor account for the impact of size or make-up of the individual practices. A further limitation was that it did not explain or account for the impact of actions taken at the local level by practice leads or the impact of local or national policy. The tone from the top whether that is the national or local perspective can dictate or influence workplace behaviour, which has significant effects on appropriation and therefore the domestication of ICT.

Within general practice there are core ICT users such as GPs, nurses and administrative staff but there may also be other users employed within the practice such as public health professionals or counsellors and therapists. Given the different roles and responsibilities of these users, the impact of ICT will not be universal across all groups or even across individuals within any one occupational group, as they will also have different skills, despite the fact that they carry out the same job. Furthermore, some groups are more used to using ICT as part of their job than others, for example administrative staff and as such any introduction of ICT is likely to have a lesser impact on that group.

Much of the research literature surrounding the relative success or failure of ICT has concerned the design of systems or the lack of user engagement in the design of these systems. This research, however, sought to examine the user's perspective, experience of ICT, as well as the domestication and impact of ICT on communications (across occupational groups) within general practice, at a time when central government policy was focused on increasing the use of ICT within the NHS. The majority of the research literature to date has concentrated on GPs' and patients'

experience of ICT and NPfIT, particularly how this has affected the patient consultation,[4] [5] and has not examined the impact of ICT on other user groups in general practice. However, the components of NPfIT (as discussed in **Chapter 1 Figure 2**) meant that no user within general practice would be exempt from its implementation, although it could be argued that some would have greater exposure to ICT than others, for example GPs. This is discussed in greater detail in **Chapter 4**.

In summary, rather than examining the implementation of any individual ICT, such as the EHR or implementation of ICT in general (which has been well researched), a multi-group-centred approach allowed for a richer analysis of why and the extent to which the various users appropriated and domesticated various ICTs within general practice and their individual or group communication behaviours. Therefore, this approach not only addresses the limitations of the KCL study but builds on and contributes to the existing literature on the implementation and domestication of ICT, using an entire workplace and profession rather than a single user group or ICT as its focus.

3.5 Research Questions

Using the findings of the KCL research as a baseline and the general aims outlined above, three specific research questions were identified. These questions were refined during development of the methodological framework for this study.

1. *To what extent, how, why and by whom are ICTs domesticated within general practice?*

- Who communicates with whom in general practice and by what methods?
- Why are particular ICTs utilised in a particular manner? For example under or over-utilised.

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[4] Hayes, G.M. (1993) Use of the computer in the consultation. *Update,* **44, 4** 465-8.
[5] Hayes, G. M. (1993) 'Computers in the consultation: The UK Experience' In: Safran, C. (ed), *Proceedings of the 17th Annual Symposium on Computer Applications in Medical Care,* 103-6. New York: McGraw-Hill.

2. What is the impact of domestication of ICTs on communications in general practice and how does the role of the occupational groups affect the use of communications within general practice?

- Why, despite the benefits of ICT, do communications in general practice appear to revolve around paper/verbal channels of communication and is it dependent on an individual's role in general practice?
- Has domestication led to a dominant mode of communication in general practice being established?
- Why do different groups, for example GPs and practice nurses, use different modes of communication?
- How does ICT affect the relationships between staff in general practice?

3. *What are the benefits and barriers to the use and domestication of ICT and other methods of communication in general practice and at an individual user level and why do users experience different problems and are these common across occupational groups?*

- Why is ICT not universally integrated/implemented in general practice amongst all users?
- Why is ICT not used to its full information/communication capacity?
- Why does the presence/implementation of ICT present problems within general practice?

There were also a number of smaller subsidiary questions which formed part of the research:

- Does ICT aide or hinder communications in general practice?
- What are the problems in communicating via ICT?
- What tasks are carried out via paper/ICT?

Unlike the KCL research, these questions and the subsidiary questions have a central theme of the users' perspective and their individual experience, rather than focusing on the technical or functional aspects of ICT.

3.6 Methodological Design of the Study

Research for this thesis consisted of ethnographic techniques, namely semi-structured interviews and participant observation at two 'paper-light' general practices in London. The design of this study built not only on the findings and research methods used in the KCL study but also the existing research literature examining the use of ICT in the workplace and domestic environments and also that which addresses the implementation of ICT within general practice and individual and group behaviours. Together these considerations helped inform the final methodological approach to the fieldwork for this study. The following sections discuss some of the factors which influenced the development of the fieldwork and research design.

The Research Setting – Studying Domestication

In order to fully understand how ICTs were domesticated in the two general practices as part of my research and how the different occupational groups utilised ICT and communicated with each other, it was necessary to develop a research design that did not focus on the technical aspects of ICT but rather addressed the social elements and interactions of my research, namely the individual user's experience. This approach had implications for the research design. In order to gain a detailed picture of the user's experience, the design had to be local, longitudinal and situated in the user's physical environment.[6] Whilst there is rich literature on the implementation of ICT, and indeed domestication within the home, there is little that focuses on the work place and even less on domestication within the NHS, let alone general practice. The research of Haddon[7], Silverstone[8], Frissen and Punie[9] and Sørensen[10], who have

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[6] Suchman, L. (1987) *Plans and situated actions: the problem of human-machine communication.* New York: Cambridge University Press.

[7] Silverstone, R. & Haddon, L. (1996) 'Design and the domestication of ICTs: technical change and everyday life' In Mansell, R. & Silverstone, R. (eds), *Communication by Design. The politics of information and communication technologies*. Oxford University Press p 44-74.

[8] Silverstone, R. Hirsch, E. et al (1992) 'Information and Communication Technologies and the Moral Economy of the Household', In: Silverstone R, and Hirsch, E. (eds), *Consuming Technologies*. London: Routledge.

[9] Frissen, V. & Punie, Y. (2001) *Present users, future homes: A theoretical perspective on acceptance and use of ICT in the home environment.*

[10] Sørensen, K. H (2006) 'Domestication: the enactment of technology' In: T.Berker, T. et al (eds), *Domestication of Media and Technology.* Maidenhead: Open University Press. p40-61.

examined the use of ICT within the home in particular and latterly the working environment, contributed to the development of a suitable methodological framework for my research. To understand how individuals or groups of individuals domesticate technology, it is first necessary to understand what these users actually do in their everyday working lives, before examining how their use or non-use of ICT is potentially influenced by factors such as their job, their relationship with others and how their individual routines and approaches may conform or differ from the norm.

The advantages of studying a day-to-day workplace over time and doing so in-situ, is that it allowed me to identify not only changes over time and analyse the users in their natural working environment, but also witness their communications and interactions with multiple users in the practice, and how they interacted with the various ICTs and communication channels at their disposal. Furthermore, this approach also enabled me to identify the lack of engagement with ICT or with individuals and the various problems they encountered. This was particularly true of ICTs that did not function in ways that the user expected, for example system crashes or the internet being unavailable.

A further element concerning the research setting was the decision that had to be made regarding the relative breadth and depth of the sample size and resultant data collection. Using two practices, which may be considered a small sample, allowed for greater depth of data collection compared with the breadth of coverage that would have been achieved using a larger sample. The data from the KCL study and using participants from this group ensured that a comparative approach with a small sample of users demonstrating 'average' characteristics could be used, as the results of my research could also potentially be extrapolated across general practice as a whole. A final element of the research design was that the depth that was afforded by the smaller sample size, as well as the longitudinal element of the research, allowed for greater examination of the physical workplace and the extent to which the physical layout of the practices affected the domestication of ICT and communications amongst the various users in the practice.

Sample Selection and Negotiating Access – Identifying Participants

As part of the KCL questionnaire, respondents were asked whether they would be willing to participate in further research, of which 84 practices consented to. Using the findings of the KCL study, I identified those practices which were considered 'average' and 'paper-light' according to the 2003 study findings (including average staff, age of lead GP, patient list size and the use of a computer in general practice) and contacted these practices. Each practice consisted of approximately 10 members (full time equivalent) of core staff: four GPs, two or three receptionists, one practice manager and two nurses. This left a group of 34 'average' consenting practices who were contacted to participate in further research. All 34 practices were approached by letter (in 2005) and their attention was drawn to the fact that whilst this was further research based on the KCL study, the findings would form the mainstay of this thesis.

As an incentive to participate, I offered each practice an anonymised summary report of my broad findings at six months and on completion of the fieldwork, which covered ICT use and barriers to ICT use, good practice (where available) and suggestions for improvement in their practice. The final reports did not provide detailed comment on relationships between the various groups of actors (despite my findings in this area), as this would have been less useful to the practices and may have been deemed inappropriate. High-level findings such as interactions in practice meetings (discussed in **Chapter 5**) were, however, discussed briefly in the interim report. The rationale behind offering the reports, was that not only would the practices themselves have an output from participating in the research, but the reports themselves would highlight areas for improvement, such as the provision of ICT training, and would identify actual patterns of ICT use and communications which could be used internally to raise awareness and stimulate improvements within the practice. All the practices who agreed to participate were particularly enthusiastic as to the prospect of a report focused on their practice as opposed to local guidance from the PCT or nationally from the DH.

Given the time delay between the practices originally participating in the KCL research and approaching them to participate in this further research (two years), and the relative time impact on the practices required for participation, only 10 practices agreed to participate in this research. In order to identify two suitable practices, I had detailed telephone conversations with the practice manager at each site to further discuss the aims and objectives of my research and the benefits to and impacts on the practices. During these conversations, given the time delay since the practices originally participated in the KCL research, I also ensured that the practices could still be considered 'average' according to the KCL criteria. At this stage, three of the 10 practices declined to be involved further.

Next, I considered the geographical location of the seven remaining practices and how this might impact on the data collection. Geographical analysis of their locations identified that two of the practices were in neighbouring boroughs and in one case, the same catchment area. Choosing sites from the same locality would have potentially reduced the richness of the data collected. For example, similar factors such as the make-up of their local populations or the governance arrangements and local approaches of their respective PCTs may have been found to be influencing the practices. This analysis further reduced the sample to four consenting practices. The final site selection was based on the practicalities of travel arrangements to and from the practices, (which was particularly important given the size of London as a city), and the geographical diversity represented by the individual practices. Following this analysis, the agreement of the two chosen participating practices was secured from the senior GP partner and practice manager.

Following the final selection of the practices who ultimately participated in this research, I attended a practice meeting with each practice to: share further details about my research; discuss issues of confidentiality; and explain how the results of the research would be used. This provided an opportunity not only to inform all staff in the practice about the research but also gave staff the chance to ask any questions prior to the research beginning. This meeting, I believe, was crucial in securing the engagement of staff in the research, who consequently were largely accommodating

when it came to organising fieldwork visits and were open in their responses during interview. My presence at the meeting also sent out a clear message from the practice manager and senior GP partner that this was something that everyone in the practice was expected to participate in and that the practices were committed to contributing to my research. Furthermore, having met with me in this team environment, I believe this helped to put many of the staff at ease during their first interviews and the first day of observation, as they had a clear understanding of my research, its purpose and the general subject matter on which I wanted to interview or observe them.

Ethics - Confidentiality and Disclosure

The ethical approval for the research in this thesis was covered by the original ethical approval granted for the KCL study, which was given Multi-research Ethics Committee (MREC) approval in 2002. As part of the original approval, the research application had stated that following the survey, we would be asking consenting respondents to participate in further research and semi-structured interviews which may be used for additional research purposes, but did not specify the nature of the research. As the research for this thesis did not involve clinical issues, patients or issues of patient confidentiality, the semi-structured interviews and observation undertaken for this thesis were ethically approved by this original MREC.

As part of the ethical procedures both practices were made aware of the important issues of consent and confidentiality prior to agreeing to participate in this research. After approaching the 34 eligible consenting practices (as discussed earlier in this chapter), those who agreed to participate in this research (10 practices) were given a fuller brief of the research and ethics of the study. That is, that all information collected by interview and observation would:

- be obtained by consent of the practice and individuals;
- that any data collected would be anonymised within the data sets, interim and final reports and the final thesis; and
- that data collected would only be used for these purposes.

Individual staff members were also required to give their consent to being interviewed on each occasion. Confidentiality was vital to securing participation in this research, particularly given some of the staff dynamics (which are discussed in **Chapter 5**) and, as such, the practices and the staff within them are not identifiable in this research by name, initials, NHS numbers or any other identifiers that might compromise their confidentiality.

Access to Participants

In studying users within general practice, the issue of access was initially a problem for my research. General practice operates within specific times, and given the sensitivity of the business at hand, namely individual patients' health concerns and the resultant confidentiality issues, gaining access to GPs in particular to study their behaviours and understand their working world posed a number of issues. As such, the design for my research had to be appropriate as to enable the gathering of the relevant data and information, but also be of minimal impact to the participants and not disrupt their daily routines. This was particularly important for the observation component of the research, as I did not want my presence to alter the natural behaviours of participants, which would have impacted significantly on my findings. The highly specialised nature of medicine meant that 'going native' and essentially working or living within this group was not possible and so alternatives that did not duplicate the findings of the KCL study but would provide a rich source of data had to be identified.

Much of the established literature that examines medical professionals and their use of ICT has concentrated on specific groups such as GPs or hospital-based clinicians. There has been little research that has concentrated on general practice as a complete entity. Given the diversity of staff and the increasing community-based services that are provided in general practice, I concentrated on those users who were greatest in number and for whom the results could possibly be extrapolated for other general practices – namely practice managers, GPs, administrative staff and practice nurses. Although the practices did include other staff such as counsellors and therapists, these were not staff groups common across general practice at the time. Other staff

such as health visitors, whilst more common in general practice, they largely operate in the community and thus gaining access to this group of users was difficult. Therefore, my research concentrated largely on gaining the opinions and views of the 'core' staff group and, although the other staff groups were not excluded, they were included in participant observations rather than interviews.

However, the focus of my research (the domestication of ICT and communications between occupational groups in general practice and not between staff and patients) automatically reduced the available time of the participants. I was limited to conducting interviews when staff (mostly GPs and practice nurses), were not involved in patient consultations. As each practice had protected time when they did not consult, (usually a two-hour block at lunchtime) I relied on gaining access to clinical staff in particular during this time period. The large numbers of administrative staff at each practice meant that on the whole they were able to participate in interviews at any time without compromising the service they provided to patients or to the practice.

The time-pressured and reactive environment of general practice also led to some other practical problems in gaining access to participants. For example, individuals had agreed to be interviewed in advance but on occasion, due to late running appointments or other more pressing priorities, they did not have sufficient time available on that day to complete an interview. This situation was further complicated by the fact that not all staff worked full time, which was a problem when I was attempting to build up a picture of change over time amongst individuals and groups. As a result, in order to ensure the continuity of participants and to ensure all those who wanted to participate were able to, on occasion I visited the practices to interview a single member of staff who had not been available on a previous visit. Recognising the constraints under which the practices operated, I was as flexible as possible as to the dates and times that I undertook my research and largely allowed the practices and individuals to set those which suited them best.

Ensuring that respondents were open and detailed in their responses was also a factor for consideration, but as previously stated, I believe this was largely minimised by my attendance at a practice meeting prior to starting my research. My further attendance at a practice meeting (at each practice) during the course of the research further helped to secure staff engagement and openness. Alongside this, I had to consider the issue of participant bias where respondents could potentially mislead me or conceal information. This of course could be intentional or unintentional. However, several facets of my chosen research design helped to minimise the potential possibility of participant bias, namely: the time period over which the research was conducted (14 months); the series of interviews that I undertook with each member of staff (3); and the use of participant observation which enabled me to identify areas for additional exploration particularly if participant responses and observations did not match or there were significant changes over time.

A further dimension that had to be considered was that unlike domestication within the home environment where a user normally chooses to bring a technology into their home, in the case of general practice, ICT has largely been (and continues to be) imposed by central government policy or local NHS directives. Whilst non-voluntary adoption by organisations is unusual it is more commonly identifiable at individual level within the workplace and by individual technologies. In undertaking this research I had to continually assess the development and implementation of NPfIT both from a written policy perspective but also its practical implications for the practices in my research, and how this might affect their experience of domestication of ICT and communications. This posed an interesting element to the issue of uptake by individuals or groups of users, as was discussed in **Chapter 1**, government policy and the components of NPfIT do not affect users equally. Given this dimension, my research design had to take account of this. The near constant and largely negative referencing of NPfIT within the press at the time of my research, helped identify some of the behaviours I witnessed in my research, but I also had to ensure that my perception was not overly influenced by such reports and this ongoing policy analysis was a constant throughout my research as it was not possible or appropriate to separate the two.

Provision of Practice Reports

Each practice was provided with two reports based on my findings. One was shared with the practices at approximately seven months after the start of my fieldwork, once two complete interview schedules and two days of observation had occurred at each practice. In addition to the original research design, I was able to attend a practice meeting which provided further material for observation. This meeting at both practices happened within the first six months of the research.

Each report contained high-level anonymised findings and indicated where there was good practice and where improvements could be made. This ensured that not only did I have an opportunity throughout my research to conduct some mid-research summary analysis, but it also provided the practices with some pointers as to how they may improve their communications and domestication of ICT.

3.7 Characteristics of the Practices

The two practices chosen for this research each displayed as close to average characteristics as identified in the KCL study as possible. Each practice contained approximately 10 full-time members of staff (whole time equivalent) and at the time of the survey (2003) were considered to be 'paper-light'.

Yellow Practice

This is a large practice in a deprived spearhead area of East London, which is currently undergoing a degree of regeneration. By definition a spearhead area is where the local authority is in the bottom fifth nationally for three or more of the following:

- male life expectancy at birth;
- female life expectancy at birth;
- cancer mortality rates in the under 75s;
- cardiovascular disease mortality rates in the under 75s; and
- average score for the 2004 index of multiple deprivation.

There are currently 70 spearhead local authorities and 62 spearhead PCTs.

The **Yellow Practice** serves a predominantly young black and minority ethnic community and has a patient list size of 10,500. The practice employs 21 staff including: six receptionists (including medical records administrators), two nurses, six full-time GPs, a practice manager, a medical secretary, a midwife, physiotherapist, health visitor, counsellor and welfare advisor. However, many of these staff were only employed part-time. Interviews were carried out with the practice nurses, the practice manager, GPs, records administrators and receptionists.

Yellow Practice –Health of the area

Given the high levels of deprivation and associated health inequalities, on average men and women in the area live two years less than the England average and death rates from major causes are much higher than in England overall. For example, the death rate from stroke and heart disease is 1.6 times higher. One in 17 people in the area has diabetes compared to one in 27 in England as a whole. All but two of the 37 small areas within the local authority are in the most-deprived fifth in England. The proportion of people dependent on means-tested benefits is over double that of the average in England. However, death rates from cancer, and levels of binge drinking are lower than the England average, as are road injuries and deaths and hip fractures in the over 65s.

Red Practice

This is a similarly sized practice in South London, with a practice list size of 10,300. The area is relatively affluent and the community served is predominantly white European. The practice employs 26 staff including: five receptionists, a secretary, an administrative assistant, two nurses, 10 GPs (five full-time, five part- time), a practice manager and six paramedical staff including a health visitor, healthcare assistant, phlebotomist, counsellor, counselling psychologist and an addiction counsellor.

Red Practice –Health of the area

On average males in the area live shorter lives than the England average, while females are on a par with the England average. The area has a high death rate from smoking, with one in three adults smoking and one in six deaths related to smoking. The rate of early death from heart disease and stroke is high compared to the England average. The borough is made up of several contrasting areas with some areas in the most-deprived fifth of England and others in the least deprived. The teenage pregnancy rate of the borough is also higher than the England and London average.

A variety of staff with different levels of experience at both practices were interviewed, and, where possible, staff were tracked over a 14- month period (**Appendix 1**). Due to the limited working hours of many of the paramedical staff, they were not interviewed in either practice. The behaviours of 'other' staff were captured where possible during participant observation.

Physical Layout of the Individual Practices

The physical layout of any workplace and your relative proximity to your colleagues ultimately affects how you communicate with them. The two practices involved in this research had very different physical layouts, which may in part be responsible for some of the communication patterns that are discussed in **Chapters 4 and 5**.

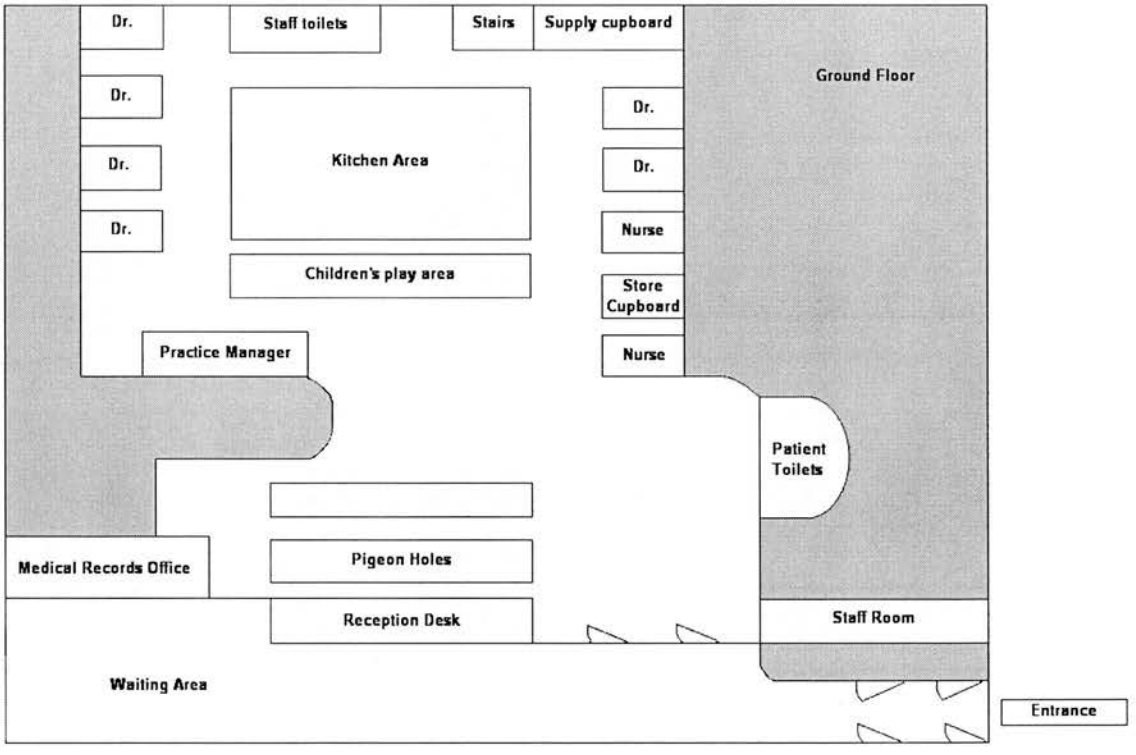
Yellow Practice

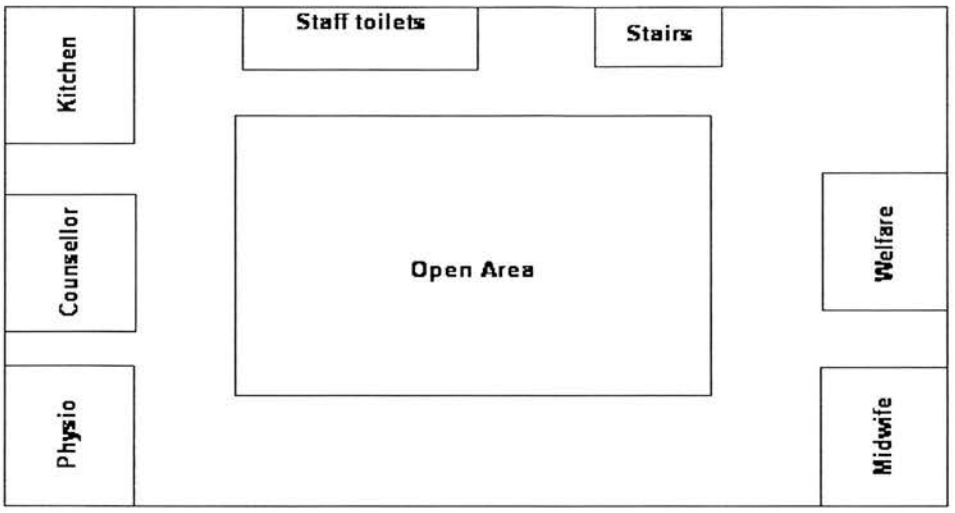
As seen in **Figure 9** below, in the **Yellow Practice**, the waiting room and the reception desk were separated from the rest of the surgery by electronically activated double doors. The waiting room consisted of 25 chairs for patients, which faced the reception desk and an electronic display board. Patients obtained access to the consulting rooms as and when their names were displayed on an electronic display board. Each time a patient was 'called' their name would be displayed together with the name of the GP or nurse who they were seeing and the number of the appropriate consulting room. This information was also accompanied by a short beep to alert patients to appointments being called. Once a patient was called, the electronic lock on the double doors was released for one minute and thirty seconds. Access from the

consulting rooms back to the reception area was controlled by a door release trigger, a button that staff and patients could press from the inside main consulting area.

The consulting rooms, bathrooms, staff area and store rooms were spread out across two floors. The centre of the building was essentially hollow, allowing for a large open space with consulting rooms and offices either side of it. There were seven consulting rooms on the ground floor, one staff room, the practice manager's office, three toilets and a small kitchen area. On the second floor there were a further five consulting rooms. The reception area/front desk had an adjoining back office where medical records were stored. Immediately behind the back reception wall was a narrow corridor which contained the staff pigeon holes and an adjoining corridor to the main consulting rooms, therefore staff were separated from the waiting area and did not need to use the electronic double doors.

Figure 9 Yellow practice floor plan

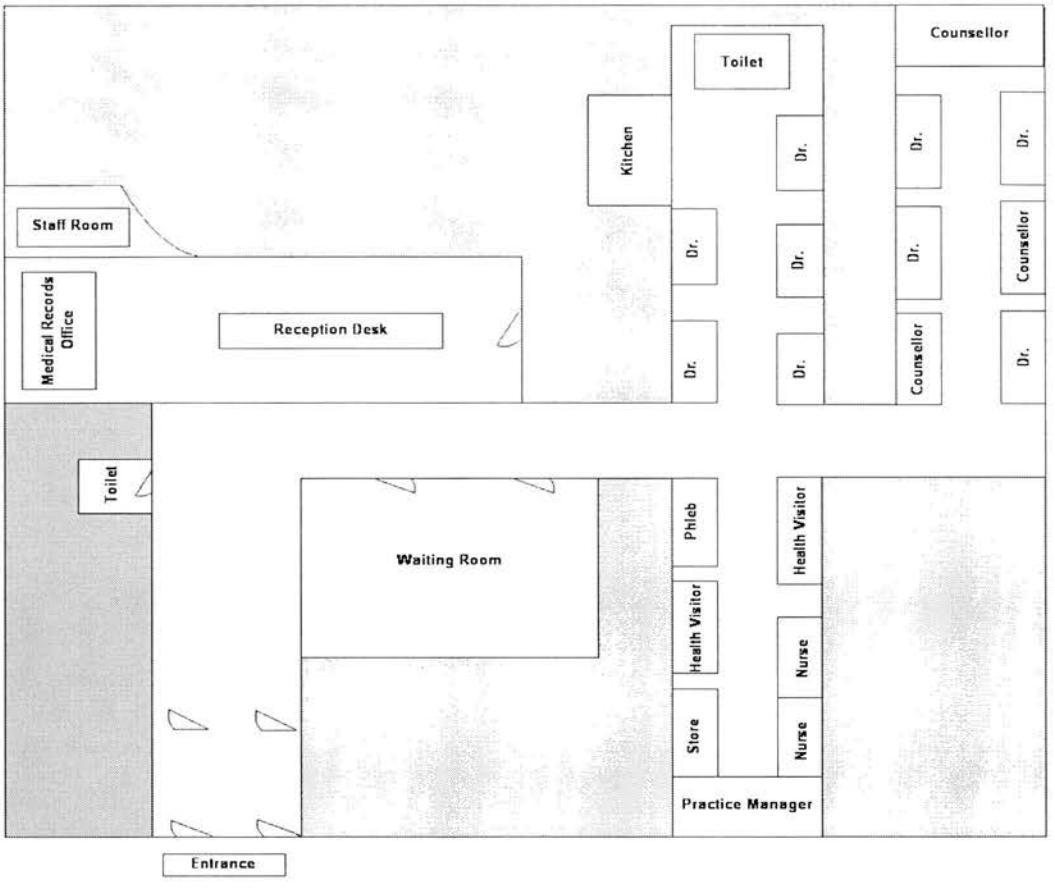




Red Practice

In direct contrast, the **Red Practice** was laid out over a longer and wider but more contained physical space as shown in **Figure 10**. The practice covered one floor, and had a large glass-fronted waiting room, which was contained within the overall building and was separated by glass doors from the rest of the practice. The waiting room was situated in front of the reception desk so upon checking in, patients then opened glass doors to the waiting room. Patients were physically called by the individual doctors and taken to a consulting room in one of three corridors. The corridors contained between five and seven consulting rooms each, with one corridor specifically allocated to the practice manager and nurses. The explanation for this was that nurses may want to talk to other nurses and GPs likewise and therefore the close proximity would be beneficial. In reality, observation and interviews identified that a mix of nurses and GP consultation rooms may have aided communication and may have increased face-to-face consultation. Attached to the reception desk was an office for medical administration containing paper medical records and four desks. The staff pigeon holes were located on the back wall of the reception desk and therefore, unlike in the **Yellow Practice,** they were not separated from the reception desk.

Figure 10 Red practice floor plan



Typical Practice Day and Daily Routines

Both practices operated similar routines in their daily operations, perhaps in some respect reflecting the established and embedded processes required to operate general practice effectively. The **Yellow Practice** opened for patient consultations at 8.00am until noon and then again from 2.30pm until 6.45pm, but closed for the day at 1.30pm on Thursday afternoons. The **Red Practice** operated from 8.00am until 11am and then 1.30pm until 6pm. The break time in both surgeries was used for departmental administration, writing up patient notes and referral letters, lunch break and practice meetings. Staff in both practices completed their day between 6.30pm and 7.15pm approximately.

During the working day there were a number of daily routines and tasks that took place. Research also identified several tasks which were carried out by occupational groups but that were not considered a daily task or routine – for example patient

audits or recall of patient records with a specific illness. Those tasks that were considered to be regular and routine are broken down according to occupational groups below.

Receptionists: handling patient enquiries, both by phone and in person, disclosing the results of simple blood and urine tests, booking patient appointments.

Practice manager: processing day-to-day administration to ensure smooth running of the practice, liaising with their local PCT over budgets and service provision and responding to practice letters and emails.

GPs: patient consultations, writing up consultations in patient's medical records, reviewing test results, providing prescriptions, and referring patients for specialist treatment.

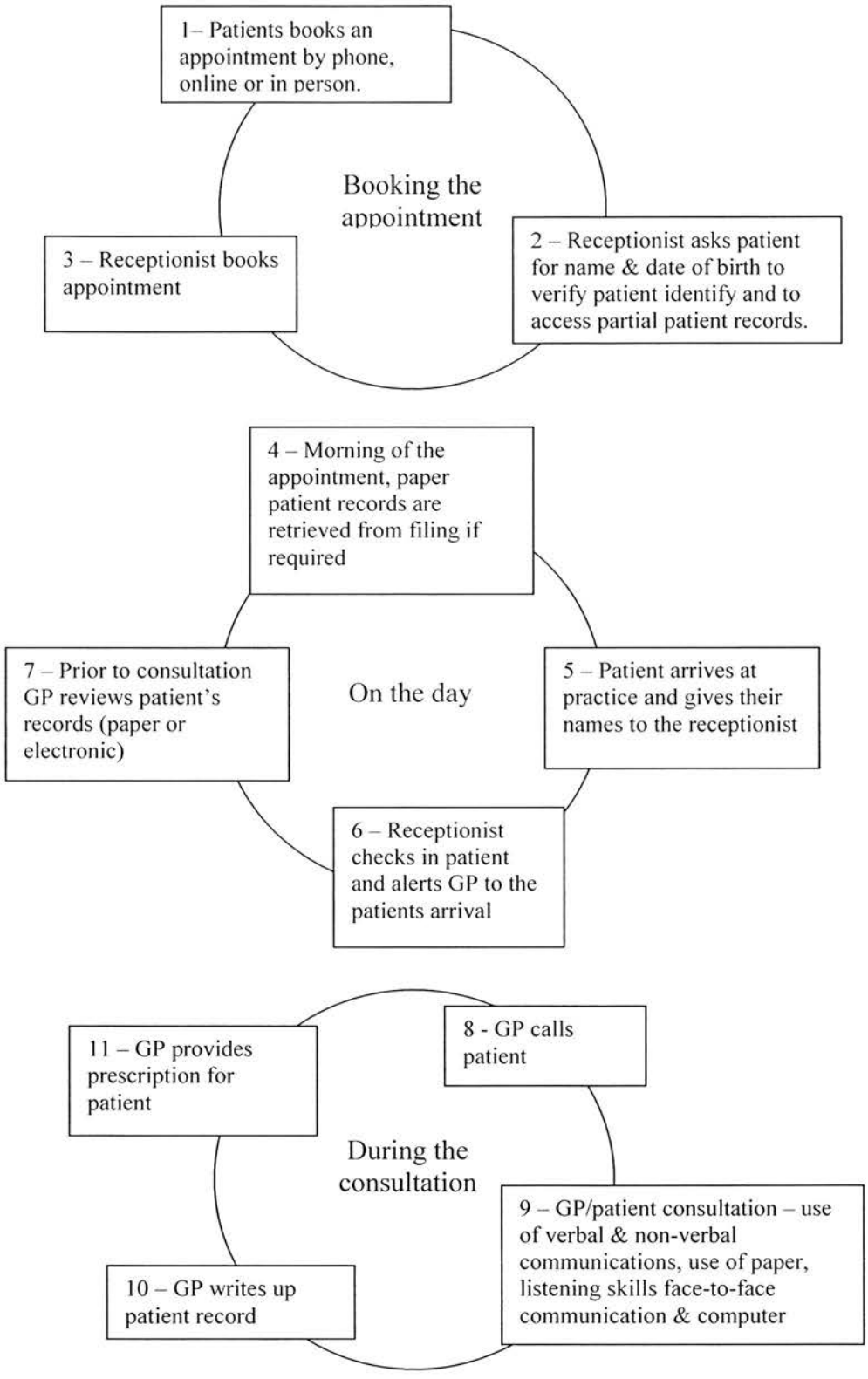
Practice nurses: patient consultations, writing up consultations in patient medical records, reviewing test results, and administering standardised vaccinations, immunisations and carrying out blood tests.

These broadly defined tasks were the norm for a day-to-day activity within both practices, as supported by interviews and observation. However, the tools required, namely the use of ICT, and paper and verbal communication and the ways in which these tasks were carried out varied between the practices which will be detailed in **Chapters 4** and **5.**

3.8 Typical Information Flows in General Practice

Working from the premise that the main activity undertaken within general practice is the treatment of patients, then the basic information and communication flows can be summarised as shown in **Figure 11**. The diagram assumes a GP and patient consultation within a paper-light practice. As the diagram demonstrates, there are several communications and information flows via a variety of means, involving a number of actors over a period of time. Each actor uses a number of different communication methods and alone communicates with a number of different actors, using multiple ICTs and modes of communication.

Figure 11 Typical information flows in general practice



This is a typical and very simplified cycle of patient/staff communication and information flows in a general practice setting. However, there are multiple occupational groups in general practice and a patient may interact with several of them in ways not described in this diagram. The information and communication flows resulting from these interactions may also be internal and external. Furthermore, communications in general practice are not limited to between GPs and patients but involve several staff groups in a complex web of information sharing and communication. The methods of communication vary considerably according to the individuals involved and specific circumstances and often involve several diverse communications and information flows as will be demonstrated in the following chapters.

3.9 Empirical Data Collection

Prior to undertaking the interviews, I asked each staff member participating in the interview component of the research to complete a short questionnaire on how they rated their skills in relation to a number of different ICTs and tasks, as well as an overall rating for their skills. Staff were asked to rate themselves on a scale of zero to 10 for each question. This process provided me with some interesting baseline data to not only cross-reference with the participant observation component of the research but I also used this to feed into the interviews with individual users.

The purpose and design of the interviews was to gather individual's views, opinions and experiences of: ICT within general practice; the extent to which they domesticated ICTs; the problems they encountered and how they overcame them; how the presence of ICT influenced their methods of communication (both internally and externally) and overall behaviour; the use of paper and verbal communications; and why they chose these communication channels. While I was not looking to gauge their opinions of central government policy on ICT, the nature of the interviews and the then current policy climate meant that it would have been inappropriate to exclude it entirely and, indeed, respondents frequently spoke of it during interview. I addressed these issues in the interviews under a number of broad

categories, reflecting the three interviews conducted at six-monthly intervals with each participant. These categories are not exclusive and, as such, the semi-structured nature of the interviews reflected this. The broad content of the interviews is outlined as follows:

Interviews at month zero

- basic demographic information – job title, length of time in practice, full time or part time, length of time using a computer;
- attitudes towards ICT;
- use of paper-based communications and ICT;
- general ICT use – in the home and work;
- Skills perception – based on findings of the self-rating questionnaire;
- training in ICT; and
- ICT domestication.

Interviews at month six – including data gathered from first session of participant observation

- individual's capability and capacity relating to ICT;
- are behaviours as a result of choice or centrally or locally imposed policy?
- personal barriers to ICT use and communications;
- attitudes of the practice towards ICT;
- non-domestication or lack of engagement with ICT;
- communications with colleagues;
- how using ICT changes individual's jobs; and
- does the way you communicate change the way you are treated or perceived by others?

Interviews at month 12 – including cross-referencing of data gathered from two sessions of participant observation and two previous interviews

- overall views of how the individual felt they had used ICT in the last year;
- overall views of how they believed they communicated internally and externally;

- significant problems they had experienced and how they were resolved;
- what was the individual or the practice going to do differently in the future in relation to ICT and communications?
- what does the norm look like? Both nationally and for that practice?
- awareness of the communications style/preference.

The fieldwork was conducted over 14 months in total. As agreed upfront with the practices, interviews and participant observation was conducted at six-monthly intervals, which led to a total of six days (three days per practice) of observation. The interviews were divided across several days to reflect the differing working patterns and commitments of staff. Over the 14-month period, I spent approximately five days at each practice interviewing staff.

Interviews were carried out on a semi structured basis, in accordance with an agreed timetable with the individual practices. As both practices had already participated in the KCL study, a pilot of the interview schedule was not undertaken but rather I discussed my questions and areas of interest with colleagues and contacts I had in the medical profession. This not only helped to refine the interview schedule and research design, but also was helpful in identifying questions which may have been difficult to answer or, in some cases, identify areas for which I had not originally considered asking a question.

The first set of interviews was conducted in February 2006 firstly at the **Yellow Practice** and then the **Red Practice**. A total of 71 interviews were completed in 14 months. All participants were interviewed three times with the exception of one practice nurse who left the practice during the third set of interviews. Interviews varied in length between 40 minutes and one hour 10 minutes subject to the participants' available time, interest in the subject matter and job they held in the practice. The interviews undertaken at each practice were transcribed (39 at the **Yellow Practice** and 32 at the **Red Practice**). The last set of interviews was conducted in April 2007.

The premise of these first interviews was to gain an understanding of:

- the then current levels of ICT use within each practice and the individual's use of ICT; and
- their approach and attitudes to ICT and the overall ethos of the practice in relation to ICT, in order to establish a benchmark on which to base future interviews at both practices.

The questions concerned the individual's current use of ICT, the problems they had encountered and how they used both paper and ICT in their daily working lives. Therefore, the initial line of questioning focused on their daily routine rather than specific questions regarding individual ICTs. The only definition and guidance given to participants to help frame their responses was the division between CMC and NCMC.

Interestingly, at the time of the second interviews some participants were eager to speak with me again, as there had been some changes in the practices and they wanted to feedback on their experiences. This enthusiasm could in part have been driven by the knowledge that I would be providing a report on my findings within the practice. By the time of the second and third stage of interview and observation, all participants were used to my presence at the practice and I established a good rapport with many of them, which led to some very detailed interviews. The second set of interviews built on the first, together with what I had observed in the practice, particularly where the evidence contradicted itself. This second set of interviews challenged some of the views that participants had expressed previously and explored communications between the various staff groups, but also amongst their own group. These interviews also explored in more detail why some occupational groups: relied on paper-based communications when CMCs were available to carry out the same task; why some users felt more confident at using the various ICTs at their disposal; and why others struggled or in some cases refused to conform. This second stage interview was particularly important as a method of identifying why some ICTs were domesticated and others were not. At this stage I also prompted

users to discuss their views on how they perceived the overall communications and use of ICT within the practice and to discuss how they felt their own group communicated.

Observation

Participant observation was carried out on three occasions at each practice between 8.30am and 6.30pm. One further session was carried out by way of attending a two hour practice meeting at each practice, which offered very interesting insights into the group dynamics of the practices. However, I was unable to attend further meetings due to issues of patient confidentiality. This was the only occasion at which I was able to observe all the staff at each practice and it was incredibly useful to gain further insight into the communications and relationships within the practices, particularly amongst those individuals who were not part of the interview group.

By undertaking participant observation I negotiated with each of the practices a suitable focal point within the practice that would allow me to observe participants without compromising patient confidentiality. These included: the patient reception area; behind the reception desk; the staff rooms and, on occasion, staff offices (when consultations were not underway). As my research was conducted over a long period of time this method worked well and allowed for rotation of focal points throughout each day of observation. Furthermore, this allowed for me to validate some of the responses given in the semi-structured interviews, question the validity of others but also enable me to watch some interesting interactions, behaviours and communications between particular staff groups, including staff not participating in the interviews, such as therapists, counsellors and health visitors. I was also presented with a number of informal opportunities to observe and get to know and understand the context of the individual practices, for example while waiting for staff to be available for interviews.

3.10 Analysis of Empirical Data

All 71 interviews were recorded, transcribed and analysed for cross- referencing and thematic breakdown using NUD•IST which allowed for direct coding and searches of related text to be analysed. Following directly from the initial first set of interviews and prior to the first day of observation, I produced a basic list of initial themes which was further developed during the first period of observation. These themes were refined several times over the course of the interviews and observations. Refining the themes in this way not only helped to identify meaningful quotes from participants but also helped me to group responses and identify outliers, or themes which may be only relevant to one particular respondent. The structured process of data collection at six-monthly intervals allowed for constant analysis and refinement of my identified themes, which were analysed alongside ongoing changes in central government ICT policy. This process also helped greatly with providing relevant data for my six-monthly and final reports to the practices.

Participant observation data and material was also analysed for emerging themes and coded according to responses not only by groups but also individuals and recorded in Excel spreadsheets. This approach allowed me to develop further themes relating to particular groups or individuals and cross-reference them according to their interactions with others; their use of specific modes of communication, for example how long their communications lasted; the length of time they engaged with an ICT or colleague; attitudes and perceptions; and successful or unsuccessful domestication of ICTs. Therefore, my data collection could be cut and analysed from a number of different angles – the interviews themselves giving an individual perspective, the overall user group perspective and experience and overarching themes that emerged from my research questions and the literature to inform the research. The themes were also, where possible, aligned with three stages of domestication – appropriation, objectification, and conversion. The following two chapters discuss the empirical findings from this research.

Chapter 4 Findings: computer mediated communications

For simplicity of presentation, the findings from this research are divided into two distinct chapters: CMCs and NCMCs. This chapter focuses on CMCs (computer mediated communications). Under this definition I have included: the use of a computer to carry out any information and communication-based task, and the use of other ICT such as handheld computers. The use of face-to-face/verbal communication (including telephones) and paper-based communication is addressed in **Chapter 5**.

Insights are sought through comparison between two practices, over a 14-month period, which were considered to be examples of 'average paper-light' general practices, according to the criteria of the KCL study:

The use of technology to carry out tasks that are traditionally paper-based, including computerised practice management and the use of electronic records in the consultation.

This comparative approach has enabled me to identify distinct differences between the two practices, for example, their implementation strategies and distinct staff hierarchies which have had an impact on the implementation, appropriation and domestication of ICT within them.

This chapter deals with findings on a comparative level related to the use of CMCs and discusses: the implementation of ICT in the Yellow and Red practices; how ICTs are used, adopted and domesticated by the various occupational groups in general practice; the benefits and barriers to the domestication of ICT in the practices; and the impact of ICT domestication on occupational groups' relationships with patients. This chapter discusses the variation in domestication (using the framework advanced by Silverstone and Sørensen) in the two practices and within the various occupational groups and how this has impacted on communications, information flows and relationships within the practices. It explores how some users have implemented, appropriated and domesticated technology but also why others have

resisted or simply failed in the final phases of domestication. That is that they formally adopted ICT but failed to fully appropriate it.

4.1 Implementation of ICT

The approach to implementing ICT within the two practices varied considerably. The governance structures of the practices had a significant effect on their overall use of ICT but also on its implementation, appropriation and adoption at an individual user level. In the **Yellow Practice** the overall governance of the practice, including the associated implementation of ICT, was led by the practice manager, to whom the senior GP partner had delegated the majority of the non-clinical decision making. The practice manager was very structured in her approach. In short, she was target driven and wanted to implement policy strictly in accordance with directives that came from either the local PCT or government policy. This is not to say that the practice manager made decisions in isolation, but more that they had significant decision-making powers and responsibility within the practice. The practice manager implemented ICT in an autonomous way. She alone negotiated with the local suppliers of the system when the software would be available and then arranged for it to be implemented within the practice. In the case of *Choose and Book*, the practice manager arranged for half a day's training on the system (provided by the local PCT on behalf of the DH) but expected the practice to be using it with immediate effect. As she argued:

The practice has been operating almost paperlessly for a long time. We're all used to using a computer... Change is disrupting, so it's best to do it quickly... bit like taking off a plaster.
Practice Manager Yellow Practice

The practice manager and senior GP partner also liaised heavily with the local PCT on developments affecting the practice. The practice manager met fortnightly with the senior GP partner to discuss pertinent business issues, which included some decisions in relation to NPfIT such as problems that had been experienced with *Choose and Book* or staff ICT training. But the senior GP partner admitted that ICT issues were not the normal topic of discussion, and when they had been raised he had

tended to defer decisions until he had talked to the ICT GP enthusiast within the practice. The monthly practice meetings also provided a further forum for discussion of ICT issues and overall governance of the practice. The practice manager further highlighted that as the practice was an independent business she was responsible for the running of that business (on behalf of the GPs who own the practice) and as such was accountable for the decisions that she made, which included ICT implementation. Whilst this may be appropriate for much of the day-to-day running of the practice, it can be argued that such a singular approach was not appropriate for the implementation of widespread change, such as NPfIT, which would not only result in behavioural changes but also affect occupational groups in very different ways.

The decision by the senior GP partner to delegate specific responsibility for implementation of NPfIT to the practice manager, with help from the GP IT enthusiast within the practice, was as shall be discussed in **Chapter 6**, ultimately a poor decision for the operation of the practice. The practice manager was very efficient but also rather forthright in her approach to management of the practice, a quality that they recognised but argued:

We are a large practice and there is so much going on, so many changes at so many levels. General practice is a time-pressured environment. It never stops from the minute you get in. There is no way I can see everyone at the same time, so I have to make decisions and sometimes difficult ones, but they have to benefit the practice – I engage with the staff where necessary, where I can, but sometimes it's easier…and for the benefit of the practice to simply make decisions. If there is a national policy then we have to conform, it's not really up for debate… I've been here a long time now… staff are usually vocal if there's a problem.
Practice Manager Yellow Practice

The GP ICT enthusiast on the other hand, whilst very warm in their personality, was so competent in their use of a computer that they could not always comprehend why some staff struggled to use the ICT available to them:

It's frustrating. There is so much we could be doing, but some people just don't understand the basics, not matter how many times I explain it…. It's not that hard.
GP Yellow Practice

This combination of personalities, lack of understanding of user needs and implementation approaches could be responsible for the lack of cohesion in the practice and the differential ICT experience of the occupational groups within it. The overall approach to the implementation and governance of ICT within the practice, it appeared, did not take account of the varied capabilities of the different occupational groups and how the various components of NPfIT would impact on their daily jobs. As a result, there was no middle ground regarding the ICT implementation strategy in the **Yellow Practice**. On the one hand, there was the ICT GP enthusiast who was not understanding of those with low ICT skills and capability to allow an incremental approach to implementation. On the other, the practice manager simply wanted the technology implemented. The role of the senior GP partner in this relationship however, was not particularly helpful. Deferring decisions to the ICT enthusiast delayed decision making, but neither did he delegate responsibility to this individual and consequently the successful domestication of ICT in the **Yellow Practice** did not happen in the way in which it was envisaged by the senior GP partner.

Since the initial KCL study, the **Yellow Practice** has made several inroads in the use of ICT and is now largely considered by staff to be paperless, that is:

No use of paper-based applications or retention of paper-based documents except those required by law. In practice this means having no written patient information or records in the consultation.

However, as shall be discussed in **Chapter 5**, this staff perception was in part due to the fast-paced implementation of NPfIT by the practice manager and, despite this approach, attitudes towards the use of ICT varied considerably within the practice and particularly within occupational groups.

In direct contrast the approach in the **Red Practice** was much slower paced. Implementation, however, was led by the senior GP partner in discussion with the practice manager but, even as the practice manager acknowledged, this was to ensure she was kept up to date with the senior GP partner's activities and that his ideas were implemented, rather than contributing actively to decisions regarding ICT. The

senior GP partner, as a direct user of the ICT being implemented, had a greater understanding (albeit only from his user perspective) of the potential impact of introducing ICT within the practice. Nevertheless, this slower, more measured approach had a number of benefits, largely that users were not overwhelmed by the pace of change. As the practice manager in the **Red Practice** highlighted:

We're not the most IT savvy bunch of people. We're computerised but we still use paper records... I don't even have to use half of it. It's taken time to get everyone to where we are now and it's been hard. I'm trying to move the practice forward and with the national programme [NPfIT] we have to but I want to take everyone with me. The only way for us is one step at a time.
Practice Manager Red Practice

It is unusual for a single senior GP partner to be in charge of implementation arrangements given their patient workload but, in this case, it could be attributable to the fact that the senior GP partner had been at the practice for almost 20 years and had been responsible for its initial set-up and therefore felt a greater sense of ownership. The practice manager and the senior GP partner had a very close relationship and were extremely communicative about developments within the practice. The practice manager had overall responsibility for the budget, and decisions that impacted on this, the management of the patient list and the day-to-day running of the practice. However, all decisions made and actions taken as a result of national ICT policy were made by the senior GP partner, who had the ultimate sanction on decisions and could overrule the practice manager in certain circumstances.

Despite this set-up, it appeared to work very effectively and both the practice manager and the senior GP partner were well respected within the practice. Although the senior GP partner had limited ICT skills, which may have contributed to the overly cautious, slow-paced implementation of NPfIT within the practice, this was not perceived as detrimental, but instead led to greater staff cohesion within the practice and ensured that the pace of change reflected the needs of all staff within the practice. The **Red Practice** has also had ICT developments since the initial KCL study, although nowhere near the same scale as the **Yellow Practice** and is still considered a paper-light practice.

4.2 Adoption and Domestication of ICT in General Practice

Like many businesses and organisations there are a variety of ICT skills among staff and general practice is no exception. The appropriation and implementation of a national ICT programme cannot be expected to be universal, indeed, at the time of the introduction of NPfIT, the government set some long lead-in times for local implementation of the various components of the programme to counter the various states of computerisation in general practice and the relative skills of users. To this end, training could not be universal but rather it had to be tailored to the needs of the specific occupational groups. However, unlike large-scale business, it appeared that given the relatively small number of staff in each practice, the variation in computer literacy was extremely marked. Many staff had basic levels of understanding, such as the ability to navigate the internet and use emails and one or two staff in each practice had advanced skills such as the ability to create web pages and programmes. This in turn impacted on the abilities of individuals and occupational groups to domesticate ICTs.

This section considers the domestication of ICTs within the practices as a whole and is followed by a discussion of domestication by individual occupational groups.

The **Yellow Practice** was highly computerised and, on the face of it, operated largely via electronic communication, although analysis as discussed in the next chapter (**Chapter 5**) revealed a different picture. Within any occupational group there is always variation in skill set and within that there are ultimately extremes of skill. However, these extremes were considerably pronounced in the **Yellow Practice**. Prior to the interviews and observation at the practices, each member of staff was asked to complete a self-rating questionnaire on their perceived ICT skills, which covered their confidence and ability to operate the internet, email and the various components of NPfIT such as EHRs. Participants were also asked to give themselves an overall score from zero to ten (ten being the highest) on their ICT skills. The overall self-rated abilities within the **Yellow Practice** demonstrated substantial variation, with the lowest score being three and the highest being nine with minimal

clustering at any level. Normal distribution would expect to see some clustering either by skill or user group. Staff, particularly those who were part-time, lacked basic ICT skills. This finding was supported by the interviews and observation, which identified some staff (both GPs and practice nurses) asking colleagues for assistance when using ICT. However, when some participants were unsure how to undertake a specific activity or task, on occasion, rather than ask a colleague, they either did not carry out the task or found an alternative or makeshift solution – for example, the use of a post-it note in place of an email. This was not always a suitable course of action as on occasion this resulted in the loss of data or the storage of information in the wrong place, such as the wrong section of a patient record, which would then not necessarily be viewed or found by practice staff at a later date.

However, the **Red Practice** was not as highly computerised as the **Yellow Practice** and there was not the same drive and commitment at the practice level to use ICT. Consequently, overall, their use of ICT and their self-rated abilities were not as high as those in the **Yellow Practice**. Indeed, the majority of staff appeared to have the same levels of basic ICT capability. The lowest self-rating was four and the highest was eight, but there was significant clustering around the five and six level. Therefore, whilst there was a more positive attitude towards ICT, the overall ICT skills of staff in the **Red Practice** were perceived to be at a lower level than those of the **Yellow Practice**.

The **Red Practice** had been slower to computerise overall and took a step-by-step, incremental approach, which was perhaps responsible for the more relaxed attitude towards ICT found in the practice. Staff acknowledged that they found using ICT difficult and frustrating at times but seemed more at ease with its use, given the less pressurised environment. The lack of drive to domesticate ICT, nevertheless, also resulted in the greater use of paper-based communications, which, as shall be discussed in the following chapter, had an adverse impact.

The interviews and observation identified that the varying abilities and levels of confidence in the use of ICT in both practices, were not affected by age. Indeed,

some of the youngest members of the practice had the lowest use and ability when using ICT. This could be due to the relative lack of work experience of some members of staff. For example, some staff had only been at the practice for one year and indeed, in some cases this was their first post as a GP and thus it could be argued that they did not have much experience of using the systems required for the job.

Electronic communications, such as the use of email (internal and external) and instant messaging, was an area of significant difference between the two practices and consequently further demonstrated the differences in the levels of domestication occurring in the practices. In the **Yellow Practice**, the interviews and observation revealed high levels of electronic communication, particularly via instant messaging as part of the EMIS system. The interviews confirmed that the use of instant messaging was a decision made by the practice manager and that, where possible and appropriate, communications between staff should make full use of the system. It was used to communicate telephone messages, requests to speak to staff members, and was particularly used to communicate 'all practice' daily reminder messages such as the presence of workmen on site, the planned back-up of servers or reminders of meetings happening that day. Overall, staff were broadly supportive of the principal of the system as it was part of the EMIS system which they operated during their day-to-day activities. However, as shall be discussed, not all the staff in practice felt comfortable and/or confident enough to use the system.

In direct contrast, internal electronic communication was very rare in the **Red Practice** with the exception of urgent notices that were delivered via the EMIS system and were automatically flagged on screen to attract the users' attention, for example to let staff know the fire alarm was being tested. However, instant messaging was not widely used in the **Red Practice** and although email was freely available, participants only used it occasionally to communicate internally. It was more widely used, however, for external communication such as communication with specialist consultants or to contact the local PCT or for personal use.

External electronic communication was common, as would be expected for such tasks as contacting specialists and consultants via email but, despite the growing research literature on patient/GP emails, there was minimal evidence of this in the **Yellow Practice**. Indeed, the practice had more or less banned patient communication via email. When asked why patient electronic communication was not encouraged, a variety of reasons were offered, which related largely to the particular population that the practice served and the early experience of practice/patient email communication. As discussed in **Chapter 3,** the practice was located in a deprived area of East London with a high percentage of ethnic minority groups and, in particular, refugee and asylum seekers who often had complex medical history. When the practice had initially introduced the option of email contact for patients, the practice was quickly inundated with inappropriate communications such as the request for social services help or questions about employment and dentistry. The reason for this was that for some patients, particularly the refugee group, the practice was their only contact with the wider services available to them and having made contact with someone they trusted (namely a GP) they then continued to rely on them for all their information needs, largely due to their unfamiliarity with the system. Consequently, the practice staff had spent large periods of time responding to emails that did not actually concern the patients' health.

A further explanation offered concerned a handful of patients who were considered either to be 'heart sink'[1] [2] hypochondriacs or simply difficult patients. These were patients who either frequently visited the practice sometimes only for a chat – particularly older/retired patients, some who presented with nebulous or persistent, unresolved clinical conditions or those who visited the practice regularly with various ailments, many often not serious enough for a consultation. When the practice announced the use of email to contact GPs and practice nurses within three weeks a significant amount of the email traffic generated came from these patient groups.

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[1] Butler, C.C. & Evans, M. (1999) The 'heartsink'patient revisited. The Welsh Philosophy and General Practice Discussion Group. *British Journal of General Practice*. **49** (440): 230–233.
[2] O'Dowd, T.C. (1988) Five years of heartsink patients in general practice. *BMJ.* **297** 528–530.

The only electronic patient communication that was encouraged within the **Yellow Practice** was online appointment requests. In order to do this, patients had to obtain a unique patient identification login and once they had this they could request an appointment online. Once the patient submitted the request, they were automatically given an appointment date and this was automatically logged in the practice appointments system. Therefore, in this situation, there was no direct contact with any member of the practice staff.

However, in direct contrast to the **Yellow Practice**, in the **Red Practice** direct communication with patients via email was encouraged amongst particular patient groups, namely those who had a chronic condition such as asthma, diabetes and coronary heart disease. This was particularly true of the practice nurse group, which shall be discussed in greater detail later in this section.

As part of the research interviews, participants were asked to list the websites that they accessed on a regular basis (**Table 2**). The internet was used largely as a resource for staff to check the latest guidance or treatment options for particular diseases and conditions but, as the table below demonstrates, the internet was also used to access a number of non-work-related websites. GPs (and practice nurses) in both practices made use of the internet both inside and outside the patient consultation. Unlike many commercial businesses, access to the internet and external email was limited to GPs, nurses and practice managers, despite the fact that all staff had an allocated NHS email address. The constant workflow of general practice also meant that users had little time to surf the internet or compose personal emails except during the time when practice was closed or at the end of the day. In the **Yellow Practice**, however, a computer was provided in the staff room area for all staff to use during their breaks. Examination of the history files on the communal computer in the **Yellow Practice** did not provide much additional material, with similar sites being accessed by non-clinical staff – largely those in the bottom half of **Table 2**.

Table 2 Websites used/visited regularly by practice staff

Website	Yellow Practice	Red Practice	Type of information
NICE www.nice.org.uk	√	√	National evidence-based clinical and public health guidance.
NHS UK www.nhs.uk	√	√	Official website of the NHS in England – basic information such as names of hospitals and contact details.
Mentor www.emis-online.com/products/mentor-library/	√	√	Electronic medical knowledge support system developed by EMIS and Oxford University Press, integrated with EMIS clinical systems, enabling health professionals to quickly reference information during consultations.
Patient UK www.patient.co.uk	√		Health information and advice for GPs and patients such as patient information leaflets
Onmedica www.onmedica.org.uk	√		Online medical publication for daily news, views, blogs and learning.
GP notebook www.gpnotebook.com	√		Online encyclopaedia of medicine.
BNF www.bnf.org	√	√	Online drugs formulary.
Clinical Knowledge Summaries http://cks.library.nhs.uk/home		√	NHS Clinical Knowledge Summaries (formerly PRODIGY) is evidence-based information and practical 'know how' about the common conditions managed in primary care.
Royal College of GPs www.rcgp.org.uk		√	Professional accreditation website – Royal College of GPs.
BBC News www.bbc.co.uk/news		√	News website.
Google www.google.co.uk	√	√	Search engine.
Hotmail www.hotmail.com	√	√	External email accounts.
Amazon www.amazon.co.uk	√		Internet shopping.

Attitudes Towards and Experience of ICT as Drivers of Innovation

The overall attitude towards ICT in both practices was quite positive but there was variation across occupational groups.

GPs

Whilst the GPs as an occupational group demonstrated varied ICT skills, overall, they also had the most advanced ICT skills compared to other occupational groups. However, at practice level there were also sharp differences in GPs ICT skills – overall the GPs in the **Yellow Practice** had more advanced ICT skills compared to GPs in the **Red Practice.**

In the **Yellow Practice**, although the GPs had a variety of ICT skills, one GP had significantly advanced ICT skills which, time permitting, he had used to develop templates which could be used for referral letters and also a series of online resources for specific chronic conditions such as asthma, something he believed would benefit the practice. However, without the basic understanding and ICT skills necessary to navigate these resources, some staff felt they were still too complex to be used properly. As one participant stated:

He [a GP] is very confident with it [the computer] and so enthusiastic but many people are not comfortable and I think he forgets this when he suggests new IT things for the practice. I haven't even mastered his last invention.
GP Yellow Practice

This comment suggests unease with ICT, that it was an 'invention' and thus perhaps viewed with caution and scepticism and not as a trusted technology. Such attitudes undoubtedly impact on the appropriation and domestication of ICT. When I asked one of the GPs to demonstrate the types of resources referred to I was presented with a series of templates. They looked straightforward enough. Essentially, the user could alter the basic template according to their need and content of the letter, for example a referral letter or correspondence. However, a series of embedded rules meant that certain fields needed to be completed before the letter could be printed and some complex formatting was also included. For example, the referral letter required that a patient's name, address and NHS number were included, which is standard for any referral. However, the template also asked for a patient's contact

telephone number, which was not always available from the patient's record. Unless this field was completed, the template would not allow the user to complete and print the letter. This field had to include N/A if no contact number was available. This was a very subtle nuance of the template that was not immediately obvious to most users.

A further template was for those specific patients who had chronic diseases and were being referred to specialist clinics. This template required the completion of several test results, which the creator had assumed were standard but, in reality, patients were often eligible or required referral without all the test results. A similar problem arose regarding the completion of all fields in the record. Therefore, in both cases, even if the user didn't want to fill in a particular field, they had to otherwise the letter could not be printed and they were directed to a missing field in the document. A final problem was that of basic formatting. All the templates designed in-house had specific formatting attached to them and, when an individual attempted to use bold or italics or any form of superscript, the formatting of these templates went awry, which was the cause of great frustration amongst the users as it curtailed their freedom to write a letter. In essence, the idea of writing a letter – something quite simple – had been made relatively complicated and inflexible, although not deliberately. The GP who designed the templates had been attempting to standardise the process but in doing so had not allowed for any user to deviate from the template. As the GP demonstrating the template argued:

It's a standard referral letter apparently. How difficult can it be? But it has all these bits to fill in and sometimes I don't want a letter with all those things, but it doesn't let me print it if I don't. Maybe I am doing something wrong.
GP Yellow Practice

But, perhaps more worrying was their additional comment:

I've asked him [the designer of the template] twice how to use it. Asking again would just be embarrassing. It's easier and quicker to stick to what I know.
GP Yellow Practice

This not only highlights the varying skills of the GPs in the **Yellow Practice** but also their confidence in their abilities to use the ICTs at their disposal. Furthermore, the

views of some staff members in the **Yellow Practice** were particularly against certain aspects of ICT. As one GP commented:

Being a GP is busy, you know, it's a constant... everyday it's busy... patients to see and paperwork to deal with... letters and calls to follow up... but then there are computers. They're good, I mean I know they help with lots of things, but it's just sometimes... it's too much... I don't need anything else to do. I have no more time. I have email-related stress – this little box pops up and reminds me oh so helpfully... you have mail. Thanks Mr Gates but I have a job to do.
GP Yellow Practice

Nevertheless, this is not to say that participants who had good ICT skills made good use of the ICT available to them. For example, one GP in the **Yellow Practice** was highly competent in his use of the EHR but, interestingly, had a strong preference for paper in all other types of communication.

Although one or two GPs were less enthusiastic, on the whole, GPs in the **Yellow Practice** were significant users of the electronic messaging system. As one GP stated:

It's easier to use one system. Otherwise, I have to keep opening other programmes to check for email and, often, the more things I have open on my computer, the more it freezes.
GP Yellow Practice

This was not a particular issue for GPs in the **Red Practice** given that they did not actively use instant messaging.

One of the cited benefits of the system was that it provided a read receipt to indicate to the sender that the recipient had not only read the message but also that the recipient could tag the message to display that the appropriate action had been taken on receipt of the message. For example, a message can be sent from reception to a GP asking them to call a patient. The GP can then send a response saying 'message received' and that the patient has been contacted. The benefit of the tagging system allowed the sender, and also the recipient, to look at all their messages and easily identify those that were still outstanding. However, the interviews and observation

identified that, similarly to email, it is very easy for the user to lose control of the messages and the number of messages that have not been actioned, unless the message inbox is maintained and old messages are deleted.

I try to keep on top of my messages but some days it's impossible... and I don't always get to return phone calls or do what I need to.
GP Yellow Practice

However, one GP within the **Yellow Practice** argued that although a number of staff used or claimed to use the EMIS messaging system, he himself did not, as he had no idea whether the message he sent had really been opened, read and actioned.

It's a bit like an audit trail; we like to say we've done things, when sometimes we haven't... It's easy to read a message and then tag it saying I am going to do what you've asked, but then something distracts you and you forget to do it... I end up writing a to-do list.
GP Yellow Practice

As will be discussed in the following chapter, this is one reason why paper communication was also found to be surprisingly prevalent in the **Yellow Practice**. The negative effects of over-reliance on the electronic system were also a concern for some GPs. Indeed, some GPs thought that the electronic reminder system and email was abused and used too freely by certain individuals in the practice.

I don't want everyone else's mail or reminders. I want mail that is relevant. So I don't send emails by groups or to everyone. It's on a par with dropping litter. It's lazy and it's very antisocial.
GP Yellow Practice

An alternative view was also expressed by GPs in the Red Practice:

We're pretty good at talking to each other or leaving messages in pigeon holes, so why use email? It's not something we do in the practice and, well, I guess I think there isn't really a need for it. I mean it's not like we're suffering or not communicating because we don't use it.
GP Red Practice

This was further demonstrated by another GP:
Email is fine if I need to send a personal email, or great if I want to contact a consultant at a hospital or something but when I am literally next door to my

colleagues it just seems wrong somehow or lazy not to go and speak to them. It's different if it's after hours, but if it's urgent I can call them. So I don't really see the need to email internally.
GP Red Practice

The instant access to information was seen a significant benefit to staff and patients in the consultation. It was also perceived, particularly amongst GPs and to a certain extent practice nurses in the **Yellow Practice,** as being a more professional approach to the consultation, as opposed to referring to well-thumbed and often old books. When asked why staff thought that using a computer in the consultation was more professional, a number of reasons were given:

It's quicker than looking up a book. Sometimes in the past I didn't have the most recent version [paper] of the BNF (British National Formulary). Now I know if I go online, I have the most up-to-date information and patients appreciate that. It's so quick and, in some circumstances, I can also share the information with the patient, they can see it easily on the screen. It's harder to try and do that with a book.
GP Yellow Practice

Patients aren't stupid, they know about electronic records and most of them have computers at home. If we don't use them in the consultation, it's unprofessional. They come with stuff they've found online. When we didn't have computers we had to rely on books but now the tools at our disposal are different and we have to move with this change. There are many trusted sites out there for information such as NICE (The National Institute for Health and Clinical Excellence) and the BMA (British Medical Association) and I get information quicker than going through books. It's also a quicker way of digesting information. Many sites do quick summaries, which are much better than reading a journal article or chapter.
GP Yellow Practice

But not all staff agreed with the sentiments of their colleagues, although those who didn't were a very small minority:

I know my colleagues probably think I am stuck in my ways... I use the computer, I'm not a technophobe, I mean I know it's a good thing but I like my paper and books. There is so much information out there [on the internet] sometimes it's almost inaccessible. In a book, I know exactly where to look and get the answer. It's better that I can give my patients the answer quite quickly, rather than endlessly clicking away.
GP Yellow Practice

In the **Red Practice** the majority of GPs in the practice demonstrated broadly similar ICT skills, although they largely acknowledged that they were perhaps not as advanced as they could be. As one participant stated:

My IT skills are ok. They could be better, probably. But I have enough to do my job
GP Red Practice

This statement largely reflected the views of many staff in the **Red Practice**, namely that they had ICT skills, albeit limited in some cases, but they didn't believe this had a detrimental effect on their work. Only one GP in the **Red Practice** had advanced ICT skills. This he explained was in part due to his overall interest in ICT, indeed, he claimed to use his home computer a great deal in his spare time, but interestingly added:

I know my skills are more advanced than my colleagues but I don't think that's an issue. We can all use the technology to do our jobs and patients get the care they need and that's what's important... Does it matter that I am better at using IT than my colleagues? A practice near here has all the gadgets imaginable, but if not everyone can use them, what's the point?
Senior GP Partner Red Practice

Practice Nurses

As a group, practice nurses in both practices demonstrated lower ICT skills compared to other occupational groups. The practice nurses in the **Yellow Practice** appeared to have limited ICT skills, with one participant asking for basic training in the use of email. Amongst this group, their attitudes towards ICT were shaped partly by their reaction to what was perceived as a fundamental change to their job.

We used to look after patients, now we're only doing an admin job. It's all changed. I came here to do a job. I want to help patients... [Now] It's all paper work and no time for patients.
Practice Nurse Yellow Practice

In the **Red Practice**, the relaxed approach to ICT (or it could be interpreted as resistance to change at senior management level) discouraged staff from developing their ICT skills but this did not mean that staff accepted their limited ICT skills,

indeed, all participants interviewed in the practice asked for more training. But some admitted that finding the time for training was a problem and training was only necessary if it was real need, as one practice nurse argued:

The *system works and I know how to use it. I could use it better, but it's not an urgent need... It's not like I do anything wrong but maybe just not as quickly as I could. The next thing I definitely need to know how to work is the new bit of Connecting for Health when that happens.*
Practice Nurse Red Practice

Given the lower ICT skills of the practice nurse group in both practices, practice nurses whilst active users of the instant messaging service in the **Yellow Practice** and competent users of email (indeed practice nurses in the Red Practice actively engaged in patient communication via email), many expressed an interest in receiving training to allow them to use the internet to search for information on disease management. There is a vast array of medical sources available on the internet, some are registered charity sites such as the British Heart Foundation, others are self-help resources run by patients, others are sponsored by the pharmaceutical industry, and some are professionally run such as NICE. When faced with the plethora of resources generated by a simple Google search, many practice nurses were discouraged and were unclear as to who owned the content and who ran the site. Practice nurses (and GPs) in both practices wanted a safe, up-to-date informative source which they could access easily. As one practice nurse stated:

The internet is a wonderful resource... so much information... But a nightmare when you don't know where to look or what to trust...There is so much out there.
Practice Nurse Red Practice

The ability to search efficiently and quickly, many argued, would enhance their ability to offer advice and information to their patients but only if they were competent users. Again, in a view similar to that of the GPs, the issue of how they would be perceived by patients was deemed to be important:

I don't want to embarrass myself in front of my patients with the computer. So I don't look online while the patient is there, unless I know the exact site. But I do look up books sometimes.
Practice Nurse Red Practice

However, as suggested by a practice nurse in the **Yellow Practice**:

Patients use the internet to search for information all the time and that's what they expect of us. It appears to them old fashioned if we consult books, like we are behind the times and aren't at the cutting edge of our profession. It looks bad.
Practice Nurse Yellow Practice

As mentioned previously, practice nurses in the **Red Practice** actively engaged in patient communication via email with those patients who had chronic conditions. The practice nurses emailed to remind patients that they were due for a check up, medication review or other specifics relating to their condition. This was seen as an important way in which to encourage patients to manage their condition and hopefully prevent them from attending A&E. During the period of research, this method of communication had only been running for eight months, but fears that patients would abuse the use of email had not yet materialised and early evaluation had yielded promising results, namely that patients were attending surgery for their regular check-ups and that there was limited deterioration in their health. Nevertheless, the system was dependent largely on patients having access to email and so some patients were excluded from this service. Those who didn't have access to email were contacted via telephone. For those that were included in the email group, if a patient had not booked an appointment within three weeks of the email being sent, a follow-up phone call was required. This was a very time-consuming process, but one that the practice was committed to as it had actually reduced the number of reminder letters and phone calls that had to be sent or made to patients.

Chronic conditions are expensive to treat when they go wrong and can be debilitating. I'm spending less time calling and writing to patients now we have the clinics. If we can stop patients getting to this stage and help them manage their condition, and so we see them less and they don't end up at A&E, then the effort must be worth it.
Practice Nurse Red Practice

Administrative Staff

There was large similarity in attitudes towards ICT between the receptionists and administrative staff in both practices. Amongst this group, the use of ICT was seen as an essential component of their job. Prior to large-scale computerisation, many staff

in this group had been using a computer on a weekly basis for spreadsheet work and composing letters on behalf of the GPs and practice nurses. The main function of this group was booking patient appointments, accessing partial medical records and general administrative duties. Whilst this group in both practices acknowledged that they had used a computer as part of their job for some time, the main change for both groups had been the introduction of electronic practice bookings and electronic patient records.

As the **Yellow Practice** had been paper-light overall for almost 15 years and the majority of administrative staff had been there for more than two years, they were very used to using ICT in their daily jobs and working in an environment that was heavily computerised. Nevertheless, whilst computerisation of the appointment system had brought benefits, such as the speed of booking appointments and the security of record keeping afforded by the EHR, computerisation also added complications, namely that the electronic system allowed administrative staff to view only basic patient information on screen.

It's great... but it can be awkward and sometimes a real pain. A patient comes in and wants to discuss something with a GP. I can see part of their records. They know that you know details about them; they can see me looking at the computer. But they don't understand that we can't see everything and start asking lots of questions I can't answer. For confidentiality reasons, we can't see their history but they assume we can see their whole records.
Receptionist Yellow Practice

Administrative staff in the **Red Practice** also demonstrated similar positive attitudes towards ICT. The practice moved to an electronic appointment system seven years ago with excellent results overall.

When we moved to an electronic system, it was difficult, suddenly working with a patient record or bits of it. I had no idea what all the bits were for, I mean I can tell what GP the patient last saw. I liked the paper system, but now I wonder how we coped without this [the electronic system]. It's so quick.
Receptionist Red Practice

But as another receptionist in the **Red Practice** stated:

What's that thing they say? A bit of knowledge is a dangerous thing. Patients think because we have a computer we know everything about them or sometimes that we want to know... It's difficult to explain to a patient that the computer doesn't mean that we can talk about their personal details, even harder when English isn't their first language, which is common in London.
Receptionist Red Practice

As an occupational group, the administrative staff in **the Yellow Practice** regularly used the instant messaging system but administrative staff in both practices were less likely to use email internally and only used external email if they had been asked to send a letter or correspondence to another healthcare professional on behalf of a GP. Given the constant nature of their job and that most administrative staff within the practices sat in front of a computer the majority of the day, during their breaks they were unlikely to use the computer unless they had a specific task to carry out. As one participant stated:

My last job, I surfed and emailed a lot. You get used to life without the internet though, and even email, because, well, I can't access it. I mean I have work email, so I don't need hotmail or anything really. But the office computer, it was a god-send when I had to do my Christmas shopping. But I already spend seven hours a day in front of a computer screen; I don't want to make it eight.
Medical Records Assistant Yellow Practice

Perhaps given the repetitive nature of the receptionists' and administrative staff's daily routine, ICT was seen as being embedded amongst this group in both practices.

Practice Managers

Despite the **Yellow Practice** being highly computerised, the facilities available to staff were not being fully utilised or appropriated as some users did not have the relevant skills to enable them to do so. When I presented this finding to the practice manager in the interim report, she demonstrated that she was unaware that such a stark contrast in ICT skills existed but also I believe did not initially recognise the impact of this on the practice. In reference to the GP enthusiast in the practice and the lack of skills I evidenced in the report, she stated:

He's fantastic with all things IT and he really enjoys it... but how can staff say they want email training... we've been using it for years!
Practice Manager Yellow Practice

This lack of awareness not only contributed to the problems that some staff experienced when domesticating ICTs but, furthermore, the variation in skills and indeed the negative views of some of the GP group made it difficult for practice-led initiatives to be fully implemented. However, as the practice manager observed:

IT has been a major issue in the last 10 years. Not everyone likes it but as long as everyone works to the same minimum standards, I am happy. It's a cultural and behavioural shift and I know from experience, not everyone will make the effort. I know not everyone will like it... But as long as everyone is aware of what we have to do and what they should be doing... Some are just stuck in their ways.
Practice Manager Yellow Practice

Overall, whilst there was a generally positive attitude towards ICT within both practices, the ICT skills in the two practices were quite diverse, which in turn impacted on the domestication of the various ICTs available to them. However, there are also a number of benefits and barriers to ICT appropriation which must be considered in order to understand how the various occupational groups domesticated ICT and the impact this had on communications within the practices.

4.3 Benefits of ICT

Technology is great how did we manage without it?
Practice Nurse Yellow Practice

On the whole ICT was seen as largely beneficial to participants but they had concerns about the rate of change and their ability to cope with it. The time saved in operation and the speed of operation were seen to be the most significant perceived benefits of ICT by participants but many felt they lacked the appropriate skills to use ICT effectively.

However, the development of EHRs, and in particular their inherent legibility, was seen to be the most powerful benefit. To demonstrate this point I was shown a

handwritten note that had been left in one of the participant's pigeon holes by another staff member. I was asked if I could read it and after about a minute of trying, I had to confess that I could not. To illustrate the problem further, the participant responded:

I can read this, well, only just. It [the note] says that the supplies I requested have been ordered and that the time of the practice meeting has changed. Not important I guess, but imagine if it was about a patient and their medication. You can't read it, then what do you do?
GP Red Practice

This was further emphasised in the **Yellow Practice**

I now have instant access to records that are now legible – [previously] I could spend the first few minutes of consultation trying to read my colleagues previous entry. It's ok if you know the patient and were the last person to see them but when you weren't... Consultation is a bit difficult if you can't read test results or why the patient last saw a doctor... You end up having to ask the patients questions about their last visit... and sometimes they don't remember...Or they want to know why I don't know. It all gets rather embarrassing and complicated, like I don't know their history or I can't do my job.
GP Yellow Practice

When asked about the benefits of ICT, overwhelmingly participants commented on the ability to share and store information quickly.

Now I won't work without a computer, I can't cope with the paperwork.
GP Yellow Practice

Not only did the electronic records allow information to be shared with ease but it also allowed staff to record details of the consultations in different sections of the record, rather than the continuous narrative, diagnosis and prescription required by the paper record. Therefore, the user could look at individual sections, for example diagnostic or medication history, rather than having to read all the consultation notes as required for a paper record. However, participants cited that electronic records did have their limitations, namely their character length, that is, how much an individual user could type in an individual section of the record.

In paper records you could write a short essay, if you wanted... now we're limited, which in some cases isn't always a good thing, particularly when there is a complex case and you want to give as much detail as possible... especially if there are mental health issues or just lots of context required if the case is unusual.
GP Red Practice

Another benefit of using ICT cited was the creation of an audit trail. Within an EHR, it is possible to identify which staff member last looked at the record and who is responsible for the last entry – information that was not always possible with a paper record.

4.4 Specific Barriers to the Domestication of ICT

In both practices a number of barriers to the use and implementation of ICT were identified and observed. All staff interviewed claimed to have sufficient ICT skills to enable them to carry out their day-to-day tasks but spoke of how improved skills would enable them to communicate and work more effectively. During the 14 months of interviews and observations, staff in both practices received half a day's training on *Choose and Book.* Many staff, however, argued that this training was very generic for a complex new ICT system and assumed that users had more than a basic knowledge of ICT and that the training was not pitched at the appropriate level. One GP in response to *Choose and Book* training stated:

Two hours. It's a major new system. With such little training, I am not enthusiastic about it. If you want me to use it, you have to show me how and not just talk to me about it... Am I supposed to be an expert now?... It took me a couple of months to really get to grips with the basics of the electronic records and now after three hours I'm supposed to be able to book appointments!
GP Yellow Practice

Other than training for the component parts of NPfIT, only four staff across both practices received any formal training during this time. This training included the use of spreadsheets, basic email skills, and the European Computer Driving License (ECDL). But there was high demand within the practices for further training particularly amongst the practice nurses (**Yellow and Red Practices**), receptionists (**Red Practice**) and amongst some GPs (**Yellow and Red Practices**). The training

requested nevertheless was quite far reaching with some participants requesting basic internet skills, whilst GPs on the whole wanted to explore EMIS in greater detail in order to make best use of the system. One GP stated:

We only do what we have been taught, we don't play around to find out and know what we can do…it might help and patients might benefit too… Maybe it would make things better too, or maybe at least quicker. I don't know really.
GP Yellow Practice

This was a common theme amongst the participants in both practices but particularly in the **Yellow Practice**. Both practices made use of the EMIS system, but like most computer packages, it has several functionalities, many of which are not utilised unless you are aware of them. Therefore, it was common for participants to identify that they could make better use of the systems. However, as discussed earlier, the response to this in the **Yellow Practice** was to develop additional tools and templates in-house, rather than provide training on the existing systems and thus potentially duplicate functionality that may already exist.

Nevertheless, one participant was so disillusioned by the poor ICT training offered throughout their 15-year career in the NHS and in the general practice and highlighted that all their IT skills were self-taught, as they added:

IT training, what's that? I learnt on the job.
GP Yellow Practice

One of the reasons for the low levels of training received was that the majority of training, with the exception of that provided for NPfIT was offered offsite. Consequently, individuals had to travel for the training and therefore their workload had to be covered within the practice. As both practices are large inner-city groups with large patient lists this proved to be very difficult, hence why training that affected the whole practice was often delivered in half-day batches, requiring the surgery to be closed for short periods of time only. Indeed, when training was provided onsite, both practices tried where possible to use the two-hour closure over

lunch and extend this by an hour, so as to have minimal impact on the running of the practice.

Computer system crashes and freezes were also a common complaint amongst participants and were observed on three separate occasions in the **Red Practice** and once in the **Yellow Practice**. Whilst technical problems such as the server or web pages being unavailable and particularly system crashes (requiring applications to be closed or the computer re-booted) are not unusual (most individuals who have ever used a computer have experienced a crash or freeze at some point), the frustration and inconvenience of a system crash or freeze during a patient consultation was seen as highly embarrassing and difficult, particularly when all the information stored on a particular patient was electronically based. All interviewees, with one exception, cited system crashes as a significant problem.

The system usually crashes at least once a week usually first thing in the morning, so I print out the list of patients for the next day the night before in case it crashes.
Receptionist Yellow Practice

As *Choose and Book* was the one major ICT development in both practices and one that almost all practice staff utilised in some capacity, it is perhaps not surprising that comments in regard to problems with ICT often referred to this area.

Choose and Book regularly freezes and it doesn't always recognise users when you log in and then when you do get it, it usually freezes just when you actually want to make the appointment... Usually in front of the patient. It's not really helping.
Practice Nurse Yellow Practice

This was further illustrated by another participant in the practice:

It's [the system] full of gremlins and glitches. At 9.05 it works and then 30 minutes later it won't do anything.
GP Yellow Practice

The use of ICT, whilst meant to increase efficiency in general practice, was also identified as having a substantial impact on participants' use of their time, particularly when the systems were not working, which contributed to lower levels of domestication amongst some users. If the system was not operating as normal, as a

result, GPs and practices often ran their appointments behind schedule which tended to have a knock-on effect throughout the day.

A more significant example of the impact of ICT is in the **Yellow Practice** when the server had to be replaced, which happened with little warning. As one participant explained:

One morning we got to the surgery turned on the computers and nothing happened... we tried again... checked fuses and even looked to see if the buildings next door had been affected... we thought there was a power cut or something you know... but nothing... After much fiddling and checking, we got the system to work – four hours later but that didn't last long. It took ages to get it sorted.
Receptionist Yellow Practice

However, by the end of that day, the practice manager had been informed that the server would have to be replaced and that as soon as the surgery finished for the day the system would have to be shut down. This resulted in little short of chaos. Without the computerised system, it transpired that the whole practice would have to use paper-based systems for four days, although they were not aware of this at the time. Prior to the system being shut down, and given that the practice was unsure how long the system would be down for (although initial estimates were 1-2 days), the appointment list for the immediate two weeks had to be printed off, so that paper records, where they existed, could be pulled for patients attending the surgery and a limited number of future appointments could be booked. I had expected that when the practice had moved towards their paper-light operation, they would have considered an action plan should such a situation arise. But as one respondent explained:

An action plan, at the time of the crash?... Sure... she [the practice manager] probably wrote one, a long time ago, but it's not like we've been reminded how to cope if it happens...Its probably stored electronically and, well we couldn't access it then...guess you don't really like to think about it...everyone made the best of it, but it was more trial and error than a plan, we mostly panicked...we constantly get reminded what to do if the fire alarm goes off... but not if we have no computers.
GP Yellow Practice

Prior to the system shutdown, where possible, data had to be backed up and stored on the existing server in the hope that no data would be lost during the transfer of data to and installation of a new server. However, given that the system had already been down for four hours, time was limited before the system would be shut down again. The four hours without the system had been extremely disorganised and were symptomatic of what would happen in the coming four days. Fortunately, the receptionists had printed off the patient appointments for that day, so paper records could be accessed for some patients who attended during those four hours.

However, the limitations of this and the problems it caused were observed when I attended the surgery on its third day without a computer system, which accounts for some of the overly negative comments I recorded. Whilst I was initially asked if I had any ideas of what they could do to help minimise the perceived levels of problems they experienced, I observed high levels of confusion and frustration amongst staff as the situation had been going on longer than most of them were comfortable with. Naturally, they were not too enthusiastic to see me, as one participant said in passing:

So…What are we supposed to do? What has the government said we're supposed to do in this situation… let me guess… It's our fault and has nothing to do with them? Don't suppose you know what to do? Or do we just wait until normal service resumes and the server is sorted?
GP Yellow Practice

A practice nurse also added:

To say I am stressed is an understatement. This is a complete nightmare.
Practice Nurse Yellow Practice

However, although it was evident that no real action plan was in operation, initially I was confused why it was a 'nightmare' as this was simply how things used to work before computerisation. She further added:

The records aren't up to date, I feel I'm not doing a good job as I have no information, patients aren't happy and writing up the consultation on paper that isn't

a proper paper record is just asking for trouble... Everyone is really stressed... the practice is in chaos. I don't like using loads of time on the computer but it definitely helps.

Printing out the appointments list for the immediate two weeks averted some problems, namely knowing which patients had appointments on what day, but the patients were frustrated and didn't understand why they couldn't book appointments further than one week in advance, given that the practice usually operated one month in advance. This led to some fraught conversations between receptionists and patients and, despite the receptionists asking patients to call back the following week, some patients called every day only to be told the same thing.

However, a more serious problem had emerged and that was the use of or rather lack of patient records. Whilst staff had attempted to retrieve paper records for patients attending the surgery over those four days, the practice had stopped updating the paper records in 2002, the exception being those patients who had recently transferred to the practice from another practice. Therefore, many patients' records were simply not up to date, which is particularly dangerous for patients with complex medical histories. Furthermore, the situation was even worse for those patients who had joined the practice post 2002 but had no existing paper record. Without the computerised system, practice staff had no idea of the patients' clinical history.

Not updating the paper records was a disaster waiting to happen. We're now in the middle of that disaster... it's childish but I did say this would happen one day. I've seen patients today for the first time and for some of them I have no record... Now I have a sheet of paper and when the system is up and running I have to enter in their electronic record... Actually I have three days of records to do... when I am going to do that I have no idea.
GP Yellow Practice

One of the particularly interesting facets of the situation was how participants reacted to having to use paper records, handwritten prescriptions and even books.

I'm embarrassed to say this, but it was like, paper records – how do I write again? What do I say? I had to look up drugs manually in the BNF.
GP Yellow Practice

In the **Red Practice** on the other hand, they had also experienced similar barriers to the use of ICT, but due to the relatively lower levels of computerisation and the use of paper records (which are discussed in the following chapter), they did not have the same levels of concern except with the *Choose and Book* system and general frustration with system freezes and crashes.

It's [Choose and Book] slow and clunky... but I guess it will get better the more I use it or once the government finds out what the unpopular bits are and redoes it.
GP Red Practice

It's a great idea, but in reality it's terrible... well in my experience. I can never get it to work, well not for long anyway... it's so unreliable and well at least with a paper referral I know where I am... In a day I may want to book four appointments. I'm lucky if one of those works.
GP Red Practice

However amongst some staff who had previously worked in highly computerised practices, the problems and barriers they experienced were considered minimal.

We used to use smart cards in my old job and the system froze all the time, so now that I don't use them, the system freezing a few times a week is nothing.
Receptionist Red Practice

As previously highlighted, training was not a prominent feature in either practice. The lack of training in how to use ICT and the general lack of awareness as to the functionality of the various ICTs available to practice staff was also seen as a barrier to the use of ICT in the **Red Practice**, which was interesting when considering their relaxed attitude to the computerisation of the practice.

I can use the system, but there is so much more – email, the internet and everything – and I don't really know how to use them properly. If I had training I could do things better.
GP Red Practice

The difficulty of reading documents on screen was also seen as a barrier to the use of ICT. The interviews and observation also identified that participants particularly GPs and practice nurses in the **Red Practice,** often printed out documentation rather than

reading it on screen resulting in the use of paper, which will be discussed further in the following chapter.

A final barrier to ICT cited by both practices was that information such as phone numbers and contact details on websites, often NHS-based websites and local information sites, were not up to date. This was particularly common when looking for local services and specialist care. A further problem was that web-based links provided on these websites were also often broken and did not direct the user to the appropriate page.

It's ironic. We have computers to help us provide information and assist us in our jobs. But sometimes a click [of the mouse] gives you nothing.
GP Red Practice

4.5 Effects of ICT Domestication on Patient Relationships

Although not the focus of this research, many participants reported that whilst ICT had in many ways enhanced their daily work, it had a negative impact on their relationships with their patients and, as such, this deserves consideration in this research. There was little difference is the views of both practices on this issue. As one GP argued:

I used to talk to patients, now I talk to a computer. What happened to being a GP?
GP Yellow Practice

A common observation in both practices was that ICT had reduced levels of face-to-face communication in the patient consultation. Due to issues of patient confidentiality, I was not able to observe any consultations but the messages from participants were overwhelmingly similar. Subject to the individuals' competency and confidence in using a computer, and whether there was an existing relationship between staff and the patient, this could often result in large quantities of time spent looking at the computer screen. As one practice nurse highlighted:

When there is a new patient, you've never seen them before and you have a lot of information you need to record. Many basic checks need to be done. I can spend most of the time in that situation glued to the computer screen.
Practice Nurse Red Practice

Although this was considered the norm when establishing a new patient record, overall, the use of the computer at GP, nurse and receptionist level was thought to change the levels of face-to-face interaction with patients, with less eye contact and more focus on the computer than when using a traditional paper record. Some participants felt the use of a computer could inhibit the development of rapport between staff and patients, an issue that was raised frequently at both practices amongst GPs.

I've tried to position my screen so that the patient can see it, you know, so I don't turn my back on them, but my typing isn't great, I'm not fast or good at it so I have to look at the keys and screen a lot. I'm sure it doesn't help the patients.
GP Yellow Practice

Nevertheless, ICT was also thought to enhance some patient relationships as some GPs were able to direct patients to recognised sources of information, such as www.patient.co.uk and were able to provide patient information leaflets from http://cks.library.nhs.uk/ which explained clinical conditions in basic language were well received by the patient, particularly amongst those for whom English was not their first language. Some staff believed that the provision of such information led to an elevation of their status in the eyes of the patient, as expressed by one participant:

It is good to give information to a patient. Often I feel that talking doesn't always get the point across. But I can give them a leaflet that explains everything that they can read at their leisure. I think this reassures them and makes them feel like they were treated well.
GP Yellow Practice

On occasion, GPs had also experienced system crashes where they were unable to access the information online, which was considered embarrassing by some practice staff (practice nurses and GPs in the **Red Practice**) but in such circumstances, staff simply wrote web addresses on paper for their patients to access at home.

Nevertheless, some participants felt that computers and access to the internet also encouraged some patients to self-diagnose and many therefore returned to the surgery convinced they had symptoms of a variety of conditions, which in turn often had a detrimental effect on the clinician/patient relationship. As one practice nurse highlighted:

Last week three patients came to see me and told me what was wrong with them and even gave me print offs from the internet. It's good that they are taking an interest but we are the experts and not the patients.
Practice Nurse Red Practice

Therefore, ICT amongst some participants was seen as a double-edged sword in regard to the effect it had on clinician/patient relationships and, in some cases, participants felt that they were no longer the sole authority on medicine, which in some cases served to undermine their position in the patient relationship.

Summary

This chapter has discussed the implementation and domestication of ICT in two general practices by examining the use of CMCs. It has demonstrated that this is a complex process affected, for example, by the competing demands of users, the uneven benefits delivered to users and the barriers of CMCs. It has highlighted the processes by which ICT is appropriated and domesticated such as the local implementation strategies and the creation of additional functionality, but has also illustrated the benefits of ICT, which to some extent facilitate domestication such as the speed and accuracy of information flows afforded by ICT. However, it has also demonstrated the negative impacts of ICT and how users have struggled to tame the technologies and, as a result, have prevented domestication occurring at some levels. This discussion has revealed distinct differences between the two practices in regard to their use of CMCs but there are also other factors to consider when looking at the domestication of ICT. To that end, the following chapter examines the use of paper-based and verbal communications – in other words NCMCs and how these impact on communications and the domestication of ICTs.

Chapter 5 Non-computer mediated communications and information flows

The previous chapter captured the emergence of communications mediated through new ICTs that were being implemented in modern general practices. This constitutes only a small part of overall communications that practice members were involved with in and at work (even though we were looking at 'paper-light' practices). This chapter therefore seeks to explicate what we describe as NCMCs (non-computer mediated communications).They represent the traditional methods of communication, how information was shared, accessed and communicated prior to the advent and implementation of the ICTs present in modern general practices. They include the products of earlier technologies of coordination (including paper-based records and communications arising from previous phases of administrative reform).

What is of interest is the extent to which they have been replaced or altered by the introduction of CMCs which, as discussed in the previous chapter, bring a number of benefits as well as problems. The rationale behind the introduction of many ICTs in general practice was that they would replace the established paper-based activities, such as the paper medical record, to improve efficiency. However, as this chapter will demonstrate, ICTs have not simply replaced traditional methods of communication. Some have worked in parallel, whilst others, it will be argued, have worked at odds with the traditional channels of communication. Whilst ICTs have added an additional complexity to modes of communications, some of the traditional methods of communication have retained a significant presence in general practice, for example, paper-based communications, while others, such as face-to-face communications amongst some user groups have suffered. However, a number of factors need to be considered that may explain the relative domestication of ICT and continued use of NCMCs.

The previous chapter discussed the use of computerised communications including the use of EHRs, in-house instant messaging systems and email. This chapter examines the use of paper-based communications, face-to-face and verbal communications, and explores how factors such as the physical layout of the

practices have impacted on communications and the extent to which ICT is actually being counter-productive and duplicating information and communication flows.

Before continuing with the discussion, it is worthwhile revisiting the differences between the two practices – the basic characteristics, the physical layout and the implementation strategies, as these factors had an impact on the domestication of ICT within the practices. These same factors as shall be highlighted also had an impact on NCMCs, although other factors also contributed. As previously discussed, both practices were considered to be 'paper-light' and therefore paper-based communications were seen to be limited to tasks that could not be carried out by ICT. Although the **Yellow Practice** largely considered itself to be paperless, fieldwork revealed a significant use of paper-based communications arguably more than they had realised, but the **Red Practice** also demonstrated a heavy reliance on paper-based communications**.** Therefore, immediately I was alerted to the differences of perceptions versus the actual reality of communications in the practices.

The physical layout of the two practices were very different, as discussed in **Chapter 3**, with the **Yellow Practice** being split both physically over two floors and by occupational group, while the **Red Practice** operated on one floor organised into three long corridors of mixed occupational groups. However, the physical layout of the **Red Practice** facilitated, encouraged and supported greater opportunity for ad hoc face-to-face discussion amongst staff.

The ICT implementation strategies in both practices were also markedly different: one being very much driven from the top down, in a targeted time-driven manner; the other in a more gradual, grass- roots approach. All of these factors had an affect on the use of verbal and paper-based communications, although not necessarily, as shall be discussed, in the ways that would be expected.

Furthermore, analysis revealed a very interesting facet about some NCMCs, namely that many of them were about communications and some even duplicated information flows within the practices. For example, the post-it-note left for a GP

informing them that a patient had phoned the practice, information which was also sent in an email.

The findings on NCMCs are discussed under the following headings:

- paper-based communications;
- paper records;
- general face-to-face communications; and
- face-to-face communications – practice meetings.

5.1 Paper-based Communications

The use of paper in general practice serves a number of purposes, such as the referral letter, the prescription, messages left for colleagues, patient information leaflets and the patient record. The introduction of ICT into general practice was intended to replace many of these traditionally paper-based activities. Indeed, the change to the GPs' *Terms of Service* in 2000 meant that practices no longer had to legally keep paper records, setting the tone for the increased use of ICT. But as shall be discussed, the use of paper as a tool of communication has persisted and indeed in some circumstances has thrived.

Internal communications (not including face-to-face communications) in both practices were highly paper-based, occurring largely via post-it notes, messages and memos left in pigeon holes and on office doors and desks. The main reason for having pigeon holes in any business or office is to provide a systematic delivery system for paper-based messages and post for staff and this was supported by the interviews and observations in both practices. Whilst many of the pigeon holes were filled with daily post, high levels of paper-based messages were also identified within the **Yellow Practice,** which was surprising given the high level of ICT use and capability in the practice. Observation and interviews revealed that many staff in the **Yellow Practice** were still extremely reliant on paper-based messages and indeed, in a single hour of observation in the morning, 15 paper-based messages

(excluding post) were left for a cross-section of staff in their pigeon holes. A further 20 were left in the afternoon. This was especially interesting given the high levels of email literacy within the practice and the culture of using the in-house instant messaging system. One possible explanation for this was given by a GP:

I like the satisfaction of knowing I physically left a piece of paper for someone or spoken to them. It's harder to ignore. It's a lot of paper, but I use a red pen to indicate the urgency and importance if I need to. I can't do that on email.
GP Yellow Practice

Further questioning with the individual GP revealed that he knew it was possible to write an email in red font, but he did not know how to do it himself and he believed that his colleagues would take more notice of a paper message than an email. However, when asked why he thought this to be true, particularly given the use of the in-house messaging system, he was unable to really explain this, but offered:

Instant messaging is all well and good, and I know some people use it all the time, but I can't do it in red pen, and well one click on the message and it's gone into some file for me access and action if I remember. My paper messages are tangible, till you physically throw them away. I think you're more likely to respond to this.
GP Yellow Practice

In line with the views of the GP above, other staff also argued that paper was a more reliable way of communicating a message and, despite the potential to lose paper, particularly small post-it notes. One GP believed they had a possible solution to this:

I know bits of paper get lost, so I write my messages on A4 bits of paper, even if it's a short message. My handwriting is legible and so if I put it on their desk or in their pigeon hole I know it's physically there and so from my point of view the job is done. You can't ignore a message on A4 paper. They have to read it.
GP Yellow Practice

This is an interesting approach that was voiced on a number of occasions amongst staff that, essentially, colleagues would take more notice of a paper message than an email. But once again when I asked the second GP why they thought paper to be a more reliable communication method and more likely to be actioned, their response was as confused as their colleagues:

Well, we're all used to dealing with paper. We get post in the morning and we collect that, so we can collect paper messages at the same time. People don't always read their email.
GP Yellow Practice

I further raised the issue that the practice was increasingly computerised and so if staff were spending large parts of their day working on a computer then surely an instant message or email would be appropriate as it would be in line with their work activity:

True, but I often switch off my email. It's annoying... And instant messaging, it's only useful if things are urgent. With the pigeon holes you know you're going to check them probably twice a day. If it's really urgent someone will call you.
GP Yellow Practice

In short, the reason for the use of paper in the **Yellow Practice** was not that it was easier as a method of communication but it was a behavioural response – staff believed that messages would be better received if they were communicated on paper. In some cases, this may also be an expression of resistance to domesticating ICTs. Paper-based communications are present in all businesses and staff within the practice had been using such communications for as long as they could remember and such behavioural attitudes are not easy to change. However, it was also the urgency, sensitivity and content of the message that ultimately determined whether paper or electronic communication was used. If the message was urgent, instant messaging was the preferred medium but verbal communications were only also used if there was no response to the electronic communication. For example, discussion of an individual patient tended to occur face-to-face between individuals, small groups of staff or in a practice meeting. Notification of a change to a meeting date on the other hand occurred via email.

Observation revealed that reception and administrative staff in both practices were heavy users of paper-based communications. At both practices, it was common for patients to call the practice wanting to speak to staff. Other external clinical staff also called to speak with practice members and, as such, this had to be communicated. Reception and administrative staff were also exposed to constant interactions from

patients calling to change or make appointments or deal with general inquiries and therefore staff often wrote messages on 'scribble pads'. They were also dealing with patients handing in letters for clinical staff or paperwork for their patient registration. In addition, in the **Red Practice** the reception and administrative staff also had to use paper records on a daily basis. Therefore, with the constant flow of paper-based information it is not surprising to find that they were large users of paper-based communications and that often these paper- based communications were themselves about communications.

However, in the **Yellow Practice**, the practice policy or intention was that messages for staff should be communicated to the relevant staff by using the in-house messaging system. However, more often than not, given the constant pace of the receptionist's job, namely a constant flow of patients booking in and phoning the practice, many of these messages remained in paper format and were posted in pigeon holes. In this case, this was an example of an ICT which stood little chance of being domesticated by some users as it simply did not fit the needs of their job. Indeed, one receptionist stored all the messages (unless they were considered to be urgent, in which case she used the instant messaging system) on a pad until the surgery was closed (prior to the afternoon surgery) and then methodically cut the A4 sheet into individual messages and posted them in the staff pigeon holes. When asked why she had not written all the messages up as electronic ones her response was:

I've already written the message out once, and I was snowed under today. This is quicker. I've been doing it for ages and I guess everyone expects it too. I know they'll check the pigeon holes after 11am when we close for messages.
Receptionist Yellow Practice

This statement, however, appeared to be at odds with the practice manager's strategy that electronic messaging should be used to communicate messages.

Paper was used as a significant mode of communication within the practices, and despite staff claiming to make heavy use of the pigeon holes for paper-based communications, observation also revealed high use of post-it notes stuck to

computer screens and office doors and messages left on desks in both practices. However, observation also identified post-it notes that had fallen off office doors and therefore there was high potential for the message to be lost or worse still, if they were sensitive in nature, they could potentially be picked up by patients or other staff members. Such circumstances are one of the reasons that CMCs have been introduced in the business world. In fact, many of the messages that were communicated by paper could just as easily, and more securely, been communicated electronically, but this required the practices to consciously move towards this way of working and create less reliance on paper-based messages.

As part of the interim reports I provided to the practices, I drew their attention to the high use of paper-based communications in their respective practices. Whilst this was not surprising or unusual in the **Red Practice**, the practice manager of the **Yellow Practice** was noticeably annoyed that greater use was not being made of the in-house messaging system and emails.

It's really not that hard. If everyone uses the messaging system then we'll get used to using it and communicating that way. But if staff insist on doing things their own way then we'll never be paperless.
Practice Manager Yellow Practice

One of the main reasons given by participants for the high use of paper in both practices was the difficulty in reading large volumes of text on screen. Many GPs and practice nurses spoke of their frustration at having to read policy documents, guidance from the local PCT or referral letters and communications on screen and preferred to print it out to read. Whilst short referral letters or test results sent from hospitals were scanned into respective patient records in both practices, guidance from the DH or their local PCT and this may be anything from five to 50 pages long. In such circumstances, staff in both practices printed the documentation.

When I've been sat at the PC all day, and I have to read something, it's much easier to print it off even if it's just a letter or short document. I can also write on it or highlight important bits and access it easily.
GP Yellow Practice

The creation of referral letters and prescriptions was also a high generator of paper in both practices. Under NPfIT, in the future, prescriptions will have the capability of being transferred electronically to nearby pharmacies for collection by the patient. A number of pilot schemes have successfully tested this initiative and it is available at a very small number of practices in England. However, at the time of my fieldwork, neither practice was participating in the pilots. The concept was also not one that many of the participants were overly enthusiastic about, as one nurse stated:

Electronic prescriptions are a good idea in principle, but you're limited to where you can collect them and I know patients don't always go straight to the chemist following an appointment. So, if you're restricted to where you can pick up your prescription, it's going to be really inconvenient for some people. Paper is much easier and more user-friendly and, given the mess with Choose and Book, it's probably a more reliable system!
Practice Nurse Red Practice.

Therefore, prescriptions were printed from the GPs' and nurses' computers and were physically given to the patients or left at the reception desk for collection by the patient if it was a repeat prescription. Nevertheless, the paper-based prescription was often mislaid or lost by the patient and therefore, on occasion, required replacing at a later date.

Patient information leaflets were a further source of paper-based communications in the **Yellow Practice**. Essentially, these were basic information leaflets that covered common clinical conditions (such as, urinary tract infections) that staff could print off in the consultation and give to the patient. However, this created a frustration for some of the staff, namely that the printer was set up to print prescriptions on specific paper, but when they wanted to print out patient information leaflets they had to change the paper in the printer to A4.

In much the same way that electronic internal communications had on the whole been viewed by the practice as the norm for communication in the **Yellow Practice** (although the findings contest this viewpoint to some degree), paper-based communications were considered the norm in the **Red Practice**, and were driven and

entrenched partially by the incremental approach to ICT implementation, a finding supported by the interviews and observation.

Duplication of Information

Observation in the **Red Practice** identified that, on occasion, electronic communications were supplemented with paper-based communications. This was not simply that they were used in parallel, but rather, a conscious decision on behalf of the user to use multiple modes of communication to share the same information. One example was when a patient called to speak with a GP. The receptionist put a message in the GPs' pigeon hole and sent an email. Interestingly, this was also a communication about communication. Depending on which message the GP accessed first, the other would then become out of date, or possibly confuse the GP into thinking the patient had called on more than one occasion. A further example of multiple communications was a receptionist speaking to a GP and confirming that the blood results for a particular patient had arrived in the practice. The results had been delivered electronically, but rather than waiting for the GP to access the results electronically, the receptionist not only spoke to the GP but also put a copy of the results in their pigeon hole. Therefore, the same message had actually been conveyed three times – electronically, verbally and by paper. When questioned about this one participant replied:

The practice is busy and information is important. No-one likes to find out that messages and stuff weren't passed on. People get upset and angry when you can't give them information and, I guess worst-case scenario, losing information could mean the wrong treatment for a patient.
Senior Receptionist Red Practice.

When I questioned why the GP couldn't simply access the test results electronically, particularly as the receptionist had spoken to the GP to let them know they had arrived the response was:

I guess the GP would have accessed them at some point, definitely within the next day or so. But he's not great with computers. They tend to check the system every couple of days... but the patient had called that morning, the results were abnormal, so they needed to see the doctor. I wouldn't have left a note and spoken to the GP if

the results had been normal, but didn't think I should labour the point anymore by saying they were abnormal. It's not like it's a serious test result but it does need action. So I was just alerting him that he needed to look.
Senior Receptionist Red Practice.

Again, this is an example of where the type of information and its importance dictated how it was communicated. However, it also highlights the lack of domestication of ICT amongst some particular users at the **Red Practice,** which was actually negatively impacted on some communications and information flows. With clearer direction about what types of communication should be used in different circumstances, the need for multiple communication channels for a single communication would be minimised unless the communication was urgent.

5.2 Paper Records

This was one area of significant variation between the two practices, namely they were used rarely in the **Yellow Practice** but they were used daily in the **Red Practice**. As discussed in the previous chapter, in the **Yellow Practice**, paper records were only used in two specific circumstances: when staff were unable to access the EHRs or when new patients joined the practice. In the latter situation, the paper record was used only nominally. If the new patient had an existing GP in the UK, then the practice would request their medical records from them. If this arrived in time for the patient's first appointment with the **Yellow Practice**, then the GP would go through the key medical history of the record with the patient. During the consultation, the GP would create an EHR for the patient and include the most recent and relevant patient information, such as existing medical conditions and medications. The paper record was then stored for reference use only. If the record did not arrive in time, or the patient did not have a previous GP in the UK, a basic EHR was created for the patient and the relevant additional information was added if and when the paper record arrived at the practice.

Unsurprisingly, this process was not without its problems. As one GP stated:

Colleagues' handwriting can be difficult to read at times but you can ask them what it says. When you get a paper record you've never seen before, there are so many different writing styles in it, there will be at least one entry you can't read. If it's a new record from the hospital or another practice, sometimes it's like guess work.
GP Yellow Practice

Paper records were kept at the **Yellow Practice** for all patients who were patients prior to the introduction of EHRs or where patients moved to the practice in the scenario outlined above. However, since the practice experienced the server crash, staff had been debating whether new patients should also have a basic paper record so that if the EHRs were not accessible for any reason, then at least some basic medical information would be available for these patients. Some staff had extensive knowledge of their patients' medical history without looking at the medical record. However, this of course would not be possible with some of the newer patients who did not have established relationships with the practice and if EHRs were the only source of information for these patients, in a server crash or similar situation, the lack of information could be potentially detrimental to the health of some patients. This was also considered to be beneficial given the high numbers of patients from ethnic minority groups in the practice, many of whom did not speak English as a first language. However, the difficulty that was acknowledged by the staff was how to keep the paper record up to date. But, as one nurse argued, if the record was not completely up to date, at the very least, if staff could access a record that gave some information then this would be better than nothing. At the time of the fieldwork, however, no decision had been made as to whether to create new paper records for new patients.

In direct contrast, in the **Red Practice**, despite the use of EHRs, paper records were also used in the consultation. This immediately struck me as rather odd, as not only would it duplicate the work of staff in what were already very time-constrained consultations, but the complication of keeping two records up to date seemed difficult and unnecessary, particularly as they were no longer legally required to keep them. A further component was how to ensure that both records contained the same information, which seemed difficult given the different physical layout of the two records. The paper record was essentially made up of sheets of paper that were

enclosed in a folder, with the most recent entry at the front of the folder. The EHR on the other hand, had a series of tabs that the user had to navigate in order to refer to or enter different types of information. For example, the most recent entry in a paper record would contain the clinical narrative and any prescriptions. On the EHR, the same information would be stored in at least three different areas: a summary for the last entry, a detailed patient history, and a record of prescriptions. Subject to the user's ICT competency, this could be rather complex to navigate.

In the **Red Practice**, the rationale for the completion of both records was that electronic records were being phased in within the practice, given the low levels of ICT capability among staff. A senior GP partner informed me that, whilst the practice was using electronic records to record the details of the consultation, the paper record in his opinion provided the details of a patient's past medical history that was not easily accessible on the electronic records. This may in part be a personal behavioural response, namely that he was used to using paper records and his own ICT skills were average and therefore it is possible that he was using his own experience to determine practice policy. He further stated that not all the staff were comfortable using the electronic records and so rather than the practice completely eliminating paper records, they were moving towards a phased programme of transfer.

Removing the use of paper records completely would be a disaster at the moment. Instead, staff must record all details on the electronic record and high-level details such as the date and any prescriptions on the paper one.
Senior GP Partner Red Practice

When questioned as to whether this was not simply duplicating work load or whether there was a danger that staff may not be completing both records in the same way, he responded:

It's some duplication, but it provides a safety net for some staff. Left alone with an electronic record, some of them would panic and record information in the wrong parts of the record, which could be dangerous for patients. But we've been very clear about the expectations for completing the records.
Senior GP Partner Red Practice

We've been using electronic records for just over 12 months and it's hard at times but I know I have to get used to it…Apparently from the end of 2008 we won't use paper records at all…well that's the intention anyway.
Practice Nurse Red Practice.

The final transition to EHRs appeared to be very protracted in the **Red Practice**. But as one GP added:

If we had abandoned the paper records immediately, we would've struggled to get everyone up to speed on the computer. This way may be slow, perhaps too slow, but it gives everyone a chance. It's damage limitation I guess.
GP Red Practice

Although I could understand the rationale for this, I was unsure as to whether all staff were happy with the additional workload of completing two patient records and yet, by and large, the majority of staff appeared to have accepted this:

It's like anything, it becomes second nature. Compared to what I used to have to write in the paper record, its not anymore additional work. I have to remind myself that I need to update both. Using the computer has become easier the more I've done but it's such basic information that I record on the paper record I don't mind…I have forgotten to do it [complete the paper record] sometimes the more I got used to the computer…But it's [the paper record] a useful quick reference though at the start of the consultation rather than clicking through screens.
GP Red Practice

But not all staff felt this way:

I wish I only had to use the electronic record. The paper just duplicates everything. We have to use electronic records, so we may as well do it….it's the only way we'll learn… but I know not everyone feels comfortable with the records yet… I hope we might give up the paper ones before the end of 2008 as that seems such a long way off.
GP Red Practice

While staff seemed broadly happy to complete both records, I was curious as to whether this dual system created communication problems, in particular whether the information contained in both records was the same.

It's been made clear, that we are not to use the paper record as the main patient record and are only to record certain information in it. There is a template of date,

prescription and diagnosis. It's short hand I suppose and safe as I would admit to getting lost occasionally on the electronic record.
Practice Nurse Red Practice.

But the system was not perfect:

I've done some spot checks on the paper records of those who I know don't like using electronic ones... most of the paper ones seem to be completed correctly but some of the early electronic records have been variable.
Senior GP Partner

Given the overall acceptance that electronic records had to be used, I further questioned the practice manager as to whether they really intended to use paper records until the end of 2008.

The original date was so that staff didn't feel under too much pressure and panic and make mistakes. We've not been good overall with technology and have been slow to adopt it all round. We're getting better... Perhaps a three-year phase in was too long but some staff could barely use email a year ago... it seemed like the safest option. I'd like to think we might go paperless soon, if the majority of staff agree... extra training should help... but the decision has to be at the right time.
Practice Manager Red Practice

The system, although it appeared to be laborious, seemed to work for the practice without too many problems. However, it raised questions as to whether the senior GP partner and the practice manager were underestimating the ability of their staff to use electronic records and were overly cautious in the transfer to electronic records.

5.3 General Face-to-Face Discussions

Face-to-face communications are a regular occurrence in everyday life and within general practice they are most common between healthcare professionals and patients – the staple component of the daily tasks undertaken by general practice staff. However, this research did not focus on patient interaction per se, an area that has been well researched, but rather was concerned with face-to-face communications between staff groups and the factors that affected it. Face-to-face discussions were examined in the semi-structured interviews but were also analysed

through informal opportunities for observation, as well as the more formal opportunities such as practice meetings. This identified significant variations in the internal communications between the practices. In both practices, face-to-face communications occurred in a number of different settings, which often reflected the sensitivity or type of information that was being discussed. Such settings included: practice meetings, ad hoc discussions between staff in corridors and offices, the pigeon holes in the **Yellow Practice**, and the reception desk area. This section covers general face-to-face discussions that occurred outside the practice meeting.

Yellow Practice

Face-to-face communication in the **Yellow practice** was markedly different between the various staff groups. Amongst GPs and to some extent the practice nurses, face-to-face communication only occurred during: practice meetings, discussions of confidential patient information, or when staff required a second opinion of their colleagues during consultation. Therefore, these communications were rather limited and formal in nature. Observation revealed higher levels of face-to-face communication amongst GPs and practice nurses between 11am and 1pm when the practice was closed. These discussions were largely ad hoc, namely staff passing each other in corridors rather than specifically going to speak to individual colleagues. On the occasions where staff did seek out their colleagues, this was largely to discuss confidential patient details. Nevertheless, both interviews and observation identified a handful of occasions when staff had gone to speak to one individual in particular, namely the GP ICT enthusiast in the practice, to discuss ICT problems that they experienced, such as the use of the referral template he had designed, or the *Choose and Book* system. As these communications were largely asking for assistance and advice, staff preferred to communicate in person rather than via the telephone or email.

Face-to-face communications between GPs or practice nurses (located on the ground floor) and staff located on the first floor (counselling and therapy staff) were only observed twice during fieldwork and were rarely reported during interviews. The practice nurses and GPs generally had greater access to other staff groups such as the

administrative staff and practice manager. The therapists and counsellors (who generally worked part-time hours) were situated on the first floor and largely worked in isolation from other staff groups, unless they used the staff room or kitchen facilities on the ground floor. The fact that these groups were separated by significant space had, I would argue, a substantial impact on their communications, particularly with regard to face-to-face communications and, thus, the physical space to some extent dictated the social architecture within the practice. This physical separation was further compounded by the fact that the daily work of the practice nurses, on the whole, did not involve patient referrals to these staff groups. This physical division, it can be argued, increased the reliance on CMCs within the practice. The provision of ICT, which could facilitate communication without requiring face-to-face communication, appeared to be exercising a strong influence within the **Yellow Practice** and, as such, some ICTs were well domesticated and adopted within the practice. However, this, I would argue, was at the expense of face-to-face communications, which had a negative impact on staff relationships and, in this sense, ICT was counter-productive as will be demonstrated in detail later in this chapter.

However, this was not true across all occupational groups. One group in the **Yellow Practice** who relied on face-to-face communications more than most was the receptionists and medical secretaries. This, in part, could be attributed to the fact that three receptionists worked on the front desk at any one time and two medical records secretaries worked in the adjoining office. Given the nature and constant activity of their jobs, namely taking telephone calls from patients and dealing with patients as they arrived for their appointments, and the close physical proximity of their colleagues, it is perhaps not surprising that they displayed high levels of verbal and face-to-face communication as a user group. Face-to-face communication was easier and quicker amongst this group and lower levels of CMCs (between them) were identified.

CMC was used solely by this group to communicate to other staff groups within the practice. Despite her relative physical proximity, face-to-face communication with

the practice manager was rare. This I considered rather unusual, given that the working pattern of the practice manager was not dictated by patient appointments and therefore the assumption would be that the practice manager would be more accessible to administrative staff. However, the constant stream of patients at the reception desk meant that it was often difficult for administrative staff to leave the reception area, and therefore they relied largely on CMCs to contact the practice manager, despite physically only being separated by the pigeon holes.
The location of the pigeon holes in both practices appeared to be one of the driving factors in face-to-face communication, thus they fulfilled a dual purpose from a communications perspective for both paper-based and verbal communications. High levels of face-to-face communication occurred in the staff pigeon hole area in the **Yellow Practice**, which was unusual given its physical size and location. Essentially, it was a long walk-in cupboard located directly behind the reception area, which could accommodate no more than three staff comfortably at any one time. Nevertheless, despite its small size, it was not physically constraining enough to prevent substantial levels of face-to-face communications. Observation identified that all staff groups, particularly the administrative staff, engaged in verbal communications in this area for up to five minutes at a time, although two incidents of nine and twelve minutes were also observed. However, shorter communication engagements of two to three minutes were more common as staff picked up post and messages left for them, particularly early in the morning, although short communications under one minute were also observed.

Face-to-face communication in this space was overwhelmingly personal in nature, such as staff discussing problems getting to the practice due to transport problems first thing in the morning or discussions relating to family members. Specifics relating to the practice were also discussed. However, on occasion, given the limited physical space of the area, private discussions of a sensitive nature were also observed, with discussion in almost whispered voices. Over the space of a single day, face-to-face communication in this physical space accounted for 57 minutes of communication and therefore approximately five hours a week.

Discussions observed in this physical space could be as a result of the overall lack of privacy in the practice, namely its large open-plan structure. Apart from the individual consultation rooms and the staff room, the pigeon holes were the only isolated, private space. This may explain some of the personal discussions particularly amongst the administrative and reception staff that occurred in this area, as it could be easily accessed at any time and was not subject to the impact of patient appointments as private consultation rooms were. It was also close enough to the reception desk that staff could conduct short, private conversations in this area, without it significantly impacting on their job, and they could return to the reception desk quickly if required. A further explanation for the high use of this area is that the open-plan nature of the reception desk and the waiting room meant that there was little privacy for reception and administrative staff, as there was a high risk of their discussions being overheard by other staff members or patients. Overall, the pigeon holes were used heavily for face-to-face discussions by all staff groups, although the nurses made marginally more use of it than the GPs. The paramedical staff made the least use of this area, largely due to their part-time hours, but also their relative isolation on the first floor that afforded them privacy, relative to other staff groups.

Red Practice

In direct contrast, in the **Red Practice**, fieldwork observed significantly higher levels of face-to-face communication between all staff groups on a regular basis, demonstrating more integration, social cohesion and less hierarchy amongst the staff, a finding which was also backed up at the practice meeting I attended. One respondent argued that face-to-face communication was the only way to ensure that:

Your message was communicated and that you had their [the message recipient] attention.
GP Red Practice

Unlike the **Yellow Practice** face-to-face communications in the **Red Practice** did not occur in any particular physical space and neither were they concentrated amongst any particular staff group. This could be indicative of the established social relationships evident within the practice. This observation is particularly interesting

considering that the physical layout of the reception area and adjoining medical records office were almost identical in both practices and, consequently, the receptionists and medical secretaries were situated in close proximity to each other. Therefore, I expected to have identified higher levels of face-to-face communication between administrative staff, compared to other staff groups, similar to that observed in the **Yellow Practice**. But the same communication patterns were not replicated. There are three possible explanations for this: the physical layout of the practice; the location of the staff pigeon holes; and the fact that staff physically collected patients from the waiting room for their appointments.

The physical layout of the **Red Practice** at some level increased the opportunity for face-to-face communication across all staff groups. Crucially, the waiting room was physically closed off from the reception area, by glass windows and doors, which allowed staff to engage in dialogue of a personal or confidential nature in the reception area without concern that they may be overheard by patients. This, it can be argued, increased the levels and likelihood of face-to-face communication between staff in the **Red Practice**. Indeed, observation revealed several interactions in this area between GPs, practice nurses and the administrative staff. The location of the staff room, behind the reception area, also facilitated greater face-to-face communication; staff had to walk through the reception area in order to access the staff room, which increased the opportunities for interactions and communications. However, the staff room was not used by staff groups equally, particularly as there was a kitchen located at the end of one of the corridors. Staff with consultation rooms in this corridor, specifically the GPs, would use the kitchen facilities and then return to their office rather than using the staff room. Nevertheless, this did not have a significant negative effect on the levels of face-to-face communication.

The location of the pigeon holes also helped to facilitate face-to-face communication and this, I believe, significantly contributed to the observed greater integration of staff, particularly across user groups. The pigeon holes in the **Red Practice** were located on the back wall of the reception area and, as a result, staff from all groups frequently congregated in this area to collect post and messages and, consequently,

engaged in dialogue. All staff had to pass through the reception area at least once a day to collect paper records from the pigeon holes for their appointments. In reality, it was usually at least twice a day as staff collected records for the afternoon surgery.

The fact that staff regularly interacted in the reception area operated as a leveller of any hierarchies and almost forced staff to communicate with each other. The separation of the pigeon holes in the **Yellow Practice,** on the other hand, enforced and increased the isolation and hierarchy of individuals and staff groups.

However, as one participant highlighted, although the pigeon holes were a very effective communication method as everyone visited them at least once a day, if you missed that window for an individual, they may not pick up the message until 24 hours later. This may explain why the **Red Practice** often used a number of communication channels in parallel with each other, often resulting in confusion or miscommunication. In the absence of a dominant communication technology or strategy, users intuitively chose a mode of communication or ICT that suited them best. If that choice failed in its communication, additional channels were also utilised. However, this failure occurred largely because at an organisational level there were no shared protocols that outlined how information should be communicated.

A further difference that increased face-to-face communication in the **Red Practice** was that GPs and nurses physically collected their patients from the waiting room, which involved staff walking directly in front of the reception desk. This increased the likelihood of passing colleagues in corridors and therefore increased the opportunity for face-to-face communications. Indeed, observation identified a number of staff engaging in short bursts of face-to-face communication as they passed each other in corridors en route to the waiting room or reception desk. In the **Yellow Practice**, the electronic system for calling patients enabled staff members to essentially not leave their office for periods up to two hours at a time, and therefore limited the opportunities for face-to-face communications.

Overarching all of these factors is the local culture within the **Red Practice,** which was to incrementally implement ICT. Where ICT had been domesticated, it had not negatively impacted on social relationships. However, it can also be argued that this incremental approach may have had the effect of increasing reliance on alternative methods of communication.

5.4 Face-to-face Verbal Communications – Practice Meetings

Both practices held a practice meeting once a month, which normally lasted for two hours subject to the agenda. Meetings were usually held during a lunchtime when the surgeries were closed. I was able to attend one practice meeting at each practice within the first six months of fieldwork. This added an additional dimension to the evidence I collected through interview and observation, as this was the only occasion that I was able to witness all members of each practice interacting with each other.

Practice meetings in both practices operated on the lines of a three-line whip, in that all staff had to attend, with sickness or annual leave being the only exceptions. The monthly meetings for the year were scheduled on an annual basis and were held on a day when all staff, including those who were part-time, could attend. For both practices, this was the only structured occasion where all staff had the opportunity to engage in face-to-face communication with one another. Some user groups held additional meetings, for example the practice nurses and GPs in the **Red Practice** had fortnightly meetings for their teams. However, interviews revealed that in the **Yellow Practice**, the practice meeting was the only time that some staff had any verbal face-to-face communication with each other at all, which as discussed earlier, could be attributed to a number of different factors including the physical layout of the practice and working hours of these particular staff groups. This was particularly true of the communication between the nurses and the occupational therapists and counsellors in the **Yellow Practice**. This lack of face-to-face cross-group communication and awareness of other staff was highlighted by one practice nurse:

The practice meetings always surprise me. Everyone is there. Suddenly you realise or remember how many people work here. People you've not seen for ages or spoken

to. I see the same faces most days and then every meeting there is this huge group. I forget they are here sometimes.
Practice Nurse Yellow Practice

A number of interesting elements emerged in these meetings, some of which were very specific to the individual practices such as: the staff hierarchies in the **Yellow Practice**, the integrated approach of the **Red Practice**, the social and yet formal nature of the meetings thus fulfilling a dual purpose for some staff; the reliance on paper as a method of communication within the meetings and the lack of ICT used within the meetings.

Yellow Practice – Practice Meeting

In the **Yellow practice** the practice meetings were held in the staff room, located at the front of the building, away from the main consulting rooms. Although, staff members brought their own lunch; cakes, biscuits and soft drinks were also provided by staff to share at the meeting, an act which served not only to distinguish the practice meetings from normal lunchtimes in the staff room, but also added an additional social dimension to the meetings. The practice meetings had two almost tangible components – the social and the formal. The atmosphere at the start of the meeting was distinctly sociable with discussion across staff groups in a relaxed manner, for example conversations about holidays and families, particularly amongst those staff who did not have daily engagement and communication with each other. It could also be argued that discussions amongst some individuals were at a very superficial level.

One of the most interesting observations was that when the meeting was due to begin, the atmosphere noticeably changed and staff resorted to hierarchical type. The practice manager who chaired the meetings indicated that the meeting should start and, despite the opportunity to sit anywhere around a large square table, all the staff clustered themselves according to staff group without exception. That is, all the GPs sat together, all the practice nurses sat together, as did the other staff groups. This therefore highlighted the inherent staff hierarchies amongst the practice and relative safety or strength they felt in their own staff group. This unspoken seating

arrangement was particularly interesting considering that staff arrived ahead of the meeting at different times. But I observed that as they arrived, they either stood around the table talking, or alternatively, rather than sit next to those already seated, they chose to sit at a separate area around the table and establish their own group, unless members of their own staff group were already seated. This instinctive seating arrangement provided a fascinating dynamic, as on the one hand it was clearly an established routine or expectation, but on the other, I was interested to know whether there was some underlying reason for it. The impression that it gave to a practice outsider was that the meeting was going to be almost battle-like, with each staff group taking their respective positions as a group ahead of any verbal attack that might be laid upon them and therefore when a staff member spoke, it was as a user group representative rather than as an individual. Interestingly, this particular dynamic was not something that either the senior GP partner or the practice manager was actually aware of until I provided details of this observation in the first interim report (after six months' fieldwork) to the practice manager. Her reaction to this finding was one of surprise and confusion:

Really, was it really like that? We've had meetings for ages now... I guess I just don't notice. Time is tight and we always have a big agenda... Some people don't like the meetings as it impacts on their time to catch up on admin and emails... Some people like to catch up with others at the meetings, maybe that's why they sit together... But do we really sit together in teams?... Discussions are always heated, but then what can I do? I can't make people sit in particular seats. I mean, why would I?
Practice Manager Yellow Practice

Nevertheless, whilst this was not something the practice manager could actively do something about, it was more important that she and other staff members were aware of this dynamic and the effects on the communications and relationships within the practice it may have been creating or encouraging.

This unusual staff dynamic and hierarchical behaviour was further demonstrated and confirmed during the interviews with the receptionists and administrative staff following the practice meeting:

When the whole practice comes together, something strange happens. I don't know why and I can't explain it. It's like a war sometimes... it's ridiculous, an 'us and them' situation... but you half expect it... everyone defends their own corner and we always end up fighting about who gets the worst deal in any situation. It's like we can't talk to each other when it's about work. Anything else and its fine mostly... Sometimes I think they [the doctors] get their own way just because it's them and there's more of them. I mean who are we? We only book appointments and we're not that important in the day-to -day running of this place.
Receptionist Yellow Practice

As the practice meeting progressed, as shall be discussed, this occupational group culture or 'pack' mentality and the unwritten hierarchies amongst the staff persisted and became even more pronounced, particularly as individual staff groups responded to agenda items.

In the **Yellow Practice**, practice meetings were led by the practice manager, with minutes and action points being taken by hand by one of the administrative staff. The agenda and action points from the previous meeting were circulated via email a week in advance to allow for any changes to the agenda. Despite the advance circulation of the agenda, the practice manager provided copies of the agenda at the meeting, even though some staff had already printed the agenda out prior to the meeting. The provision of additional agendas was an interesting commentary on the practice manager's perception of her staff's ability to print out papers for the meeting but was also in direct contrast to her approach to the implementation of ICT. As stated in the previous chapter, the practice manager was very aggressive in her approach to ICT implementation in that she was driven by targets and compliance with local and national policy. And yet, in providing additional copies of papers for the practice meeting she was not only encouraging the use of paper, but also ensuring that some colleagues did not have to use ICT in order to access the papers. When I asked her why she provided paper copies, she informed me that staff often forgot their papers for the meeting. I was interested to know whether this was a reflection on the lack of ICT confidence amongst some staff in the practice, or whether it was simply laziness, as staff knew the practice manager would bring additional copies of the papers. The practice manager did not have any strong views on this but in interviews with practice nurses and therapy staff, the perception was that they were used to the

practice manager providing papers and therefore did not see the need to print them off. However, one practice nurse, in relation to printing in general, did state that:

If you have been doing prescriptions, you have to change the paper if you want to print out normal things. It's annoying and sometimes the printer doesn't like when I change paper; it's easier not to bother sometimes.
Practice Nurse Yellow Practice

As part of the six-month interim report, I raised this issue with the practice manager and suggested that she stopped providing additional agendas and papers to the practice meetings and therefore transferred responsibility to the staff, thus encouraging them to use ICT, which would force those who were resistant to build on their skills. At the end of the fieldwork, by which time there had been 12 additional practice meetings, I revisited this issue with the practice manager. She informed me that she had been surprised by my findings relating to the practice meeting and wanted to see for herself if they were true. As a result, three months after receiving the interim report, she sent an 'all-practice' email stating that it was staff responsibility to bring paperwork to the practice meetings and that, as a paperless practice and in an attempt to be more environmentally friendly, she would not be providing additional papers. As a result, on the whole staff responded by bringing their own papers. However, as I found out from one member of staff, there were shortcuts to overcoming difficulties with ICT:

When the practice meeting comes round, I just print off copies and then photocopy them for all the girls. They all know I'll do it, it makes it easier if one person takes responsibility. We're busy and someone might forget otherwise... Saves five of us doing it and means that no-one ends up shouting at the printer when it doesn't work.
Receptionist Yellow Practice

The agenda for the practice meeting that I attended covered the following areas:

- the increased numbers of patients missing appointments;
- an increase in requests for repeat prescriptions – namely by patients who claimed to have lost their original prescriptions;

- a presentation from one of the GPs on a meeting he had attended with the local PCT on health inequalities in the borough;
- the budget for the coming financial year; and
- patient and staff use of the *Choose and Book* website.

The final agenda item was concerning specific patient cases that I was not permitted to attend for confidentiality reasons.

Perhaps one of the most interesting and immediately obvious facets of these discussions was that considering how ICT literate the practice was overall, there was no use of ICT within the meetings and all communications were conducted using verbal and paper-based communications. There were a number of opportunities within the meeting to use ICT, for example, the minutes of the meeting could have been written directly to a laptop. The lack of ICT became even more apparent during the presentation given by one GP, as shall be discussed later in this chapter.

The discussions in the practice meeting were dominated largely by the GPs, who not only spoke the most frequently throughout the meeting but actually tended to speak the loudest, even when the discussions were not particularly heated or argumentative. The volume at which they spoke could be interpreted as reinforcing their hierarchical position within the practice. Despite only contributing to specific topics, the receptionists and administrative staff were the second most vocal group at the meeting, contributing largely to the discussions on missed appointments, the loss of prescriptions and the use of *Choose and Book*. As shall be discussed, these issues directly affected the receptionists, as they were at the frontline for dealing with patients in these circumstances. The practice nurses contributed to the meeting but at a level significantly below that of the GPs. Part-time members of staff (regardless of staff group), and paramedical staff appeared relatively passive in the meeting and spoke only occasionally and quietly, generally in response to questions being directed specifically towards them. This again could be interpreted as a display of their lower hierarchical position within the practice.

Agenda Item – Missed Appointments

The discussion on missed appointments was exceptionally lively between the reception staff, administrative staff, the GPs and practice nurses. The practice manager reported that in the previous month there had been over 40 'no-shows' and in the two months prior to that this was closer to 35 and 30 respectively. Some basic analysis by administrative staff had also identified that there was a handful of patients who repeatedly missed appointments, including one patient who missed several appointments over the space of six weeks but kept rebooking a future appointment. Essentially, the problem was due to a lack of communication by the patients. The receptionists and administrative staff spoke of their frustration at not being able to offer patients appointments when they wanted them, as in principle the appointments for the immediate few days had been allocated. 'No-shows' not only impacted on the general availability of appointments but also added a further layer of complexity when patients wanted emergency appointments at short notice. As one receptionist commented:

Patients call for appointments and we offer what we can which is usually 24 or 48 hours later, but then on any day, people don't turn up. If we'd known, we could have given that appointment to someone who calls and needs it.
Receptionist Yellow Practice

Another added:

I know we have emergency appointment slots or patients can come and wait to see someone but they're angry when we can't give them those slots. I have to explain why we can't see them. But then others don't turn up and so we could have seen them.
Receptionist Yellow Practice

GPs on the other hand, whilst concerned that some patients (particularly those with complex health issues) were not honouring their appointments or letting the practice know they would not be attending, were grateful for the extra administrative time that they had due to 'no-shows' and they did not perceive the lack of communication by the patients to be having a negative effect on their daily practice.

It's not ideal for anyone I know, but having that extra ten or 20 minutes because there is a no show between appointments makes a huge difference to my day. It's a chance to write up notes from the last consultation or make a phone call.
GP Yellow Practice

This comment particularly enraged some of the administrative staff, who argued:

You have a two-hour gap at lunch to catch up on admin. We're on the go constantly and have to deal with patients who're angry they can't see you as there are no free appointments. But as long as you have an extra ten minutes to catch your breath that's ok! If the patients aren't going to turn up they need to let us know. It's not much to ask that they call and cancel. I don't want any more earache from patients complaining they can't see their GP for two days.
Secretary Yellow Practice

One receptionist further went on to argue:

It's not like it's just the phone calls. It's the patients who come in to book an appointment and we have to deal with them face-to-face. You [the doctors] don't have to deal with these sorts of discussions. If we can't give them the appointments, we're the ones who get the blame. No-one else. We're first in the firing line everyday.
Receptionist Yellow Practice

This was the first time within the meeting that the two user groups of administrative staff and GPs utilised their group seating arrangements and, as such, the dialogue was directed from opposite sides of the table at the exclusion of the rest of the staff present at the meeting. This discussion also highlighted the different communication methods that were employed by both patients and the reception/administrative staff, namely verbal (telephone) and face-to-face communications. It also demonstrated the power of patient communication (or rather the lack of it) and its ability to impact both negatively (on the administrative staff) and positively (for some of the GPs) on the workings and daily communications in the practice as a whole. As tensions in the meeting were clearly apparent, at this point, the practice manager suggested that rather than debating the problems of 'no-shows', the discussion should focus on what action should be taken, as she stated: *we're all agreed it's problematic*. I was interested to note that the paramedical staff had not contributed to this discussion. This appeared unusual, as it is unlikely that they would have been unaffected by the

issue of 'no-shows', particularly given the sensitive nature of their roles in the practice, for example, counselling. However, as I was not interviewing any of these groups, it was difficult to ascertain a reason for their silence during this part of the practice meeting.

Nevertheless, the attempt to diffuse the situation by discussing appropriate action only resulted in the discussions being even more animated. The discussion focused on how to communicate with patients to let them know the consequences of missing their appointments. Or in other words, it was a discussion about communicating the need to communicate. Interestingly, at this point in the meeting, what was not said was almost as telling as what was said. Namely, the body language of the GPs and the administrative staff became particularly confrontational, with both sides leaning in across the table to get their respective voices heard, and this was accompanied by heavy gesticulation and often those who were listening did so with folded arms and direct eye contact, which was rather aggressive. This situation was particularly interesting as the problem stemmed from a lack of communication between patients and the practice and, yet, both the GPs and administrative staff were now experiencing their own communication problems as a direct result of the discussion. Indeed, one or two members of these groups appeared to simply shut down in regard to their input to the discussions. Other staff groups largely tried to avoid making eye contact with anyone, indicating their unease with the discussion. As an observer, it was a fascinating situation but one that was rather tense and uncomfortable. It was also interesting to note how quickly individuals became clearly tense and aggravated by the comments. This is perhaps a further symptom of the impact of ICT. That is, that the high levels of computerisation in the **Yellow Practice** had been detrimental to face-to-face communication. It appeared that staff were unable to communicate verbally about practice matters, particularly given the distinctive hierarchical nature of the practice. However, it is difficult to know what social relationships were like prior to the introduction of ICT in the practice but it appeared that the domestication of ICT had done little to improve these relationships.

Although the practice nurses had contributed small details to the previous conversation, and one therapist had added that given the part-time nature of their hours and consequent pressure on appointments, they had tried to stress to patients the importance of letting the practice know if they could not attend their appointment, the debate on what action to take became a distinct three way communication between the GPs, receptionists and administrative staff, and the practice manager.

Suggestions for appropriate action ranged from:

- writing to all patients who had failed to attend in the last three months;
- writing to particular patients who were seen to be serial 'no-shows';
- placing a notice in the reception area and on the doors exiting the surgery, to serve as a reminder to patients;
- receptionists reminding patients when they booked their appointments, if they could not attend to inform the practice, (this suggestion was not well received by the administrative group); or
- as was suggested by one receptionist, almost in retaliation to the previous suggestion, that individual GPs spoke to the serial 'no- shows'.

After much discussion, and many raised voices, particularly around the respective burdens that each action would place on staff, it was decided that a soft communication would be the most suitable approach and that notices in the reception area and on the exit doors of the surgery would be most appropriate. It was also agreed that a review would happen in three months to assess the impact of the measures and if there had been no change in the number of 'no-shows' then a more direct communication would be required.

Agenda Item – Repeat Prescriptions

The next agenda item for discussion was again introduced by the practice manager, who spoke of the increase in patient requests for repeat prescriptions. At the **Yellow Practice**, patients could request a repeat prescription by three distinct routes: attending an appointment, an online request or completing a repeat prescription form

in the practice. The online request was the only form of electronic patient communication that the practice permitted. The practice manager explained that the numbers of online requests and prescription request forms had risen 15% in the last six months. While that figure was not necessarily alarming, what was of concern was that almost 10% of those requests were to replace original prescriptions that patients stated they had lost. The practice was situated in an area of high deprivation and the practice manager believed that:

Not all of these prescriptions can be genuinely lost. Looking at the specifics of the requests, some of these are strong pain control drugs, others for depression and these have a high street value. I am not suggesting that some of these requests aren't genuine, but please can you check, if a patient asks for a replacement prescription, when did you write the original prescription and if you are at all suspicious, ask the patient to make an appointment rather than issue the replacement. It just seems a bit strange... this sudden rise. I want everyone to check every request that comes in. Is there a trend or group we need to sort out?
Practice Manager Yellow Practice.

Online requests were electronically allocated to administrative staff who distributed them to the patients' relevant doctor for authorisation. The system automatically flagged whether the request was not appropriate, for example, the patient had requested a drug for which they didn't have a current prescription or if their prescription was not due for renewal. When a patient submitted a request in person at the practice, all the checks on the prescription needed to be done manually, which left room for human error. However, if a patient claimed to have lost a prescription, there was little that the practice could do other than issue a replacement. What was of concern was whether it was a particular group of patients who were repeatedly claiming a loss of their prescriptions (which may indicate fraudulent activity) or whether this activity was attributable to other factors. To account for the increase in online requests one secretary suggested:

I've noticed an increase in the online requests but I thought it was maybe just more patients being aware they didn't need to come in to make a request.
Secretary Yellow Practice

The practice manager further added:

I'm not saying we're contributing to a black market in drugs or anything, it just seems unusual, so can we all keep an eye out.
Practice Manager Yellow Practice.

This is an example of where technology, which is supposed to be beneficial to communications and streamline processes, was actually being counterproductive and resulted in an additional workload for the practice which had to perform additional checks on the legitimacy of the requests. In the past, patients would have had a face-to- face discussion with the GP to get a repeat prescription which would have enabled the clinical staff to have greater control over the issuing of prescriptions. Electronic communications, however, had potentially given greater control to the patients and reduced the effectiveness of the communication from the practice perspective.

Given perhaps the previously heated discussion on missed appointments, this agenda item surprisingly passed without too much comment.

Agenda Item – GP Presentation on Local Health Inequalities

When reading the agenda and seeing that a presentation was to be given by the GP ICT enthusiast in the practice, my expectation was that this would have been given via Powerpoint or at the very least via overhead projector. I based this assumption on the relatively high levels of ICT capability within the practice, the fact that there was a computer in the staff room, the individual GP's enthusiasm for ICT and the practice's paper-less ethos. However, this was not the case. The presentation on local health inequalities and implementation of central government policy to reduce them raised some interesting internal communication issues. The GP handed out some paper notes to accompany his presentation with graphs showing particular trends in mortality rates, disease prevalence and incidence amongst specific population groups. Nevertheless, the notes themselves were not easy to follow. As Powerpoint was not being used, the notes and accompanying graphs were not laid out as individual slides and, furthermore, the GP did not always present the information as it was laid out in the handouts, which led to confusion. As a result, throughout the presentation, staff including the practice nurses and the paramedical staff asked for

clarity as to what graph or figures the GP was referring to. As such, this was an example of where face-to-face and paper-based communications were confusing for the recipients and potentially led to the information being lost in communication. It could also be argued that the GP's daily reliance on CMCs (in line with the practice culture) had potentially resulted in his face-to-face communications being less effective. In this instance, the use of ICT, even if it was used to present paper copies of Powerpoint slides, would have been a more appropriate and effective way to communicate his messages.

At the end of the presentation, the GP offered to circulate more detailed notes via email which resulted in a discussion as to the burden of email in practice and the perceived overuse of all practice emails. A number of staff members, including the paramedical staff and reception staff, complained that their inboxes were already full and that perhaps the best solution would be that if individuals wanted a copy of the notes for the presentation, they should contact the GP individually. As one of the health visitors commented:

We need to get better as to what we send to who. I'm only here two days a week and when I log on there is all this stuff in my inbox and lots of it isn't relevant and lots of that is 'all practice' emails. I spend the first 20 minutes when I log in trying to find out what's relevant and what I need to read. And then people 'reply all' to 'all practice' emails and there is the whole discussion which I am automatically included in despite the initial email not even being relevant to me. It takes two minutes to decide does everyone really need to know about this issue. If not, then an 'all practice' is not appropriate.
Health Visitor Yellow Practice.

The practice nurses were particularly supportive of this view with one nurse commenting:

My inbox is out of control, it has a life of its own because of all the practice-wide emails. When I open my inbox and see it's full of 'all practice' emails, I tend to look at the ones that are personal first, they are more likely to be of importance.
Practice Nurse Yellow Practice

This view was common across the practice, as one of the administrative staff stated:

I agree. Half the time, these emails aren't even relevant to me. I just delete them.
Medical Records Assistant Yellow Practice

This is another example where ICT that facilitates the ease of information communication via email may actually be leading to miscommunication, having unintended consequences (emails being deleted without being read) and being counterproductive. Thus the communication is not having its intended effect. This not only indicates that email is not always the most effective way to communicate information but also highlights the danger of using only one method and arguably an instantly disposable mode of communication. The instant deletion of email means that the recipient doesn't even have to open the email.

However, the GPs were less enthusiastic about changing email patterns as one argued:

How else are we supposed to know what's going on at practice level if we don't use 'all practice' emails?
GP Yellow Practice

This quote is very interesting as the GP in question is ruling out face-to-face communications (possibly due to the physical structure of the practice) but essentially he was asserting that the only way to communicate was via ICT. As the meeting developed, it became clear that face-to-face communications within the **Yellow Practice** were quite strained and that ICT may actually be entrenching these poor verbal communications and relationships.

At this point, the practice manager suggested that this issue of email lists and distribution should be an agenda item at the next practice meeting as there was clearly a need for further discussion. As part of my interviews with the practice manager and my commentary in the interim report, I asked her what had been discussed at the practice meeting in regard to 'all practice' emails. The decision had been not to change procedures, but when using the 'all practice' email address, users were asked to include (where appropriate) a red exclamation mark in the reader pane, which would indicate the relative urgency of the email. While this had been

implemented by some users, it had not reduced the amount of 'all practice' emails that were sent but the practice manager believed that it had led to more staff reading the emails rather than simply deleting them. As such, her response had to been to continue to use ICT despite the flaws it had rather than improve face-to-face communications, which might have reduced the need for as many 'all practice' emails.

Agenda Item – Budget for the Financial Year

The budget for the financial year did not result in any discussion. The practice manager informed staff that the budget for the coming financial year was being confirmed and that it would be largely the same as the last financial year and that any outstanding resource requests had to be lodged by the end of the month.

Agenda Item – Choose and Book

The final agenda item for which I was present, the use of *Choose and Book*, was particularly animated and heated. Crucially, it was the only occasion when all staff groups actively participated in the meeting. As discussed previously and demonstrated in **Figure 2 Chapter 1,** this is the one component of NPfIT where not all user groups interact with the system, but they are all affected by it. The initial roll out of *Choose and Book* began in 2005-06 but was still in the early stages of implementation at the end of 2006 and consequently had not been in place long when I was undertaking my fieldwork. This may explain the problems and frustrations that many of the users expressed in the meeting. The discussion focused primarily on the problems that staff had experienced when using the *Choose and Book* website to book patient appointments at hospitals and specialist treatment centres. The main concern was that the website had often crashed during consultations, which was seen as unprofessional and therefore many staff had resorted to traditional paper-based methods of patient referral – writing a letter to a consultant. Nevertheless, one of the more fundamental, associated issues of the system crashing was that consequently, staff were unable to offer patients choice[1] during the consultation. The crashing of

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[1] The introduction of free choice means that patients referred to see a specialist can choose where they will be treated. They can choose from any hospital that meets NHS standards. There are two areas of

the system not only led to the generation of paper-based communications, (traditional referral letters) which impacted on the workload of both the clinical and administrative staff, but it also went against the practice's paper-less ethos and led to a delay in obtaining an appointment for the patient. This negative user experience undoubtedly had an impact on the domestication of *Choose and Book* within the practice.

However, *Choose and Book* also had a greater indirect impact on the administrative staff, who themselves did not use the system. *Choose and Book* generates a patient code for each appointment. This enables patients to change their appointment online or via the telephone at a later date if it is unsuitable. However, a number of patients who had accessed the website from their personal home computers had contacted the practice to express their frustration and inability to navigate the website. As one GP stated:

It's so embarrassing. I'm trying to organise a referral and the system crashes. I can't do the referral, I can't offer choice, I can't do anything and I end up looking bad in front of the patient. But also... if it crashes mid-appointment is the appointment booked?...I don't know...When I've been able to [access the system] patients who I think can access the net at home and could figure their way around it, I've given them their passwords [to let them log on] and left them to their own devices. What choice do I have? I can let them do it and they have a choice of providers, or I can write a letter to one and then they can wait for weeks for the appointment to come through.
GP Yellow Practice

This was followed up by a receptionist who argued:

Yeah, and when that fails and they can't work it [Choose and Book], they call us!
Receptionist Yellow Practice

This demonstrates that the use of ICT can result in the uneven distribution of benefits and impacts across users.

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healthcare where the location in which you are treated is not subject to free choice: mental health services and maternity.

On a more positive note, a number of GPs and practice nurses acknowledged that when *Choose and Book* had worked, it had been hugely beneficial. The ability to book online referral appointments was seen as a significant advantage but, overall, they felt that the system did not work frequently enough and so staff had often used the traditional paper method for referrals. This is a further example of ICT being counter-productive and duplicating the workload of staff with the risk that the same information, namely the patient appointment, was being requested twice – once in paper format and once electronically. As for the inability to offer patients choice, one GP argued that his patients didn't seem interested in this and argued that it had little impact on their referrals:

Most of the referrals that I have managed to do online, the small number of times the system worked, I've tried to offer 'choice', but patients don't seem bothered where they go to as long as it's close by. They don't mind if there's a long wait, but they want to stick to what they know. Some asked me where I think they should go, that's not really patient choice... If the system freezes, I can write a letter and it's usually to the closest hospital, which is where the patient wants to go...When it's [Choose and Book] worked... I've given them their log in details, but so many of them have then tried to alter their appointment dates and messed it up. So they turn up here for a second appointment to sort it out...that's not my job. I'm getting fed up of sorting out the mess. If we'd stuck with paper referrals this wouldn't happen.
GP Yellow Practice

The conversation then began to focus on central government policy and what was perceived as its limitations and how:

We get told to do something, that it's part of our jobs we're doing anyway, and we get given a new system based on someone's naive perceptions, who has no idea how we work and we're supposed to be surprised that it doesn't work?
GP Yellow Practice

One nurse further added:

*It's [Choose and Book] a nightmare, so I have just been writing referral letters as normal and not even bothering to try and log on. At least I know where I am if I do th*is.
Practice Nurse Yellow Practice

At this juncture, the practice manager intervened and reminded staff that the system was there for a reason and that in line with national policy, patients were to be offered choice, appointments should be booked online and therefore the system had to be used, despite the problems that staff had encountered. She acknowledged that the system was unreliable, but urged staff to persist not least because the DH was conducting a national survey to ask patients whether they had been given choice at the point of the referral. In parallel, this was also a focus of some work that the local PCT was carrying out and therefore the practice was bound to be the subject of some local analysis in the near future. The discussion of *Choose and Book* overall presented a very negative picture of this particular ICT and demonstrated how a loss of confidence in the abilities of ICT had not only led to a duplication of information and workload but also led to a reliance on paper-based communications. Furthermore, it also highlighted how ICT could impact on individuals who did not actually use it.

The discussion then moved on to individual patient cases, at which point, due to confidentiality reasons, I left the meeting. The result of the continued emphasis on ICT and highly computerised nature of the **Yellow Practice (**together with its physical layout) was, I believe, demonstrated in the practice meeting, namely that the domestication of ICT had been at the expense of face-to-face communications. That is that computerised rather than face-to-face communications had become the norm and, as staff were not used to communicating in this manner as a group, it resulted in particularly heated discussions early on in the discussions, which largely set the tone for the remainder of the meeting.

Red Practice: Practice Meeting

The practice meeting I attended at the **Red Practice,** late in month three of the fieldwork was a stark contrast to that of the **Yellow Practice**. It displayed a very different dynamic and distinct lack of workplace hierarchy. The agenda for the meeting, and minutes from the previous meeting, was circulated two weeks in advance and the meeting held in the staff room located at the back of the practice, behind the medical records office. Similarly to the **Yellow Practice**, the meeting was

held during a lunch hour when the practice was closed to patients. Staff brought their lunch and the relevant papers to the meeting, as additional meeting papers were not provided. I attended this meeting after the **Yellow Practice** meeting and I was immediately struck by how integrated the staff groups were and how easily the different staff groups mixed and communicated with each other. The meeting was led by the senior GP partner and minutes were taken by the practice manager. The items for discussion were:

- minutes from the last meeting;
- staffing of the diabetes clinic;
- vaccinations;
- feedback from staff attendance at a quarterly PCT meeting;
- IT training; and
- discussion of individual patient cases, for which I was not allowed to attend for confidentiality reasons.

As this practice was not overly reliant on ICT and indeed was heavily paper based, it was not surprising to note that there was no ICT present at the meeting. The interaction between staff and the coherent and non-hierarchical nature of the practice meant that the meeting consequently was less confrontational and less verbally charged than that of the **Yellow Practice**. Unlike the **Yellow Practice**, staff groups in the **Red Practice** merged in their seating arrangements around the table in the staff room with the exception of the receptionists who had clustered together. However, this could be attributable to the fact that they arrived together at the meeting, rather than a conscious decision to sit in their respective staff group. Indeed, the administrative staff who could be considered part of the reception staff group, sat amongst the paramedical staff and the GPs.

Agenda Item – Minutes from the Last Meeting

The senior GP partner opened the meeting and the minutes of the last meeting were discussed without any issues arising and there were no outstanding actions.

Agenda Item – Staffing of the Diabetes Clinic

The next item for discussion was the staffing of the weekly diabetes clinic. This was led by one of the practice nurses who reported that there was an increasing number of patients attending the clinic and that the demand was too great for only one member of staff as she stated:

Last week over 30 patients attended a two-hour clinic and, not surprisingly, I couldn't deal with them all. As it's an open clinic we either have to ration their time and give them appointments or someone else comes to help out... It's not even the same patients I'm seeing all the time, but now we've provided the service, more patients want to use it. That's great, but it's too much for one person... But if we provide the support at the clinic to get the patients to control their diabetes better, we should in the long run see them less often. I think it's a short-term measure for a long-term solution.
Practice Nurse Red Practice

The practice nurse was passionate in her communications without being aggressive or coming across as if she was complaining and this, I believe, contributed to the positive response she received. This communication was not directed at any one staff group and discussion focused on how many patients could be seen if they were offered appointments for the clinic. However, this idea was dismissed as it would mean that only a limited of patients could be seen at any given time, and given the weekly nature of the clinic some patients may wait two weeks or more for an appointment or some patients would not get an appointment for some time, as some existing patients were already weekly attendees at the clinic. I was quite surprised when quite quickly one of the GPs offered to help at alternative weekly clinics. I had expected the responsibility to fall to another practice nurse. The GP suggested:

I can do every other clinic if that helps get things under control, but then obviously someone else has to pick up my workload for those two hours. I don't want to be doing this forever but appreciate that it would be good to get this sorted.
GP Red Practice

This integrated and convivial approach to practice issues was in direct contrast to what I had witnessed in the **Yellow Practice** and that such a discussion in the **Yellow Practice** would most certainly not have been so amicable, particularly as it involved someone taking on additional work. It was decided that the GP would help out on

alternate clinics for four months to see if this improved the situation and at which point a review would be undertaken. It is difficult to fully explain the staff unity and overall ease of communication that was displayed in these circumstances. It may be due to the fact that the topic of discussion did not involve any fundamental changes to daily practice or implementation of ICT, but rather was concerned with delivery of good patient care.

The physical architecture of the **Red Practice**, namely the closely proximity in which the staff worked, partially explained the good verbal communications within the practice. However, I believe it was also as a result of the personalities in charge of the local governance and driving change in the practice, namely the senior GP partner, who was not particularly ICT orientated. He had a very calm and friendly demeanour and was very unassuming despite his senior position in the practice. This appeared to act as a leveller in staff relations, rather than someone who imposed rules and regulations from above, as was evident in the **Yellow Practice.** Whilst he recognised the importance of the use of ICT in general practice he also recognised the need to take the issue forward as a unified practice. Consequently, he was respected amongst the staff and did not appear to have any personal agenda other than improving patient care and the overall working of the practice. However, this cautious approach to the implementation of ICT had an impact on communications within the practice, namely that they relied on face-to-face and paper-based communications. As discussed previously, this approach to ICT implementation and its resultant impact on paper-based communications was not necessarily a positive approach.

Agenda Item – Vaccinations

At the time of the meeting there had been significant media publicity about the MMR vaccination and the increasing incidence of mumps in the adult population. The senior GP partner asked staff to encourage mothers to immunise their children and provide reassurance about concerns they may have about the immunisation but also to be understanding of those who were not keen to have their children immunised. He also added that when teenage patients in particular had appointments, staff should

consult their medical records as to whether they had had mumps or whether they had been immunised. Recognising the scale of this task and believing the senior GP partner to be referring to paper records, which we still heavily used in the practice, one of the GPs commented:

That could take ages... consultations are time pressured already...We might forget and we'll always miss people; those patients who never visit the surgery. Can't we do anything with the basic information we hold on the computers to search for patients who haven't been immunised?
GP Red Practice

In response, the senior GP partner said:

Yes, sorry I meant using the electronic records rather than the paper ones, if we can do an electronic search of all records then, yes, that would be better.
Senior GP Partner Red Practice

It was interesting to observe that in this exchange the senior GP partner openly admitted his lack of knowledge regarding capabilities of the ICT system whilst acknowledging the benefits that ICT could bring to the practice. However, this was not seen as a weakness amongst the staff, as demonstrated in the receptionist's response to the senior partner, who demonstrated an awareness and willingness to use ICT but also highlighted her own lack of knowledge of the system:

I can easily run a search for those patients who have not been immunised against mumps, if we have it on record but this will cover everyone. I'm not sure if I can restrict by age groups but I'll have a dig around and see what I can do by the end of next week.
Receptionist Red Practice

This demonstrated the excellent communication capability of ICT and how CMCs could be used to facilitate verbal or written communications with the patients regarding MMR vaccination where required and, therefore, improve patients' health but also improve information flows within the practice. Perhaps recognising the scale of the task, it was agreed that a list of all those not immunised would be provided by the end of the following week and that the focus, if possible subject to ICT

capabilities, would be on all patients under the age of 30. However, the impact of this was highlighted by one of the practice nurses:

Once we have this list, I am guessing that Veronica and I [the practice nurses] will have to do the vaccinations. That could take ages especially if there are lots of them, unless we share them between everyone?
Practice Nurse Red Practice

Sensing some concerns and tension, the senior GP partner responded to this query quickly and suggested that the decision on how to address the number of immunisations and how to communicate this to the affected patients was deferred for discussion at the next practice meeting, once they had an idea of the numbers of patients who would be affected. At a later interview with the senior GP partner, I asked what had been the results of this discussion and was informed that a letter had been sent to all those patients who had not been immunised for MMR. The senior GP partner could not remember whether the search had been age restricted, although this was later confirmed by the administrative staff. The search had identified a large number of patients and the response to the letter had been very positive but without the expected negative impact on the practice nurses. In this example, ICT and paper-based communications worked in parallel and in support of each other and whilst it impacted on the workload of the practice, in that they had to send out letters to patients, and provide vaccinations, the effort involved could be offset long term if it prevents the patients getting sick and therefore visiting the practice.

Agenda Item – Quarterly PCT Meeting

The next item for discussion was feedback from a meeting with the local PCT that the practice manager had attended. She reported on developments within the PCT particularly the local arrangements in place for commissioning certain mental health services and the relative impact this may have on the practice; namely that the services for specific mental health conditions were extremely expensive and that there was a lack of staff capacity. Therefore, patients should not be referred except in the most urgent of cases and staff had to be aware of the situation when making referrals for patients with complex mental health conditions. This was met with some opposition from the GPs and counsellors and was the first time that voices were

raised considerably in the meeting. It was the first time in the meeting that communications had become tense and argumentative and that voices were raised. As one counsellor stated:

Do they honestly think we are referring just for the sake of it? So it's expensive, if it works then surely it's worth the price... what's the alternative? We only refer for those treatments where necessary. I mean look at the number of prescriptions we make for mental health conditions and then the number of complex referrals. They don't even compare. I don't want to be thinking I'm not going to refer for particular treatments because it's expensive. I want my patients to get better regardless of cost.
Counsellor Red Practice

The practice manager responded calmly by saying that this was only her feedback from the meeting and was a not criticism of the practice or any individual. However, she stated that she thought the practice could be more engaged in Practice Based Commissioning[2] (PBC) to improve service delivery for patients, of which mental health was included. Furthermore, she stressed that the practice should be concentrating on this area as they had received funds (an incentive payment) from the DH on the basis that the practice would participate in PBC and that there could be gains to be made in the more efficient provision of services. This in turn, in the future, could release additional funding for other services such as practice clinics. But as one cynical GP pointed out:

The funding was only to say that we would engage in PBC, not a measure of how much or what we should be doing. Do we really want to do more? Is it worthwhile or are we just going to be more accountable to the PCT for what we do and under more scrutiny. Doesn't sound a good idea to me.
GP Red Practice

Once again, the senior GP partner intervened at this point and suggested that this was discussed at the next practice meeting and that it might be useful for the practice manager to provide a presentation on PBC. The senior GP partner utilised his

[2] PBC is gives practices direct financial control of the way that healthcare is organised and provided. PCTs remain legally responsible for managing finances; negotiating and managing all provider contracts; the overall commissioning strategy; and the implementation of PBC. However, under PBC, practices are entitled to hold an indicative budget, on behalf of their patients. Using these budgets, practices commission services from, and manage patient referrals to, secondary and tertiary care providers and are engaged in redesigning services to make them more cost effective.

communication skills to great effect during the discussions regarding MMR and PBC and was able to easily diffuse the tension between staff and reach decisions effectively, without allowing conversations to escalate into tense discussions as witnessed in the **Yellow Practice**. It was also interesting to note that by this stage in the meeting that all staff groups had participated in discussions, unlike the **Yellow Practice.** The body language of staff was also a lot more open than that which I observed in the **Yellow Practice.** As a result, face-to-face communications in the **Red Practice** were extremely effective.

Agenda Item – ICT Training

The final discussion for which I was present was ICT training. This item was introduced by one of the junior GPs (junior in regard to their age and the length of time they had been at the practice). At the previous practice meeting, there had been discussion of NPfIT and how the practice would become increasingly computerised in the future in line with government policy. It is important to remember that at the time of the fieldwork, while NPfIT had been a policy for over four years, the various components of it had only been available in some cases for a maximum of two years, with some only being available for six months and others not yet even developed. At this meeting, staff had expressed concern as to how this change would be implemented. The result was that the junior GP had offered to look into providing a limited number of training sessions in small groups during staff lunch hours, to address issues that might arise from NPfIT or the implementation of new systems. The purpose of the discussion at the practice meeting for which I was present was to provide an update. She offered to provide basic training in some of the more advanced elements of the EMIS system, which was used by the practice. She stressed that these sessions were entirely voluntary, that they would cover some of the additional functionalities of the system that staff may not be aware of, but would also serve as a refresher on the use of some of the more basic components. The junior GP further explained:

The roll out of the programme [NPfIT] will mean we have to use the computer more. Choose and Book, electronic prescriptions and the spine at some point. But we need to know the basics first, and that means at least using electronic records more. If we

continue to use the paper and the electronic records, which I think is good and bad then we need to at the very least standardise what information we store where. I think sometimes we are making things more complicated than necessary and hopefully these sessions will make using the [electronic] system easier.
Junior GP Red Practice

Interestingly, the junior GP was not suggesting a complete or immediate move away from the paper-based records. This may be due to the fact they considered a process of incremental system change to be suitable (which was in line with that of the senior GP partner) or, perhaps being a junior member of staff, they felt that it was not appropriate for them to suggest that paper records were not used in the practice. This then resulted in an animated discussion as to what the sessions would cover, and how advanced they would be, with a number of staff stating that they wanted basic training and nothing too advanced. But it also demonstrated some staff who were lacking confidence in their use of basic ICT applications. As one practice nurse commented:

I like the idea, but I've only just got to grips with the basic record and email. I confess...I like my paper record. Is there going to be a session for someone like me... But...I know why we have the computer... A refresher... just to make sure I'm doing that right would be good, before I learn more. I'd like to be sure that I'm using it the right way.
Practice Nurse Red Practice

The junior GP reiterated that the training sessions would be small groups – four people perhaps – and they would cover whatever that group wanted, but that she was only proposing four to six training sessions, due to other commitments, and that this would impact on everyone's free time. Almost in an attempt to justify her rationale she added:

I can't do individual training, I'm hardly an expert myself and I can't give training on everything, but it's an opportunity to get up to speed or at least improve where we are, before the next hit comes from above [central government].
Junior GP Red Practice
Again, this was an example of the collaborative spirit that appeared to exist in the **Red Practice**, one that was very much absent from the **Yellow Practice**. Interestingly, within the **Red Practice**, individuals felt able to express their

weaknesses or lack of knowledge in relation to ICT skills, as demonstrated by these quotes, and indicated that staff felt they were within a safe environment and would not be judged by their peers. In the **Yellow Practice,** however, users felt unable to articulate their lack of ICT skills outside of the interviews I conducted. As suggested in this chapter, amongst other factors, this could be partly due to the personalities of those who led the practice meetings and essentially set the tone of those meetings, but also their relative position and the level of respect they commanded from the practice.

In conclusion, this chapter has sought to explicate how NCMCs that is patterns of talk and paper based communications, have impacted on the practices. This discussion has highlighted how some NCMCs are facilitated by a failure to domesticate ICTs or are used in a response to the effects of domestication. It has demonstrated how the domestication of ICT has embedded poor verbal communications and social relationships within the **Yellow Practice** but also enhanced those of the **Red Practice**.

It has also shown how structural factors such as the physical layout of the building and dominance of some ICTs has been to the detriment of face-to-face communications, staff relationships and has been, on occasion, counter-productive. The local culture of the practices has also helped to embed particular modes of NCMCs. Although there has been a strong local and national drive for computerisation and the domestication of ICTs in general practice, paper communications have retained an important status within the workplace, despite many of these paper-based communications being about communications or duplicating workloads. However, discussion has also highlighted the negative impact of using multiple communication channels without clear direction, which has led to duplication of information flows and confused communications.

The following chapter seeks to explain and analyse the substantive findings from this empirical research and draw conclusions from both the CMCs and NCMCs chapters in order to provide a detailed explanation of the behaviours evidenced in this

research how ICTs are domesticated and the consequences for communications in general practice.

Chapter 6 Domestication of ICTs in general practice

6.1 Overview

The previous two chapters (**Chapters 4 & 5**) have detailed the empirical findings from the research for this thesis. Dividing the chapters into computerised and non-computerised communications has enabled me to identify specifically how the different modes of communication available to occupational groups are being appropriated and domesticated and how they are impacting on: communications, relationships and work processes within the practices. Communications processes are deeply-inherent in general practice and any attempt to reorganise these processes via the introduction of ICT often affects one or more of these processes. The empirical findings have demonstrated sharp differences between the two practices and the various occupational groups, despite both being chosen from a sample of paper-light practices. In short, it has demonstrated the complexity of the domestication of ICT within general practice.

Using the domestication framework advanced by Silverstone[1], this chapter offers an interpretation, analysis and substantiation of the empirical findings gained from observation and semi-structured interviews over 14 months in two general practices in London. It examines the domestication of ICTs within the practices, how relationships and work processes were affected but in particular the impact that this had on communications. The findings are discussed under following thematic headings:

- a synopsis of domestication and research findings;
- ICT in general practice;
- the impact of local communications on the domestication of ICTs;
- occupational culture – understanding job perceptions and their impact on domestication in general practice; and

[1] Silverstone, R., Hirsch, E. et al (1992) 'Information and Communication Technologies and the Moral Economy of the Household' In: Silverstone R, and Hirsche E (eds), *Consuming Technologies*, London: Routledge.

- domestication amongst occupational groups in general practice.

6.2 Synopsis of domestication and research findings

Domestication in regard to ICT is a concept that has been developed to describe and examine the process of ICT acceptance, rejection and utilisation. In order to understand how ICT influences the communications amongst occupational groups and overall social change, it is necessary to understand how ICTs are appropriated and integrated into the everyday life of these groups in general practice.

The domestication framework considers ICTs and innovation as a process and not an event. By this, Silverstone and Haddon[2] have argued that it is not enough to examine the production of technology but rather that there are other important factors which must be considered, namely cultural, economic, political factors and the individuals themselves must also be considered. Using domestication as an analytical framework for this thesis allowed me both to examine occupational groups as active participants in their relationships with ICT and, enable the identification of their actions and communications as a direct result of their domestication of ICT. Furthermore, the framework facilitated the detailed analysis of the diversity of the occupational groups in general practice and the exploration of how ICT is immersed into their (and individuals') cultures and communications.[3] Before discussing the findings in detail it is appropriate to restate the three main elements of the domestication framework.

Commodification: This links domestication with the design of the ICT, the design and marketing of a product and the construction of a product by consumers.

Appropriation: The technology is brought into the 'home' resulting in the possession or ownership of the technology. ICT moves from being a commodity that is

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[2] Silverstone, R. and Haddon, L. (1996) 'Design and the domestication of ICTs: technical change and everyday life' In: Mansell, R. & Silverstone, R. (eds) *Communication by Design. The politics of information and communication technologies*. Oxford University Press p 44-74.

[3] Hynes, D. & Rommes, E. (2005) 'Fitting the internet into our lives: IT courses for disadvantaged users' In Berker, T. et al (eds), *Domestication of Media and Technology*. Berkshire: Open University Press.

exchanged to the owner's possession and thus giving it significance. In making ICT the user's own, this leads to *objectification* where technology finds a space or place in the daily life of the user. The second component of appropriation is *incorporation,* which concerns the function of the technology and its place in the pattern of daily life. In short, the ICT is used in everyday life and its functionality depends on how it is incorporated in everyday life.

Conversion: This is how ICTs fit into wider social and cultural surroundings and are presented in the domestic sphere and the meanings and uses they hold fit into wider spaces. This specifically involves *the various things that consumers do to signal to others their participation in consumption and innovations* and provides feedback to the producers of the ICT who study the lifestyle of the product.

Within all ICT implementation, a degree of domestication will occur, but the successful adoption and implementation of ICT requires dedicated implementation and a sound understanding of users' needs and the processes by which they will domesticate ICT. Furthermore, to be successfully domesticated, ICTs have to be locally negotiated both horizontally (by users within occupational groups) and vertically (by occupational users and those in charge of ICT implementation) in order to connect with the daily working practices of the users.

However, fragmented domestication can have a substantial impact. This research has demonstrated that the introduction of ICT has realised some of the expected benefits. Nevertheless, there have also been negative impacts, for example, the increased use and reliance on NCMCs at the expense of working relationships or strained face-to-face communications among some occupational groups. **Chapter 4** explored the use of CMCs and details the varied use of ICTs together with the factors that influence its domestication, such as user attitudes and ICT skills as well as specific benefits and barriers to domestication, including the speed and accuracy of ICT and the lack of user training. **Chapter 5** examined NCMCs and demonstrates how imperfect domestication or in some cases, where occupational groups and individuals struggled to appropriate ICTs, how this led to unwanted impacts on communications within the

practices, such as an increased reliance on paper-based communications, as identified the high levels of paper use in both practices, despite the **Yellow Practice** claiming to be 'paperless'.

The inability or struggle to 'tame' these ICTs is in part driven by the extent to which different users perceive ICT as assisting or compromising their roles and responsibilities as well as their own ICT skills and capabilities for appropriating ICT. This in turn increases the diversity between occupational groups. Other factors, such as the physical architecture of the workplace, also contribute to this struggle. Additionally, where social relationships were strong, ICT enhanced these relationships but it was detrimental where social relationships were already strained and tangibly hierarchical. Therefore, in the **Yellow Practice** the domestication of ICTs entrenched pre-existing social relationships. Furthermore, this research has also highlighted how in the absence of clear direction and management, the availability of multiple communication channels can lead to information being miscommunicated and resulted in the duplication of effort as demonstrated in the **Red Practice**.

Finally, the empirical findings strongly indicate the importance of local context, local communications and workplace cultures which can facilitate or inhibit the negotiations or 'communications about communications' required to domesticate ICTs. Despite the existence of the NPfIT and the targets for implementation of the core components, local implementation, communications and the associated experience has been markedly different across the two practices. Both practices in this research have adapted their implementation of NPfIT to suit the needs of their practice, which was not the original intention of the programme. This ultimately has impacted on the domestication of ICT and resultant communications.

Given the plethora of information and the variety of available communications (which are often crucial to securing a patient's good health), it is perhaps unsurprising that ICT has been heralded by central government as the saviour of the NHS, if not general practice. Indeed, in 2002 during the launch of NPfIT, the then Prime Minister Tony Blair, spoke of how the programme would link more than 30,000 GPs with 300 hospitals. *Up to 600 million pieces of paper a year* would be

saved, patients' notes would be available in any hospital at the click of a mouse and GPs would be able to book hospital appointments over the internet (*Choose and Book*). He even joked about making GPs' handwriting *legible for the first time in history*.[4] Furthermore, in 2005 Richard Jeavons, the Director of Service Implementation, stated that:

IT is going to be one of the few enablers that we know will not go away – this is not a fashion... I can't imagine, five years down the line, the NHS as an island of unchanged behaviour, particularly in IT, while the rest of the globe has moved on. I cannot imagine it from a sheer intellectual and managerial point of view and I cannot imagine it as a user of the service.[5]

However, as demonstrated in the previous chapters, it can be argued almost five years on, that general practice has not experienced the whole-scale domestication of ICT or the change in behaviour envisaged by Jeavons. The following sections discuss the findings from this research which seek to explain this.

6.3 ICT in General Practice

The NHS is a large, complex organisation[6] and the implementation of ICT in the NHS, as demonstrated by the research literature[7] [8] [9] [10] has not been an easy process. ICTs have been slowly encroaching on general practice for almost 40 years and electronic communications have long been posited as key technologies to enable new work flows, improve patient care and increase productivity within general practice and the wider NHS.[11] However, this ultimately depends on enhancing or changing processes at an individual or organisational level by which that information is

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[4] The Telegraph (2006) http://www.telegraph.co.uk/news/uknews/3340457/Computer-says-no-to-Mr-Blairs-botched-20bn-NHS-upgrade.html [Accessed: 01-09-06].
[5] HSJ (2005) NPfIT offers one-off chance 23 June http://www.hsj.co.uk/npfit-offers-one-off-chance/15795.article [Accessed: 28-06-05].
[6] Mohan, J. (2002) *Planning, markets and hospitals* London: Routledge.
[7] Keen, J. (1994) *Information Management in Health Services.* Buckingham: Open University Press.
[8] Smith, M.F. & Smart, G. (1999)'Information technology failures in the NHS' In: Bryant, J. (ed) *Current Perspectives in Healthcare Computing.* 149-55. Weybridge: BCS.
[9] Maguire, S. (2007) Twenty-five years of national information systems in the NHS. *Public Money and Management* **27** (29) 135-40.
[10] Herbert, M. (1998) Professional and organisational impact of using patient care information systems. *Medinfo* **9** 849-53.
[11] Abrams, M. (1968) A computer general practice and information system. *Journal of the Royal College of General Practitioners*, **16** 27.

provided and communicated. But it is only recently that ICT has started to take hold and, as demonstrated in this research, not without resistance and problems. But neither has it been a smooth transition in other business sectors. However, the NHS on the whole has struggled more than most as the NHS is not like other business sectors. This is particularly true of general practice, which holds a very unique position in the NHS, and often results in an uneasy relationship with the wider organisation. GPs have a large client base and are independent from the NHS salaried service and yet they are, to some degree, driven by central government to deliver against the political agenda of targets and policies and consequently largely experience top-down implementation. As a profession they are also driven by the need for service-wide integration so as to provide for the needs of their local populations. However, many GPs have also perceived the top-down politically-driven implementation as managerial encroachments on their professional autonomy and many of the policies as excessive demands for increased accountability, which sits uneasily with such an independent profession.

One of the most significant effects of ICT is how it affects the communications and interactions between individuals and occupational groups – ICT is essentially a social lever connecting organisations and individuals and manages and influences these interactions. Organisational culture has an important role to play in domestication in the workplace. The concept of organisational culture is not new[12 13 14] but the literature demonstrates that organisations within the same field or industry largely share specific cultural values.[15 16] All organisations, partly due to user needs have an increasing variety and volume of information and data requirements – in part, according to Stehr, reflecting the arrival of the 'knowledge-based' society.[17] General practice is no exception. It is a knowledge-driven organisation where communication

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[12] Pettigrew, A. (1979) On Studying Organisational Culture *Administrative Science Quarterly* 24: 570-81

[13] Martin, J. (2002) *Organisational Culture: mapping the terrain.* London: Sage Publications.

[14] Trice, H.M. (1993) *Occupational Subculture in the workplace.* ILR Press. Ithaca. New York: Cornell University.

[15] Chatman, J.A. and Jehn, K. (1994) Assessing the Relationship Between Industry Characteristics and Organisational Culture: How Different Can You Be? *Academy of Management Journal*, 37, 522-553.

[16] Phillips, M.E. (1994) 'Industry mindsets: Exploring the cultures of two macro-organisational settings'. Organisational Science 5: 384-402

[17] Stehr, N. (1994) *Knowledge Societies* London: Sage.

is defined via sets of established working practices to share, store and disseminate information and deliver patient care.

However, in general practice, as in the NHS, there is no single user but rather different occupational groups with different needs and abilities whose training has often defined their behaviours, the ways in which they carry out their jobs, their attitude to dealing with patients and, ultimately, how they communicate. In a profession that is defined by hierarchy, tradition and routine, implementing change is always going to be difficult, but when that change is directed at perhaps the most independent group of all, the GP, further complexities arise. The use and, ultimately, the domestication of ICT in general practice involves a significant cultural and behavioural shift away from traditional ways of working and, perhaps for some, as identified in this research, signifies an erosion of their autonomy and status. This was evident in the interview comments:

I used to talk to patients, now I talk to a computer. What happened to being a GP?
GP Yellow Practice

Last week three patients came to see me and told me what was wrong with them and even gave me print offs from the internet. It's good that they are taking an interest but we are the experts and not the patients.
Practice Nurse Red Practice

But general practice is exactly that, general. It is not limited by speciality, age, gender or other parameters as other clinical areas are. Therefore, the multiple users working in general practice have high levels of variability in the types of information they access, which may require the use of different modes of communication, whether that be paper, computer, or verbal communications. The use of a computer or any form of ICT is not an isolated task as identified in both practices. There is usually a constant stream of communication and information exchanges occurring in parallel, such as conversations with patients or colleagues whilst using a computer, phone calls while surfing the web, or writing a reminder on a post-it-note while having a phone call. In other words, ICT has the capacity to facilitate multiple simultaneous communications and information exchanges. However, in the absence

of clear managerial direction or local protocols which determine the use of ICT, this can also lead to confusion, mis-communication and some communications simply getting lost as they are crowded out by the multiple communication channels available to the user.

ICT has significant benefits if embraced and can affect (both negatively and positively) the ease, speed and quality of work of those who use it. But in doing so, it requires fundamental behavioural and attitudinal changes, which are challenging for a general practice, a body which operates according to defined processes and routines during its day-to-day activities. The same can not be argued for A&E, for example, which operates on a more spontaneous care level, providing care 24hours a day seven days a week, with little or no control over the patient flow. However, the parameters for behaviour and delivering care in A&E are not as defined as they are in general practice. Whilst a non-urgent patient at A&E has to be seen within four hours (in line with central government targets)[18], there is no seven-minute consultation requirement, nor does the day end at six o'clock. These defined qualities, amongst others, are specific to general practice but the ICT offered at a national level, namely NPfIT affects all of the NHS. The basic ICT requirements for general practice are no different from other parts of the medical profession – to provide the right information to the right individual at the right time, a task that ICT, if domesticated, can simplify for the user. Nevertheless, many of the components of the programme are universal and are not tailored to the needs of the specific sectors or occupational groups. However, as this research has demonstrated occupational groups have distinct identities, skills and perceptions of their job, which are not taken into account in a universal programme such as NPfIT and, as such, this impacted their appropriation and domestication of ICTs.

How these occupational groups domesticate ICTs will also, to some degree depend on their interactions and communications with other users as they negotiate its

[18]In 2000, the Department of Health, in response to patients' views that reducing A&E waits was a priority, set a target that, by December 2004, no patients would spend wait more than four hours in A&E to see a clinical professional.

appropriation.[19] It is not surprising that the use and implementation of ICT affects individuals' social interactions and, indeed, much of the research literature has focused on changes in the doctor/patient relationship.[20] [21] [22] However, as demonstrated in previous chapters, ICT does not affect all occupational groups in general practice equally, often with the uneven distribution of benefits. Therefore, the impact of ICT is perhaps more significant upon inter-practice communications and relationships than the existing body of research literature has demonstrated. This is particularly true of the communications witnessed in the **Yellow Practice**.

6.4 Impact of Local Communications on the Domestication of ICTs

The local context of the two practices in this research requires consideration as it can be argued that this had a significant bearing on the communication patterns and domestication of ICTs within the practices. Both practices demonstrated sharp differences in their local communications and ICT implementation. This was largely driven from the top-down by two distinct individuals in charge of ICT implementation in the practices – the practice manager in the **Yellow Practice** who largely implemented ICT as she saw fit, and thus made many decisions in isolation and the senior GP Partner in the **Red Practice**, who whilst ultimately leading ICT implementation, did so in conjunction with the practice manager. However, as an active user of the ICT himself, the senior GP partner was perhaps in a more informed position to make decisions in regard to ICT implementation than the practice manager in the **Yellow Practice**. These individuals set the local organisational tone for ICT implementation and its resultant communications, which in turn impacted on the domestication of ICTs by occupational groups in the practices. However, rather than demonstrating similar characteristics, those who championed the implementation were very different in their attitude, status and approach, which may

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[19] Grint, K. & Woolgar, S. (1997) The machine at work- Technology Work and Organisation. Polity Press

[20] Scott, D. & Purves, I. (1996) Triadic relationship between doctor, computer and patient. *Interacting with Computers* **8** 347-63.

[21] Hayes, G.M. (193) Use of the computer in the consultation *Update* **44** (4) 465-8.

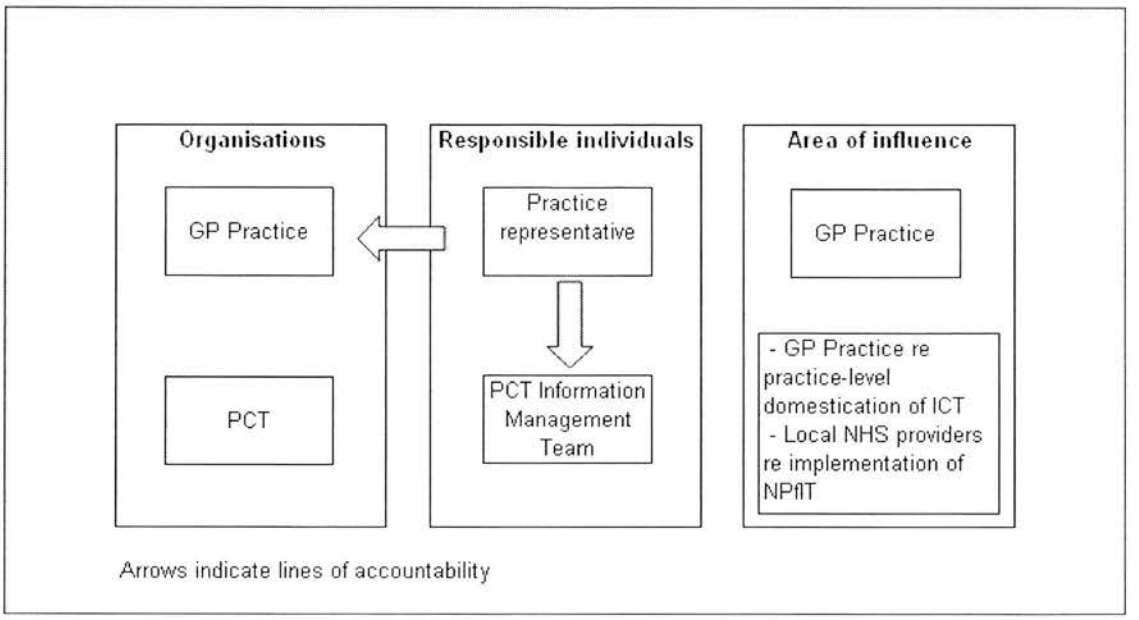
[22] The Computer Working Party of the RCGP (1980) *Computers in Primary Care. Occasional Paper* 13. London: RCGP.

in part account for the different implementation and communication strategies identified in the two practices.

The practice manager has a key role in setting the tone of the workplace. Their workload is largely directed by the GPs who own the practice. They perform a more overarching, strategic role and, as such, this role is usually motivated by the achievement of local and national targets, deadlines, value for money and the optimum use of resources, as well as driving improvements in patient care. But unlike clinical staff in general practice, they are not solely patient focused and as they develop local frameworks (largely as a result of top-down implementation), they expect these to infiltrate the system (general practice) and the ethos contained within these frameworks to be reflected in its daily workings.

Those in charge of ICT implementation within the practices needed to create and maintain organisational communications that embraced both collective and individual responsibility for ICT. Given the structure of primary healthcare (as outlined in **Chapter 1**), individuals in charge of ICT at a practice level will also be accountable to the wider management team at PCT level who are responsible for the overall local implementation of ICT. Whilst individual PCTs may be keen for their local NHS providers to implement NPfIT, the independent nature of the GP practice provides a significant level of autonomy under which they can operate. However, this does not make them exempt from the PCT's influence, which will have some degree of impact on the domestication of ICTs at practice level. Although this research did not focus on PCTs' attitudes towards ICT, analysis of PCT annual reports indicated that the PCT governing the **Yellow Practice** was more actively committed to ICT implementation than the PCT governing the **Red Practice**, which in part may explain the more proactive ICT implementation witnessed in the Yellow Practice. **Figure 12** shows the accountability and influence of GP practices within their local PCTs with regard to the implementation of ICT locally.

Figure 12 Local ICT implementation- accountability and influence



The tone from the top or the leadership or championing of ICT and the attitude of key players and individuals has been demonstrated to be a key driver in the implementation of ICT.[23] Furthermore, the quality of that leadership, the respect that the individual commands and the type of leadership they provide are all vital to successful management, implementation and change. ICT implementation has therefore largely depended on leadership within the individual practices. Changes to how mail is distributed in a practice, the introduction of an automatic patient calling system in the waiting room, or even a new telephone system, can be programme-managed with relative ease. But giving an individual the sole responsibility for local implementation, of something as large as NPfIT, could be considered a high-risk strategy, particularly given the uneven distribution of benefits associated with ICT implementation. However, in order to achieve the maximum benefit from ICT, those charged with ICT implementation must first understand what is being implemented, why it is being implemented and how this will benefit their work , what the different user needs are and, crucially, they must be actively involved in its implementation.[24] Giving an individual responsibility is not necessarily wrong but the full engagement

[23] Parliamentary Office of Science and Technology (July 2003) POST report 200 government IT projects.
[24] Hope-Hailey, V. (1998) 'Managing Culture' In: Gratton, L. Hope-Hailey, V. Styles, P. & Truss, C. (eds), *Strategic Human Resource Management*. Oxford: Oxford University Press.

of practice staff or a working group or sub-committee charged with ICT implementation with representation from all occupational groups may be more effective at managing this change. Even regular discussion of ICT implementation with practice staff would help to produce smooth, more user-focused, appropriate implementation. But as discussed previously, despite the opportunity to discuss such matters at the practice meetings, this rarely occurred and was particularly absent in the **Yellow Practice**.

In the **Red Practice**, the practice manager assumed more of a day-to-day administrative role rather than an all-encompassing strategic role and worked closely with the senior GP partner charged with implementing ICT. The presence of these two leaders, albeit not equal leaders resulted in arguably more effective ICT implementation and management with a feeling of collective responsibility, even if they were not considered as technologically advanced as the **Yellow Practice**. The senior GP partner in the **Red Practice** readily admitted that in discussions with the practice manager he deferred making decisions relating to ICT until he had spoken to the IT enthusiast in the practice. As a heavy user of the ICT associated with NPfIT and in possession of the relevant skills required to navigate the systems, they may have had a better understanding of how implementation may affect users and impact on communications within the practice. Given this three-way dialogue, it would have perhaps been more appropriate if the senior GP partner had formalised the input of these respective individuals into a more streamlined approach to communications and ICT implementation, which undoubtedly would have saved valuable time in discussions and may have resulted in a faster approach to implementation. However, the senior GP partner had a rather incremental approach to ICT implementation, which may have had an adverse effect on domestication and communications in the practice, as witnessed in their approach to keeping both paper and electronic records:

It's some duplication, but it provides a safety net for some staff. Left alone with an electronic record, some of them would panic and record information in the wrong parts of the record, which could be dangerous for patients. But we've been very clear about the expectations for completing the records.
Senior GP Partner Red Practice

I was concerned that having both the paper and electronic record, albeit it as a 'safety net', would not actually facilitate the move towards only using electronic records, but I was reminded that this was a phased activity. Nevertheless, I believe that this sent out a confusing message to practice staff and resulted in a duplication of communications and lower levels of ICT appropriation and conversion within the **Red Practice.**

In the **Yellow Practice,** the practice manager was responsible for overall ICT implementation**.** However, the practice manager is the one person who would not be actively using any of the ICTs for which they were charged with implementing, such as *Choose and Book* or EHRs. It could be argued that this approach could be considered an error given that they had no experience or little understanding of how the implementation would affect different user groups, not being a user of the majority of the new systems themselves. The empirical findings revealed that the practice manager simply wanted to implement systems in what she deemed to be the most efficient manner so that the practice was compliant with national policy, in order to meet central government targets such as the implementation target of *Choose and Book* which the local PCT were focusing heavily on. However, her approach to ICT implementation was perceived by many as giving little consideration to the diversity of ICT skills of her staff. A perception that was supported in her response to requests for additional training:

If you ask what people want they ask for more than they need. Who's asked for email and internet training? They can't need that. It's not like we just got the computers last week. It's a bit late to ask for that now especially when we've been using them for so long.

While some of the more complex ICT implementation was driven by the GP ICT enthusiast in the practice, the majority was driven by the practice manager, which led to a disjointed implementation strategy, although outwardly this was not apparent. The personality of both of these individuals may also have impacted on the communications, implementation and domestication of ICT within the practice. The practice manager driven by the tone from the top (the PCT and central government) reflected that tone in their implementation within the practice:

It's really not that hard. If everyone uses the messaging system then we'll get used to using it and communicating that way. But if staff insist on doing things their own way then we'll never be paperless!
Practice Manager Yellow Practice

This is an interesting commentary on how the practice manager viewed the practice, which ultimately impacted on her approach to implementation and overall communications in the practice. In short, she was more concerned with being a paperless practice and fulfilling national directives than attempting to understand why some ICTs were not being fully domesticated. This was substantiated by the interviews, which revealed that many individuals felt that the practice manager believed meeting PCT and government targets was more important than the experience of users. ICT implementation in the **Yellow Practice** was achieved at the expense of staff relationships and communications and the resultant breakdown of face-to-face communications was evident in the monthly practice meetings. Furthermore, some individuals resorted to traditional methods of communications, (largely paper-based) as a result of their unhappiness with the relentless approach to implementation or their inability to use the ICTs which resulted in imperfect domestication.

An additional complexity was that the practice manager mistakenly believed that all practice staff had similar levels of ICT capability and skills. The scale of the diversity in ICT skills was only apparent to her on receipt of the interim report for this research. Prior to this, she did not believe there was a need to provide additional training, and upon receipt of the report even went as far as highlighting that although she recognised the training was necessary, it was inconvenient as it required shutting the practice for the morning:

I know that it would be good to have more training, as we don't use IT as well as we should, but finding the time is difficult and sending staff on courses means getting locums in to cover... there just isn't the time at the moment.

This demonstrates a very strong message being communicated by the practice manager, namely her priority was to efficiently deliver patient care but ignoring the

need for training, was at the expense of ICT domestication and practice communications and arguably impacted on the delivery of patient care.

Although there was an ICT enthusiast within the **Yellow Practice**, as was identified in the interviews, staff felt uncomfortable asking for assistance more than once (if at all) and, as a result, staff did not openly express their lack of ICT skills or their lack of ability in regard to ICT. This negatively impacted on not only their domestication of ICTs but also wider communications within the practice. Alternatively, in the **Red Practice**, the senior GP partner was more collaborative and supportive in their attitude to ICT implementation. Initially, he had liaised with staff on a one-to-one basis or small group level, when possible, to ensure they could operate the system and to understand any user problems. This was beneficial in the absence of any alternative, but did not match the expertise and value that could be gained from an experienced user providing the support and, as such, the users took longer to acclimatise and domesticate the new ICTs in this practice. However, no such approach existed in the **Yellow Practice**, which may account for some of the negative comments staff there provided during the research.

6.5 Occupational Culture – Understanding Job Perceptions and their Impact on Domestication in General Practice.

It is important to understand the local organisational communications and culture of the practices as it had a significant effect on ICT domestication. However, there is a significant distinction to be made between the organisational communications and cultures and occupational communications and culture those at occupational level which are intrinsically linked to how individuals perceive their roles and responsibilities. This section considers the impact of occupational communications, culture and an individual's perception of their job on their domestication of ICT. The following section (**6.6**) provides an analysis of domestication in the practices by occupational group.

As argued by Trice[25], occupational cultures identify the intricacy of culture within organisations but this also questions the concept that cultures are homogenous, and can be managed by individuals or externally controlled or moderated. However, in implementing ICT, managing this culture and associated communications is exactly what is required. Indeed, the attempted management of this culture at an organisational level, rather than the preferable occupational level was evident at both practices within this research. Nevertheless, whilst there may be an organisational culture, the power of the occupational communications and identity was also a powerful lever for explaining the communications and domestication of ICT identified within this research.

Within the NHS and general practice there are numerous sub-cultures such as: consultants, public health specialists, nurses and GPs, to name but a few. Whilst it can be argued that both practices in this research expressed dominant occupational cultures, namely the GPs, sub-cultures co-existed either alongside or, more often, beneath the dominant occupational culture. However, it should be noted that the relationships with the sub-cultures varied between the two practices and were particularly strained within the **Yellow Practice**. As Trice[26] has highlighted, it is the existence of these occupational cultures that mediate and govern how members of occupational groups relate to each other, how they interpret their role and status in relation to others and ultimately communicate. Whilst this may be true of large-scale business where employees may have distinct roles such as payroll or purchase ledger, within general practice, despite the different roles of users, they are all aiming towards the same goal – the effective treatment of patients.

The actions and attitudes of all of these groups are determined and socially constructed by several factors. Firstly is the concept of being part of a community of practice. In learning a practice, by process of involvement, an individual becomes a

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[25] Trice, H.M. (1993) *Occupational Subculture in the workplace*. Ithaca. New York: Cornell University ILR Press.
[26] Trice, H.M. (1993) *Occupational Subculture in the workplace*. Ithaca. New York: ILR Press. Cornell University.

member of a community of practice, (in this case general practice) thus understanding the inner workings and talk/language of that community from the inside. In becoming a member of a community, an individual develops a social identity of say a doctor and this in turn shapes the assimilation and application of knowledge. For example, GPs and nurses may share a degree of common knowledge, but they have different attitudes towards that knowledge, shaped by their practice and identity. The very nature of medical training ensures that doctrines, principals and attitudes are enshrined within the profession. As a result, in general practice there is a culture, attitude and, at times, hierarchy that is specific to general practice. The individual colleges and organisations that exist for each group, such as the Royal College of Nurses, it can be argued further entrenches the group cultures and to some degree, enforces and indirectly encourages the divisions between groups. GPs also hold a unique position, as the only profession exempt from state control, exercising considerable autonomy and ultimately are only accountable to themselves. The same cannot be said of other occupational groups in general practice. As a result, GPs hold a very specific position within the NHS and perceive changes in culture (the erosion of their professional autonomy[27]) and methods of working in ways (long-standing patterns of work[28]) in ways that other groups within general practice do not.

In addition, the beliefs and value systems of individuals as users and finally central government policy – which lays the preferred framework of operation for the whole of the NHS and, to a degree gives power to occupational groups – must also be considered.

The practice manager, chief executive (CE) of the SHA, the CE of the local PCT and central government – all of whom are responsible for setting policy, targets and frameworks – also have distinctive attributes and cultures attached to them. As a group, these individuals have different remits and goals compared to staff in general practice. At a basic level, central government sets the policy direction, and the CE of

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[27] Anderson, J.G. (1997) Clearing the way for physicians' use of clinical information systems. *Communications of the ACM,* **40**, **8** 83-90.
[28] Beynon-Davies, P. (1995) Information systems failure: the case of the London Ambulance Service's Computer Aided Despatch Project. *European Journal of Information Systems* **4** 171-184.

the SHA is responsible for the performance management of the PCT associated with the general practice. The CE of the PCT is responsible for ensuring that patients referred to them by the general practice receive the appropriate care and that GPs are referring within the parameters of central guidance.

However, as identified in this research, this central governance framework rarely operates as intended, which is largely as a direct result of the cultural and social forces in operation, namely the occupational and organisational cultures and individuals' beliefs and perceptions. Given that many of these beliefs and values are inherently embedded within individuals as early as their educational training, it is not surprising that these cultural norms and behaviours have proved so difficult to change. Indeed, as Schein has suggested, culture is not simply *just the way things are done around here* but rather it is the *glue* that holds organisations together.[29]

Although each practice had an organisational culture and individuals within this research had specific viewpoints, the occupational group cultures and their associated communication styles and patterns were particularly evident. This was acutely pronounced in the **Yellow Practice** during the practice meeting. During these meetings, staff largely ceased to be individuals but assumed tangible occupational groupings and communicated as a member of a group and as such represented the views of that group. It can be argued, however, that GPs, particularly in the **Yellow Practice**, demonstrated in their behaviours much higher allegiance to their group, whilst there was some embracing of other sub-cultures amongst other occupational groups within the practices. This could be attributed to the organisational culture of the **Yellow Practice**, which was distinctly hierarchical in nature. The **Red Practice** demonstrated much greater fluidity across all groups and the occupational grouping and associated cultures and communications were not as tangible.

Job Perceptions- Roles and Responsibilities

Within general practice there is an inherent awareness of who does what, and what tasks and capabilities each group has and performs. GPs in this sense are the most

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[29] Schein, E. (1985) *Organisation Culture and Leadership*. San Francisco: Jossey-Bass.

powerful group with the widest clinical remit and knowledge base and largely demonstrated the most technical skills, which may account for their often elevated, hierarchical nature. Therefore, the different occupational groups in general practice have fundamentally different perspectives on their job (despite the fact that they may do the same or similar jobs), which in turn effects their communications and ability or willingness to embrace ICT.

This has been illustrated by Hope-Hailey[30] who states that the degree to which employees or individuals are willing to comply or buy into cultural change is not solely dependent on perhaps the most obvious factors, such as effective management leadership, communication and a clearly articulated rationale for change, together with its benefits for the organisation and its clients, although these undoubtedly are important, as demonstrated in both practices in this research. But rather, Hope-Hailey suggests that user buy-in is dependent on whether it is management's (local or national) intention to change values or behaviours (occupational culture) and the extent to which this is seen as positive or negative by members of the affected groups. Therefore, any proposed change is subjectively interpreted by the cultures and sub-cultures within the practice, which partially explains the variation in enthusiasm, ability and relative domestication of ICT amongst some users in this research and why others struggled to 'tame' technologies.

The perceived benefits that ICT will bring the user have a significant bearing on how readily individuals domesticate ICT. Individuals will appropriate new technologies only if it suits their ways of working, making it easier to accomplish their tasks, and does not destabilise their occupational culture and will enhance or maintain their status, or because it is enforced. Alternatively, as demonstrated in the **Yellow Practice**, domestication becomes more likely because an individual acts as a champion for change and others are persuaded to follow. However, if the ICT represents a real or indeed perceived threat to their occupational culture or ability to carry out their defined role, domestication is more fragmented. The introduction of ICT in this research was at times detrimental in that it entrenched poor social

[30] Hope-Hailey, V. (1998) '*Managing Culture*' In: Gratton, L. Hope-Hailey, V. Styles, P. & Truss, C. (eds), *Strategic Human Resource Management*. Oxford: Oxford University Press.

relations and impacted on face-to-face communication or was of negative value – for example the use of 'all practice' emails in the **Yellow Practice**, which some users simply deleted without reading. Yet, it can be argued, that communications changed in the general practices in this research, in some cases as a direct result of using the ICTs available. On other occasions it was also simply as a result of doing things in a different way. For example, the practice manager in the **Yellow Practice** no longer printing agendas for practice meetings, thus passing responsibility to staff members or recognising the impact that the physical structure of the building had on face-to-face communications and amending practice communications accordingly.

The choices associated with domestication in this research were motivated and controlled by the local organisational culture, such as the need to meet targets in the **Yellow Practice** and the slow incremental approach to implementation witnessed in the **Red Practice**, whilst others simply recognised the benefits afforded to them by domesticating ICT. As one participant stated: *how did we manage without it*?

Given that most tasks in general practice have the capability to be or are facilitated by the use of ICT, it is important to understand how ICT has affected the individual's ability to carry out these tasks and ultimately communicate and do their job. The implementation of large-scale programmes such as NPfIT requires some degree of shift in attitudes and behaviours which necessitates that:

Participants not only to do things differently, [but] to do different things.[31]

However, this alone does not explain all the variations across the two practices.

User engagement, particularly in the design of systems is important if the implementation of ICT is to be successful.[32] Lack of engagement with stakeholders is one of the most common causes of project failure.[33] Indeed, this is one of the main

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[31] Scott, W.R., Ruef, M., Mendel, P.J. & Caronna, C.A. (2000) Institutional change and healthcare organisations. Chicago: Univeristy of Chicago Press.
[32] Preece, J., Rogers, Y. & Sharp, H. (2002) *Interaction Deisgn: Beyond human-computer interaction.* New York: Wiley.
[33] NAO/OGC (2002) *Common Causes of Project Failure.* London: The Stationery Office

criticisms (and continues to be so) of NPfIT, namely that, healthcare professionals were not significantly engaged in the design of the programme, a finding which is supported by much of the existing research literature in this area.[34] Therefore, many users feel that a system has been designed that does not fit their needs and does not make their ability to carry out their jobs any easier and consequently does not promote a sense of ownership of the ICT. This may partially explain the resistance to the programme's implementation or the relative appropriation of its component parts that has been identified in this research.

Within this context, it is increasingly important for general practices to engage users at the local level when implementing a programme of change, especially one on the size and scale of NPfIT, to ensure their ownership of the agenda – rather than the forthright approach witnessed in the **Yellow Practice**, which had a number of negative impacts on communications and the domestication of ICT.

However, a reluctance to engage can have a significant impact on the domestication of ICTs. As Lorenzi and Riley have stated, *the technically best* system can be dismissed by individuals who do not feel ownership, or understanding of the system and resist its implementation. On the other hand, a *technically mediocre* system can be extremely valued by its users.[35] Therefore, it is important to understand what users need and want in their technologies, to ensure they are appropriated, as redundancy in communication is a common feature of the health service. User confidence and trust in the dependability of the systems plays a significant role in the overall uptake of ICT but also in the actions of the individual and the extent to which they rely on ICT to carry out their everyday tasks.

The pervading presence of ICT in both the home and the business environment has undoubtedly increased the level of domestication of ICT within general practice, with some ICTs being overwhelmingly embraced by users. However, the research

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[34] Heathfield, H.A., & Wyatt, J. (1993) Philosophies for the design and development of clinical decision-support systems. *Methods of Information in Medicine* **32** (1) 1-8.
[35] Lorenzi, N.M. & Riley, R.T. (2000) Knowledge and change in healthcare. *Studies in Health Technology and Informatics.* **76** 63-69.

literature has not only demonstrated that users need to develop new communication skills in order to appropriate some ICTs[36] but the empirical findings of this research have also illustrated that in order to domesticate some ICTs, users in general practice have specifically modified ICTs to suit their working requirements in line with their perceptions of their role and responsibilities and how they perceive ICT to assist or hinder their ability to carry out this role.

Users in both the **Yellow and Red Practices** had varying attitudes to ICT, partly informed by their own confidence and skills and ability in utilising the ICT available to them. Unlike previous research that has identified that age and in some cases, gender[37] is a significant factor in the adoption of ICT, my research did not confirm this, as some of the youngest members or the practices had the lowest use and ability in regard to ICT, indicating that their reluctance to engage with computer-mediated technology was attributable to something else.

The implementation of any new system or individual ICT will always have associated 'teething' problems. This is particularly true if there is limited assistance to enable the user to navigate the system or operate the technology. Given the large-scale change that is involved with implementing any new communications system, it is imperative that users receive training. Even something as straightforward as a new phone system requires user guidance to allow individuals to record voicemail messages and listen to messages left for them. However, given the complexity of NPfIT, it was surprising to learn that staff in both practices had received only half a day's training (three hours at one practice and four hours at another) in regard to *Choose and Book*. The training was provided by the respective PCTs for each practice on behalf of the DH. This training, however, had been a Powerpoint presentation and a question and answer session and no actual hands on operation in the presence of the trainer. Consequently, users struggled through the system or, as

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[36] Booth, N., Kohannejad, J. & Robinson. P (2002) *Information in the consulting room (iiCR) Final Project Report*. Newcastle Upon Tyne: University of Newcastle Upon Tyne.
[37] Faulkner, W. (2007) Gender in the information society. *Gender, Technologgy and Development.* **11** (2) 157-77.

one practice nurse referred to it, *flying blind* in the first few weeks of *Choose and Book* going live.

Interestingly, despite the problems encountered across all user groups, initially, neither practice provided any additional training, either by staff in the practice or by external trainers. Only in the **Red Practice**, after *Choose and Book* had been operational for a number of months, did a junior GP offer to provide additional ICT training on a number of ICT issues – although this training was delivered almost three months after it was initially suggested. The reliance on the limited training provided by the PCT appeared to be strange and potentially dangerous, particularly given that the system uses confidential patient data and at the time was an entirely new concept and operating system, with no precedent to learn from.

The failure to provide adequate training and the need to focus on the human components of implementation has been well addressed in the research literature[38], and therefore it was unusual that the practices and indeed the wider NHS were not better prepared for the implementation. It poses a question as to why the NHS and, in this case, general practice has not learnt from ICT implementation in other business sectors. This is not an area that can be fully understood by this research but can perhaps be partially explained by the tone set by the leads in the respective practices. However, new ICT systems are not only unfamiliar but usually they also have increased functionality, which could benefit users. But a lack of training in both practices did not encourage users to explore this functionality. In such circumstances, users may persevere for a while but, once again, if they continue to encounter problems, they either resort to their traditional methods or find some alternative way. Examples of such behaviour, namely the ownership, localisation and appropriation of ICT were evident in the **Yellow Practice**, where at the most basic level users were writing in red pen on paper to communicate important messages as they did not know how to change the font colour in an email. Furthermore, some users also had concerns that ICT would not fulfil their needs, for example the belief that a message on an instant message system would not guarantee action and therefore a paper-based

[38] Mitchell, E & Sullivan, F. (2001) A Descriptive Feast but an Evaluative Famine: Systematic Review of Published Articles on Primary Care Computing 1980-97. *BMJ* **322** 279-82

message was more appropriate, which led to a lack of confidence in utilising ICTs, and saw individuals revert back to traditional methods of working.

As a result of this inability, or perhaps lack of awareness of the capability of the ICT at their disposal, a cottage industry developed in the **Yellow Practice**, where the GP ICT enthusiast designed letter templates and other useful computer-based tools for his colleagues to use, some of which were already included in the EMIS system. However, some users hand wrote referral letters as they were unable to use the templates available to them. Whilst the GP modifying the technologies was doing so in an attempt to adopt and domesticate them, it is also one example of where ICT has duplicated effort. Overall, in both practices the provision of ICT training was extremely limited and, indeed, the recognition that it was necessary or the 'real' scale of the requirement involved was almost absent. As a result, it is not surprising that both practices utilised and, at times reverted to, other traditional methods of ICT and alternative ways of communicating and sharing information.

6.6 Domestication and Occupational Groups

Given the different needs and perceptions of the various occupational groups, this section discusses the domestication of ICTs by the individual occupational groups in general practice – GPs, practice nurses, administrative staff and practice managers. The research has demonstrated that there is considerable variation in ICT use within these occupational groups and as such the following discussion draws on the empirical findings at both the occupational group and practice level. Where possible arguments for factors the affecting the occupational group as a whole are made.

NPfIT was introduced at a point when the user experience of ICT was very diverse. Prior to this, the occupational groups within general practice had varying experiences of using ICT and much of this was driven by the requirements of their jobs. For example, the administrative staff on the whole had greater exposure to ICT through the use of basic computer packages required for typing referral letters or the use of spreadsheets in Excel. Whilst many users were aware of email and the internet, this

was largely used for personal purposes rather than work-based activities. NPfIT was, it could be argued, meant to provide a level playing field for ICT in the NHS – that is that all users in the NHS, including general practice would be using ICT in their everyday working lives.

GPs

In both practices, GPs largely had greater overall confidence in their ICT skills (although this varied across the practices, attributable to the varying levels of computerisation in the two practices) but also a more negative attitude towards the use of ICT and the various perceived additional responsibilities they now had as a result of the introduction of computerisation.

Amongst this occupational group there was also a belief that NPfIT, and some ICTs, did not adequately address their needs, hence the presence of paper-based, face-to-face and verbal communications. This was particularly true of emails, (and to some extent instant messages), which some GPs felt not only increased their workload (a finding which has been cited in other work[39 40]) but also added to their daily responsibilities, disrupted their routine (the use of pop-ups alerting them to emails or instant messages – this was particularly true of GPs in the **Yellow Practice**) and changed their daily working practices. For example, if a GP chose to turn off his emails during consultations, at the end of their patient consultations they had to check for messages left in their pigeon holes but additionally check for emails and instant messages that may require an immediate response. This obviously had a knock-on effect throughout their day and could result in a large number of messages to respond to at the end of the working day. For some users, this was perceived to be overwhelming and, as such deleted 'all practice' emails largely without reading them in an attempt to control the level of messages they received. The alternative would be to fully appropriate and domesticate these technologies and to respond to these CMCs as they occurred (when not engaged in a patient consultation).

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[39] Pal, B. (1999) Email contact between doctor and patient. BMJ 318, 1428.

[40] Hobbs, J., Wald, J., Jagannath, Y.S. et al (2003) Opportunities to enhance patient and physician e-mail contact. *International Journal of Medical Informatics* **70** 1-9.

But email has another significant effect. Prior to the introduction of email, an individual's workload was largely restricted by the practice opening hours. But this is no longer true. Healthcare professionals can now communicate at any time they like, which benefits the busy clinician who can, in theory, send quick emails during their lunch hour or at a time that is more convenient to them. The speed of this communication is a huge advantage for both those writing and receiving the email, particularly when you consider that some of this communication in the past would have been by letter.

GPs across both practices whilst on the whole had above average ICT skills and confidence, they often chose not to use ICTs or in many cases not to their full potential. Analysis of their self-rating questionnaires also identified the highest self-ratings but also the greatest extremes across their perceived skills and confidence in using ICT compared to other user groups. Nevertheless this, it can be argued, is detrimental given that they are the group most affected by changes in ICT. Therefore, they should not only have the highest ICT skills but GPs as an occupational group should be able to utilise all forms of ICT to a higher level all round and to a similar level, rather than the extremes witnessed in the **Yellow Practice**. Although the **Red Practice** had a more positive attitude to ICT overall, they demonstrated lower self-ratings in their ICT ability, but with less variation in their skills.

Given that GPs as a group had the highest self-ratings in regard to perceived ICT skills, were aware of the benefits that ICT afforded them and their concerns as to how others perceived them, it is perhaps surprising that they did not fully embrace and domesticate ICT. Arguably, there was less pressure or requirement to domesticate within the **Red Practice**, due to the practice's incremental approach to ICT implementation. However, given that they were moving towards full use of EHRs and many of the GPs in the practice expressed similar concerns to those in the **Yellow Practice**, it might be expected that their domestication of ICT would be higher. One possible reason for this is that, as an occupational group, given the variation in their skills, and being aware of the advanced skills of some of their colleagues, some GPs in particular felt uncomfortable drawing attention to their

limited skills and instead found alternative ways of communicating. For example, the GP who chose to write their messages on an A4 piece of paper and leave them in the relevant pigeon hole. It can be argued that this could have been achieved by attaching a word document to an email. This demonstrates discomfort with communicating within this user group.

I've asked him [the designer of the template] twice how to use it. Asking again would just be embarrassing. It's easier and quicker to stick to what I know.
GP Yellow Practice

In addition, other users in the **Yellow Practice** felt uncomfortable communicating their lack of skills to this group. This indicates that the source of the tension is not necessarily the GP group per se but possibly an individual(s).

He [a GP] is very confident with it [the computer] and so enthusiastic but many people are not comfortable and I think he forgets this when he suggests new IT things for the practice. I haven't even mastered his last invention.
GP Yellow Practice

Undoubtedly, GPs have experienced a significant shift in, and challenge to, their everyday routines as a result of the introduction of ICTs and NPfIT. Indeed, they are the most affected group in general practice. However, they also have the greatest level of job control and autonomy compared to other user groups in general practice. Whilst their status does not rely on their ICT skills, some participants stressed that they were concerned about the impact on patients' perceptions of them and their ability to do their job by not domesticating ICT or being able to navigate or use ICT systems, which might undermine their status in the eyes of the patient:

Patients are used to seeing me use a computer and if I can't get it to do something, or the system crashes it's just embarrassing and unprofessional... sometimes you can't help it if the system goes down but if it's just that you don't know how to work it it's terrible. If I don't know I'd rather use a book than take the risk in front of a patient.
GP Yellow Practice

This issue is discussed separately later in this chapter, as it affects both GPs and practice nurses.

On occasion, GPs were more likely to attempt to domesticate where they could identify alternative ICTs or adapt them, rather than use the systems and tools provided to them. Again, this could be as a result of their entrenched culture and traditional ways of working and the independent nature of their profession. If they adapt ICT, rather than accept what has been given to them, arguably they have greater control of the technology, which explains the development of templates and modifications to the technologies witnessed in the **Yellow Practice**.

Practice Nurses

The practice nurses were less confident in their ICT abilities and as a group also displayed a negative attitude towards ICT, but not nearly as vocally as the GPs, as in both practices, the nurses spoke freely of the benefits of CMCs.

Practice nurses have a restricted clinical remit in regard to prescribing and diagnosis within general practice and carry out specific limited tasks. Their workload is to some extent determined by the GPs who in response to the increasing demands being placed upon them have delegated certain functions to practice nurses. This is as a result of policies such as increasing access to GPs for patients and changes in 1990 to the GP contract that required GPs to take on additional work in health promotion and chronic disease management.[41] Patients are only referred to them when standard procedures such as vaccinations, blood pressure checks and other routine tasks need to be undertaken.

Given this strictly defined remit, it can be argued that they are generally trained to be somewhat reliable and, if not predictable, then not particularly innovative as a group and in this sense follow routine. This was very evident in both the **Yellow** and **Red Practices** where, although the practice nurses may not have been overly enthusiastic about ICT they largely embraced it and attempted to work with it and within the frameworks provided to them. Certainly, in the **Yellow Practice**, practice nurses recognised that, whether they liked it or not, using ICT, was part of their jobs and that in the organisational culture they were expected to use it. In the **Red Practice**, in

[41] Department of Health and Welsh Office (1989) *General Practice in the National Health Service: A new contract*. London: HMSO.

contrast, the approach to ICT overall was one of positive ambivalence, in that users largely accepted the implementation of ICT, but did not use it:

The computer makes some things much easier and quicker but it means that my job isn't about the patients anymore, or at least that's how it feels and I want to deal with the patients not a computer. I try to concentrate on the patients and what they need rather than the computer. I could use it more, but at the moment I don't need to.
Practice Nurse Red Practice

The work of practice nurses, whilst arguably routine (due to their limited clinical remit), is more varied than that of the administrative group and undoubtedly they use ICT in a different way to this group. Nevertheless, the routine nature of their job also to some degree results in routine use of ICT. Whilst they have had to adapt to the change from paper to electronic records, their interaction with patient records is more contained compared to that of a GP. Interviews revealed that practice nurses used a smaller selection of CMCs than the GPs and also utilised paper-based communications on a regular basis. Practice nurses, on the whole, record routine results in an EHR, rather than the narrative that might arise from a GP consultation. Furthermore, the types of patients they see also means that their use of *Choose and Book* is limited as it is unlikely they will be referring patients on a daily basis. Therefore, as a group they are more likely to engage in traditional and, in particular, verbal communications with colleagues and patients, as they have a smaller pool of CMCs to draw from. As a group, given the variety of communication channels available to users, they were also more likely (compared to GPs) to use paper-based communications when they were unsure of how to use ICTs (which in diluted the process of domestication) and as such were less likely to adapt a technology to suit their needs.

If it [the system] is down or there's a new update, I can always just write a letter or make a phone call. It's better than trying to figure out how to use a new thing. Sometimes I don't really need to use the computer.
Practice Nurse Red Practice

As a group, their ICT skills and their confidence in these skills were low, which compounded their frustrations when using and domesticating ICTs. Analysis of the

self-rating questionnaires identified that practice nurses did not rate themselves highly on the scale compared to other occupational groups. However, across the two practices, the self-ratings for the practice nurses were broadly comparable. This could be attributable to the relative deprivation they experienced or felt as a result of the implementation of ICT. Whilst the **Red Practice** recognised that some of this group had limited ICT skills, the incremental approach to implementation did not result in such negative attitudes as displayed in the **Yellow Practice.** Nevertheless, practice nurses in the **Red Practice** had overall lower perceived and real ICT skills compared to those of the practice nurses in the **Yellow Practice**

It is particularly interesting to note that some of the practice nurses in the **Yellow Practice** requested internet training and email training, indicating basic skills that needed developing and, yet, they were expected to know their way around a new operating system (*Choose and Book*) within three hours. This attitude is very common across business, as long as everyone has sufficient basic skills to do their job then this is acceptable, usually because there is always someone else to ask or who can help. But in a busy team such as a general practice, time to ask for help is very limited.

This is not to say that practice nurses fully embraced CMCs. Like the GPs, many perceived the introduction of ICT to be a distraction from their main job, and disliked the additional administrative tasks that came with operating the electronic record:

When I used the paper one [record] all I had to do was write information on the page. I could say what I wanted and easily Now with the electronic record different information has to go in different places. It takes longer and I know why it's like that but sometimes it seems more complicated that it needs to be.
Practice Nurse Yellow Practice

However, practice nurses as a group were largely resigned to working with the systems as they were provided and did not seek to change them in any way.

Administrative Staff

The administrative staff group had significantly higher ICT skills (both real and perceived) compared to practice nurses, although lower than the GPs. Receptionists and administrative staff in both practices demonstrated largely positive attitudes to ICTs and confidence in their skills to carry out their job but this was the only group to show such unity. This attitude can be partially explained by the working conditions of this group. They are the only group in general practice that work together in the same physical space and, as such, as a result of the accessibility, are more likely to ask colleagues for assistance when required and have a greater shared working experience.

But there are also other factors to consider. The first, I would argue, is that as a group they have been the least directly affected by the implementation of NPfIT. By this, I mean that their fundamental jobs have remained unchanged relative to others. Administrative staff undertake routine tasks such as booking appointments and handling
patient enquiries. As identified in **Chapter 1**, the individual components of the programme largely affect clinical users. Therefore, there is little change or threat of change to the way that the administrative staff undertake their work. In general, administrative staff have been using computers and CMCs for much longer than clinical staff, although admittedly the systems they use have changed. Again, this is in part due to the nature of their jobs and the tasks that they are required to undertake, such as writing up referral letters and other traditionally paper-based communications. Whereas in the past these letters would have been handwritten, written on a typewriter or word processor, they are now written on computer, which has increased functionality but the keyboard and principles are the same as its predecessors. The same can not be said of the paper and electronic records. As such, the introduction of ICT has had a lesser effect on this occupational group.

For this group, the only detrimental effect of ICT was that it changed their relationship with patients. Prior to the introduction of CMCs, administrative staff had full access to patient records in their paper format. However, the presence of a

computer subconsciously raised patients' expectations and created the misguided belief that administrative staff had greater access to patient information. The in-house security set on the patient records is extremely robust and the administrative staff have arguably less access to patient information than they did, when all records were paper based. When administrative staff access an EHR they can only view basic details such as the patient's name, address, date of birth and NHS number. In the paper record full details of the patient's history was accessible.

The **Yellow Practice** also explained how they received phone calls about problems with *Choose and Book* and communication via email from patients. These are all additional patient interactions, which, it can be argued would not have happened prior to the introduction of ICT, but also highlight how ICT has impacted on this occupational group despite the fact that they themselves do not actually use it. The introduction of the telephone, the internet and email has made communication quicker and easier as a patient does not physically have to visit the surgery to book an appointment or ask a query. But the additional benefit of web-based communications is that it has created asynchronous communication – a patient can now request a repeat prescription at any hour of the day.

Nevertheless, electronic patient communication was not seen as a beneficial development in the **Yellow Practice**, as they felt it resulted in inappropriate communications by patients. Interestingly, in the **Red Practice** the use of email by patients had a very positive effect on the work of the practice – namely they spent less time calling patients or writing letters to them to remind them that they were due for check-ups. It could be argued that due to the lower levels of computerisation witnessed in the **Red Practice**, patients did not over-utilise these communications due to their perceptions of the ICT use in the practice, which may explain the lesser impact experienced by administrative staff in the **Red Practice**.

Changing patient relationships

A final area to consider when examining the domestication of ICTs amongst occupational groups is its effect on patient relationships. This is one area that affects many user groups and thus warrants a collective discussion.

The medical profession is badly prepared for the effects of the informed patient and their use of ICT.[42] Prior to the introduction of CMCs, the traditional doctor/patient interface was via the consultation, referral letter and occasional phone call. However, the introduction of ICT has fundamentally altered these interactions and the channels of communication. ICT has blurred the lines of doctor/patient engagement and healthcare professionals are now constantly available as a result of ICT developments such as phone, email, and pager – all creating increased patient expectations.

There exists a wealth of literature examining the impact that the computer has had on doctor/patient relationships,[43] [44] but this largely concerns how GPs (rather than practice nurses[45] [46]) use the computer and the proportion of time a healthcare professional spends engaging with the computer rather than the patient.[47] The majority of GPs and practice nurses in my research were aware of the importance of their consultation room layout so as to minimise any adverse effects in the patient consultation. All participants agreed that the introduction of computers in the consulting room had affected the levels of eye contact they made with their patients but, conscious of this, many worked hard to compensate for it and only in consultations with new or unfamiliar patients was it perceived as detrimental to establishing good patient rapport. Nevertheless, what I identified through my

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[42] Coiera, E. (1996) The Internet's challenge to healthcare provision, *BMJ* 312, 3-4.
[43] Als, A.B. The desk-top computer as a magic box: patterns of behaviour connected with the desk-top computer: GPs and patients' perceptions. *Family Practice* **14** (1) 17-23.
[44] Herzmark, G.A., Brownbridge, G., Fitter, M. & Evans, A. (1984) Consultation use of a computer by general practitioners. *Journal of the Royal College of General Practitioners* **34** 649-54.
[45] Morris, L., Dumville, J., Campbell, L., M & Sullivan, F. (2003) A survey of computer use in Scottish primary care: general practioners are no longer technophobic but other primary care staff need better computer access. *Informatics in Primary Care* **11** 5-11.
[46] Timmons, S. (2003) Nurses resisting information technology. *Nursing Inquiry* **10** (4) 257-269.
[47] Warshawsky S.S., Pliskin, J.S. & Urkin, J. (1994) Physician use of a computerised medical record system during the patient consultation: a descriptive study. *ComputerMethods Programms Biomedicine* **43** 269-73.

research was not that the physical position of the computer was important but rather the functionality afforded by CMCs that impacted significantly on occupational groups perceived relationships with their patients.

The channels of doctor/patient communication have increased with the introduction of email, allowing asynchronous communication to be initiated any time of day or night. Email for many individuals is the perfect communication tool – it circumvents physical proximity and availability, it allows for information to be shared and transferred instantly, files can be attached, and the greater speed of communication allows for quick follow-up of previous communications. For example, following a patient consultation or telephone call, an email can be sent quickly and easily backing up this previous interaction.

However, the impact of email on doctor/patient relationships has not been entirely positive. GPs in this research, particularly in the **Yellow Practice**, were less enthusiastic in regard to its benefits, as highlighted in the previous chapters. However, the introduction of email also created expectations on behalf of the patient. An email sent from a GP or practice nurse to another healthcare professional on a work-related matter has a shared code of conduct attached to it. Both parties have an awareness of the language to use, the confidentiality of the information, the actions that may be required as a follow-up and, perhaps most importantly an awareness of the relative urgency of the email and consequently how quickly it is appropriate to reply. However, as doctor/patient communication by email is a relatively new phenomenon in general practice and, indeed, previously unheard of in the **Yellow** and **Red Practices**, there were initially no local protocols governing these exchanges. As a result, when patient communication via email was introduced in both practices, the impact was quickly evident – patients who emailed the practice expected immediate or next day responses, made inappropriate requests such as requests for help with social services, and often the content of the emails could only be dealt with via a consultation. So rather than the patient beginning their communications by booking an appointment, the introduction of email added an additional layer of communication between the healthcare professional and the

patient. The constant emailing by a select number of patients combined with the perceived abuse of the email facility, and in an attempt to control these communications and resultant workload, patient emails – with the exception of repeat prescriptions – were not allowed in the **Yellow Practice**.

Nevertheless, as discussed in **Chapter 4**, this was still open to abuse and potentially serious prescription fraud. Few GPs in this research provided their patients with the possibility of email contact and readily engaged in it, although many patients would have liked to use this channel of communication as demonstrated from the initial high levels of email traffic received from patients in the **Yellow Practice**.
The **Red Practice**, during the period of research had not experienced such adverse effects from patient emails. On the one hand patient emails had only been used to manage those with chronic conditions but it could also be argued that patients' perception of the respective practices led to the relative use of email. The **Yellow Practice** was largely considered by staff to be highly computerised and paperless, something that would not have been lost on patients who attended the practice, and they would then expect to capitalise on the practice's technological advances. Furthermore, the practice website also had an email address listed and so patients could initially contact the practice in this manner, until the email address was removed from the website. The **Red Practice**, in contrast, would appear to the majority of patients largely unaffected by ICT, given the continual reliance on paper records and therefore it is likely many patients at the **Red Practice** were unaware of the email facility.

One of the greatest changes in the doctor/patient relationship has been the advent of the informed patient. ICT has created new relationships and new forms of communication that challenge the status quo of general practice. As discussed in **Chapter 4**, the informed patient was on occasion seen to be undermining the clinical professionals and they were no longer the ultimate authority on a patient's diagnosis.

Not surprisingly, the informed patient is largely in the under 65s, the largest group with access to the internet, but this demographic is slowly changing. The simple

provision of information on the internet has allowed patients to self-diagnose their symptoms, often inaccurately, but ICT has brought about this giving greater power to the patient and, as a result, the patient is now on occasion more challenging and testing, sometimes threatening the hierarchical position of the healthcare professional. Whereas the healthcare professional was once the fount of all medical expertise, and the patient unquestioning of the diagnosis, the wealth of health-based websites has altered this relationship irreparably. Both practices spoke of patients who consulted the internet over their symptoms, some even producing printed material, and demanding similar treatments:

They [the patients] bring in all this stuff they've found on the internet and then start asking for certain drugs... that would be fine if they were available to the UK... but half the time they self-diagnose and it's wrong. Surely they're coming to see me because they want to know what's wrong. I am the doctor after all. If they want additional information I can give them a leaflet or at least tell them what's actually wrong with them so they can read up on the right things.
GP Yellow Practice

Patients have access to so much information. It's very confusing and I think quite scary if you don't know what you're looking for. I mean, put something like causes of headaches into Google and it can tell you to be on alert for a heart attack. It's easy to get lost in a minefield of information but that doesn't stop them printing it out and bringing to the consultation. Sometimes they tell me about things I didn't know about which is a little embarrassing but it's good that they want to understand their health better.
GP Red Practice

This self-diagnosis, aside from often worrying the patients unnecessarily, the information they accessed was often inappropriate or irrelevant, as one GP stated:

There is a reason I spent five years at medical school.
GP Red Practice

To counteract and to demonstrate that the internet could enhance rather than erode the doctor/patient relationship, the **Yellow Practice** utilised the provision of patient leaflets to ensure that the patient was adequately and accurately informed and in the process directed the patients to a trusted source of information, which in the long run

may help patients. But this alone will not contain patients' activity on the internet, one simple click and there are hundreds of websites offering health-related information.

But there is one final dimension to be considered and that is how accurately and confidently a healthcare professional navigates their way around a computer or other forms of ICT in front of the patient. Previously, if a practice nurse or GP required additional clinical information, they would commonly refer to a paper copy of the BNF for prescriptions or to a well-thumbed textbook for medical knowledge. Occasionally, an individual may refer to several books, which could be time consuming, but this gives a certain impression usually positive to the patient. Given the ever-changing nature of medicine and advances in drug treatments, it is acceptable to consult a manual, thus ensuring the patient receives the most appropriate treatment. All these resources are now available online and the information can often be found quicker electronically rather than through a book. But this is a double-edged sword. The presence of computer mediated technology raises the patients' expectations as to the efficiency of the diagnosis but ICT is temperamental and often servers crash or web pages do not load properly or are diverted, creating a difficult situation for the user. In short, ICT that is meant to benefit their clinical practice has let them down and embarrassed them in front of patients, something that would never have occurred or have been so outwardly apparent if they had relied on paper-based resources.

6.7 Concluding Remarks

Within general practice there are a number of occupational groups, each with their own identity, specific attributes, communication patterns and approaches to working. Although these groups form part of the 'team' within a practice, this grouping, however, becomes even more complex when we consider that general practices are independent organisations and, as such, have even further scope to develop their own unique communications specific to that individual practice.

Research by the NHS Confederation identified that whilst employees within the NHS recognised the drive for change (largely from the government) in the way that the NHS functions, they were sceptical and, in some cases, decidedly hostile towards cultural change.[48] Much of the literature on the domestication of ICT and the interaction between ICT and organisations, and particularly that concerned with the implementation of ICT within general practice, has highlighted a culture of resistance to change and, in particular, the imposition of top-down implementation.

Overall, whilst there was a generally positive attitude towards ICT within both practices, amongst the GPs and practice nurses, ICT was seen to both revolutionise and hinder their everyday working, although many had issues with specific aspects of it. The ICT skills of staff in the practices were quite diverse, which in turn impacted on the domestication of the various ICTs available to them.

This research has highlighted the multiple communication channels available to users, and how at times users struggled to domesticate some ICTs and others failed to choose a single mode of communication. On occasion, these communications were in conflict – the increased of CMCs in the **Yellow Practice** resulting in poor face-to-face communications and the dual record keeping in the **Red Practice** which led to the duplication of effort. In addition, multiple communications, whilst not necessarily redundant (for example the message in the pigeon hole supplemented by an email) is arguably an inefficient method of communication. However, this can be addressed through direction from management with active engagement with users to achieve optimum communication strategies which facilitate the domestication of ICTs.

The lower levels of ICT skills, understanding and use in the **Red Practice** were somewhat of a surprise, given the general emergence and dominance of ICT within general practice over the last 15 years, particularly in the context of NPfIT. Given the relative complexity of this programme and the impact that the introduction of new systems and process has had and will continue to have in the lifetime of its implementation, it was interesting to note how few practice staff in the **Red Practice**

[48] NHS Confederation. (2002) *Why are doctors unhappy?* NHS Confederation. London.

were actually equipped with the appropriate skills to cope with the changes. However, in acknowledging this many were happy to adjust to these changes as and when required, a dangerous attitude perhaps given their daily work concerns regarding confidential patient data and the use of a computer. As such, as they did not prepare for changes in advance, they ran the risk of constantly catching up with computerisation and ICT implementation, which may be a statement of the relative priorities within the practice, namely the delivery of uninterrupted patient care. However, it could also be argued that by increasing their appropriation and domestication of ICT they could deliver higher quality patient care.

The introduction of ICT in general practice was intended to increase information flows and enhance communications within general practice between doctors and patients and other healthcare professionals and organisations. Essentially, ICT would have a significant impact on an organisation and produce changes in structures, behaviours and ultimately productivity and outcomes. The implementation and appropriation of new or additional ICT, in the case of some tasks and activities, should result in a trade-off between the past methods of communication in preference for new methods, or at least in theory. The electronic record is meant to replace the paper one and the use of email to replace letters and other paper-based communications. In fact, it could be argued that CMCs were intended to supersede paper-based communications and to some extent some verbal communications such as voicemails. But the domestication of ICT in general practice was never meant to replace the individual nor the entirety of verbal communications. And yet, as evidenced in the **Yellow Practice**, the overarching communications context within the practices, namely the drive to be highly computerised, ICT (in particular, the use of the internet, internal messaging system, and email) it could be argued did replace verbal communications. In this sense, domestication has been detrimental, particularly in regard to internal relationships and in face-to-face communications, which is not the intended effect of ICTs. The **Red Practice**, on the other hand, whilst being slower to adopt the new technologies had a more embracing attitude to ICT. Despite lower levels of ICT skills across all occupational groups in the practice they had found equilibrium of using both paper and CMCs effectively, although not

without its flaws, (including the duplication of communication and information flows).

Given the wide functionality and capability of ICTs, it is arguable to what extent face-to face communications matter. But when we consider the varied ICT skills identified amongst the occupational groups in this research, this means that not all users can necessarily communicate effectively via CMCs and thus other modes of communication must supplement the use of CMCs. In addition, given that the basic remit of general practice is the patient consultation, poor face-to-face communications would be considered detrimental and thus in short highlights the importance of good face-to-face communications as well as the use of CMCs.

This research has considered how occupational groups on a small scale have interacted and utilised the technology in self-selecting circumstances, namely they have largely adopted individual parts of ICT that they consider useful on a personal level. It has highlighted the relative difficulties occupational groups have encountered in their attempts to commodify, appropriate and convert ICTs. The findings of this research have identified that domestication within general practice is complex, with wide-ranging impacts both – negative and positive – on communications. Users have struggled to appropriate some technologies and the benefits of domestication are not evenly distributed across users. Together with the local workplace communications and context, how an individual perceives their job has significant impacts on an individual's willingness and ability to domesticate ICT. Within an organisation such as the NHS, that on one hand, has been established for over 60 years and yet has undergone nearly two decades of constant reform, this research demonstrates that domestication amongst these cultural groups is a difficult process. On the one hand users cling to what they know, but on the other they view change with degrees of scepticism as history has shown that more change may be not far away and more often users are concerned how ICT will affect their status and their jobs. This becomes even more acute if the technologies are not delivered or tailored in a manner appropriate to the individual groups and users.

These main findings combined together with other issues highlighted in the empirical evidence of this research – such as the impact of top-down implementation, national policy and the physical architecture of the practices – has demonstrated the potential for domestication in general practice; how the occupational groups appropriate technologies and their resultant impact on communication patterns and information flows in general practice.

The final chapter provides some concluding commentary on these findings as well as discussion of avenues for further research and how these contribute to the existing literature in this area.

Chapter 7 Conclusions

7.1 Overview

The objective of this research was to examine how ICT affects communications, work processes, and information flows in general practice and to analyse the factors shaping these changes using the theoretical framework of domestication. The previous chapters have demonstrated the complexity of ICT adoption in the workplace of professions dominated by routine and traditional ways of working. The very nature of medicine involves a number of embedded routines and hierarchies such as the relationship between doctors and nurses, issues of patient confidentiality and the use of paper and electronic records. Medical communications are written and assimilated so as to be understood by members of that community, the medical profession and therefore the process of documentation is a socially constructed one, agreed on by the community for communication within the community – in this case, the community of general practice. Therefore, the introduction/utilisation of ICT has the potential to disrupt and refine these routines and communications.

This thesis has identified three key findings:

- to be successfully domesticated, ICTs have to be locally negotiated both horizontally (by users within occupational groups) and vertically (by occupational groups and those in charge of ICT implementation and management) in order to connect with the working practices of the individual users;
- the struggle to 'tame' ICTs (their success in domestication) is shaped by the extent to which different occupational groups or individuals perceive ICT as assisting or compromising their roles and responsibilities; and
- the importance of the local context and workplace communications that facilitate or inhibit the negotiations or 'communications about communications' required to domesticate ICTs.

7.2 Introduction

This final chapter discusses these conclusions in depth as well as demonstrating how this research contributes to the existing knowledge, provides areas for further research as well as providing commentary on policy implications for the future of ICT in general practice. These issues are discussed under the following headings:

- studies of domestication;
- dominant communications and communication preferences;
- adverse effects of ICT;
- a summary of domestication in general practice;
- implications for policy and management practice in implementation of ICT;
- contribution to analysis of domestication and ICT use in general practice;
- research design– benefits and limitations; and
- opportunities for further work.

This research has examined patterns of communication amongst occupational groups in general practice through the lens of complex work and the domestication of technology. While there is much research literature on doctor/patient communications, little is known about how healthcare professionals communicate with each other, particularly in the context of general practice. ICT allows users to give different values to different communications. For example, users can decide on the time and place of the communication such as the use of email rather than face-to-face contact. Furthermore, information systems and technology also function in diverse ways related to political and social processes that exist in the organisation.[1] Information systems in the workplace, in particular, have considerable influence as objects of control, which not only facilitate coordinated action but also constrain the outcomes of individuals' actions. ICT becomes the mechanism around which interests are negotiated, counter claims articulated and political processes

[1] Markus, L.M. (1983) Power Politics and MIS implementation *Communications of the ACM* **26** (6) 430-44.

explicated.[2] However, the specific control that an individual ICT can exert is dependent largely on its interaction with the user and their understandings and perceptions of that technology.[3]

Traditionally, the use of ICT has focused on work-orientated and related practices, resulting in frameworks that identify the use of ICT characterised by the workplace and the specific work-related tasks. Rather than analysing the implementation of a specific ICT in general practice, which is a heavily documented area[4] [5] [6] my interest goes beyond the premise of implementation, but rather is concerned with how ICTs are used in everyday general practice and how this impacts on communications. In order to understand the full potential of ICTs, it is not only necessary to understand the ICTs themselves, but also the people, environment, social issues, professional values and jobs and daily processes of those who are expected to use the ICT. The backdrop of NPfIT and the diverse range of actors in general practice provided an ideal setting in which to explore the role of local actors and their domestication of ICTs. As demonstrated by Silverstone, domestication is a powerful social force:

Domestication is practice, it involves human agency, it requires effort and culture and it leaves nothing as it is.[7]

A comparative and longitudinal study of general practice enabled me to explore how work processes and communications (electronic, verbal and paper-based) are affected by the introduction or presence of ICT and how the multiple occupational groups and individuals experience ICTs.

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[2] Burchell, S. & Clubb, C., et al (1980) The roles of accounting in organisations and society. *Accounting, Organisations and Society.* **5** p5-27.
[3] Zuboff, S. (1988) *In the age of the smart machine: The future of work and power.* Basic Books New York
[4] Toth-Pal, E., Wardth, I., Strender, L-E. & Nilsson, G. (2008) Implementing a clinical decision-support system in practice: A qualitative analysis of influencing attitudes and characteristics among general practioners. *Informatics for Health and Social Care* **33** (1) 39-54.
[5] Greatbach, D., Luff, P., Heath, C. & Campion, P. (1995) How do desk-top computers affect the doctor-patient interaction? *Family Practice* **12** (1) 32-36.
[6] Crosson, J.C., Stroebel, C. Scott, J.G. Stello, B. Crabtree, B.F. (2005) Implementing an electronic medical record in a family medicine pratice: Communication, decision making and conflict. *Annals of Family Medicine* **3** (4) 307-311.
[7] Silverstone, R. (2006) 'Reflections on the life of a concept' In: Berker, T., Hartman, M., Punie, Y & Ward, K.J. (eds), *Domestication of media and technology.* Berkshire: Open University Press.

The research concentrated on two examples of paper-light general practices in London chosen from the previous KCL study and therefore were assumed to make effective use of ICT. Seventy-one semi-structured interviews involving a selection of staff and observation were carried out at both practices over a14-month period. Interim feedback reports and a final report were also provided to both practices at seven and 14 months.

The original premise behind this research stemmed from the KCL study which examined the prevalence of ICT in general practice. However, this large-scale survey did not explain the uneven uptake of ICT and its differing outcomes. As I embarked upon my doctoral research, I became concerned with exploring how these differences appeared to be related to the way in which ICT had been implemented within organisations and domesticated – incorporated into the working practices of individuals and groups. Therefore, the motivation for this body of research was to explore:

- to what extent, why and by whom is ICT domesticated within general practice, at a time of large-scale national policy implementation;
- what the impact of the domestication of ICT is on communication patterns in general practice and how the role of occupational groups affects communications; and
- the benefits and the barriers to the use of ICT and other modes of communication and the different occupational user group experiences.

This research, given the limitations of the KCL study which was a large-scale survey that paid little attention to the local contextual factors, and given the small body of detailed research looking at domestication of ICTs in the work place in healthcare (let alone general practice), sought to provide a richer picture of ICT use and communication patterns in general practice. This was achieved through detailed case studies including a longitudinal aspect using Silverstone's domestication framework which highlights the need to address the context of technology use and adoption, and explore how ICTs are integrated into everyday life.

The study was not focused on any particular technology or the implementation of NPfIT but rather the use, adoption and incorporation of ICT and communications within general practice in the context of individuals' roles and practices. As such, the research design was developed to explore these issues in depth and examine individuals' and occupational groups' everyday communications and working experience over time. Given the concern of the KCL study on the paper-light office, this study also sought to explore the possibility and reasons why there may be a continued dominance of paper and other traditional modes of communication in general practice. Furthermore, the research design and questions proposed that, despite the presence of a central government policy on ICT use within the NHS, individuals and groups of actors would not domesticate ICT in a uniform and standard manner; adoption and communication strategies across user groups would be different, although as already noted (and discussed below) the differences identified across the two practices and the occupational groups were perhaps sharper than might have been expected.

The longitudinal and qualitative nature of the research design generated a significant volume and range data sources. Although a large number of areas of research could have been examined within the research design, I chose to focus on those which appeared to be the most significant and unexplored within the current literature and those which offered the most scope for empirical insight and the best fit with the research aims and design. Consequently, some other issues, whilst potentially interesting, have not been covered in any depth within this research as they were not considered central to the overall research aims.

In particular, this study has concentrated on: the division between CMCs (Computer Mediated Communications) and NCMCs, (Non Computer Mediated Communications); how individuals communicate in the context of their individual jobs and responsibilities; how and why individuals domesticate technologies and others do not; and the relationships and communications between the various actors both as individuals and groups in general practice. The empirical findings have detailed how domestication is influenced and affected by a number of different

factors including cultural, organisational, sociological and, to some extent, legal issues.

The data and empirical findings have been presented in the following ways:

- an analysis of the workings of general practice including the ICTs and the communication channels available and the relationships of the various occupational groups within general practice;
- an analysis of the communication patterns and information flows within two general practices, distinguishing CMCs and NCMCs amongst the different groups of users within the practices and how this affects their communications with others; and
- an analysis of how occupational groups and individuals use and domesticate ICT and how this affects their daily working lives, their perception of their job and of the utility of technologies, and routines and relationships with others, including the development of alternative communication strategies that impact on communications, information flows and domestication within general practice.

Summary of Findings

In short, the domestication of ICT in general practice is difficult. To be successfully domesticated, ICTs have to be locally negotiated both horizontally (by users within occupational groups) and vertically (by occupational groups and those in charge of ICT implementation and management) in order to connect with the working practices of the individual users, which is affected by a number of different factors. Secondly, the struggle to 'tame' ICTs (their success in domestication) is shaped by the extent to which different occupational groups or individuals perceive ICT as assisting or compromising their roles and responsibilities. This, in turn, increases the diversity between user groups. Studies of domestication in the household (notably by Silverstone and colleagues) have identified how the different interpretations of technologies by members of the household have impacted on the domestication process. This, it can be argued, was also true across the various occupational groups in general practice. As such, many users in an attempt to 'tame' these technologies

developed coping strategies or modified the ICTs available to them in an attempt to control them. This feature was identified where individuals in general practice developed alternative communication strategies. Thirdly, the research indicated the importance of the local context and workplace communications that facilitate or inhibit the negotiations or 'communications about communications' required to domesticate ICTs.

The research identified a number of overarching common themes including: resistance to and imperfect domestication of technology amongst certain occupational groups such as the GPs in both practices; a lack of clear communication pathways and information flows across the practices as witnessed in the duplicative communications in operation in the **Red Practice**; that domestication is largely determined by an individual's perception of their job and their perception of how ICT will affect their ability to do their job; considerable variety in ICT skills and in how individuals use ICT to communicate (even when they willingly appropriate and domesticate technology) and the development of alternative communication strategies in an environment of forced adoption such as the use of paper-based messaging to replace instant messaging. However, domestication of ICT can also be at the expense of other forms of communication, as evident in the poor face-to-face communications in the **Yellow Practice**. In highly computerised environments, there is a trade-off between CMCs and verbal communications that may have adverse effects. The study demonstrated that domestication of ICTs within general practice was hugely varied across user groups and individuals. The division between CMCs and NCMCs was determined by the extent of domestication and resistance to domestication – and I found that the more the process of domestication was enforced, either centrally by government or locally by the individual practices, among some groups, resistance to domestication increased. This research has also identified that the opinions or actions of one of these occupational groups, when they act collectively can drive decisions and communications in general practice. These issues will be addressed in greater detail in the remainder of this chapter.

7.3 Studies of Domestication

The concept of domestication has been developed to depict the pertinent social processes that occur when ICTs enter a variety of social settings such as the home[8] or the workplace.[9] [10] Indeed, in much of the early literature, the domestication of ICT refers to *bringing technology home.*[11] [12] Domestication, as developed by Silverstone, is the process by which ICTs become fully embedded and accepted within everyday life. Silverstone and others[13] [14] have asserted that technological innovation is not simply the process of producing an artifact, rather, the domestication framework emphasises the interaction between the social and technological changes and, in this sense, has parallels with the social constructivist approach but also the user-orientated approach found in studies of sociology of everyday life. Or as Sørensen and Berg have described the framework:

How technology is adapted to everyday life and the everyday to technology.[15]

Frissen and Punie have also developed this framework to refer to the capability of individuals, families, households and other institutions to bring new technologies and

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[8] Silverstone, R., Hirsch, E., & Morley,D. (1992) Information and communications technologies and the moral economy of the household. In *Consuming Technologies: Media and Information in Domestic Spaces,* Eds Silverstone, R & Hirsch, E. Routledge London,. 15-31.

[9] Lie, M. & Sorensen, K. (1997) 'Making technology our own? Domesticating technology into everyday life' In: Lie, M. & Sorensen, K (eds), *Making technology our own? Domesticating technology into everyday life.* Scandanavian University Press. Olso 1-30.

[10] Sorensen, K. (2006) 'Domestication: The enactment of technology' In: Berker, T., Hartmann, M., Punie, Y. & Ward, P (eds) *Domestication of media and technology*, eds. Open University Press. Maidenhead 40-57.

[11] Aune, M. (1996) 'The Computer in Everyday Life: Patterns of Domestication of a New Technology', in Lie, M and Sørensen (eds), *Making Technologies Our Own? Domesticating Technology into Everyday Life*, Oslo: Scandinavian University Press, p.91-120.

[12] Haddon, L. The home computer: the making of a consumer electronic. *Science as Culture.* **2** p7-51.

[13] Akrich, M. (1992) The description of technological objects in Bijker,W. & Law.J. (eds), *Shaping Technology/Building Society.* Cambridge, MA: MIT Press p205-24.

[14] Haddon, L. (2002) 'Information and Communications Technologies and the Role of Consumers in Innovation' In: McMeekin, A., Green, K., Tomlinson, M. & Walsh, V. (eds), *Innovation by Demand: Interdisciplinary Approaches to the Study of Demand and Its Role in Innovation.* Manchester: Manchester Univeristy Press.

[15] Sørensen, K., H. & Berg, A-J (eds), (1992) Technologies and Everyday Life: Trajectories and Transformations, Proceedings from a Workshop in Trondheim, May 28-29 1990, Report No. 5, Oslo: Norwegian Research Council for Science and the Humanities.

services into their own culture, to make them their own.[16] In basic terms, Silverstone and later Silverstone and Haddon conceived of domestication as the taming of technology, the process by which ICTs are adjusted to an individual's everyday life and incorporated into their environment. Latterly, Sørensen has referred to bringing technology in from the wild. Within Silverstone's framework, technology is integrated into the structure and routines of the household (and I have extended this to general practice) but users are also undergoing changes when these technologies are used. The domestication framework as an analytical concept highlights the identification of users as an active part of their relationship with technology, which is in contrast to other theoretical approaches that, for example highlight technological design. Focusing on the daily working life of occupational groups in general practice not only provides a contained group of actors to examine but it encourages a rich, detailed understanding of individuals' and occupational groups' relationships with technology. The domestication framework enables this analysis through attributing a higher priority (compared to other theoretical frameworks) to values and sense making to users' interactions with ICTs and, as such, ICTs are social, cultural and political artefacts.

They are symbolic and aesthetic as well as material and functional.[17]

Furthermore, domestication not only acknowledges the human capability to shape and reshape their understanding and use of ICTs but also the ability of ICT to affect (both positively and negatively) and reconstruct the social context in which it is placed.

The literature on the domestication of technology has expanded in recent years. Traditionally, the framework has largely been applied to the household[18] but,

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[16] Frissen, V. & Punie, Y. (2001) Present users, future homes: A theoretical perspective on acceptance and use of ICT in the home environment.

[17] Silverstone, R. and Haddon, L. (1996) 'Design and the domestication of ICTs: technical change and everyday life' In: Mansell, R & Silverstone, R. (eds), Communication by Design. *The politics of information and communication technologies*. Oxford University Press p 44-74.

[18] Silverstone R, Hirsch, E et al (1992) Information and Communication Technologies and the Moral Economy of the Household, in Silverstone R, and Hirsche E (eds) *Consuming Technologies*, Routledge London

increasingly, the research literature has extended to include the work place, as seen in work by Sørensen,[19] Noble and Lupton,[20] and Habib,[21] amongst others – although it is still a relatively underdeveloped area, particularly in regard to general practice.

The theoretical approach and overall research design for this study drew heavily on two strands. Firstly, the research undertaken for the KCL study and, secondly the existing body of research literature on the implementation and domestication of ICTs. The KCL study provided an existing sample of practices to draw from and provided me with basic information about their then current availability of ICT. This enabled me to identify two practices that on paper were almost identical and considered 'average' in terms of their prevalence of ICT and practice staff make-up. However, data on the prevalence of ICT within these practices did not give me an insight into how occupational groups and individuals communicated or their respective use of ICTs. Therefore, applying the theory of domestication enabled me to examine why ICTs were used in particular ways, who used them, and helped to explain the communication patterns and behaviours I identified within the two practices. Central to the theory of domestication is that technology needs to be 'tamed' in order to be incorporated into the everyday but, as this research identified, there are many barriers to be overcome if technology is to be 'tamed' even moderately within the realm of general practice (though arguably domestication of a technology is never complete and is always ongoing).[22]

General practice largely utilises the same ICTs as those that individuals use in the home and in everyday life, such as mobile phones, computers and telephones,

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[19] Sorensen, K. (2006) 'Domestication: The enactment of technology' In: Berker, T., Hartmann, M., Punie, Y. & Ward, P (eds) *Domestication of media and technology*, eds. Open University Press. Maidenhead 40-57.

[20] NobleG, & Lupton, D. (2008) Consuming work: computers, subjectivity and appropriation in the university workplace *Sociological Review* 46 (4) 803-27

[21] Habib, (2005). Domesticating learning technologies in a higher education institution: a tale of two virtual learning environments. In: Bjarnø, V (ed.) New Teaching and Learning Practices: Experiences with e-Learning Projects at Oslo University College 1998-2005. Oslo, Norway: Oslo University College pp. 79–87

[22] Silverstone, R. and Haddon, L. (1996) 'Design and the domestication of ICTs: technical change and everyday life' In: Mansell, R & Silverstone, R. (eds), Communication by Design. *The politics of information and communication technologies*. Oxford University Press p 44-74.

however, in general practice, unlike the home, users will be subject to non-voluntary use and adoption and are exposed to technologies containing safety critical issues such as patient confidentiality, which therefore gives a distinctive character to studying domestication in this setting. If a user experiences non voluntary adoption, they may experience a conflict about what it means to use that ICT as demonstrated by some of the users in this research who perceived ICT to undermine their jobs. Furthermore, ICTs introduced into general practice have, on the whole, attempted to provide electronic versions of traditional tasks such as appointment booking or patient records, as opposed to introducing an entirely new technology that requires learning a completely new skill or new task to be undertaken. Nevertheless, introducing new ways of working rather than a new technology may impact on the relative domestication that occurs.

Using general practice as a fieldwork setting, (rather than the larger setting of, say, a large hospital) and applying domestication theory also allowed me to: examine the relationships between a relatively contained and constant group of people with well-established patterns of working who have regular interactions with each other; have a working environment where the introduction of ICT is more or less stable, that is there are not constant ICT developments; and furthermore, staff could be observed and analysed as individuals but also as user groups. This research was intended to examine the use of ICT and its consequences for general practice using the utility of the domestication framework to provide an alternative understanding of ICT use in general practice. Traditionally, research literature has approached this subject from a functionalist perspective examining the 'impact' of ICT and its implementation[23] and the functionality and effects of particular technologies. Other approaches have concentrated on ICTs' impact on the doctor/patient relationship.[24] [25] Little, if any, work to date has used the concept of domestication to analyse developments in general practice, although work from a broadly similar perspective has been

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[23] Christensen, T & Grimsmo, A. (2008) Instant availability of patient records, but diminished availability of patient information: A multi-method study of GP's use of electronic patient records. *BMC Medical Informatics and Decision Making* 2008, **8:**12

[24] Sullivan, F. & Mitchell,E.(1995) has general practitioner computing made a difference to patient care? A systematic review of published reports. *BMJ* **311** 848-852

[25] Mitchell,E & Sullivan F (2001) A descriptive feast but an evaluative famine: systematic review of published articles on primary care computing during 1980-97. *BMJ* **322**

undertaken in the hospital setting.[26] As such, this research was designed to remedy the limitations of the KCL study and similar research and what I viewed as the narrow perspective of implementation and impact research, by applying a relatively 'new' approach (that is a theoretical framework traditionally used in other settings – initially the home) to a different but well-researched area. Therefore, this research approaches communications in general practice from a new standpoint situating the role of occupational groups and patterns of communications at the centre of this research, in particular the relationship between CMCs and NCMCs.

From Silverstone's explication of the domestication framework I have utilised three components – commodification, appropriation and conversion. With the links to social constructivism and user orientation, the literature highlights the importance of the values of artefacts and the fact that they may not fit with the needs or values of individual users, which in turn will impact on their appropriation and domestication. This was particularly evident in this research, where some occupational groups made only limited domestication efforts due to perceptions of how the technology may help or hinder them in their ability to carry out their job.

7.4 Dominant Communications and Communication Preferences of Occupational Groups in General Practice

The first aim of this research was to examine to what extent, why and by whom ICT was domesticated within general practice. This involved looking at the activities and actions of individuals and then those of occupational groups and comparing the groups and roles of individuals across the two practices. This research demonstrates that despite the practices being the same on paper in regard to ICT prevalence and staff levels (according to the average practice characteristics defined in the KCL study), at the level of the individual practice and occupational group there were sharp differences in the domestication of ICTs, methods of communication and the

[26] Clarke, K, Hartswood, M., Procter, R., And Rouncefield, M..(2001) have studied a broadly similar perspective on technology and working practices although this was in a hospital-based setting. Hospital Managers Closely Observed: Some Features of New Technology and Everyday Managerial Work. *Journal of New Technology in the Human Services*, **14** (1/2), p. 48-57.

prevalence of particular communication methods– thus baseline measurements of ICT can be incredibly deceptive and misleading. But that is not to say that some of the findings from this research cannot be extrapolated across general practice as a whole, as demonstrated by the administrative groups unified approach to communication, the high levels of ICT use by GPs and relative lower use of ICT by practice nurses, which provides insight and commentary on the respective roles of these occupational groups.

However, the role of these occupational groups and user's own perceptions of their roles and responsibilities played a significant part in the domestication of ICT in the practices. It affects their actions and chosen routes of communication, be they computer or non-computer mediated, and how they interact with others. But even within user groups there is variation in understanding what it means to be a GP or practice nurse, for example. Consequently, each individual has their own use of ICT, informed by their job perception and professional experience and, crucially, develops attitudes towards ICTs based on these criteria, which impact on their domestication and communications. Nevertheless, in order to domesticate ICTs they have to be negotiated vertically and horizontally within occupational groups and within the organisation as a whole. To date there has been little analysis of variation in ICT use within occupational groups in general practice, although the limited literature does support the findings from this study pointing to variation across occupational groups in primary care and the extended primary care team.[27]

Further explanation of the variations in ICT across occupational groups can be provided by examining the relative impact of ICT. Within general practice ICT is largely stable and unchanging, in that few new, core technologies are introduced. However, the capabilities of the technologies may change, such as with the introduction of new computer applications. But this will not affect all users equally and therefore ICT use by occupational groups is an important consideration. For

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[27] Morris, L., Dumville, J., Campbell L., M & Sullivan, F. (2003) A survey of computer use in Scottish primary care: general practioners are no longer technophobic but other primary care staff need better computer access. *Informatics in Primary Care* **11** 5-11.

example, GPs have been the largest affected group in regard to new ICTs and generally have high rates of ICT use. However, for each task they undertake there are a number of different communication channels and ICTs available to them, for example the use of the paper and the electronic record. Nevertheless, there is also large variation of use within individual groups due to skills and personal attitudes that are influenced by an individual's perception of ICT, which in turn influences their domestication. An individual may have several personal reasons to explain their communication choices:

Reasons for adopting ICT in the workplace:

- you have to – government mandate;
- moral obligation –you feel you should, it is the right thing to do;
- you want to – it is of interest to you or in your interests;
- beneficial –it makes your job easier;
- compliance with organisational policy; and
- financial incentives.

In this sense, domestication is negotiated both horizontally and locally by occupational groups within the practice.

A common theme across occupational groups, practices and individuals was the problems they experienced when using ICTs, which consequently impacted on their relative domestication and thus heightened their reliance on alternative methods of communications. This research identified that whilst many participants could relate to the benefits that ICT provided, such as increased access to data and speed of access, they also experienced a number of problems with ICT which at times outweighed the perceived benefits, such as the problems experienced in relation to *Choose and Book* and the internet being unavailable during the patient consultation. Such experiences directed individuals towards alternative communication strategies.

The dependability of systems and technologies has been well documented[28] [29] [30] and remains an issue in healthcare. But, as shall be discussed later, the domestication of ICTs was also driven by the overarching local communications within each practice together with the communications approach of the individual occupational groups.

The literature on the implementation of ICT often highlights the problems of adoption and implementation among individual occupational groups. However, what was noticeable in my research was that the problems of ICT in general practice were not confined to any one user group, or to those who were regular or irregular users of ICT. Indeed, those who were required to make significant use of ICT as part of their daily job, and thus presumably should be the most proficient users, were often those who had the greatest difficulties. It may be expected that those with low daily utilisation would encounter difficulties but this research points to other areas of concern. Rather, it was on occasion the technologies themselves that presented the problems rather than the skills of the individual users.

In exploring communications and the domestication of ICT, the question of non-adoption, non-use or marginal use of ICT within general practice is also discussed in this research. However, domestication is never a unifying or universal process where multiple, different users are involved. Methods of communication are highly personal in nature and rely on taking a form that the user or the recipient of that information is most comfortable with. As demonstrated in this research, individuals choose not to adopt ICT for a variety of reasons such as lack of skills and understanding, or a concern that it may fundamentally alter their ability to do their job and some continued to resist or not adopt despite the context of enforced adoption in the working environment. The adoption of ICT in general practices in this research is thus characterised by resistance, with users seeking to overcome government directives, and a high use of NCMCs. However, it also highlights the

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[28] Procter, R. Rouncefield, M.,Balka, E.,& Berg,M. (2006) *Special Issue: CSCW and Dependable Healthcare Systems*. In Computer Supported Cooperative Work, 15 (5) pp. 413-418

[29] Martin, D., Hartswood, M., Slack, R, and Voss, A. (2006): *Achieving Dependability in the Configuration, Integration and Testing of Healthcare Technologies*. In Computer Supported Cooperative Work, 15 (5) pp. 467-499

[30] Procter, R. and Rouncefield. M. (2001) (Eds.) Dependability in Healthcare Informatics: Proceedings of the First Dependability IRC Workshop. Edinburgh, March 22nd-23rd, 2001.

importance of the individual and the power of group mentality in relation to domestication and communications in the work place. Users in general practice largely worked as individuals, with the exception of practice meetings where they acted as occupational groups.

7.5 Local Culture and Domestication

The ICTs used within general practice are largely in line with those technologies present in the majority of homes. For example, many participants used a computer in their home to email but were less enthusiastic or indeed capable of using a computer as part of their daily working lives, as this required new skills, their actions impacted on others (patients) and required an alternative understanding in order to 'tame' the workplace technology. The research literature on the management of technological change assumes that ICTs and any associated changes can be readily managed and that users do not require training to manage this change. However, as the research for this thesis has demonstrated, training was required by many users ranging from using email to more complex technologies such as *Choose and Book*. Models and frameworks that explore the adoption of technologies assume the presence of a network of significant individuals such as experts, peers, the media and, in the case of the workplace, senior managers who are there to provide information and in turn influence attitudes and the adoption of ICTs. However, Stewart has highlighted the importance of local experts and local social networks which have significant contributions to successful adoption and domestication of ICTs but often these contributions are ignored or not recognised by others.[31] The multiple drivers of ICT appropriation (central policy, local protocols and local experts) affect the overall use of ICT and the adoption process. These factors present an additional dimension in understanding how individuals view and use technologies and chose to domesticate them in the workplace and, as such, require consideration in this discussion.

The roots of some of these issues can be found by taking a step back to the very process by which ICT is introduced to general practice. Many models and

[31] Stewart, J (2007) Local experts in the domestication of information and communication technologies. *Information, Communication & Society* **10** (4) 547-69.

frameworks that explore the adoption of technologies such as those from social psychology, assume that adoption is an individual act within a given particular social context. Much of the domestication literature, due to its focus on the home, involves the element of user choice and individual decision. That is, that the user chooses to bring the ICT into their home.

Adoption of ICT within general practice does not involve a free personal choice of which ICTs to introduce into the practice and the choice of ICT made on behalf of the practice may not necessarily reflect the needs of the individuals within it. But the user can exercise choice in the method of their communication due to the variety of channels available. Therefore, the choice available to the user is whether to use CMCs or NCMCs. They can choose to communicate verbally, in writing or electronically or in severe cases not at all, which in itself is communication. The degree of choice impacts on levels of resistance, reliance on traditional NCMCs and overall domestication. Furthermore, CMCs are also seen to be restrictive and controlling, such as the character limitation of the electronic patient record that restricts the clinician's narrative or the word template which requires completion in a particular way. NCMCs, on the other hand, offer the user much greater freedom in their communications and therefore are often much more familiar and favourable to the needs of the individual user.

Given that the implementation of ICTs in general practice is largely imposed on users via top-down implementation practice management structures or central government policies, user choice can be reduced by choosing to use it or not in line with practice protocols and expectations. Adoption involves the user developing skills and ways of working to enable use of (effective and appropriate for the individual) or 'taming' of an ICT. This also pertains, but becomes more complex, when ICT is introduced through enforced appropriation. Participants, in some cases, did not feel the need or desire to adopt ICTs and others lacked the skills to adopt them. Consequently, they used alternative methods of communications, which they believed were equally or more effective than ICTs (and we saw that staff had more confidence that a paper note would be seen and sent more quickly by a colleague

than an email). However, this in itself was an indication of resistance to directed or enforced adoption. Given the long tradition of the profession, relative stability of the daily tasks and processes undertaken by general practitioners, it is unsurprising that there has been such resistance. Many participants found it difficult to comprehend why they should use the new technologies when the paper-based ones, in particular, in their view were working well. Therefore, there is not only a resistance to technical change but also to changes to traditional and established ways and routines of working and overall social and behavioural change.

Traditionally, much of the domestication research has looked at the introduction of a single, new technology such as the mobile phone or the internet, which at the time of their introduction to the market were significant events. This provides a contained subject to examine but also allows for the effects of that technology to be specifically identified. The change and impact that an individual technology creates can therefore be analysed in the context of everyday life. In the case of general practice, there was not a single episode in the introduction of a new ICT per se, given that computers have been slowly introduced to the NHS since the 1970s but rather the capabilities of the computers were changing, and were being driven by the central government programme NPfIT, providing an additional driver to the concept of forced appropriation. However, the introduction of these new functionalities undoubtedly changed the architecture of ICTs in general practice.

The introduction of the various components of NPfIT, to date, have impacted considerably on the daily routines of general practice and had an effect on ICT appropriation and user attitudes towards ICT within the two practices. In this research, the role of central government received a very mixed, but largely neutral or negative, response with the history of failed initiatives and late delivery being prominent in the minds of participants. On the one hand NPfIT had laid out an ambitious 10-year programme but, on the other, the delivery of its components was already far behind schedule by year three, leading to a lack of impetus on behalf of those users who would be most affected by it. In some cases, user attitudes were positive and some users expressed a sense of inevitability with the adoption of ICT.

Much of the resistance demonstrated in this research was a direct link to the fact that it was imposed top down or centrally rather than locally (practice led), which was further compounded by a lack of firm enforcement by the government, allowing many users to resist and created a sense of ambivalence but also encouraged multiple communication coping strategies to develop. In addition, as demonstrated in both practices, there was a lack of clarity at a management level regarding the implementation of ICT, (a side effect of the promises afforded by technology) which impacted, often adversely, on the domestication of ICTs and, consequently, implementation by management did not have the intended effect. For example in the **Red Practice** a lack of direction as when to use CMCs resulted in the duplication of effort and often led to miscommunications or multiple communications regarding the same item of information. Whilst in the **Yellow Practice**, the implementation strategy was clear, the practice was to use CMCs at all times, the lack of understanding of the diversity of user skills within the practice resulted in imperfect domestication of ICTs as users struggled in some cases to appropriate them.

As shown in this research, users chose not to domesticate some ICTs due to what they were perceived to represent. In general practice, the solution to non-adoption was seen to be the presence of local experts to provide assistance, rather than active enforcement. But this, as my research has identified, sent out the message of optional adoption despite what central government policy or local practice protocols indicated.

Organisational leaders

Domestication can be aided or hindered and influenced by the attitudes of key individuals and the overarching organisational context and approach to implementation. The role of the expert, leader or project champion is particularly important in influencing methods of communication and the domestication of ICT within the work place; setting the tone for its use, its development but also setting expectations for how others will communicate, adopt and use ICT. As such, they establish appropriate rules of engagement for activities relating to individual ICTs or tasks within the work place. Although some of the literature from computer

professionals has highlighted the importance of a leader or project champion in system implementation[32 33], the role of this champion and its implications will vary between settings. The literature on system design and management identifies the importance of a project or product champion, literature from social psychology identifies the importance of the opinion leader whilst technology studies highlight the role of the intermediary. The management research literature argues that intermediaries are formally designated roles, given to specific individuals who are allocated the task of managing the implementation. Recent work by Stewart and Hyysalo[34] has highlighted that these intermediaries often emerged from existing experiences in practice. Williams, Stewart and Slack[35] have also shown how intermediaries arise simply by virtue of getting the technology to work, together with the problems and challenges associated with this. Indeed, in each of the practices there were those who could be identified as ICT experts, or considered project champions, but they held different occupational positions within the practice. Furthermore, they had very different personality types and their methods of creating rules of engagement had significant effects on the day-to-day operations and communications within the practices.

However, their existence and their ability as an intermediary or facilitator of domestication are not as a result of a formal role. As Stewart has suggested[36], these local experts or intermediaries are not self-appointed or have emerged through special training, rather they emerge through the activities, experiences and relationships of the social network, in this case general practice. In addition, having knowledge is not enough, it is only when other users start to want and need to know about technologies that they call on the enthusiasm and experience of these intermediaries, who take on the role of local experts. These experts and leaders,

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[32] Stewart, J. (2007) Local experts in the domestication of information and communications technologies. *Information, Communication and Society* **10** (4) 547-569

[33] McCormack, J. (1997) When will smaller medical groups discover computer? *Health Data Management*, **5** (10).

[34] Stewart, J. & Hyysalo, S. (2008) Intermediaries, users and social learning in technological innovation *International Journal of Innovation Management* **12** (3)

[35] Williams, R., Stewart, J. & Slack, R. (2005) *Experimenting with information and communication technologies: Social learning in technological innovation.* Cheltenham: Edward Elgar,.

[36] Stewart, J. (2007) Local experts in the domestication of information and communication technologies. *Information, Communication and Society* **10** (4) 547-569.

however, have multiple roles – the leaders not only push and develop the ICT agenda within the practice and provide organisational direction, but the experts can also provide support for less capable users. Others who might have been perceived as leaders within the practices (such as the ICT enthusiast in the **Yellow Practice**) and could be approached to assist in decision making and to help deal with ICT problems, however, were positioned in relative isolation in the minds of other users in the practices. The advanced skills of the experts and the relative position of senior staff members made them unapproachable in the eyes of other users, which in turn can have an adverse effect on the appropriation of ICT. This was evident in the **Yellow Practice** where users felt unable to approach the ICT enthusiast for fear of demonstrating their lack of confidence and ability in operating some ICTs. This is also true of more senior staff, who may appear inherently more unapproachable. This, it can be argued, was evident at the **Red Practice** where the junior GP providing ICT training did so within the parameters set by the senior GP partner despite the fact that she did not necessarily agree with the approach. However, both of these individuals had key roles to play in promoting the use and domestication of ICT in the practices, through the developments of additional ICT functionality in the **Yellow Practice** and the provision of training in the **Red Practice**.

In both cases, the local experts and leaders worked within the practices thus making themselves accessible and, crucially, could be viewed as separate from central government and its associated policy. However, they also have personal knowledge of the users in the practice, which should be used to influence and support users through this, which was not always evident, as this research has demonstrated. The leaders, ultimately responsible for providing training and increasing the skills of the users (employees), largely failed to meet this need. Local experts on the other hand, such as the IT enthusiast in the **Yellow Practice** and the senior GP partner and junior GP in the **Red Practice** are generally positive users of technology who can provide support and assistance when problems with ICTs are encountered. But they also help to develop the capabilities of the ICT, believing it is for the benefit of all, and may help to change the processes and attitudes of those who are less enthusiastic. Nevertheless, their skills and enthusiasm can, on occasion, be detrimental if

implementation is considered by other users to be too fast or the changes too advanced, as those with lesser skills are constantly being left behind with the introduction of these developments, a perspective that is supported by this research. Therefore, appropriation and adoption are socio-technical in that they require understanding of the ICTs themselves, acknowledging multiple users adopting the ICTs, and the impact this has on the work place.

7.6 Adverse Effects of ICT

The development of ICT is largely to provide faster, more efficient and, in short, better ways of carrying out specific tasks. This research has demonstrated, however, that there are a number of real and perceived adverse effects associated with ICTs and communications. ICTs can be divisive communication tools, whereby differing ICT capabilities result in multiple communication strategies, leading to the duplication of work load and effort and, overall, can be perceived as burdensome. Given that ICTs do not affect everyone equally, dominant modes of communication were different between different groups and, as such, face-to-face communication could in highly computerised environments be extremely problematic, as witnessed at the practice meetings. Face-to-face communications were also the time that all users acted as united groups and in the interests of the group, thus further indicating the divisive nature of ICTs.

A further adverse effect evidenced in this research is the impact on the doctor/patient relationship. There exists substantial literature on the physical impact of having a computer in the consulting room and how to position a computer in the consultation for optimum interaction with the patient. For example, if the computer monitor is placed in such a way that the user has to turn their back on the patient in order to record details in the EHR, this will have an adverse effect on doctor/patient communications as the user may miss important visual cues from the patient.[37] However, my research identified a further adverse affect on this relationship, namely

[37] Greatbach, D., Luff, P., Heath, C. & Campion, P. (1995) How do desk-top computers affect the doctor-patient interaction? *Family Practice* **12** (1) 32-36.

that users perceive that the presence of ICT in the consultation creates expectations on behalf of the patient, in that they assume the user (practitioner) may have access to particular information. Furthermore, patients expect the health professional to be proficient in their use of the computer, which places additional pressure on users. ICT also has created the informed patient who challenges the role of the user in their knowledge and diagnosis. Greater use of ICT and increased capabilities of the technologies themselves, however, have also led to the misuse of that technology, including fraudulent requests for prescriptions and the misuse of email facilities by patients. All of these factors change the traditional doctor/patient relationship and therefore explain the communication activities of some users.

7.7 Domestication in General Practice – Summary

If ICT is to be fully embraced within general practice, then ICTs need to be domesticated or 'tamed'[38] [39]. However, as Silverstone has noted, the product or technology can never be completely domesticated. This was evident in my research, where even those participants who were identified as experts and the most technologically competent still did not utilise ICT to its full capacity and thus did not fully domesticate it. Within the research, domestication occurred to varying degrees and, in some cases, it was close to failure among specific individuals, as they only used the ICT where there was no alternative available. Where there were alternatives to CMCs, some users preferred these methods and trusted those communication channels implicitly, therefore demonstrating a lack of faith in the alternatives.

The literature on domestication describes how individuals often interpret technology differently, leading to dissatisfaction with the technology and resultant tensions in the households. This could be equally applied to the various actors in general practice who, due to their differing jobs, have interpreted ICTs in different ways.

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[38] Silverstone, R., Hirsch, E. et al (1992) 'Information and Communication Technologies and the Moral Economy of the Household' In: Silverstone R, and Hirsche E (eds), *Consuming Technologies*, Routledge London

[39] Sørensen, K. H. (2006) Domestication: the enactment of technology in T.Berker et al (eds) *Domestication of Media and Technology.* Maidenhead: Open University Press. p40-61.

As discussed earlier, due to central government policy much of the ICT domestication in general practice does not involve true appropriation, as the technology is appropriated on behalf of the user. However, due to the implementation approach such as the top-down approach of the **Yellow Practice** and arguably bottom-up approach in the **Red Practice**, there can be significant degrees of scepticism or differences in expectations on behalf of the user as a result, which may increase or decrease during adoption and domestication. For example, the user may discover unpredicted benefits but negative perceptions may be enforced if the technology proves difficult to use for the user, as is demonstrated by some participants in this research. However, those users with low expectations, when forced to adopt, are not surprised when the technology fails to deliver.

Managing expectations in an enforced appropriation is therefore of great significance and should be considered when ICT is introduced into the work place, to ensure adoption, as negative attitudes and mismanaged expectations lead to non or partial adoption as this research demonstrates.

7.8 Implications for Policy and Management Practice for Implementation of ICTs in General Practice

The current drive and policy for improved ICT in general practice has come from central government and with this comes the knowledge of history. The scale of the implementation challenge (NPfIT is the world's largest non-military IT procurement programme) is compounded by the history of previous failed government ICT programmes across a variety of sectors (as discussed in **Chapter 1**) which in turn affects users' perceptions of large- scale technological change and will ultimately have some impact on their domestication of these technologies. A top-down implementation also asks questions of the technology for example, given its wide remit, what was it intended to do? Is it a management tool to control general practice, will using the technology undermine the professional autonomy of the user and ultimately will it enhance or compromise their ability to carry out their job? Such concerns affect the appropriation and domestication of technology.

One of the first elements to that needs to be considered is what the actual scope of NPfIT was and what it was intended to achieve, before examining how this has been translated in reality. NPfIT was designed to tackle:

The remaining critical barriers to the effective use of IT as a strategic tool in the delivery of healthcare by the NHS.[40]

However, the evidence from the research for this thesis would suggest that this has not been effective and government have failed to anticipate was the impact that this approach would have on the staff in general practices. To many, including those participating in this research, the programme was perceived to be too large and unmanageable, which for many ultimately meant unworkable. Both the **Yellow** and **Red Practices**, expressed concern about NPfIT, for example, the security and reliability of the new applications in the programme, many of which they deemed to be unreliable, and they also perceived it to be creating an additional workload. These factors explain some of the reliance on traditional methods of communication identified in both practices, such as the use of pigeon holes for paper-based communications which consequently were dominant amongst some individuals and occupational groups.

Like many government strategies there were and continue to be targets for implementation of the various components of the programme. However, there are no penalties at the local level within general practice or the wider NHS, for failure to meet these targets. The lack of penalisation at the local level can partly explain the variable implementation, as seen in the **Red Practice**, but it does not explain the target driven implementation strategy of the **Yellow Practice**. Furthermore, the tone and direction set from central government, has not been firm, (as demonstrated from the delayed delivery of the programme) and as such this has been translated by some at the local level as implementation is a desirable outcome rather than a definite or time critical one as demonstrated in the **Red Practice**.

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[40] NHS Executive (1998) *Information for Health. An Information Strategy for the Modern NHS 1998-2005. A National Strategy for Local Implementation.* Leeds: NHS Executive.

The speed of the implementation is also an area for consideration. Change, particularly behavioural change takes time. As discussed, general practice occupies a unique and hierarchical position in the NHS, and thus change is always going to be difficult. But this is even harder, given the NPfIT provides universal ICT and is not tailored to the diversity of users and skills present in general practice. Due to the scale of the programme and the interdependencies of a number of the components, for example the creation of the N3 network to facilitate electronic transfer of confidential information, a timetable for implementation was set for each of the components as well as the final anticipated deadline for delivery of the entire programme- the end of 2010. However, as highlighted in the most recent PAC report, the programme is now four years behind schedule and delivery is now expected in 2014-15[41]. Nevertheless, there are significant problems which can arise from the phased implementation of ICT. As noted by Stolterman et al[42] technology is dynamic and constantly changing. As a result, by the time some of the government's proposals are implemented, there will undoubtedly be alternative and perhaps more advanced and or appropriate ICTs available for general practice. This scenario has recently become reality for the programme. Two of the four original system suppliers have subsequently left the programme, putting additional pressures on the remaining two suppliers which have contributed to the delays in delivery. As a result, the DH has recently given the programme seven months to make significant progress in delivery of its systems and has recently announced plans to invite approved suppliers to provide additional systems and to design new ICT products that can be added to the central system to compensate for the delay in delivery and take account of new ICT developments. However, the Conservative Party have also suggested that should they come into power they would dismantle several components of NPfIT – in particular NCRS.

To date, none of the NPfIT targets set by the government has been met[43]. For example, in 1998, the NHS Executive set a target for all NHS trusts to have EHRs in

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[41] House of Commons Public Accounts Committee (2009) *The National Programme of IT in the NHS: Progress since 2006.*

[42] Stolterman, E., Ågren, P-O., Croon, A. (1997) Virtual Communities - why and how they are studied. 1997. Working paper.

[43] NAO (2006) *National Programme for Information Technology in the NHS.* HMSO London.

operation by the end of 2005[44], a functionality that was included in NPfIT. But in 2002 only 3 per cent of trusts were on course to meet this target[45]. Furthermore, the government had originally envisioned that Choose and Book would be fully operational by the end of 2005. The final cost of the programme (once completed) is now considered to cost close to £12.7 billion[46], significantly over the original estimate of £2.3 billion. The knowledge of the past failure of government ICT programmes combined with the increasing cost of the programme has sent out a rather negative message to users, which has ultimately impacted on their perceptions of the programme and its associated technologies. In addition, poor functionality and a lack of training have contributed to poor user experience as demonstrated with the use of *Choose and Book* and delays in delivery. As PAC stated:

The programme is intended to generate substantial benefits for patients and the NHS……Delivering clinical functionality will be key to convincing NHS staff of the benefits of the programme because what has been provided to date has not met their expectations[47]

NPfIT in its current state of implementation is close to imminent failure, and has demonstrated what happens when technology is implemented that does not put utilisation and communications at the heart of its adoption. The actions and behaviours of users and the social shaping of technology must be considered in any future implementation. This research has demonstrated the complexity of how the various occupational groups in general practice domesticate ICTs, including the varied skills, perceptions of ICT which can lead to imperfect domestication and the impact of the local communications. As such, any future ICT programme should take these factors into consideration and have a greater awareness of the engagement of users and how they use ICTs when designing ICTs for everyday use.

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[44] NHS Executive (1998) *Information for Health. An Information strategy for the modern NHS 1998-2005.* NHS Executive. Leeds.
[45] Hoesksma. J. (2002) IT strategy in ruins as only five trusts hit April EPR targets. *Health Service Journal* 5797. 4-5.
[46] NAO 2008 *the National Programme for IT in the NHS: Progress since 2006*
[47] House of Commons Public Accounts Committee (2009) *The National Programme of IT in the NHS: Progress since 2006.*

7.9 Contribution to Analysis of Domestication and ICT use in General Practice?

This thesis has sought to contribute to the critical analysis of the claims surrounding ICT – visions of transformation, the gaps between the promise and performance of ICTs and the shift from a technology-driven/technology-centred view of ICTs to one centred upon practices and communications.[48] [49] [50] This thesis is not attempting new theorising but rather tests and applies these concepts, in particular domestication within the setting of health services (which is largely under-researched). The wider characteristics of healthcare – namely the presence of experts, judgement, professional models of work and high dependability by decentralisation – have been undergoing reform with technological and organisational change which has introduced centralised accountability and especially in general practice which is characterised by its traditional, small scale. However, general practice is becoming more closely integrated within health service as a result of changes in technology and health governance.

This thesis has offered new insights into the issues surrounding ICT application in general practice but has also offered a distinctive characterisation of change in undermanaged settings of general practice; local cultures of resistance. The use of the domestication framework has shown the similarities with everyday, voluntary adoption of ICTs but the consequences of non-voluntary adoption vary greatly, such as the uneven benefits realised by individuals and occupational groups. As such, the findings have enriched the conceptualisation of domestication – as well as demonstrating its applicability to other settings.

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[48] Williams, R., Stewart, J. & Slack, R (2005) *Social Learning in Technological Innovation* Cheltenham: Edward Elgar.
[49] Kallinikos, J. (2006) *The consequences of information: institutional implications of technological change.* Northampton: Edward Elgar.
[50] Orlikowksi, W.J. (1992) The duality of technology: Rethinking the concept of technology in organisations. *Organisation Science* **3** (3) 398- 427.

Much has been made in recent years of the individual ICTs and developments in general practice and, in particular, the introduction of NPfIT and whether it is achievable or desirable from both a communications and security perspective. Existing literature has also concentrated on what has been perceived as the inevitable computerisation of general practice, as it is, computerisation is a facet of the modern world. There are high expectations given the long history of ICT developments in the NHS and that UK primary care is the most developed in the world in regard to ICT. It assumes that implementation would be straightforward and that the benefits afforded by ICT would be realised with relative ease. However, such a technologically driven perspective underestimates the differing needs of occupational groups and, in particular, the need for tailored training and, as such, the need for local appropriation as demonstrated in this research.

My research has provided an alternative view of domestication in the work place, highlighting the needs and approaches of different users and, as such, provides an organisational approach to communications in general practice. The research literature on communications, however, has largely focused on doctor/patient communications, which is unsurprising given that clinical care is the key objective in general practice. However, patient care can be affected if information is not shared effectively and efficiently among staff, such as blood test results, thus demonstrating the importance from a patient-care perspective of this research. NPfIT was introduced as a method to improve clinical care and efficiency in the NHS and, in line with much of the current literature, this research would not support its overall chances of success. But this is not to say that individual components may not work, as shown in this research individual elements of the programme may be suitably domesticated. I observed resistance to using some ICTs – such as instant messaging in the **Yellow Practice** and arguably, to some extent, the use of electronic records in the **Red Practice** – but not to all CMCs, therefore demonstrating that although it is complex, domestication actively occurs in general practice. Where domestication has failed beyond the case of the individual user, but rather occurs across the occupational group or in severe circumstances the practice, there is reliance on traditional methods of communications such as handwritten notes in pigeon holes or

the use of paper-based records, which was largely driven by personal or adverse experiences with ICTs. This was particularly true of *Choose and Book* across both practices, which at times resulted in the high use of paper-based referral letters due to technical problems with the system. It was also evident immediately after the server crash in the **Yellow Practice**, where users demonstrated a higher than normal use of paper-based communications due to their experience of having no EHRs for four days. Nevertheless, these activities were not a constant feature throughout this research.

This research has not only added to the limited domestication research outside the home but has provided perhaps one of the few insights into general practice and the groups of actors within it using this theory and as such has given an alternative view to communications, information flows and overall ICT use in general practice. The key contribution of the study lies in offering a theoretically –sophisticated framework in which to examine and explicate detailed patterns of communications in general practice. By addressing both electronic and paper-based communication as well as face-to-face interaction, this thesis and its findings have provided a basis for future research in this area as NPfIT and other technology programmes develop. Whilst some of the findings are specific to the attributes of the medical profession, the application of domestication as a framework of analysis has demonstrated the applicability of these models to the wider spheres of business.

This research provides commentary on internal communications and relationships within general practice, whereas much of the current literature focuses on communications between doctors and patients. Ultimately, the introduction of increasingly complex ICT within the work place brings a number of short-term problems such as unfamiliarity with the system or technology but, among those who are sceptical of the benefits, it also creates an expectation of more problems at a later date and also expectations of how actors will use the technology. Interestingly, despite the opportunities and new ways of working offered by new technologies in general practice, there were significant numbers of participants who preferred to use traditional ways of working and communications, believing the new ICTs had

adverse effects on their relationships with their patients, but were unaware of how this affected their communications with other staff members. Indeed, as the research has identified, new ICT also created additional expectations on behalf of the patient, which has not been fully explored in the current literature.

One additional observation is that multiple communication channels often resulted in information overload on an already time pressured user. The use of email and instant messaging gave users access to information in formats that otherwise would not have been available in such a timely fashion but also led to the generation of more communication, such as 'all practice' emails, and information was on occasion communicated that otherwise might not have been. In other words, some communications occurred quite simply because there was a fast and instant way of conveying information and not because it was important or necessarily relevant. Users in receipt of these types of communications perceived them as burdensome and this impacted on their use of these ICTs. In essence, ICTs, whilst often introduced to control the flow of information can adversely increase the information flow and communications across user groups with little control by the end user.

7.10 Research Design – Benefits and Limitations

The methods employed for this research have been largely ethnographic and qualitative in nature, although incorporating the foundations for this research, the KCL research also used quantitative methods. The large-scale survey nature of the KCL study provided a ready-made sample of 'average' practices on which to draw from, which made the recruitment of fieldwork sites easier and, as a result of their inclusion in the KCL study, I already knew the basic characteristics of the practices. This ready-made sample enabled me to progress with relative speed and ease from contacting the initial sample to participant selection. The research design provides multi modal approach utilising the findings from a large- scale survey and a comparative and ethnographic approach. It provides a detailed case study analysis of two general practices through its longitudinal insights, despite what might be considered a relatively short time frame. The research design was robust for the

required purposes but had limitations in the size of the sample and the timing of the study. That is that this research is essentially a comparative study of two general practices, during a time of considerable flux in ICT implementation in the NHS and, as such, could be seen as a snapshot of general practice at a particular moment in time.[51] Nevertheless, the findings are applicable in the long term as considerations that should be applied to domestication research in the work place, rather than just as an explanation of how things were at that time. Indeed, given the backdrop of NPfIT, there is considerable scope to expand the longitudinal base of this research or include a larger sample of practices.

Benefits

Like any research design, choices have to be made regarding the relative breadth or depth of the research. The advantageous solution was a longitudinal multi-method research design. This approach of semi-structured interviews and observation afforded me not only the benefits of detailed ethnographic research at two general practices (particularly through insights gathered at the practice meetings) but, as these practices were chose from the KCL study, I gained additional information from the large-scale survey results and was able to extrapolate some of the findings. Furthermore, the diversity of tools employed in the research design provided me with rich and varied data to analyse.

Without the ready-made sample of practices from the KCL study it would have been considerably harder to find two near identical practices to participate in this research. As participants in the KCL study, this meant that not only was gaining their consent to participate easier (they could see the benefits of participating in a longitudinal study) but I also had ready access to the quantitative details in regard to the ICT prevalence and use in their individual practices. With this information as a baseline, it enabled me to develop a more qualitative approach, more suited to ethnographic and comparative research and yet still use the quantitative findings of the KCL research.

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[51] Williams, R. & Pollock, N. (2009) *Beyond the ERP implementation study: A new approach to the study of packaged information systems: The biography of artefacts framework. Forthcoming*

The research design allowed for me to not only gather information on the individuals' experience but also qualify their perceptions through observation and identify actions and attitudes of which users may not have been aware. Furthermore, this was occurring during a ten-year implementation phase of a central government programme, which enabled me to observe how users were responding to the enforced and directed introduction of ICT. As a result, I was able to examine how the different user groups within general practice were affected by ICT and how the various user groups interacted with each other as well as how the various channels of communication were used in the daily work environment. By virtue of looking at all actors within general practice I was able to explore adoption and non-adoption and its results, which provided a richer picture of overall communications. Analysis in this way also enabled me to explore how groups of users domesticated ICT and communicated and perceived the actions and communications of other users in general practice. Traditionally much of the literature has only concentrated on one user group, such as GPs, rather than a whole practice approach as demonstrated in this research. Analysis by occupational group provided an additional level of complexity and understanding of the findings, which would not have been possible if a singular group had been chosen as the focus for this research. This approach allowed for identification of the issues that are specific to individuals, groups and how these may mirror the communications of other groups or be shared among users. In this sense, analysis in this way provides a truly holistic view of communications in general practice.

The use of a self-rating questionnaire at the beginning of the research asking participants to rate their skills and confidence in using various communication technologies provided a useful base measurement from which to compare the results of the interviews and inform subsequent interviews and observation. The provision of feedback to both practices at both seven and 14 months had a dual benefit. On the one hand, it provided a useful incentive for the practices to participate and to continue to participate during the 14 months of fieldwork. On the other, it was also a useful insight for the participants as to how the practices perceived themselves and how they thought they communicated and used ICT, thus providing them with

information as to the weaknesses or strengths in their then current communications. The longitudinal element, including their participation in the KCL study allowed me to not only see what developments the practices had made since the KCL study, but also how they responded over a 14-month period to changes in ICT and communications, at a time of significant government activity in this area.

Furthermore, providing feedback in this way enabled me to actively track communication changes at the practices over the 14 months but also helped clarify the emerging themes from the research.

By choosing to examine overall communications and ICT use rather than the implementation of an individual technology, this provided a rich insight as to the latter stages of domestication, particularly in regards to adoption and overall engagement, rather than the traditional approach in the majority of the existing literature which focuses on users' decisions to implement a new system and the expected benefits or the concentration on one particular system or technology such as the electronic patient record.

The other benefit of this research design is that I was able to observe how individuals had developed skills, addressed problems and changed their communications (if at all) over a 14-month period. Observation enabled me to identify issues that had not been addressed in previous interviews or allowed me to challenge the previous responses of participants based on what I observed, which was sometimes conflicting. In this sense, on occasion the use of observation acted as a method of quality control during data collection. Finally, the routine nature of general practice and the presence of a national government policy also enabled me to analyse the data with relative ease, despite the high volume of data and the analysis by user and group stratifications.

Limitations

There were three main limitations to the research design: gaining timely and appropriate access to the participants, the scale and timing of the implementation of

NPfIT and the small sample. Firstly, the confidential nature of general practice meant that I was unable to observe how communications between practice staff and patients operated (outside of the waiting room and administrative group) and were affected by ICT. Whilst my research generated some interesting perception data on behalf of users, it is not possible to verify these statements from the patient perspective and although this was not the immediate focus of this research, I was unable to explore this particular issue in any depth. As a result, the research concentrated on user groups but the busy nature of general practice and my choice of methodology to conduct interviews with staff required that interviews were carried out in small numbers and on occasion, were shorter than anticipated due to users' work commitments, which on a small number of occasions (four interviews) had an impact on data collection for that user.

The very existence of NPfIT was both a benefit and a barrier to this research. The implementation of NPfIT was not the purpose of this research but it provided a useful dimension and driver to explore ICT domestication and communications within general practice. However, at the time of the research, the first initial building blocks of the programme, namely the technological infrastructure to enable secure communications and *Choose and Book,* had not long been introduced. With this in mind, some of the ICTs being used by staff were very unstable and in their infancy and it would have perhaps been more insightful to have conducted this research at a time when NPfIT was more established within the NHS, which may have provided a more solid view of domestication of those particular individual elements.

The small sample involved in this study could be argued as not being representative of general practice as a whole but, using the KCL research to identify what was classed as an 'average' practice, I would argue that this goes some way to offset this issue. Given my use of both interviews and participant observation, I would also argue that this provided a richer view of communications in general practice allowing for in-depth comparison, rather than high-level analysis if a higher of volume participants had been included. As such, the sample size is a small shortcoming in regards to the research design and, furthermore, allows for an in-

depth analysis of domestication by individuals and user groups within the work place. Given the similarities and differences I identified in my research, I would also argue that increasing the sample size would not necessarily have revealed any new data, particularly as I was not focusing on the implementation or domestication of a singular technology but rather was exploring domestication, communications and information flows as a whole across general practice and between individuals.

Finally, linking the literature of domestication to my research was, on occasion, difficult due to the lack of domestication literature that deals with the work place but also the dominance of the implementation literature. I had to ensure that my research was distinct in its approach and could not be confused with research on implementation. As such, this research uses and is guided by the theoretical principles of domestication and applies them to the work place, rather than directly drawing on established literature in this area.

7.11 Opportunities for Further Work

Due to the choices that were made during the empirical design of this study there are a number of areas that provide possibilities for further work which may have been overlooked due to the research design or have emerged from the findings of this research. Firstly, further examination of domestication within the work place and in particular in the NHS. Building upon the empirical findings and the research design and methodology employed in this study, a number of detailed opportunities exist for further work, such as:

- a follow-up study at the same practices, of which there could be three variations all of which would look at how communications, information flows and domestication have been affected and changed since my initial research:

    a) analysis of how they have domesticated the latter stages of NPfIT;
    b) analysis of the implementation of the key stages of NPfIT; and

c) analysis towards the end of NPfIT implementation.

- a similar study to that which I have undertaken but using more practices in the sample size to potentially allow for greater extrapolation of messages;
- a repeat of this study with different participants once the NPfIT programme is completed and is suitably established in general practice and the NHS as a whole. Also a longer timeframe would provide insights into incremental change from a social change and domestication perspective;
- utilise the same approach and research questions but from a rural and urban perspective, where it would be expected that there would be significant differences in domestication and communication due to different patient populations and pressures on the practices;
- an in-depth study of communication techniques of one particular user group such as nurses or GPs and their use of an individual ICT, rather than the broad coverage of this research;
- given that the mode of communication is chosen and shaped by the individual clinical problem/issue being addressed at the time, there is scope to explore the use of different modes of communication, and how they are appropriated and understood according to the different contexts in which they are utilised; and
- following on from the detailed case study approach taken in this thesis, I have also been invited to contribute to the University of Edinburgh's Connecting for Health Evaluation Programme (project CFHEP10) which aims to explore the changes in social interactions, timing, patient involvement and attitudes of patients and healthcare professionals across the different functionalities of the NPfIT compared to normal functionalities available before the Programme, in order to identify and feedback how to maximise the advantages of different applications and minimise the disadvantages to support the continuing roll-out of the programme. Whilst the methodology for this project is markedly different

(including multi-channel video recordings of the patient consultation and patient questionnaires) to that undertaken for this thesis, there is clearly overlap in the subject matter and scope for building on the findings of this research.

7.12 Final Thoughts and Overview

This study has examined the communication patterns, information flows and domestication of ICTs within general practice, at a time when there was intense government involvement in the technological development in the NHS, with the intention of making the NHS more responsive to the needs of patients, to improve clinical care and improve the efficiency of the health service. The introduction of such large-scale, top-down ICT has significant effects on domestication among occupational groups.

In undertaking this research, I observed how ICT whilst meant to be beneficial and unifying, was at times destabilising, uncertain, divisive and undermining in a profession that has long established routines, hierarchies, processes and traditions. I was able to observe how both individuals and occupational groups coped with and managed technological change and how this impacted on their communications patterns, how they domesticated technology in their daily working lives. This research has demonstrated the complexity of domestication of ICTs within the work place.

New technology is not confined to one domain, it is part of modern society and part of everyday life and impacts on both our working lives and personal lives but the impact of ICT and how individuals communicate in the work place is distinct and separate. ICTs in the work place can be a powerful communication tool and can change behaviours and attitudes towards work, both positively and negatively. The domestication of ICTs in general practice is linked directly to individuals' perceptions of their job and the perceived and actual impact that new ICT has on their workload and how it impacts on their ability to do their job. In this sense, ICTs

create both control and freedom for the individual. However, an individual's decision to communicate or share or store information in a particular way can have a significant impact on overall communications in the work place, especially face-to-face communications, which can suffer if communications become largely computer mediated in nature.

ICTs are of course not perfect and are open to interpretation and have an unfinished character which is a key part of domestication. Part of the reason for the success of technology and, to some degree, its domestication, is rooted in their inherent flexibility, for example spreadsheets, which can be used for a number of purposes and in varied ways by different users. However, the introduction of ICTs is also seen as challenging to current ways of working and their adoption has individual meanings for different actors. Their imperfections can be exploited to prevent their use, thus adding further layers of complexity to communications in general practice. There is not a routine way to communicate but rather individuals tailor communications and use of ICTs according to their own individual needs and, as such, domestication in general practice is not universal but rather it is on a case-by-case basis and varies greatly even within homogenous user groups. General practice, and the medical profession as a whole, is dominated by tradition and routine and the introduction of ICT has the potential be very destabilising in regards to communications and information flows, particularly in that it creates expectations (often unmet) on behalf of the user and also the patient. As a result, individuals have developed their own coping strategies for communicating, adopting and using ICTs. However, in an environment where government policy is moving ever closer to the paperless general practice and computerisation of the NHS, it is interesting to see some users and occupational groups resisting domestication of ICT for as long as possible, believing that it is detrimental to their job. However, it should be noted that medical work has a number of distinctive characteristics, which go some way to explain this behaviour such as the high levels of professional judgement demonstrated in their everyday work, together with the autonomous status of the GP, which is a unique position within NHS. The specific characteristics of general practice therefore make the application of ICTs that have been designed for more

routine work more complex. Therefore, this research has produced a characterisation of general practice as well as ICT domestication.

This research has identified not only the importance of communication in general practice but also the diversity of communications in occupational groups which need to be accounted for if additional ICTs are to be introduced within this environment. To be successfully domesticated, ICTs have to be locally negotiated both horizontally and vertically in order to connect with the varying working practices of the individual users and account for the organisational and occupational cultures of these work places. Domestication of ICTs for some individuals is a struggle shaped by the extent to which they perceive ICT as assisting or compromising their roles and responsibilities. ICTs can impact in ways that were perhaps not anticipated or desired, as this research demonstrates how face-to-face communications can be damaged by ICTs and how far users will go to find alternative methods of communication, particularly when they believe their job will be altered as a result of ICT domestication. As such the impact of ICT should not be underestimated.

Over time, assuming that NPfIT delivers and that radical new ICTs are not introduced without consideration of the local context in general practice, then it can be argued that occupational groups in general practice, whilst at some level continuing to resist ICTs, will overcome their relative struggle to domesticate current technologies and, as such, this provides an interesting position from which to assess the future impact of NPfIT as it develops in the coming years.

Appendix 1

Staff interviewed at the Yellow Practice

	Length of time in practice	Length of time using a computer as part of job
GP	1 year	2 Years
GP	10 years	8 years
GP	15 years	15 years
GP	8 months	8 months
Practice Nurse	3.5 years	3.5 years
Practice Nurse	2 years	2 years
Practice Manager	14 years	14 years
Receptionist	5 years	5 years
Receptionist	6.5 years	6.5 years
Medical Secretary	4 years	4 years
Receptionist	2 years	2 years

Staff interviewed at the Red Practice

	Length of time in practice	Length of time using a computer as part of job
GP	2 years	2 years
GP	12 years	10 years
GP	4 years	4 years
GP	4 years	4 years
GP	1 year	1 year
Practice Nurse	2 years	2 years
Practice Nurse	3 years	3 years
Practice Manager	9 years	9 years
Receptionist	10 years	8 years
Receptionist	5 years	5 years
Receptionist	4 years	4 years
Admin Assistant	6 years	6 years
Secretary	4 years	4 years

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