

Refereed papers

Information communications technology in general practice: cross-sectional survey in London

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ABSTRACT

Objective To determine the prevalence of use of a range of information and communications technology (ICT) applications in general practice in London, UK.

Design Cross-sectional postal questionnaire study.

Participants 996 general practitioners (GPs) working in 32 primary care trusts (PCTs) in London.

Main outcome measures Rates of self-reported use of paperless, paper-light and paper-based consultations in general practice, perceived barriers and facilitating factors relating to their use and current use or interest in using innovative ICT.

Results Questionnaires from 520 respondents (52%) were analysed. A computer was used in clinical consultations by 95% of respondents; 34% operated paper-light consultations, and 41% paperless consultations. An electronic record was always used in 76% of consultations and paper records were never used in 19%. Paper-light and paperless consultations were conducted more frequently in

larger practices and those in more affluent PCTs. Numerous barriers to the implementation of ICT were identified, including lack of time, lack of training resources and negative attitudes to computers. Personal digital assistants were used by 18% of respondents and 72% were interested in their use in the future.

Conclusion We have shown that there has been a considerable increase in the rate of use of ICT in general practice in recent years, but these rates have fallen behind targets set by the NHS IT Strategy. Numerous barriers to the implementation of ICT exist, and further research is needed into means of overcoming them and on the evaluation of computer-supported consultations and other technologies in primary care.

Keywords: computers, family practice, medical records

Introduction

Computers were first used in general practitioners' (GPs) consulting rooms in the early 1970s. By 2001, 97% of GPs in the United Kingdom (UK) had installed a computer in the consulting room and a more recent study reported that 98% of GPs were using a computerised system, although only 4% of them considered themselves to operate a 'paperless' system in the consulting room.^{1,2}

The development of information and communications technology (ICT) in general practice is a priority for the National Health Service (NHS). ICT includes the concept of the electronic health record (EHR), but also comprises other computer applications employed in managing patients and communicating with them and with other health professionals. In 1998, the NHS Executive commented that 'most of the

NHS remains at the trailing edge of information technology', and *Information for Health* provided an information strategy for the NHS, to be developed over the subsequent seven years, including the development of the first generation of the EHR.³ The 'information core' of this strategy is seen as an important part of the implementation of the NHS Plan. The electronic transfer of all biochemistry, haematology and microbiology results was planned to be in place by March 2003, with electronic appointment systems planned for 2005. By 2008 it is hoped that EHRs will be fully available across all sectors of the NHS.

These developments have been underpinned by the Wanless Report, which regarded the development and effective use of ICT as a major priority and recommended a doubling of the IT budget, which it was anticipated would have a crucial impact on health services over future years.⁴ It is now estimated that the NHS will spend £6.2 billion on ICT over the next ten years, but the proposed implementation of the National Programme for IT has already run into some well-documented difficulties.⁵

In a recent themed issue of the *British Medical Journal* on electronic communication and health care, a number of important messages emerged.⁶ One was the lack of empirical, evaluative outcomes-based research on IT applications in medicine and, indeed, a surprisingly thin evidence base for the design and implementation of IT strategies more generally. Another was the cardinal importance of people – professionals and patients – in determining the uptake and utilisation of IT in health care, and the extent to which new systems conform to their needs. A third theme was the relative caution with which IT, for the most part, is being employed, and even imagined, in health systems. Last year two studies from Scotland described the use of ICT at the interface between primary and secondary care, reporting on experience with an electronic immediate discharge document and the use, by GPs, of rapid computer access to laboratory results.^{7,8}

Little is known about the pattern of use of ICT in general practice, about the innovative use of ICT or the factors which either inhibit or facilitate the implementation of IT strategies. Our survey was designed to examine and analyse the current use of ICT in general practices in London, with a particular focus on determining the extent to which practices have now become 'paper-light' or paperless (see Box 1).

Box 1

Paper-light use of ICT in general practice means the use of technology to carry out certain tasks which are traditionally paper-based, including computerised practice management and the use of electronic patient records in the consultation, but with a continuing use and retention of paper-based information for certain other tasks.

Paperless practice means patient (and practice) management where there is no routine use of paper-based applications or retention of paper documents, except for those required to be kept for legal reasons.

across all 32 Primary Care Trusts (PCTs) in London. The questionnaire was designed through an iterative process, which involved a literature search to identify gaps in knowledge and areas of interest in the ICT literature. The initial questionnaire was piloted among a small group of local GPs. The final questionnaire, modified after piloting, covered a number of aspects of the use of ICT, including utilisation rates, interest in and use of innovative technology, and general demographic data about doctors and practices. The questionnaire is shown in Appendix 1.

The GPs were sampled at random within the 32 London PCTs, generating a sample frame of 996 GPs, approximately one-quarter of GPs practising in London. The questionnaire was accompanied by a Freepost self-addressed envelope and a letter emphasising anonymity and confidentiality, which also invited GPs to participate in further, interview-based case-study work to explore issues around uptake and development of ICT within their practices. The questionnaires were addressed to individual GPs rather than practice managers, because previous studies have identified that GPs and practice managers have different interpretations as to how ICT is used in practice.⁹ Two postal reminders were sent to non-responders. In addition, we conducted a non-response follow-up of 40 non-responding practices, using a telephone interview with practice managers, to determine their rates of use of paper-light and paperless consultations. The study received ethical approval from South West Multi-centre Research Ethics Committee.

Methods

We used a cross-sectional design, and developed a questionnaire to be sent to a random sample of GPs

Results

We were able to analyse 520 (52%) of the questionnaires; 56% of the respondents were male and 44%

female and their average age was 47 years. The response rate varied across the PCTs, with a mean response rate of 71.5% in the two PCTs with the lowest levels of deprivation and 32% in the two PCTs with the highest deprivation levels. The mean patient list size per practice was 7388 and there was a mean of four whole time equivalent (WTE) principals in each practice.

A computer was used in clinical consultations by 95% of respondents, 95% CI (CI 93.4% to 96.2%), and 34% (CI 31% to 36%) considered themselves to operate 'paper-light' consultations according to the definition provided in the questionnaire. Slightly more, 42% (CI 38% to 45%), considered their practice as a whole to be paper-light. Paperless consultations were considered to be provided by 41% of respondents (CI 37.9% to 44.1%), and 21% of practices were reported as being paperless (CI 18.5% to 23.5%). An electronic record was always used in 76% of consultations (CI 73.3% to 78.7%), whereas only 28% of practices use paper records in all their consultations (CI 25.2% to 30.8%), although 42% (CI 38.9% to 45.1%) sometimes use them. Paper records were never used by 19% (CI 16.6% to 21.4%) (compared with 22% of practices that considered themselves to be paperless). The prevalence of paper-light and paperless consultations was higher in practices with more than two WTE principals, and practices with two or fewer WTE principals were more likely to operate paper-based consultations than larger practices. Paper-light consultations were also more likely to be reported by practices in areas of low deprivation, and GPs working in the two PCTs with the lowest levels of deprivation had been using computerised systems for a mean of over ten years, whilst those in the two most deprived PCTs had been using computerised systems for a mean of less than five years.

The non-response follow-up study indicated that similar proportions of paper-light and paperless consultations were being carried out in practices that did not respond to the postal survey.

Figure 1 illustrates the variety of tasks carried out at least once a week using ICT. These were most commonly prescribing (97%) (CI 95.9% to 98.1%), reference to electronic patient records (93%) (CI 91.4% to 94.6%), patient registers (89%) (CI 87.1% to 90.9%), general internet use (88%) (CI 86% to 90%), and email (87%) (CI 84.9% to 89.1%). In 52% of practices, referral and other correspondence was scanned into the computer system (CI 48.9% to 55.1%).

Problems in implementing ICT in practice were reported by many of the respondents. Figure 2 shows these barriers to ICT implementation, including issues of finance, lack of training, lack of time, colleagues' attitudes and lack of technical support. Participants also highlighted a number of other barriers to the implementation of ICT; these included a recognition of incompatibility with secondary care IT systems, lack of support from the local PCT, concerns about the medico-legal implications of paperless practice, inability to transfer electronic records between practices, IT systems that did not fit well with current ways of working, worries about individual technical competence in using a computer, and concerns about intrusion of the computer into the consulting room.

We found that there was considerable interest in the use of innovative ICT applications, and a number of participants had definite plans to implement ICT in their practices, as shown in Figure 3. Personal digital assistants (PDAs) have the highest utilisation (18%) (CI 15.6% to 20.4%) and the highest interest rates (72%) (CI 69.2% to 74.8%) among GPs. Electronic signatures represent an alternative to manual passwords for the security of the computer system, and speech recognition software and speech authentication security can also be used to access computer systems. Mobile telephones can now access the internet to obtain clinical information, and smart cards can also be used to hold and retrieve patient data. ICT is also used for communicating directly with patients, via

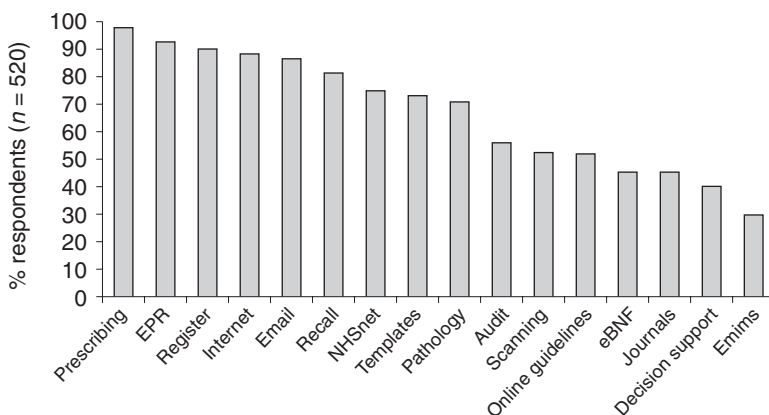


Figure 1 General practice tasks carried out by the use of ICT at least once a week

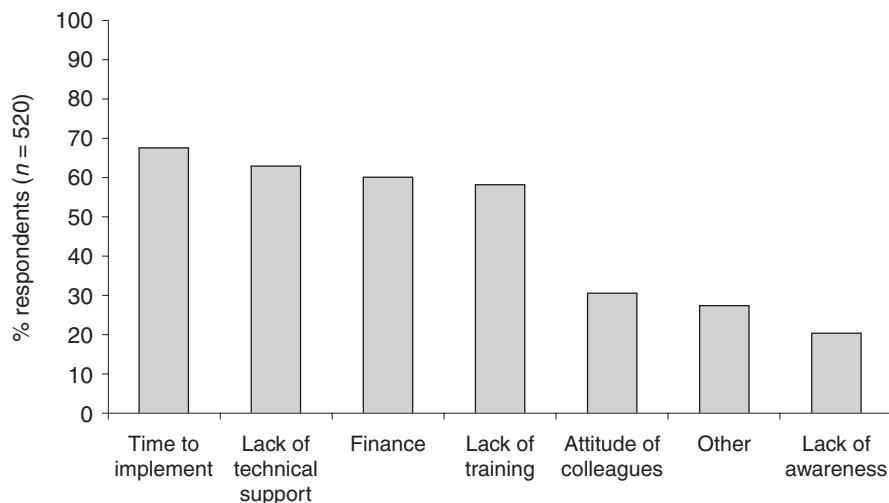


Figure 2 Barriers to ICT implementation

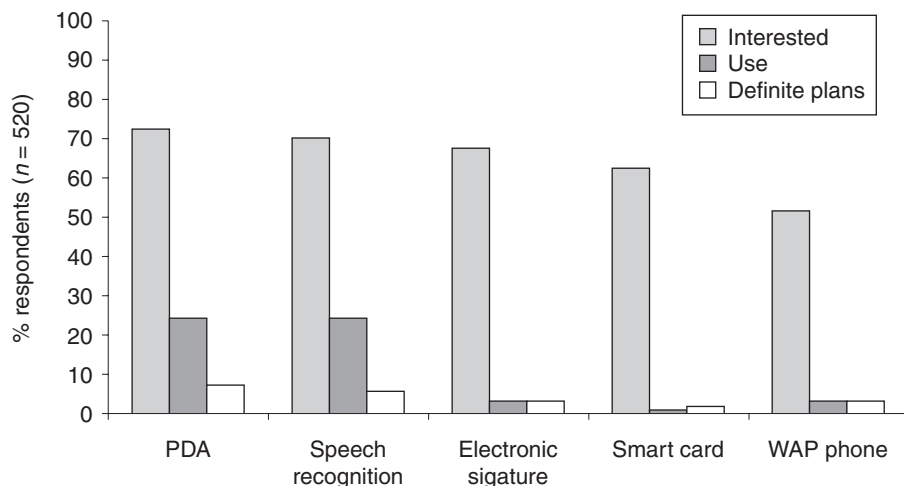


Figure 3 Use of and interest in new ICT

practice websites (32%) (CI 29.1% to 34.9%), the use of electronic booking systems (61%) (CI 58% to 64%), email (24%) (CI 21.3% to 26.7%) and text messaging (9%) (CI 7.2% to 10.8%). The content of these emails and messages – for example, whether they are reminders to attend follow-up or surveillance appointments, or relate to a specific visit – is unknown.

The use of ICT in primary care was not restricted to GPs. A number of other healthcare professionals now use the new technology as part of clinical practice (see Figure 4), most notably the use of computers, electronic patient records and electronic messaging by nurses and practice administration staff. Barriers to extending the use of this technology include limited literature on examples of good practice and of evaluations of successful implementation, a general lack of awareness of the capacity of the new ICT to provide support, concerns about security, and issues of software compatibility and cost.

Discussion

This survey has shown that the frequency of use of ICT in general practice in London has increased considerably in recent years. Computers and electronic patient record systems are now ubiquitous, and around one-fifth of practices and as many as 40% of individual practitioners in London operate paperless consultations, with a further 20–30% or so operating paper-light consultations and management systems. The response rate of 52% means that these figures have to be accepted with some caution; questionnaire response may be related to the relevance and interest of the subject of the questionnaire to the respondent, and our differential response rates between deprived and non-deprived practices, which parallels lower and higher levels of utilisation of ICT, to some extent supports this.¹⁰ It is possible that these figures are an overestimate

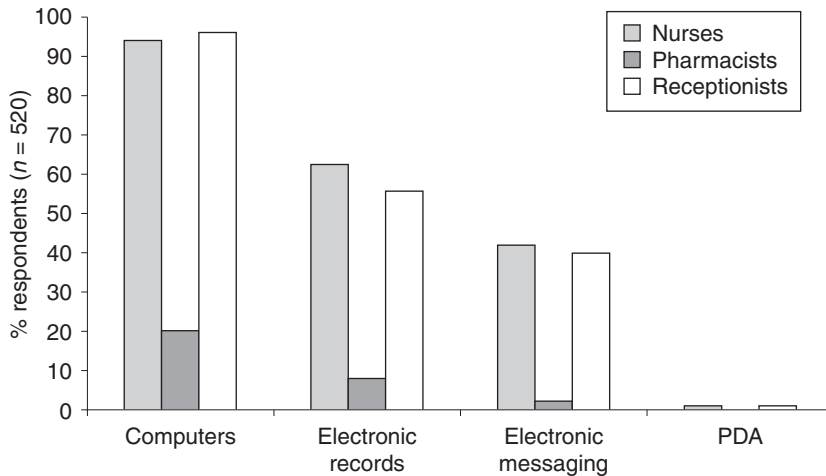


Figure 4 Use of ICT by nurses, pharmacists and receptionists

of the extent of use of ICT in general practice in London, although our non-response follow-up study found similar rates of paper-light and paperless consultations in practices that did not respond to the postal survey. Our findings suggest that GPs practising in deprived areas of London have less interest in and make less use of ICT in their practices, which can be interpreted as another example of the inverse care law.¹¹

The use of ICT is, at present, concentrated on the electronic health record, patient registers and prescribing, but is also increasingly used for electronic transfer of pathology results, access to chronic disease management templates, and general internet and email use. We did not ask specifically about computerised decision support, and recognise that templates for chronic disease management are part of most GP software systems. Whilst the interest in more advanced applications of ICT is high, utilisation rates of applications such as PDAs, text messaging and web technology is low, and substantial barriers exist to further implementation at present. Given the considerable interest among GPs in using new ICT, and considering it could lead to cost savings, we need to ask why the uptake of this technology is not greater. The literature on the use of new ICT in primary care rarely amounts to more than assessments of software, and little or no information is available about the best implementation strategies to use. There is an understandable concern about the security and encryption of data on new ICT applications, not least because much of this technology is highly mobile and vulnerable to loss or theft, which is compounded by a dearth of information on which to base clear guidance on issues of security and confidentiality. It is difficult for practices to find clear legal guidance on their responsibilities for the retention of paper records, resulting in the continued, parallel and unnecessary storage of contemporary and historical written files, while paperless consultations are taking place.

One explanation for the slow uptake of ICT in general is likely to be the lack of ICT training that GPs receive, resulting in many GPs being unfamiliar with ICT in general, and the fact that many older GPs have never acquired keyboard skills and computer literacy. The engagement with ICT – the ‘carbon-silicon interface’ – needs to start early in medical education and to be integrated into training for clinical practice in both primary and secondary care, and by all professionals involved in patient care and clinical administration.

For some years another concern has been the impact of having a computer in the consultation room. Once again this topic has not been extensively researched, and there are few recent publications to show how the technology can best be integrated into the consultation.^{12,13} The design of healthcare environments incorporating ICT is assuming increasing importance, and the three-way relationship between the doctor, the patient and the computer should be a topic of considerable research interest.¹⁴ In the Netherlands, the second National Survey of General Practice has found that, since the previous survey in the 1980s, there has been a reduction in the amount of empathic and affective interaction and dialogue between doctors and patients in general practice consultations, whilst the amount of ‘technical’ information has remained constant. In some consultations, up to 1 minute and 20 seconds are spent in silence, while the general practitioner attends to the needs of the keyboard and the electronic patient record (Bensing, personal communication). Research of this kind, which raises questions about the effective use of ICT and the impact on the doctor–patient relationship, which many regard as being at the core of effective primary care, needs to be conducted in the NHS context.

There is some recent evidence that the ICT industry is beginning to respond to users’ needs, and many software applications and web pages are now being

updated for PDA compatibility and for compatibility between desktops and other mobile devices. The PDA in particular has great potential for use among nurses for prescribing and recording clinical data on home visits, and a recent qualitative study has confirmed that, in the United States at least, there is growing enthusiasm for the use of handheld computers in clinical practice.¹⁵ The potential of the use of this technology by professionals involved in community-based health care – home visits, chronic illness reviews and palliative care, for example – is enormous, and deserves more research attention.

This survey, and almost all published research on the uses of ICT in primary care, addresses the service development and health systems applications of ICT, and does not deal with the IT requirements for research and teaching. However, the concept of the ‘well-found laboratory’ is gradually being translated from the hospital to the community so that well-connected networks of practices, capable of capturing and collating high-quality patient and clinical data, are making a substantial contribution to clinical epidemiology, clinical trials and health services research. The recent initiative from the Medical Research Council on e-science also recognised the need for networks and grid technology to contribute to large-scale data collection exercises related to healthcare research. Now that over 40% of general practices in the UK are involved in undergraduate teaching or postgraduate training, access to resources such as medical schools’ virtual campuses and (via local networks or the internet) to reference sources for students and trainees is becoming increasingly important.

In conclusion this survey provides an overview of the way that information and communications technology is used in general practices across London. There is evidence of increasing rates of usage, although these are lagging far behind the targets, explicit and implicit, set in the various NHS IT implementation plans and strategies, with a strong indication of the importance of adequately resourcing practices to support their use of ICT. There is evidence too of considerable interest in more imaginative uses of the technology, but little real activity and even less evidence of effectiveness. At a time of massive investment in IT in the NHS, it is incumbent upon us to provide as robust as possible an evidence base for its use. This means achieving an understanding of the barriers to the uptake of information technology in healthcare systems, and the means of overcoming them, as a matter of urgency; research of the kind published by McAlearney and colleagues is capable of illuminating professional attitudes in a way that can form the basis for training and educational interventions.¹⁵ The impact of the hardware in intimate healthcare settings and patients’ views about computer use, and also about data storage and security, are becoming increasingly

important, as is the need to provide evidence, from trials whenever possible, on the benefits in terms of health outcomes of engagement with current and future health-related technologies.¹⁶

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CONFLICTS OF INTEREST

None.

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Appendix 1: Paper-light general practice survey

- 1 Do you currently use a computer in your clinical consultations? YES NO
- 2 Do you consider yourself to operate paper-light consultations? YES NO
- 3 Do you consider your practice as a whole to be paper-light? YES NO
- 4 Do you consider yourself to operate paperless consultations? YES NO
- 5 Do you consider your practice as a whole to be paperless? YES NO
- 6 How long have you been using a computer for as part of your practice management system?
NEVER LESS THAN A YEAR 1–3 YEARS 3–5 YEARS > 5 YEARS > 10 YEARS

- 7 Do you use electronic records in the consultation?
ALWAYS OFTEN SOMETIMES NEVER

- 8 Do you use paper-based records in the consultation?
ALWAYS OFTEN SOMETIMES NEVER

- 9 How often do you use a computer to carry out the following tasks?

	Daily	2–3 per week	Once a week	Once a month	Never
Electronic patient records					
Connect to NHSnet					
Electronic pathology messaging					
Online guidelines					
Decision support					
Prescribing					
Recall system					
Audit system					
Register					
eBNF					
Templates/NSF					
eMIMS					
Scanning of letters					
Access to internet					
Email					
Electronic journals/databases (Medline and Cochrane Library)					

Other computerised tasks, please specify:

10 Do you use any of the following in general practice?

	Daily	2–3 per week	Once a week	Once a month	Never
Speech recognition software					
PDA/Palm					
WAP enabled phone					
Smart card					
Electronic signature recognition					

11 If you do not already do so, all factors being equal, would you be interested in, or are you planning on using, any of the following in practice?

	Interested	Definite plans	Not interested
Electronic patient records			
Connecting to NHSnet			
Electronic pathology messaging			
Online guidelines			
Decision support systems			
Prescribing			
Recall system			
Audit system			
Register			
eBNF			
Templates/NSF			
Scanning of letters			
Access to internet			
Email			
Electronic journals/databases (Medline and Cochrane Library)			

Speech recognition software			
PDA/Palm			
WAP enabled phone			
Smart card			
Electronic signature recognition			

12 What do you consider to be the biggest barrier to operating a paperless practice and implementing information technology? (please tick all that apply)

Financial cost	
Lack of training	
Lack of awareness	
Time to implement	
Attitudes of colleagues	
Lack of technical support	

Other barriers, please specify: _____

13 Do you use any of the following?

	Always	Sometimes	Never
Practice website			
Electronic appointment booking			
Use of email to contact patients			
Use of text message reminders to patients			

14 Do any of the other members of your primary care team use the following?

	General computer use	Electronic messaging	Palm/PDA	Electronic patient records
Nurses				
Pharmacists				
Receptionists				

Other, please specify: _____

15 Do you participate in any formal data collection service (e.g. for local disease registers or for PCT)?

YES NO CONSIDERING

16 Do you currently use a computer to produce patient information leaflets?

YES NO CONSIDERING

Are you: MALE FEMALE

Age: _____

Year of qualification: _____

Size of patient list: _____

Number of principals (full-time equivalents): _____

Thank you for taking the time to complete this questionnaire.

All information contained in this survey will be treated in the strictest of confidence. Based on the results of this survey, and in order to identify examples of best practice and innovation, we would like to follow up a selection of practices, with either a telephone call or personal visit. If you would be willing to participate in this, please sign below:
