

# ACNielsen

**A STUDY INTO LEVELS OF,  
AND ATTITUDES TOWARDS  
INFORMATION TECHNOLOGY  
IN GENERAL PRACTICE  
Volume One**

Prepared for: **General Practice Branch  
Department of Health and Family Services**

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## **EXECUTIVE SUMMARY**

This report presents the findings of the quantitative research phase; the results of the qualitative phase are presented elsewhere in Volume 2.

The quantitative research program consisted of three interrelated surveys. First there was a nationwide telephone survey of 1,000 practices, based on a sample of doctors drawn randomly from the Health Insurance Commission (HIC) database. This Screening survey was generally completed with the receptionist, and captured basic information about computerisation within the practice. These responses determined whether the selected doctor qualified for either of the two subsequent surveys. One hundred and eight interviews were conducted with doctors using computers for Clinical tasks (Clinical users), and 109 interviews were conducted with doctors in practices using computers for administrative tasks (Administrative users).

To be eligible for inclusion in the survey the doctor had to be a Vocationally Registered GP or a Fellow of the RACGP, with at least 1,500 Medicare claims in the last 12 months.

The surveys are of different kinds; the Screening survey was primarily concerned with practice level characteristics, while the subsequent Clinical and Administrative surveys were focused for the most part on the attitudes and behaviours of the individual doctor. Because of this, different weightings have been used for the data. The 'doctor' data has been weighted to the distribution of GPs, as provided by the General Practice Branch of the Department of Health and Family Services. At the 'practice' level weighting was used to control the probability of over-sampling of group practices.

The research was conducted in October 1997.

### **SCREENING SURVEY**

- **Levels of Computerisation in Practice**

Computers were present in 31% of Australian practices. As would be expected computers were more likely to be found in group practices; they were also more common in country practices.

There is no comparable estimate of computerisation, as other studies have been based on GPs as distinct from practices.

- **Levels of Computerisation by Doctor**

Fifteen percent of GPs were Clinical users (with Clinical functions broadly defined as recall, script writing, electronic storage of patient information, or clinical records). This is in line with other recent studies of Clinical use among GPs. Clinical users were more likely to be males and to be in smaller practices. There were no distinctive patterns in terms of age, state or region.

- **Computer Functions in Practice**

In those practices with computers, analysis of the functions present within the practice indicates that a combination of Clinical and Administrative tasks was common (74%). Nineteen percent of practices use computers only for Administrative tasks, and 7% use computers exclusively for Clinical tasks.

The most common functions were patient registrations, billing and financial management of the practice. Of the Clinical functions, recall was the most widespread (used in 47% of practices), but the other Clinical functions had lower levels of use. Clinical notes was the least common, being used in 29% of practices.

- **Computer Functions by Doctor**

Of the four Clinical functions examined, script writing was the most common, being used by 12 % of all GPs. The other three functions, storing information electronically, recall system, and clinical notes, all had the same level of usage (7%). While recall was quite common at the practice level, it is of less significance among doctors; only 7% of GPs personally use a computer for recall. This suggests that while recall is a Clinical function, it is one often managed by the clerical staff.

- **Intentions Among Non-Users**

In those practices currently without computers there is considerable interest in computerisation. Among these practices four out of ten (42%) have seriously considered adoption, and 41% consider it is likely to occur in the next two years. (Note however that these are in most cases the views of the receptionist or Practice Manager, rather than the GP.) Consideration was higher among group practices and country practices. Amongst those likely to adopt, six out of ten indicate that the computer would have a role in the Clinical area.

- **Other Technologies in the Practice**

Four out of five practices (79%) have a facsimile machine. One in five practices has a modem (19%).

## CLINICAL USERS SURVEY

By design, the Clinical and Administrative interviews had some content in common; where differences of interest were found, these comparisons are presented below.

- **Computerisation Patterns**

Among Clinical users the average number of computers in the practice was 4.3. By contrast the comparable figure for Administrative users was 3.2. As would be expected the number of computers in the practice was related to practice size. It was also related to age and gender, with higher numbers of computers among older doctors and female doctors.

<b>Practice size</b>	<b>Av. No. of PCs</b>	<b>Age of doctor</b>	<b>Av. No. of PCs</b>
One doctor	2.2	21 - 40 years	3.8
2 doctors	3.1	41 - 50 years	4.4
3-4 doctors	4.5	Over 50 years	4.8
5 or more	8.1		
<b>Gender of doctor</b>			
Male	4.0		
Female	5.6		

The majority of the Clinical users (87%) had a computer on their consulting desk.

In most practices computers were used for both Clinical and Administrative tasks, although the history of use varied. On average, computers had been used for Administrative tasks for just over 5 years, while the period of Clinical use averaged 2.6 years.

- **Clinical Functions**

Clinical users were asked about their use of eight different Clinical functions. The proportion using each of the functions is listed below:

Script writing	78%	Recall system	49%
Referral letters	69%	Receiving/storing info electronically	45%
Accessing educational materials for patients	66%	Clinical notes	32%
Patient summaries	57%	Decision support	32%

The average number of Clinical functions was 4.3; the range of functions was higher among older doctors, males, and those with a longer history of clinical experience.

Each of these eight functions was explored further and the main findings were as follows:

- â Where script writing was in use it accounted for a high proportion of scripts written.
- â Use for educational purposes appears to be higher among females.
- â Among those using patient summaries, only a minority had all records up to date.
- â Most (59%) have current summaries for half or less than half their patients. Details were usually entered by the GP, but in some instances (6%) this was done by support staff.
- â Recall was used for a very wide range of procedures and conditions, but the leading registers were for Pap smears (89%) and immunisation (51%). Most Clinical users entered the recall details themselves, but there was also significant delegation; 37% pass all or some of this task to the support staff.
- ã Discharge summaries and specialist reports were usually received in hard copy, but electronic transfer was common (46%) for pathology results. Storage of this information tended to reflect the mode of receipt, except for pathology where electronic storage lifted to 74%. Parallel storage of pathology results (in hard copy and electronic form) was common (49%).

Among those storing information electronically one in five indicated that they have sent patient details outside the practice electronically, primarily to other health providers. Of these, seven out of ten take no data security measures to ensure the confidentiality of the record is secure, and ensure the record was received as intended.

- ã Among those using the computer for clinical notes, consistent use was common; three out of four (73%) had used the computer for most or all their consultations in the last week. It is interesting to note however the incidence of dual record systems. Over half the doctors (58%) using computers for clinical notes, also kept records in hard copy. The reasons for this included slow typing speed, fear of losing computer data, reservations about software and medico-legal factors. Notes were usually entered by the doctor, but as with patient summaries, they are in some cases (7%) entered by support staff. Three out of ten had no security system to control staff access to records.

- **Internet and E-Mail**

At the practice level 44% had access to e-mail, and 47% had access to the Internet. Both were more common in solo practices; incidence of Internet was higher in country areas.

Personal access was lower; 27% of Clinical users had e-mail at their desk, and 30% had Internet access. Both functions were more likely to be found where the doctor was male, the practice was metropolitan, and there was a bias towards the older age group. Levels of Internet access were twice as high among males as females.

Of those with e-mail, 15% had received communications from patients via this medium. Of those with Internet access from their desk 12% either had no security measures to protect records from outside access, or were unaware of them.

Among Clinical users the Internet plays an important role in pursuing professional interests. The leading professional uses were accessing journals and medical data bases, finding information to help patients, and continuing education. Administrative users by contrast were less likely to use the Internet, and use was predominantly for personal rather than professional interest.

- **Future Intentions**

Most Clinical users (76%) intend to increase the range of Clinical functions in the coming 12 months. The functions generating interest tend to be the ones which are at present less common. The leading mentions were receiving/storing information (36%), clinical notes (31%) and patient summaries (24%). The pattern among Administrative users was quite different; they expressed very strong interest in script writing (83%) with patient summaries and information storage as second level priorities.

GPs are making strong forecasts about wider Clinical use. Both Clinical and Administrative users expect that non-users in the practice will take up Clinical functions in the next two years; 63% of Clinical users and 57% of Administrative users consider that non-users in their practices will move into Clinical functions in the near future.

The three main factors that would encourage Clinical users to expand their range of tasks were availability of suitable software, financial support from the government, and lower purchase prices.

-

- **Levels of Technology**

The profile of related technologies was as follows:

	<b>Clinical Survey</b>	<b>Administrative Survey</b>
Facsimile machine	97%	98%
Modem	87%	43%
CD ROM drive	78%	37%
Scanner	30%	3%
Laptop	28%	14%

Three out of ten Clinical users have no disaster recovery plan in the event of major system problem.

- **Attitudes to Computers**

To evaluate attitudes to computers respondents were asked whether they agreed or disagreed with a range of statements. In answering these questions they were asked to focus on clinical usage.

Among Clinical users there was high agreement that computers:

- 
- create a good impression with patients (79% agreement)
- are becoming a necessity in general practice (74% agreement)
- can significantly improve patient care (74% agreement)

Clinical users are uncertain about the value of electronic records and the security advantages of computer based records. Their views about the impact on doctor-patient relations are more decisive, and a majority (59%) consider there is no adverse effect.

The responses of Administrative users provide an interesting contrast. While they consider computers are more useful for administrative functions, at the same time they share the views of Clinical users that computers are rapidly becoming a necessity in general practice, and that they can enhance patient care. They express clear reservations however about the impact on doctor-patient communication.

The majority of GPs (61%), both Clinical and Administrative, believe that widespread adoption will not occur until the government provides a financial incentive.

Clinical users consider that computers provide numerous benefits, foremost of which were faster, more accurate script writing, ease and speed of information retrieval, ease of access to information such as journals, and good resources for patient education.

## **ADMINISTRATIVE USERS SURVEY**

- **Computer use**

Half the Administrative users indicated that they use a computer on occasion in the practice.

- **Computer Functions**

At the practice level the main computer functions were patient registrations, word processing and patient billing. At the doctor level Internet and e-mail were the primary functions, followed by scheduling appointments and word processing.

Medclaims was used by 29% of practices, and users were very positive about the system. Among those not currently using Medclaims almost half considered they would probably take it up within the next two years.

- **Future Intentions**

There are strong intentions to take up Clinical functions among Administrative users. Two out of three consider they are likely to do so in the next two years. This confirms the views previously reported that computers are becoming necessity in general practice.

Among those unlikely to adopt, (and they are of course a minority), a wide range of reasons were given, however the major barrier was lack of computer skills and confidence. Cost and confidentiality were also significant concerns.

# **BACKGROUND AND OBJECTIVES**

## **INTRODUCTION**

ACNielsen was commissioned by the General Practice Branch to conduct a research project evaluating the level of computerisation in Australian general practice, and assessing attitudes among general practitioners (GPs) towards the use of information technology.

This research complements other studies undertaken in this field. In 1993 the Information Management Steering Group (IMSG) was established, bringing together representatives of the General Practice Branch, the medical profession and information technology (IT) experts and consumers. This group has been responsible for developing a strategy for improving the usefulness and uptake of computer systems by GPs.

In 1995 and 1997 the IBM Consulting Group conducted two major projects, the first investigating the optimal use of information technology for electronic prescribing, and the second defining the key elements and functions of the Clinical Workbench.

While these have made a major contribution in the technical area, no comprehensive and representative research had been undertaken to establish the current profile of computerisation in general practice.

Accordingly, the General Practice Branch commissioned ACNielsen to conduct a two phase research project; the first consisted of qualitative research exploring attitudes to computers, while the second was a national survey to establish current levels of computerisation. The results of the second quantitative phase are presented in this report. The overall research program was to provide a benchmark against which future progress could be evaluated, and to help guide planning for future developments in general practice computerisation.

## **OBJECTIVES**

The research had two separate objectives; one was to examine the attitudes prevailing toward computers, the other was to survey the current levels of computerisation. The first of these was obviously qualitative, while the second was more quantitative in nature. Within each of these fields the information objectives are indicated below.

An additional requirement of the project was to provide a brief review and report on the relevant literature in this field.

## **QUALITATIVE OBJECTIVES**

- What attitudes do doctors have toward IT (apprehension, interest, scepticism etc)
- What are the perceived benefits and burdens of computers in general
- What are the perceived benefits and burdens of computers specifically for clinical applications
- Who will mainly benefit from adoption
- What impact would adoption have on their income, Dr/patient relationships, quality of care
- What are the critical barriers/obstacles
- How are 'early adopters' or sophisticated users regarded
- What values and attitudes are associated with IT
- What level of interest/resistance exists
- What trends are seen/expected in the future
- Which groups show more/less willingness to consider IT
- Who makes the decision in group practices, and what is the process
- How do they think patients will respond to computers as part of the consultation
- What would facilitate/motivate adoption
- Among those with experience of IT, has that experience been positive or negative

## QUANTITATIVE OBJECTIVES

One of the key objectives of the quantitative phase was to provide baseline data on levels of computerisation for clinical and non-clinical purposes. The information objectives varied depending on whether the practice had computers:

Among those **without** any computers:

- doctor's predisposition and practice predisposition re computerisation
- who makes the decision
- reasons for non-use
- likelihood of adoption in next 12 months
- functions of most interest
- sources of information and influence
- incidence of faxes and other information technology

Among those **with** computers:

- what range of functions are used ( Administrative - word processing, accounts, appointments, e-mail; Clinical - clinical, prescribing, records, call/recall systems, online)
- within the practice who uses computers, and who is the primary user
- previous experience/level of familiarity with computers
- what technology/hardware do they have/use (fax, PC's, laptops, CD ROM, printers, modems)
- what software is used
- back-up and security procedures
- attitudes to use of computers for clinical purposes
- future intentions in the area of IT (more, less, same; plan to buy in next 12 months)
- incidence and uses of computers at home

## TARGET GROUPS

The qualitative phase was to explore attitudes across all levels of involvement, ranging from Clinical use through to those with no computer at all. Geographic diversity was another consideration. The 'climate' with regard to computerisation varies from state to state, so it was important to cover several states, and within that to include representation of rural doctors.

The brief specified that the survey should be nationally representative of GPs, and take into consideration features of the practice (including size and geographic location) as well as the practitioner (age and gender). Results were to be provided for both practices and GPs as relevant.

## RESEARCH DESIGN

Given the range of objectives two separate phases of research were necessary. First qualitative research was undertaken to provide an understanding of the attitudes and opinions surrounding IT. This provided the foundation from which a questionnaire was developed, and in the second phase a major national survey was conducted.

Discussions with the Director of the Strategic Development Section, General Practice Branch, Department of Health and Family Services, indicated that while both phases were necessary, the emphasis was to be on the latter (quantitative) rather than the former (qualitative).

Further considerations in terms of research design were:

- The national sample needed to be large enough to offer high reliability.
- According to Departmental estimates the incidence of clinical applications was likely to be limited (perhaps no more than 10%). This meant that at least 1,000 GPs would need to be contacted to locate 100 Clinical users.

Taking these into account the research program undertaken was essentially as follows:

### **Phase One: Qualitative Research**

5 groups, 1 mini group and 12 depth interviews that together segment GPs in terms of practice size, presence/absence of computers, uses for computers and urban/rural location.

In addition 3 depth interviews were undertaken with Key Informants in this field.

## **Phase Two: Quantitative Research**

- 1,018 telephone interviews, mostly with the Practice Manager or receptionist to establish the incidence of clinical usage, from which followed:
- 100 interviews with Clinical users
- 100 interviews with Administrative users

The results of the qualitative phase have been presented in a separate report. This report is concerned solely with the results of the national survey.

The survey was conducted under the supervision of the Information Management Strategy Group. The Group provided helpful input, especially in the survey development phase, the questionnaire design, and in reviewing draft reports. The Information Management Strategy Group provides strategic direction to the improvement of information management in general practice. Members represent: rural and urban Divisions of General Practice, general practitioners with information management and information technology expertise, the Australian Medical Association, the Consumers' Health Forum of Australia, the Department of Health and Family Services, and the Royal Australian College of General Practitioners.

## **QUANTITATIVE RESEARCH**

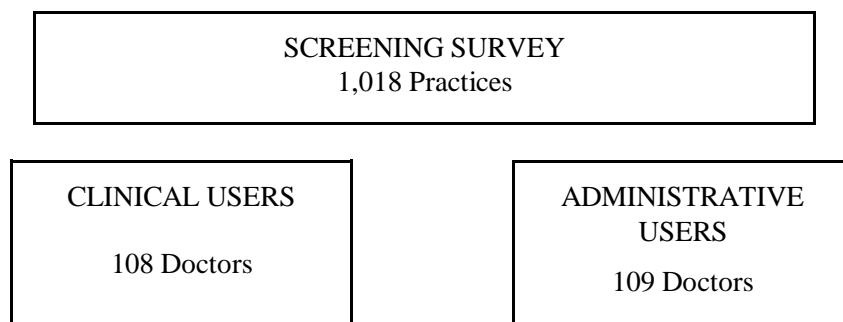
The quantitative phase involved two distinct 'layers' of research. The first stage was at the practice level, while the second focused on the specific doctor selected in the sample. The initial brief Screening interview was conducted by telephone with 1,000 practices nation-wide, using a sample provided by the Department from the Health Insurance Commission(HIC) data base. (Sampling issues are discussed in more detail below.) The interview was in most cases with the receptionist or Practice Manager, however if a doctor answered the phone it was possible the Screening survey could be completed with them.

The Screening survey took details primarily about the practice, its use of computers and levels of information technology. This interview was designed to provide baseline data on levels of computerisation for clinical and non-clinical purposes. The Screening interview also asked several details about the selected doctor in the practice, to determine whether that doctor was a Clinical or Administrative User.

An interview was then sought with the selected doctor, either at that time, or later if inconvenient. On contact with the doctor, eligibility was reassessed, and if that was confirmed the interview proceeded. The Clinical and Administrative interviews had major differences in terms of content, however some elements were common to both to allow comparisons. In summary there were three separate questionnaires, one concerning the

practice, and the other two involving the doctor selected in the sampling process.

The diagram below indicates the sample sizes in each of the three survey groups.



The questionnaires were developed in conjunction with the Information Management Strategy Group (IMSG), and pilot tested before the fieldwork commenced. Copies of these are provided in Appendix 1 of this report.

The fieldwork was conducted between 30 September and 20 October 1997.

## **DEFINITIONS AND TERMINOLOGY**

Throughout this report the term Screening Survey refers to the national survey of 1,018 practices.

For the other two surveys the following definitions were used to identify a Clinical and an Administrative user:

- **Clinical user** the selected doctor personally uses a computer for at least one of four clinical functions (recall, script writing, storing patient information electronically or clinical notes)
- **Administrative user** the selected doctor does not personally use the computer for any clinical functions, but computers are used in his/her practice for at least one of five administrative function (accounts, practice finances, stock control, appointments, or patient registration)

## **SURVEY METHOD**

The survey was conducted using ACNielsen's national CATI network (Computer Assisted Telephone Interviewing). This is a fully integrated computer based system; the questionnaire is handled electronically, and responses are entered directly via keyboard. Several features of this system were particularly valuable for this project - the order of questions can be rotated, call-backs can be programmed for the required time, and interviews can be suspended then subsequently resumed when convenient.

To encourage co-operation a letter was provided to us by the Department giving some background to the survey. (A copy is provided in Appendix 1 of this report.) As respondents would have grounds for being wary of any survey asking about the number of computers in the practice, the letter was also a means of providing reassurance about the surveys' bona fides. If the receptionist asked for verification or seemed reluctant about passing the call on to the doctor, then the letter was faxed to the practice, and followed up with another call.

Call-backs were an important part of the field process, not only because doctors are busy and hard to reach, but also because this reduces response bias. The time for the call-back was recorded, and carried out on schedule. Together the use of the letter, and strict management of call-backs were effective in optimising co-operation with the survey.

## **SAMPLING PROCEDURES**

The sample for the survey was drawn from the data base of the Health Insurance Commission (HIC). To be eligible for inclusion in the sample the doctor had to be a Vocationally Registered General Practitioner or a Fellow of the RACGP with at least 1500 Medicare claims in the previous 12 months. This floor was set to exclude those doctors with very low levels of practice. Within the HIC data base 14,308 GPs met this definition of eligibility. The distribution of this population is indicated in Table 1. The sample was drawn at random from all states and across the strata of age and gender.

The initial sample drawn consisted of 4,000 names. Address details were provided for all doctors, and in most but not all cases a phone number was also listed. The quality of the survey sample depends largely on the quality of the data base from which it is drawn, and in particular the extent to which details are complete and current. When addresses and phone numbers were matched, there was some duplication within the sample. In group practices, random selection resulted in several doctors being drawn in the sample.

The HIC data base is structured on the basis of doctors rather than practices, however this survey required a practice-based sample. The initial Screening interview is with the receptionist, and this focuses on the practice as a whole. While there may be several doctors sampled at a particular location, the receptionist could only be interviewed once, hence the survey required a practice-based sample, with each practice existing only once.

Additionally, as indicated in the survey outline provided above, only one doctor was to be interviewed from each practice.

As the research was being conducted by means of a telephone survey, it was necessary to identify an up to date telephone number for as many doctors and practices as possible. To generate a practice-based sample, the address and phone number details of the 4,000 doctors were cross matched with the latest electronic Yellow Pages listings, as well as Oz on Disc. (The phone numbers proved less reliable than the address. The data base address given is theoretically their 'main' location, whereas the number could relate to one of several locations at which the doctor works.) The result was a sample of 2,674 unique practices.

Having grouped doctors into practices, the next step was to select the doctor to be interviewed. In most practices only one doctor had been sampled, so selection was straightforward. However, where more than one doctor had been drawn in the sample, it was necessary to randomly select the doctor to be interviewed. A randomisation process was used to select the 'first prospect'. If that doctor was no longer with the practice, or not available during the period of the survey, then randomisation was used again to select a second doctor from those names remaining. This technique was to ensure that all doctors sampled in the practice had an equal probability of being selected for interview.

Although they may have qualified in terms of the surveys' eligibility criteria, doctors that were not on the sample list were not considered for interview. This ensured that those interviewed all met with the General Practice Branch's definition of GPs.

## **SAMPLE DISTRIBUTION**

The following table compares the unweighted sample counts with the distribution of the population of GPs from which it was drawn to give an indication of the representativeness of the sample prior to weighting. As can be seen from this table a close match was obtained for age, gender and location. Geographic quotas were not set in advance, as the distribution of Clinical usage was not known, and as a result there is some over-representation of the smaller states. Weighting to the known distribution of GPs avoids undue influence from these states.

**Table 1: Distribution of Survey Sample Compared with GP population**

	Survey Sample	GP Population
<b>Age</b>		
<35yrs	7%	10%
35-44 yrs	33%	35%
45-54 yrs	33%	32%
>55 yrs	26%	24%
<b>Gender</b>		
Male	76%	73%
Female	24%	27%
<b>Location</b>		
Metro	75%	76%
Rural	25%	24%

	Survey Sample	GP Population
<b>State</b>		
NSW	25%	35%
Vic	17%	25%
Qld	27%	17%
SA	14%	9%
WA	14%	9%
Tas	2%	3%
NT	0.7%	0.6%
ACT	0.7%	2%

To provide some further information about the nature of the survey sample, tables have been provided in Appendix B showing the unweighted sample profile in terms of such characteristics as practice size, computers in practice, and employment status. These tables also allow a comparison between the Clinical and Administrative sample profiles.

## RESPONSE RATES

From an initial field available of 2,673 practices, 2,040 practices were contacted to achieve 1,018 interviews. Several call-backs were made if necessary in the interests of gaining an interview. This approach accommodated those who were busy at the time of contact, and improved the response rate. The response rate is expressed as a percentage of practice numbers tried.

The table below shows the breakdown of contact attempts. Interviews were achieved at 50% of practices contacted. A further 20% were still potential interviews at the time the fieldwork finished i.e. arrangements were in place to recontact these numbers. One in five contacts resulted in a refusal, primarily by the receptionist, and with a further 10% of the sample there was a problem concerning either the telephone number or the receptionist/doctor.

**Table 2: Response Report**

Response on Contact	Number	%
Interviews achieved	1,018	50%
Refusals Busy/temporary refusal/for call-back	413	20%
Refusal	408	20%
Excluded (e.g. Dr not at practice, language)	118	6%
No answer, fax/pager, dead, wrong number, engaged	83	4%
Total	2,040	100%

Response rates are an important consideration, as there is always a possibility that non-respondents may have differed from respondents in some way, and hence the potential for error exists. In this study some of the non-response relates to the sample itself. Every attempt was made to secure an up to date match of doctors and phone numbers, but a proportion still remained that were a problem, and this is not uncommon in telephone survey work.

The refusal rate of 20% is modest for a business survey, particularly about computers, and this was presumably reduced by the provision of a support letter, and the flexible call-backs. While it is possible that non-respondents and refusers may be different in some way from those that agreed to the survey, and as such be a source of bias, this could only be established if an analysis of non-response were undertaken.

## **DATA ANALYSIS AND WEIGHTING**

On completion of the interviewing data analysis was conducted. A set of computer tabulations were prepared, and these have been separately provided. The data in this report are based on those tables, and all data have been weighted.

Survey weighting is carried out for two main reasons; firstly, because there may be some bias operating in the selection procedures, and secondly because the final sample is seldom a perfect match to the population from which it is drawn. Weighting is used to adjust the sample so that it more closely reflects that population.

In this particular study it is important to remember that it covers information of two different kinds. The Screening interview with the receptionist focuses mainly on the practice characteristics, while the Clinical and Administrative interviews are primarily concerned with the views and experience of the individual doctor.

Given two kinds of information, two levels of data weighting were required, the first relating to doctors, and the second relating to practices.

## **Doctor Weighting**

In consultation with the General Practice Branch it was agreed to weight the doctors to the distribution of GPs with at least 1,500 Medicare claims in 1996/97. This constitutes a population of 14,308 GPs, and the General Practice Branch provided details concerning their age, gender, state and location. The distribution of this population has been indicated in Table 1. This information allowed the calculation of person-specific weights which were used for questions relating to the selected doctor in the Screening survey (S17, S29, S30, S32) as well as all the data from the Clinical and Administrative interviews.

## **Practice Weighting**

As mentioned above, weighting is used to correct any bias operating in the selection procedures. In this particular study the selection process meant that larger practices were likely to be over-represented. The Department's data base is based on doctors, and any random sample of those doctors would be biased towards large practices. The more doctors that are in the practice the greater the probability of being selected, thus larger practices will be over-represented. For example, a solo practitioner has only one chance of being selected, while a larger practice with three doctors has three times the probability of being selected. By taking into account the number of doctors in the practice, (which was asked in the questionnaire) weighting reduces this inequity in selection probabilities.

This second set of weights, practice weights, was calculated and used in addition to the doctor based weights for those questions in the Screening survey focussing on practice characteristics.

## **Reliability of Estimates**

In reading this report it is necessary to keep the sample sizes in mind, as reliability and sample size are related. The sample size in the Screening survey involves a very large sample (1018 interviews), however the subsets of Clinical and Administrative surveys are based on a smaller sample (just over 100 interviews) and hence the margin of error is greater. As a guide to the reliability of the survey results a margin of error table has been included in Appendix C. This provides a simple guide to the confidence intervals that apply given varying sample sizes and response levels.

In the Clinical users survey some analysis by subgroup is detailed, but these should be considered indicative rather than definitive. Given the smaller number in the subgroups, these patterns are likely to be less reliable.

## STRUCTURE OF THE REPORT

The Final Report consists of three volumes as follows:

- Volume One (this document) presents the context for the research and provides results in detail for the three surveys
- Volume Two describes the initial qualitative phase of the research program
- Volume Three contains the computer tabulations for the three surveys.

This report (Volume One) consists of five Sections structured as follows:

1. **Section One** explains the background to the study, how it was conducted, and summarises the key findings.
2. **Section Two** presents a brief literature review, to provide the context for this research.
3. **Section Three** outlines the results of the Screening survey which examined patterns of computerisation within over 1,000 practices.
4. **Section Four** provides detailed information about the functions currently being used by Clinical users.
5. **Section Five** describes the results of the survey with Administrative users.

The appendices include the questionnaires and sample profiles. All tables in this report show data as proportions rather than numbers, and the sample base is indicated wherever practical.

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## **SECTION 2**

# **LITERATURE REVIEW**

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## LITERATURE REVIEW

A brief literature review was conducted to provide a context for the current research. Medline and Healthstar databases were searched for articles examining the use of computers in general practice. Before considering the findings, a general comment is warranted on the body of research available in this field. Three points are worth noting; there is a paucity of published research, the methodologies used are often prone to bias, and the 'loose' use of terminology at times makes interpretation difficult.

Given that computers have been in use in general practice for some years, and in some countries the penetration is now high, there has been remarkably little systematic research about this change or its implications. In the United Kingdom the period 1984 - 1994 saw enormous changes in terms of computerisation, however a wide search of the British literature covering that period revealed only 30 studies examining the impact of computerisation on general practice<sup>1</sup>.

Here in Australia there have been a number of studies, but few have been published. Of the eight studies reported by Bolton<sup>2</sup> and conducted in the period 1989 - 1995, only two are available in the literature. This poor coverage may reflect the fact that medical journals regard information technology as of limited relevance, or alternatively that funds are not readily provided for research in this field.

Funding limitations may be one of the reasons why many of the studies have weaknesses in terms of their methodology. Mail surveys, which are relatively inexpensive, have been widely used, and these are subject to certain kinds of bias. The response rates can be low, and self selection is another concern. All the Australian studies reported to date have used a self completion methodology.

The third issue to consider is terminology. The term computerisation is widely used, but it can mean many things. At the very least there are three dimensions to computerisation:

1. When this term is used does it mean that computers are being used for administrative or clinical purposes, or both? It is very important to be able to discriminate between the two, but this is often unclear.
2. Apart from the task itself, it is also important to consider who is doing the task. For example a recall system may be run by the doctor or by their receptionist. If we are interested in clinical use by GPs then it is important to know who carries out the task, not just whether the task occurs.

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<sup>1</sup> Sullivan F, Mitchell E Has general practitioner computing made a difference to patient care? A systematic review of published reports. *BMJ* 1995; 311: 848-852

<sup>2</sup> Bolton P A review of computer use in Australian general practice. *Proceedings of the 8th RACGP Computer Conference*

3. There is also a practice dimension which is seldom considered. Given that doctors in this country are moving away from solo practices, the practice profile in terms of information technology is worth considering. In terms of the diffusion of technology, it helps to understand the patterns of computer usage within the wider practice environment.

These variations in terminology can make it difficult to interpret results, and draw comparisons between studies.

### **Estimates of Computerisation**

Bolton's review (in 1995) of eight local studies suggested that around 40% of GPs were using a computer, with word processing and practice management systems being the most widely used. Estimates of clinical use varied, depending on the definition used, but the range was between 3% - 8%. The review concluded that over the period 1989 - 1995 the overall rate of computerisation had remained constant, while use for clinical functions appeared to have risen slightly.

A recent local study in New South Wales<sup>3</sup>, conducted in late 1995, indicated that 14% of GPs were using a computerised patient record.

Several studies have assessed the characteristics of computer users, and use tends to be higher among males, in rural practices, in larger practices, and those with higher gross incomes<sup>4</sup> This is similar to the patterns observed elsewhere<sup>5,6</sup>.

Studies in other countries show much higher levels of computerisation. In Britain in 1995 almost 90% of general practices were using a computer, and 55% of GPs were using computers for clinical functions<sup>1</sup>. Corresponding figures were 84% in New Zealand<sup>6</sup>, 70% in Denmark, 60% in Sweden and 40% in Netherlands<sup>7</sup>.

Computerisation in Great Britain was greatly accelerated by financing schemes and a range of incentives. In the mid-80s several of the leading software vendors were providing 'free' computers, and the National Health Service put in place a range of

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<sup>3</sup> Bomba DT Australian general practitioners and computerised patient records HIC 1997 *Proceedings of the Health Informatics Conference*

<sup>4</sup> Bolton P, Gay G Review of computer usage among RACGP members *Australian Family Physician* 1995; 24:1882-1885

<sup>5</sup> Szecsenyi J, Buschhorn A & Kochen MM General practitioners' attitudes towards future developments in practice computing - a representative survey of Northern Germany *Family Practice* 1992; 9 (3): 357- 361

<sup>6</sup> Thakurdis P, Coster G, Gurr E & Arroll B New Zealand general practice computerisation; attitudes and reported behaviour *New Zealand Medical Journal* 1996; Nov: 419 - 422

<sup>7</sup> Als AB The desk-top computer as a magic box: patterns of behaviour connected with the desk-top computer; GPs and patient perceptions *Family Practice* 1997; 14 (1): 17- 22

administrative and financial incentives to encourage uptake<sup>8</sup>.

### **Computer Functions**

Computers were mainly used for the repetitive and administrative functions of the practice. Common tasks were word processing, practice management, appointments, an age-sex register, and recalls<sup>2,6</sup>.

A recent study in New Zealand<sup>6</sup> found that the clinical functions of most interest to doctors, and presumably those with the greatest potential for growth were doctor education, automated checking for drug interactions/contraindications, patient education, and interfacing with laboratories. The findings of a German study were similar, with the functions of most interest being a computerised drug data base and medical library, and automatic patient monitoring<sup>5</sup>.

Security of computer records has not yet been examined in any published study.

### **GP Attitudes**

Not surprisingly, Clinical users are generally very positive about the advantages of using computers, with the main benefits being seen as better quality control, faster and easier access to records.

Among non-users the trend toward computerisation is seen as inevitable, although there are some indications that the translation from interest to uptake may occur gradually rather than rapidly. Bomba's study found that despite widespread recognition of the advantages, very few GP non-users were actually making plans or taking steps toward computerisation. Specifically, among those not using Clinical functions, two thirds (67%) said they did not plan to implement CPRs within the next three years.

The main reasons given for reluctance to adopt were cost and lack of computer literacy<sup>2,3</sup>. Secondary barriers were concerns about both privacy and the doctor-patient communication, lack of software standards, lack of data portability between software systems, and fear of choosing software that may become obsolete or incompatible.

### **Patient's Response to Computers**

Several studies have examined the impact of computers on patients, and to date they have all found that the use of a computer apparently has no negative effect on patient perceptions of the consultation<sup>9,10</sup>. It seems that patients are much less concerned about

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<sup>8</sup> Miller G, Britt H The information revolution: data collection and changing health care systems; United Kingdom *MJA* 1993; 159: 471- 479

<sup>9</sup> Brownbridge G, Herzmark GA & Wall TD Patient reactions to doctor's computer use in general practice consultations *Soc Sci Med* 1985; 20 (1): 47-52

<sup>10</sup> Rethans JJ, Hoppener P, Wolfs G & Diederiks J Do personal computers make doctors less personal? *BMJ* 1988; 296: 1446-1448

this initiative than doctors. The quality of the doctor-patient relationship depends more on the personal qualities of the doctor than the technology used in the consultation.

The only proviso is that the role of the computer needs to be explained to the patient, and ideally the patient can see what is happening on screen. GPs don't always give an explanation about what the computer is being used for, what the benefits are, and what security measures are in place. Without this, the patient can feel 'left out'<sup>7</sup>. Patients who are unfamiliar with computers are uncertain where their information is held and who can access it, highlighting the need for doctors to inform patients about the security systems<sup>10</sup>. The more patients know about the computer and what it was being used for, the more positive their attitude towards the computer.

### **Impact of Computerisation on Practice**

Based on the UK experience it seems that use of computers extends the length of the consultation by 45-90 seconds, and using these figures the IBM Consultancy calculated this means an additional hour each week for the average Australian GP<sup>11</sup>. The nature of the consultation shifts with computerisation, with doctor initiated and 'medical' content increasing at the expense of patient initiated and 'social' content.

Clinician performance is generally improved; most of the studies have been concerned with preventive care, screening and repeat prescribing.

It is a concern however to see that there has been little research into the impact in terms of patient care<sup>12</sup>. It is commonly assumed that computerised records will result in better quality of care, but there is as yet little evidence to support this. Of the 30 studies reviewed by Sullivan and Mitchell 21 focused on the clinician's performance of tasks, 6 examined the effect on the consultation process, and only 3 measured the impact on patient outcomes. Only one of the three showed an improvement in patient outcomes.

In conclusion, the published research in this field is limited, and the quality is variable. Recent studies date indicate that in Australia less than 50% of GPs are using computers for administrative purposes, and that Clinical use could be 14%. There is general acceptance that computerisation is inevitable and ultimately beneficial, but the pace of adoption is unhurried. It seems the reservations may lie more with the doctors than the patients, and these concerns are not unreasonable, if implementation means longer consultations in addition to the direct costs. The impact in terms of patient care has as yet received little attention, and more studies are needed in this area.

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<sup>11</sup> Quoted in Bollen M General practice and computerisation *Australian Family Physician* 1996; 25 (8): 1203-1204

<sup>12</sup> Bolton P Clinical decision making; are computers really helpful? *Australian Family Physician* 1995; 24 (5): 882- 885

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**SECTION 3**  
**SCREENING SURVEY OF PRACTICES**

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# PATTERNS OF COMPUTER USE WITHIN PRACTICE

## PENETRATION OF COMPUTERS

Computers were present in one third (31%) of the practices surveyed. There is no comparable figure from other studies, as these have been based on doctors as distinct from practices.

Computers were much more likely to be found in group practices, outside the metropolitan area, and there are some regional variations in incidence. Computers were twice as likely to be found in practices in West Australia as in New South Wales.

**Table 3: Penetration of Computers**

Penetration of Computers	Computers Present In Practice %
<b>Total Sample</b>	<b>31</b>
<b>No. of doctors in practice</b>	
One doctor	21
Two doctors	33
3 - 4 doctors	44
5 or more doctors	74
<b>Region</b>	
Metropolitan	27
Rural	42
Remote	45
<b>State</b>	
WA	52
SA/NT	40
Qld	38
Vic/Tas	30
NSW/ACT	22

Among practices with computers the average number of computers per practice was 1.9.

**Table 4: Number of Computers in Practice**

Number of Computers	Practices With Computers n = 456 %
One computer	37
2 - 3 computers	39
4 or more computers	24
<b>Mean score</b>	<b>1.9</b>

S19 *How many computers or computer screens are there in use in this practice, whether for Clinical or Administrative functions?*

As would be expected, the number of computers was related to the number of doctors in the practice. The average number of computers tended to be higher in country areas (rural 2.1, remote 2.0), and those practices which carry out both Clinical and Administrative tasks (2.1).

Number of doctors	Average No. of PCs in Practice
One doctor	1.5
Two doctors	1.9
3 - 4 doctors	2.0
5 or more	2.5

## COMPUTER FUNCTIONS IN THE PRACTICE

The interview explored the use of computers at three different levels. First it covered activity within the practice as a whole, then it examined activity by the doctors, then at the final level the focus of enquiry was the specific doctor whose name had been drawn in the sample.

A range of computer tasks were read to the respondent, and they were asked whether in their practice computers were used for these functions. The range included the most common administrative and clinical functions; the latter are marked with an asterisk below. The functions have been ranked on their frequency.

Patient registrations, accounts and practice finances were the most common tasks; at least half the practices 'usually' or 'always' carry out these activities via computers. The Administrative tasks with least usage were stores control and patient appointments.

Clinical functions were relatively less common. The majority of practices ‘never’ use any of the Clinical tasks. The Clinical functions with most usage were recall (40%) and script writing (33%) The Clinical function with least use was doctor’s notes (16%).

**Table 5: Computer Functions in Practice**

Computer Functions	Always %	Usually %	Sometimes %	Never %	DK %
Recording patient details	73	4	2	20	-
Issuing patient accounts	63	1	3	33	-
For practice finances	47	8	9	30	6
Running a recall system*	35	5	6	53	1
Writing prescriptions*	26	7	7	59	-
Scheduling appointments	19	-	1	79	-
Storing info. electronically*	17	2	7	75	-
Receiving pathology results*	16	3	4	77	-
Keeping doctor’s notes*	13	3	11	71	1
Stock/stores control	4	3	4	87	2

S15 *I’m going to read out a range of tasks and for each one I’d like you to tell me whether in your practice computers are used for these tasks always, usually, sometimes or never.*

\*Those functions marked with an asterisk, are defined in this study as Clinical functions. All figures are percentages, and the sample size for all functions is 456.

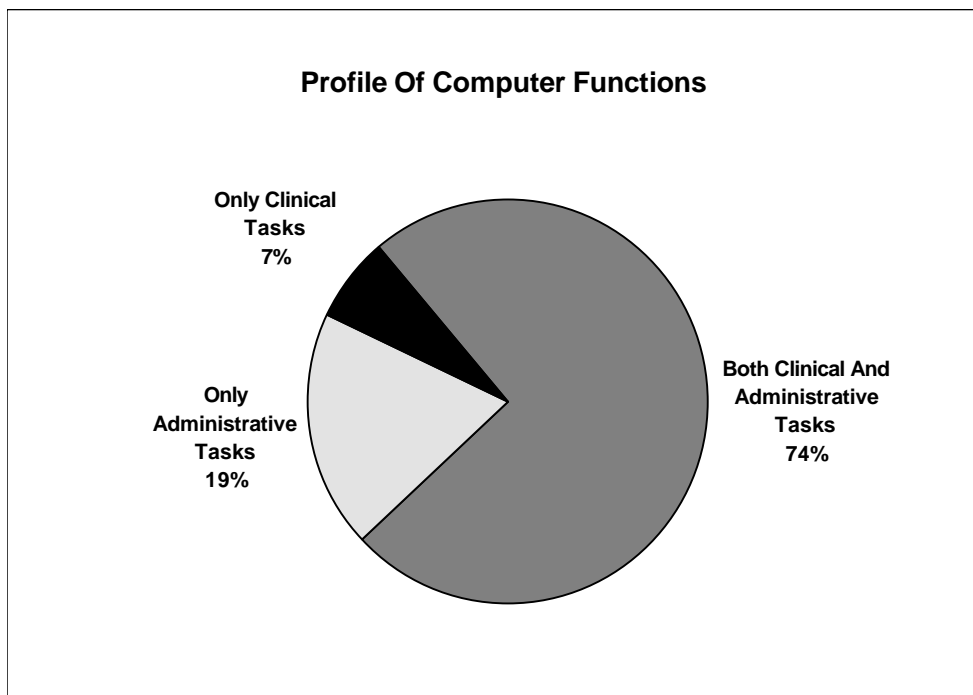
Usage of the Clinical functions showed the following patterns:

- Recall (35% ‘always’) showed a bias towards:
  - practices with 5 or more doctors (44%)
  - rural and remote practices ( 40% and 46% respectively)
- Script writing (33% always/usually) was more common among:
  - solo or 2 person practices (39% and 38% respectively)
- Clinical notes (16% always/usually) showed a bias towards:
  - solo practitioners (21%)

Among the practices with computers, three out of four (74%) were using a mix of Clinical and Administrative functions. One in five (19%) were using just Administrative functions, while 7% were using exclusively Clinical functions.

Exclusively Clinical practices were most common in New South Wales (15%).

**Figure 1: Profile of Computer Functions**



## CLINICAL USE BY DOCTORS

Having asked about the computer tasks within the practice the interview went on to establish the extent of Clinical use by the doctors. Respondents were asked whether any of the doctors in the practice regularly used any of the four main Clinical functions - scripts, recall, patient records and storage of patient information.

In four out of ten practices (40%) GPs were using computers for script writing, and this is consistent with the results in the previous section. The other three functions all had similar levels of use (22% - 24%). Use by doctor is at a much lower level than use in practice, indicating that this function is often carried out by the clerical staff. It may be a Clinical function, but it is often administered by the support staff.

Practice level activity indicated that Clinical notes were used in 29% of practices, however the table below shows that in one in four practices (24%) GPs use computers for Clinical notes. This discrepancy may relate to who carries out the task; it is possible the GP is dictating or writing the notes for clerical staff to enter.

Use for Clinical notes was more common among solo practitioners (31%).

**Table 6: Clinical Functions in Practice**

Clinical Functions	Practices with Computers n = 456 %
Script writing	40
Recording clinical notes	24
Storing information eg pathology/reports	23
Recall system	22

S 16 *Do any of the GPs in this surgery **personally** use computers for any of the following functions on a regular basis?*

Half the practices with computers (51%) have doctors that are using at least one Clinical function. Clinical functions were much more likely to be found in practices with numerous computers; among practices with 3 or more computers three quarters of them (76%) have doctors using Clinical functions. The proportion was also above average among solo practitioners (54%), rural practices (56%), and Victoria (57%).

Looking at Clinical use across all practices, 15% of practices have doctors present who are Clinical users. Clinical use was more commonly found in group practices (19%) and outside the metropolitan area (22% rural, 21% remote). Clinical use was relatively **less** common in New South Wales (11%).

**Table 7: Number of Clinical Users in Practice**

Number of Clinical Users	Total Sample n = 1018 %
None	85
One doctor	10
2 - 3 doctors	4
4 or more	1

S18 *How many of the GPs use computers for any of the functions I just mentioned?*

Comparing the number of Clinical users with the number of doctors in the practice indicates the extent to which the practice environment is uniform. To the extent that Clinical use is not standard and fully supported it probably causes additional work for the Clinical user, as dual record systems must be maintained.

In most cases where Clinical use exists, the Clinical users were in the majority (12%). In 2% of practices they formed a minority.

**Table 8: Proportion in Practice Using Clinical Functions**

Proportion Using Clinical Functions	Total Sample n = 1018 %
No Clinical users	85
Less than half the doctors are Clinical users	2
50% or more are Clinical users	3
All doctors in practice are Clinical users	9

S12 *How many GPs work at this location?*

S18 *How many of the GPs use computers for any of the Clinical functions I just mentioned?*

## CLINICAL USE BY INDIVIDUAL GP

Having asked about activities within the practice and the doctors as a group the next question focussed on the individual doctor whose name had been selected in the sampling process.

Respondents were asked whether the particular doctor regularly used any of the four main Clinical functions - scripts, recall, patient records and storage of patient information. The pattern of responses was similar to that seen in the previous section; script writing was the most common function, and the other three had much the same level of use.

In practices with computers, three out of ten GPs (29%) were using computers for script writing. Sixteen percent were using computers for clinical notes. The right hand column shows usage of these functions among all GPs. Script writing is used by 12% of all GPs, while the other functions have 7% usage.

**Table 9: Clinical Use by Individual GP**

Clinical Use by Individual GP	Practices with Computers n = 456 %	Total Sample n= 1018 %
Script writing	29	12
Storing information electronically	18	7
A recall system for patients	17	7
Recording clinical notes	16	7

S17 Does Dr ..... *personally* use a computer on a regular basis for any of the following functions?

Demographic patterns for all four functions were similar, with all functions being more common among males and smaller practices. For most functions there was no clear pattern in terms of the doctor's age, however for clinical notes there was a slight bias in favour of the older age group (19%).

On a nett basis, one in three GPs (36%) in practices with computers were Clinical users i.e. using at least one of the four Clinical functions. As just mentioned Clinical use was more likely to be found where the doctor was a male and in a small practice. There were no marked variations in terms of the doctor's age, state or region.

The table below shows the data from two different perspectives. On the basis of practices with computers the proportion of Clinical users was 36%; while on the basis of the total population the proportion of Clinical users was 15%.

**Table 10: Clinical Use By GP**

Clinical Use By GP	Practices with Computers n = 456 %	All doctors n = 1018 %
Individual GP uses at least one Clinical function	36	15
Individual doctor uses no Clinical function	64	85

On the basis of the answers concerning computer use and functions each doctor was classified as either a Non-user, an Administrative user or a Clinical user. This classification determined whether the individual doctor qualified for the subsequent more detailed interview.

This analysis indicates that almost two thirds of GPs are in practices where computers are not used for either Clinical or Administrative tasks. As above 15% of the doctors were Clinical users.

**Table 11: Status of Selected Doctor**

	All doctors n = 1018 %
Clinical user	15
Administrative user	22
Neither Clinical nor Administrative user	63

## INTENTIONS AMONG NON-USERS

Those practices without computers were asked about their future plans concerning computers. Four out of ten respondents (42%) indicated that the doctors in the practice had given serious consideration to acquiring a computer. A small proportion (9%) were unable to answer the question; these are presumably receptionists in practices where the issue has not been discussed.

Consideration was related to practice size, with larger practices much more likely to be thinking about computerisation. Country practices also showed more readiness to consider the technology (rural practices 62%, remote practices 52%).

**Table 12: Ever Considered Computers**

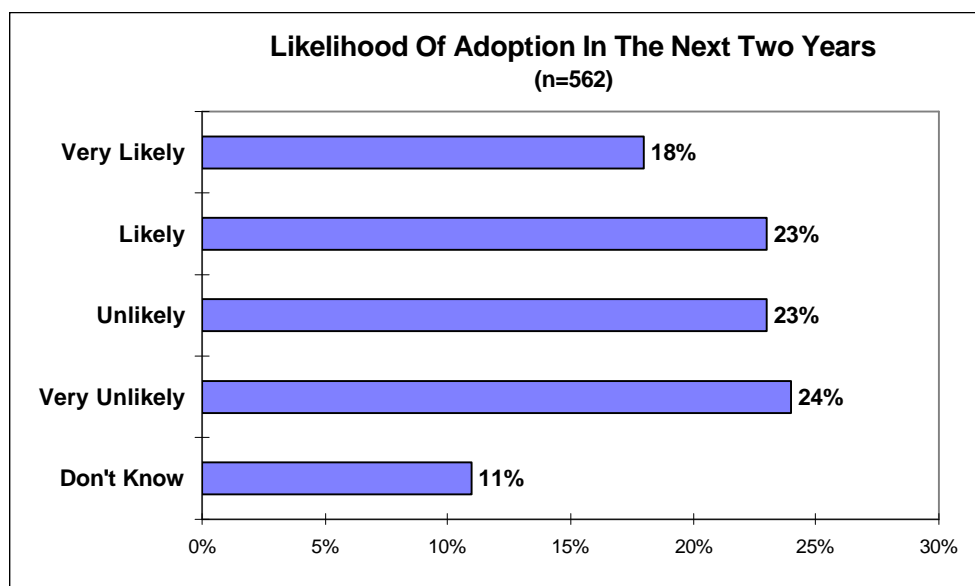
	Practices without Computers n = 562 %
Have considered computers	42
Have not considered computers	49
Don't know	9

S20 *To your knowledge have the doctors in this practice ever seriously considered getting a computer?*

Intentions were explored more specifically by asking about the likelihood of adoption in the next two years. Responses were in line with those for consideration. Four out of ten (41%) considered adoption was likely, and of these 18% considered it a strong possibility.

As before, large practices were much more likely to be considering uptake, and Non-users in Victoria showed above average interest.

**Figure 2: Likelihood Of Adoption In The Next Two Years**



S21 *How likely do you think it is that the practice will acquire a computer in the next two years?*

Those who considered uptake in the next two years was a possibility were asked about the tasks for which they thought the computer would be used. Six out of ten ( 61%) considered that Clinical tasks would form at least part of the computer's function. This is very positive, however it should be remembered that these are in most cases the views of receptionists, rather than the views of doctors.

**Table 13: Intended Functions**

Functions	Likely to Adopt in Next 2 years n = 249 %
For doctors with patients	6
For administrative functions	35
For Clinical and Administrative functions	55
Don't know	4

S 22 *Is that likely to be for the doctor's use in their work with patients, for administrative functions, or for both?*

## PRACTICE CHARACTERISTICS

Sharing of patients was common. In 96% of group practices the doctors see each others' patients.

Bulk billing was widespread, with 46% of practices indicating that 85% or more of patients were bulkbilled.

**Table 14: Extent Of Bulkbilling**

Proportion Bulkbilled	All practices n = 1018 %
None	2
Less than 50%	12
50 - 64%	13
65 - 84%	19
85- 99%	18
100%	28
Don't know	8

S26 *What proportion of the patients are bulkbilled?*

## FACSIMILES AND MODEMS

Four out of five practices (79%) have a facsimile machine. This technology was much more likely to be found in larger practices, and those in country areas.

One in four practices (19%) has a modem. As with facsimiles, the incidence of modems was related to practice size, and country practices, with larger practices and rural practices being more likely to use facsimiles and modems.

**Table 15: Facsimiles and Modems**

	All practices n= 1018 %
Have facsimile machine	79
Have computer and modem	19
Have computer but no modem	12
Have no computer	69

*S27 Are there facilities for faxing in the practice?*

*S28 Does the practice have a modem?*

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**SECTION 4**  
**CLINICAL USERS SURVEY**

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## PATTERNS OF COMPUTER USE WITHIN PRACTICE

Where the same questions were asked in both the Clinical and Administrative interviews, the results are both presented in this section allowing comparisons to be made. Note that the sample size in both the Clinical and Administrative surveys was approximately 100; although some analysis by sub-group is presented below, given the modest sample size these results must be considered indicative rather than definitive. The sample size is shown in all tables, as a guide to reliability.

### PENETRATION OF COMPUTERS

In the practices with which the Clinical user was associated the average number of computers in use was 4.3.

The incidence of computers was related to practice size; the average number per practice was as follows:

<b>Practice size</b>	<b>Av. No. of PCs</b>
One doctor	2.2
2 doctors	3.1
3-4 doctors	4.5
5 or more	8.1

The number of computers in the practice was higher for females (5.6) than males (4.0).

The number of computers may be related to age; the average number of PCs in the three age groups were:

- 21 to 40 yrs, 3.8
- 41 to 50 yrs, 4.4
- over 50 yrs, 4.8

In the Administrative survey the average number of computers in the practice was lower (3.2).

The majority (87%) of the Clinical users being interviewed had a computer on their consulting desk. Availability on the desk was more common among:

- older doctors (93%)
- those in metropolitan practices (92%)
- and those in group practices where clinical use was uniform (92%).

In the Clinical survey the doctor being interviewed was obviously a computer user, but the other doctors may not have been. When the number of doctors is compared with the number of Clinical users in the practice it indicates that three quarters of the doctors in those practices (75%) were using computers for clinical tasks.

## COMPUTER TASKS AND THEIR HISTORY

Clinical use was strongly associated with administrative functions. Nine out of ten Clinical users (87%) said that computers were also used in the practice for administrative tasks.

Clinical and Administrative users were asked for what period their practice had been using computers for administrative functions. The average number of years of administrative use was the same in both survey groups i.e. 5.3 years.

By contrast the average period of Clinical use by the practice (among Clinical users) was much shorter - average 2.6 years.

Clinical users were asked about their personal history of clinical use. Their average period of experience was longer than that of their practice - average 2.8 years. These figures are summarised below.

	<b>Average years of use</b>	
	<b>Clinical survey</b>	<b>Admin. survey</b>
Administrative functions in practice	5.3	5.3
Clinical functions in practice	2.6	-
Clinical use by doctor	2.8	

Although 87% of practices in the Clinical survey were using computers for administrative purposes, seven out of ten (71%) still maintain a paper-based patient index system, and among the older doctors the proportion was 100%.

# CURRENT CLINICAL FUNCTIONS

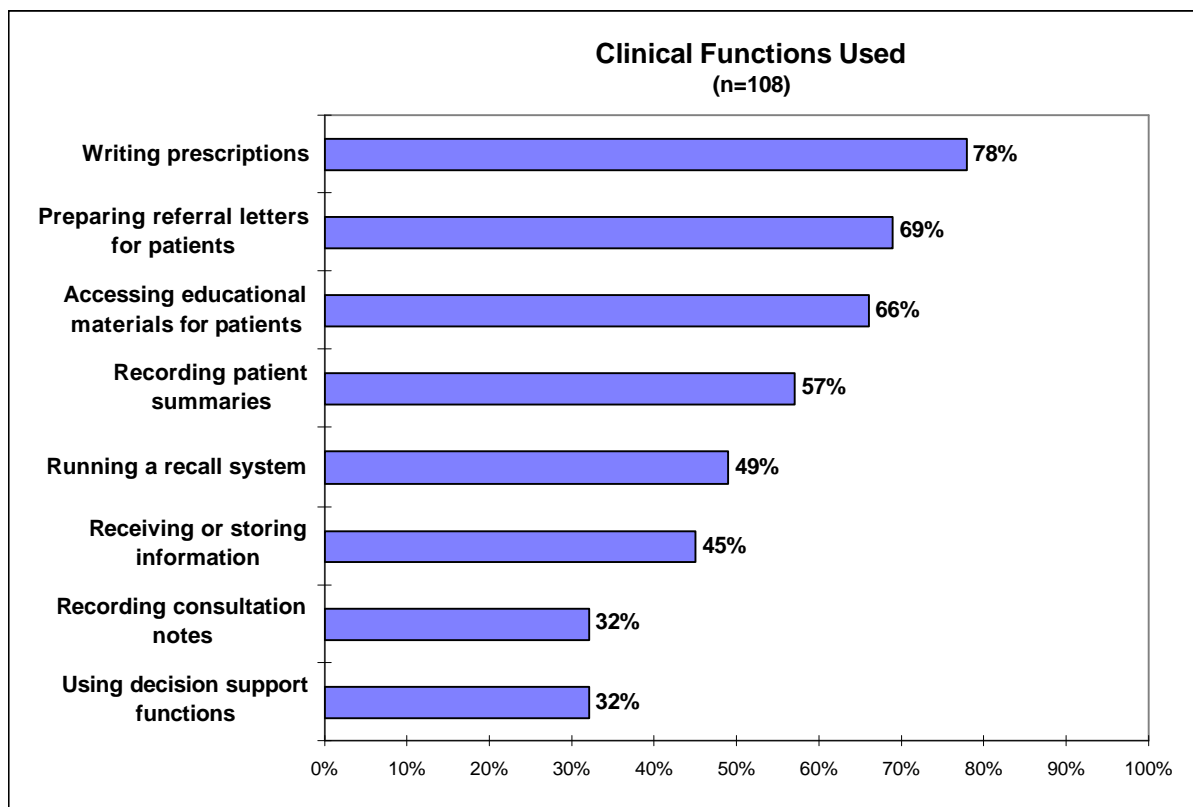
## INCIDENCE OF CLINICAL FUNCTIONS

Clinical users were read a list of eight different clinical functions and asked whether they personally ever use a computer for such tasks. The list was designed to cover the main clinical functions.

Prescription writing was the most widely used function, being used by eight out of ten Clinical users. This was followed by its use for generating referral letters. These two leading functions both involve a document that is sent outside the practice.

Use for educational purposes was relatively high, being used by two out of three (66%) Clinical users. Use for patient summaries and for recall were both used by more than half the sample. The two functions with lowest level of use are clinical notes and decision support (both 32%).

**Figure 3: Clinical Functions**



C1 Do you personally ever use a computer for any of the following functions?

Looking at the average number of functions used gives an indication of the breadth of clinical activity. On average each doctor was using a little more than four (4.3) of the eight functions canvassed. When the range of functions is compared across the different sub-groups, there are some interesting patterns apparent:

- the range of functions is higher among older doctors (average number of functions 4.6), compared with younger doctors (average number of functions 3.8)
- males use more functions than females ( 4.4 versus 3.8)
- a wider range of functions correlates with longer clinical experience (4.8), familiarity with the Internet (5.0), self confidence about using computers (4.9), and practices with larger numbers of computers (4.5).

Each of these clinical functions was examined in more detail with a subset of questions about each one. These are covered further on in this section of the report.

The demographic profile shows some variation across the different functions, and where distinctive differences exist, these are outlined below.

- Prescription writing (78%) shows a bias towards:
  - older doctors (50 + years) (90%)
  - group practices with more than 3 computers (95%)
  - and a relatively short history of clinical use, 2 years or less ( 84%) This is the only function to show this pattern; the other functions all show higher levels of use among those with a longer history of use.
- Referral letters (69%) show a slight bias towards:
  - older practitioners (75%)
  - those in remote locations (73%)
- Accessing educational resources ( 66%) shows a bias towards:
  - the 50+ age group (77%)
  - males ( 71%)
  - those in urban locations ( 71%)
- Use for recall (49%) is more common in:
  - large practices, 5 or more (69%)
  - rural areas ( 66%)
  - those with longer history of clinical use, more than two years ( 61%)
- use for storing information (45%) correlated with:
  - more years of clinical experience ( 60%)
-

- Use for clinical notes (32%) is more common among:  
those aged 41 - 50 years ( 43%)  
solo practitioners (43%)
- Decision support (32%) is more commonly used by:  
doctors in remote areas (43%)

### Clinical Audit

An additional question was asked about the use of the computer for clinical audit. At least one in three Clinical users (36%) said they use the computer in this way. Use for clinical audit was more common in large practices ( 52%), and rural areas (50%).

## PRESCRIPTION WRITING

Those doctors using computers for script writing were asked what proportion of their scripts were produced in this way. The pattern was for high levels of use; two out of three use the computer to generate virtually all their scripts (95% or more of scripts). Even among the remainder, the pattern was for heavy rather than light use.

**Table 16: Proportion Of Scripts that are Computer Generated**

Proportion Of Scripts	Use computer for script writing n = 87 %
All scripts - 100%	31
Virtually all scripts - 95% - 99%	36
Less than 95%	31
Don't know	3

C 12 *What proportion of your prescriptions are written using the computer?*

High levels of use were more common among the younger age group (41%) and those group practices where clinical use was uniform (44%).

Review of prescribing patterns was only undertaken by a minority (28%). Those who use the review function were more likely to be male (32%), and in the 41-50 age group (37%).

## EDUCATIONAL RESOURCES

In terms of frequency of use to access educational resources, behaviour varies. The overall pattern favoured occasional use, however there were also many who use this function regularly. Samples in sub-groups are in some cases limited, but the results suggest that 'frequent' use for educational purposes is more common among women (68%), those in remote areas (62%), those with a longer history of clinical use (51%), and those under 50 years.

**Table 17: Frequency Of Access for Educational Purposes**

Frequency of Access	Use computer to access educational resources n = 72 %
Frequently	37
Quite often	11
Sometimes	51
Never	2

*C 32 How often do you access educational materials for patients via computer?*

## PATIENT SUMMARIES

Those doctors who record patient summaries on computer were asked for what proportion of their patients were these records up to date. Only a minority (19%) maintain summaries on a consistent basis, with all records up to date. Most doctors have current summaries for half or less than half their patients.

**Table 18: Proportion of Up to Date Patient Summaries**

	Use computer for patient summaries n = 64 %
All records	19
About three quarters	21
About half	23
About a quarter	14
Less than a quarter	22
Don't know	1

*C 27 For what proportion of your patients would you have an up to date patient summary?*

Those with incomplete summaries were asked whether they intended to progressively update the records as patients attended. A clear majority (91%) plan to lift the level of current summaries.

Patient summaries are commonly used in preparing letters of referral. Among the doctors with summaries, three out of four (75%) use them as the basis of the referral letter.

Entry of the summary data was typically done by the doctor (98%), but in a small proportion of cases support staff carry out this task. In some cases data is entered by both doctor and staff, hence the figures add to more than 100%.

**Table 19: Responsibility for Data Entry**

	Use computer for patient summaries n = 64 %
Entry by doctor	98
Entry by staff	6

*C 29 Is it yourself, the secretary, or someone else that usually enters the patient summary?*

## **RECALL**

Those using the computer to run a recall system were asked what procedures or conditions were being addressed by the system. Pap smears were the leading mention, followed by immunisation, then mammography. A wide range of procedures received minor mention. Those with very low levels of mention have been grouped together under 'other' in the table below, and this category includes such things as post surgical review, methadone permits, hepatitis B, and HRT reviews.

Some doctors used recall for a wide range of conditions, and across the group as a whole the average number of conditions mentioned was 2.5.

**Table 20: Target of Recall System**

Target of Recall System	Use computer for recall n = 55 %
Pap Smear tests	89
Immunisation (child or adult)	51
Mammography	27
Blood pressure, cholesterol	18
Diabetes	13
Anything needed	10
Prostate checks/PSA's	7
Bowel cancer/colonoscopy	7
Flu vaccines	6
Weight review	4
Skin checks	3
Other	16

*C9 For which procedures does the computer generate reminders?*

The majority of the doctors said they enter details and maintain the recall system themselves, but this task was also quite often delegated to, or shared with secretarial staff.

Delegation or sharing were more common among older doctors, women doctors, and those with a longer history of clinical use. Among doctors under 40 years self entry was 80%.

**Table 21: Entry of Recall Details**

	Use computer for recall n = 55 %
Entered by doctor	63
Entered by administrative staff	22
Entered by both	15

*C10 Who mainly enters the recall information - is it yourself or the administrative staff?*

The recall function is sometimes used as a reminder system; 39% use it in this way. Frequent use for reminders was more common among those group practices where all doctors are clinical users.

**Table 22: Frequency of Use for Reminders**

Frequency	Use computer for recall n= 55 %
Often	39
Occasionally	22
Never	39

C 11 *How often do you use the recall function as a reminder system to yourself, for example, to check whether tests have come back, or a patient has been to a specialist?*

## RECEIVING AND STORING INFORMATION

To explore data storage, doctors were asked about three different types of information - pathology results, discharge summaries and specialists' reports. In each case they were asked in what form the information was usually received, and in what form it was usually stored. Multiple responses were possible, as records can be received and stored in several ways.

Discharge summaries and specialist reports typically come by mail, but the use of e-mail for pathology results is very common. Almost half the doctors say they usually receive results via modem. For this type of information e-mail is almost as common as paper.

**Table 23: Receipt of Data**

Means of Receipt	Pathology n = 51 %	Discharge summaries n =51 %	Specialist reports n = 51 %
Paper	49	89	94
Fax	5	6	1
Modem	46	5	5

C14 *Do you usually get ....on paper, via fax, or electronically via modem?*

Not surprisingly, the data storage patterns reflect the mode of receipt. Discharge summaries and specialist reports were predominantly held as hard copy records, while pathology results were typically stored on computer. Across all three categories there is a shift toward electronic storage, and this is most pronounced for pathology results, where 74% are retained on computer. This data transfer from one medium to another may be accomplished by direct data entry, but it is more likely to be via scanning.

It is interesting to note that parallel storage of pathology results is commonplace. Half the doctors who store information on computers, keep pathology results both on file and on computer.

**Table 24: Means of Data Storage**

Means of Storage	Pathology n = 51 %	Discharge summaries n = 51 %	Specialist reports n = 51 %
On paper	26	83	76
On computer	25	5	10
On both	49	12	14

C15 *And do you usually file them in paper form, on computer or both?*

Cross analysis of the responses to the two questions on data provides further detail about the shift from one medium to another. Discharge summaries primarily come in hard copy, and they are generally held in their original form. Conversion from paper to electronic form occurs for 15% of discharge summaries, and 20% of specialist reports. This contrasts with the pattern for pathology results where the majority of paper results (63%) are converted to electronic form. Dual storage was common across all three categories; when data is received in or converted to electronic form it is often held in two parallel information systems.

Those doctors who store patient information electronically were asked how paper records were managed. The majority (80%) don't transfer the data to electronic form; they retain it on the patient file as paper.

**Table 25: Storage Form for Paper Records**

	Use computers to store information n = 40 %
Retain as paper	80
Scan the document	13
Type in main details	7

C16 *If there is information on paper which must be kept for the patient records, which of the following do you usually do?*

Among those doctors who either receive or store information electronically, one in four (24%) say they electronically record test results from external devices, such as ECG's or spirometry. This function was more common in the cities, and those larger practices where all doctors are clinical users.

To explore security practices, doctors who store information electronically were asked whether they ever send patient records to people outside the practice. One in five (20%) said they have done this previously. The sample is too small to be reliable, but this may be more common in rural areas.

Of those who send files outside the practice, seven out of ten (70%) take no security measures. (The question did not ask what security measures were used; it just asked whether security measures such as encryption were used).

Most of the exchange was with specialists, but other GPs also received a high level of mention.

**Table 26: External Recipients of Patient Records**

Recipients	Send records externally n = 10* %
Specialists	95
Other GPs	62
Hospitals	33
Other health professionals	7
Other	19

C19 *To whom do you send such information?*

\* Note, small base

## CLINICAL NOTES

Two questions were asked to establish the consistency of computerised note taking. The first asked what proportion of consultations in the last week were recorded electronically. Among those using computers for clinical notes, seven out of ten doctors (73%) recorded most or all of their consultation notes on computer. One in ten had not used the computer for notes at all during the previous week. It must be noted that as the overall incidence of computerised notes is low, the sample available at this level is limited.

**Table 27: Use of Computer for Clinical Notes in Last Week**

	Use computer for clinical notes n = 36 %
All notes	65
Most notes	8
Some notes	19
None	8

*C21 In the last week for what proportion of your consultations were notes recorded electronically?*

The second question asked what proportion of the doctors' clinical notes were held on computer. At this level the extent of computerisation was not quite as high, with just over half (53%) saying all records were computerised. One in five (23%) indicated that only a small proportion of their notes were computerised. These results appear to be related to years of clinical use; those with longer experience being more likely to maintain all records, and the relative newcomers being more likely to have only a small proportion of notes computerised.

**Table 28: Proportion of Notes Held on Computer**

	Use computer for notes n = 36 %
All notes	53
About three quarters	5
About half	12
About a quarter	6
Less than a quarter	23
Don't know	2

*C25 What proportion of your clinical notes are presently held on computer?*

Those using computerised notes were asked whether these were recorded exclusively on computer, or whether they are recorded both on hard copy and electronically. The majority (58%) use both media. Only 42% rely exclusively on the computer.

Those doctors using both paper and computer were asked why they choose to work in this way. The question was open-ended and respondents could answer as they chose. The main reasons given were that using a computer is slower, and that hard copy records are safer, and more secure.

**Table 29: Reasons for Using Both Computerised and Paper Notes**

Reasons	Keep notes on both paper and computer n = 21 %
Quicker to write/slow or inaccurate on computer/unable to type	23
Safer on paper/might lose it on computer/don't trust computer/double security	19
Current software is unsuitable/computer is too slow	17
Don't have a laptop for home visits/remote locations	16
Medico-legal reasons/electronic records inadmissible in courts	15
Patients feel Dr is inattentive if use a computer, patients prefer Dr to write	14
Other	30

*C23 Why do you keep notes on both paper and computer?*

Those using computerised records were asked whether the consultation notes were entered by the doctor or the secretary. In most cases this task is carried out by the doctor, but a small proportion (7%) delegate this to the secretary.

**Table 30: Responsibility for Entry of Clinical Notes**

Entry of Clinical Notes	Use computer for notes n = 36 %
Entered by doctor	93
Entered by secretary	7

*C24 Is it yourself or the secretary that usually types in the details on the computer?*

Security and confidentiality were further examined by asking whether a security system was in operation on the computer. The majority have such a system, but three out of ten (29%) said they either did not or did not know whether one existed.

**Table 31: Incidence of Security Protocol**

	Use for clinical notes n = 36 %
Yes	71
No	22
Don't know	7

*C26 Does your computer system have different levels of security for different members of staff?*

## DECISION SUPPORT

Among those who use the computer's diagnostic support function the majority say they use it on a regular basis. Six out of ten (57%) call upon this support 'frequently' or more often. There was a small proportion that claimed to have used this function at some previous stage, but when asked for more detail, they do not appear to be using it currently.

**Table 32: Frequency of Use for Decision Support**

Frequency	Use the decision support function n = 33 %
Frequently	31
Quite often	26
Sometimes	35
Never	8

*C 31 How often do you use the decision support functions to help you solve diagnostic problems or make dispensing or treatment decisions?*

# INTERNET AND E-MAIL

## INCIDENCE OF E-MAIL AND INTERNET

Clinical users were asked whether access to e-mail and the Internet were available at both the practice level and the doctor level. At the practice level, 44% have access to e-mail, while 47% have access to the Internet. Both e-mail and Internet were more common in solo practices. In geographic terms while e-mail was more common in metropolitan practices (49%), Internet has higher penetration in remote practices (56%).

Personal access to these functions is much lower; 27% have e-mail available on their desk, and 30% have Internet access. Both these functions were more likely to be found where the doctor was male, the practice was metropolitan, and there was a bias towards the older age groups.

Levels of Internet access, at both the practice and the doctor level are twice as high among males as females.

**Table 33: E-Mail And Internet Access**

Availability	E-mail %	Internet %
Available in practice	44	47
Available on doctor's desk	27	30

C 34 Does your practice have....?

C35 From your consulting desk do you have...?

Those with e-mail available from the desk were asked how often it was used. Regular use was common, with three out of four doctors (74%) saying they use it 'quite often' or 'frequently'. A small proportion (9%) have it available, but do not use it.

**Table 34: Frequency of E-Mail Use**

Frequency	Have e-mail on desk n = 27 %
Frequently	57
Quite often	17
Sometimes	17
Never	9

C 37 How often do you use e-mail?

Where e-mail was available in the practice, the doctor was asked whether any patients communicated via e-mail. Fifteen percent of doctors with e-mail say patients contact them via this means.

Doctors communicating with patients via e-mail were exclusively male, and in metropolitan practices.

## PRESENCE OF SECURITY MEASURES

Those with Internet access from their desk were asked whether their records were secure and protected from outside access. A clear majority (88%) say security is in place, however 12% say they either have no security, or do not know whether it exists. The type of security was not established, just whether it was present or not.

**Table 35: Security Measures Present**

Have Security Measures	Have Internet access on desk n = 29 %
Yes	88
No	3
Don't know	9

C 38 *Are your electronic records secure and protected from outside access?*

## INTERNET FUNCTIONS

Those with Internet access were asked how it was used, and what balance existed between personal and professional use. The same question was asked in the Administrative Users survey, so the answers are provided for comparison.

Among Clinical users there were very few with access that are not using the Internet, and use in pursuit of professional goals was widespread.

Among Administrative users use of the Net was lower, and was predominantly for personal rather than professional interest.

**Table 36: Use of Internet**

Use of Internet	Have Internet access	
	Clinical users n = 50 %	Administrative Users n = 55 %
Don't use Internet	7	29
Use mainly for personal interests	19	29
Use mainly for professional interests	34	24
Both equally	40	17

*C 39 Do you use the Internet mainly for personal interests, or for activities relating to your profession?*

Clinical users using the Internet for professional interest were asked to give further details about the kinds of activities undertaken. The leading uses of the Internet were access medical journals and to find information to help patients. When Medline searches are combined with mentions of journals, three out of four (72%) are using it to access the medical literature.

With the average number of activities mentioned being 2.7, a wider range of activities was evident among remote doctors, and young doctors, although the limited sample size must be remembered. Internet users in remote locations showed a wider range of functions, and particularly emphasised 'finding information with patients', 'contact professional associations', continuing education' and 'accessing medical journals'.

Some of the minor mentions in the 'other ' category included 'research', 'searching data bases', 'link to other practices' and seeking software and software support.

**Table 37: Professional Uses of The Internet**

Internet Functions	Use Net for professional interests n = 38 %
Access medical journals	49
Finding information to help patients	47
Continuing education/studies	32
E-mail	32
Access Medline	23
Contact professional associations	19
Professional development	19
Drug interactions/allergies	10
Consultation with colleagues	8
Interest groups	6
Other	19

*C 40 For what activities related to your profession do you use the Internet?*

## FUTURE INTENTIONS

### FUTURE INTENTIONS - CLINICAL USERS

Clinical users were asked whether in the next 12 months they intended to increase the range of clinical functions being used. Three out of four (76%) said that wider use was likely.

Intention to expand clinical use correlated with the current number of clinical functions; those using a wider range of functions showing more interest in further expanding that range.

**Table 38: Intention to Increase Clinical Functions**

Intend Increasing Clinical Functions	Clinical users n = 108 %
Yes	76
No	20
Don't know	4

*C2 Are you likely to extend the range of clinical functions on computer in the next 12 months?*

Among Clinical users the interest is strongest in those functions which are relatively less common at present. Receiving and storing information, clinical notes, and decision support were the functions generating most interest, and use of these is at present limited.

With an average of 2.5 additional functions being mentioned by Clinical users, the groups showing interest in a wider range of functions were females (3.5) and those in remote locations (3.0).

The same question was asked of Administrative users who indicated they were likely to take up clinical functions in the next two years. The functions they showed interest in were very different from those of Clinical users. Prescription writing was of far more interest than any other function, suggesting that purchasing will be strongly influenced by a software's prescribing capabilities. Functions of second order interest were patient summaries and electronic storage of information. Clinical notes ranked fifth in terms of interest.

In the table below the functions are ranked on the responses of Clinical users.

**Table 39: Additional Functions of Interest**

Additional Functions of Interest	Clinical Users Likely to extend clinical use n = 86 %	Administrative Users Likely to take up clinical use n = 67 %
Receiving/storing information	36	46
Recording clinical notes	31	29
Recording patient summaries	24	48
Recall/extend recall	22	32
Decision support system	21	6
For referral letters	20	20
Internet access	17	14
Accessing educational materials	15	-
Prescription writing	15	83
E-mail	11	10
Improve current functions	7	-
Medclaims	5	-
Scanning	5	-
Use CD ROM's	4	-
Other	12	9
Don't know/none	4	-
<i>Average number of functions mentioned</i>	<i>2.5</i>	<i>3.0</i>

C3 Which additional functions are you considering taking up?

Q14 What clinical functions are you considering using the computer for?

## FUTURE INTENTIONS - PRACTICE LEVEL

In practices where clinical use was not universal, doctors were asked about the likelihood that uptake by other doctors would occur in the next two years. This question was asked in both the Clinical and the Administrative surveys, and results are shown for comparison.

There was more likelihood of adoption in practices where clinical applications were already being used, and this is probably to be expected, however even among Administrative users there were strong indications of interest and positive intention; over half (57%) considered that the number of doctors in the practice using clinical applications was likely to grow.

**Table 40: Likelihood of Uptake by Non-Users**

Likelihood	Practices where clinical use is not universal	
	Clinical Survey n =38 %	Admin. Survey n = 98 %
Very likely	34	26
Likely	29	31
Unlikely	21	27
Very unlikely	10	8
Don't know	6	8

*C 7 How likely is it that any of the non-users will start using computers for clinical tasks, in the next two years?*

Clinical users were asked to comment on the factors that would encourage them to use computers for a wider range of clinical tasks. The question was open-ended so the respondent could answer in any way they wished. The two main factors that would encourage wider use of computers mentioned were better software and financial support from the government.

**Table 41: Factors Encouraging Wider Clinical Use**

Factors Encouraging Wider Clinical Use	Clinical users n = 108 %
Availability of software/right software	16
Govt funding/subsidy	15
Cheaper computers/lower cost	12
Faster/more reliable software	10
Depends if cost efficient/save time	10
Link to hospital/clinical info/e-mail	8
Better keyboard skills	7
More time/too busy to learn	7
Voice recognition software	6
User friendly computers/software	5
Security/authenticate records	5
Internet services for GPs	5
Scanning/faster scanning	4
Nothing	6
Other	10
Don't need encouragement/already use	13

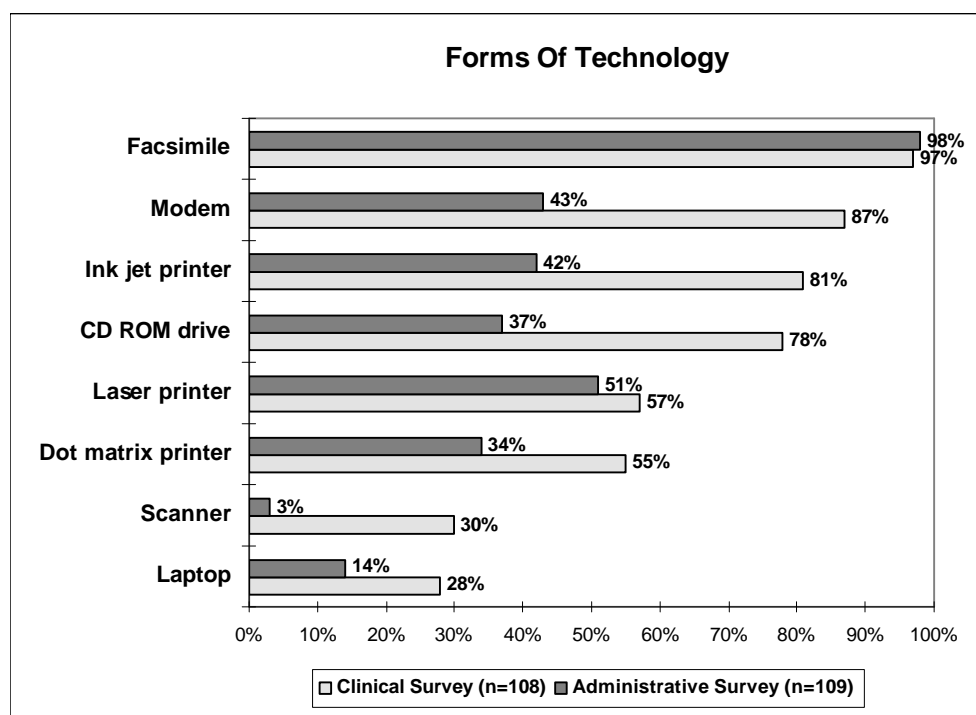
*C4 Is there anything that would encourage you to use computers for a wider range of clinical tasks?*

# LEVELS OF TECHNOLOGY

## RANGE OF TECHNOLOGY IN PRACTICE

Both Clinical and Administrative users were asked about the presence of a range of different technologies in the practice, and the profile of technologies is very different in the two groups. Penetration of facsimiles is very high, with virtually all practices in both groups having a fax machine. Modems were widespread (87%) among Clinical users, and CD ROM drives were also common (78%). Among Clinical users the incidence of modems and of CD ROMs was double that found among Administrative users. In the Clinical survey scanners were used by less than a third, but amongst Administrative users this technology is virtually non-existent.

**Figure 4: Technologies Used in Practice**



C53/Q22 Are any of the following technologies used in this practice?

## NETWORKING

Those practices with more than one computer were asked whether networking was present. Most practices with multiple computers have them networked, however the proportion was higher among Clinical users.

	<b>Networked Computers</b>
Clinical Survey (n= 98)	82%
Administrative Survey (n= 78)	69%

Among practices with networked computers, file servers were fairly common, but again much less so among Administrative practices. Just as with software, many Administrative users have little idea about what is involved in the computer systems (41% Don't know).

**Table 42: Dedicated File Saver Present**

	Have networked computers	
	Clinical Survey n = 81 %	Administrative Survey n = 78 %
Yes	62	34
No	34	26
Don't know	4	41

C51/Q20 *Is there a dedicated file server?*

## SECURITY SYSTEMS

Clinical users were asked about the frequency of data back-ups. Three out of four practices were backing up at least daily, however a small proportion do so only sporadically, and 8% were not aware how often this is done.

**Table 43: Frequency of Back Ups**

Frequency	Clinical Survey n = 108 %
Several times a day	5
Daily	72
Every few days	2
Weekly	10
Monthly	*
Every few months	3
Don't know	8

*C55 How often are back-ups done for the practice?*

- less than one percent

The majority of Clinical users have a disaster recovery plan in the event of a major system problem, but it is a concern to see that one in three have no such plan in place.

Those without a recovery plan were more likely to be older (over 50 - 45%), and solo practitioners (52%).

**Table 44: Disaster Recovery Plan in Place**

Have Disaster Recovery Plan	Clinical Survey 108 %
Yes	60
No	31
Don't know	9

*C56 Is there a disaster recovery plan for electronic data?*

## COST OF COMPUTER SYSTEM

Clinical users were asked to estimate the total value of the computer systems with peripherals included; the answers were recorded in broad ranges, rather than specific values. The range of values is considerable, however for the majority of practices the net value is under \$20,000.

**Table 45: Cost of Computer System**

Total Cost	Clinical Survey n = 108 %
Less than \$5000	13
\$5,000 - \$9,000	22
\$10,000 - \$19,000	23
\$20,000 - \$29,000	18
\$30,000 - \$39,000	8
\$40,000 - \$49,000	2
\$50,000 - \$59,000	2
\$60,000 - \$69,000	1
\$70,000 or more	2
Don't know	9

*C54 In total what's the approximate cost of the present computer system. IF NECESSARY CLARIFY Cost includes printers, scanners and modems.*

Using the mid-points of these ranges, and average value can be calculated, and this was \$18,840. This seems reasonable given that on average there were 4.4 computers in the Clinical practices.

Not surprisingly, the value of the system is related to practice size; the average value by practice size is shown below.

	<b>Average Value</b>
One doctor	\$14,900
Two doctors	\$13,600
3 - 4 doctors	\$18,500
5 or more doctors	\$32,400

It is also interesting to note that the funds invested in the computer system tended to be greater in practices outside the metropolitan area.

	<b>Average Value</b>
Metropolitan practices	\$16,800
Rural practices	\$22,700
Remote practices	\$22,400

# ATTITUDES TO COMPUTERS

## ATTITUDES TO COMPUTERS

To explore attitudes to computers, Clinical and Administrative users were read a list of statements, and asked to what extent they agreed or disagreed with each one. In answering the questions they were asked to focus on clinical usage, rather than computers in general. The order of the questions was rotated to reduce any order effects.

Three statements generated a high level of agreement; Clinical users believe that computers make a good impression with patients, that they are becoming a necessity in general practice, and that they can make a positive contribution to patient care. A majority consider that financial support from the government would encourage the uptake of computers.

Clinical users are divided about the value of electronic records and the security advantages of computer based records. The proportion agreeing with these two statements is slightly outweighed by the proportion disagreeing (44% and 41% respectively). In answering these two questions doctors showed marked uncertainty; one in five (21%) ventured no opinion regarding the security of records, while 15% expressed no point of view about the value of electronic records.

The majority (51%) disagree that use of computers leads to longer consultations, however four out of ten are of this opinion.

The majority (59%) also disagree that use of computers adversely effects the doctor-patient relationship.

**Table 46: Attitudes to Clinical Use Among Clinical Users**

Attitudes to Clinical Use (% Strongly agree/agree)	Clinical Users n = 108 %
Computers create a good impression with patients	79
Computers are becoming a necessity in general practice	74
Computers can significantly improve patient care	74
Widespread adoption won't occur until the govt. provides an incentive	61
Electronic records are more valuable than paper files	41
Using a computer means a longer consultation	41
Records are more secure on computer	37
Computers are of more benefit for administrative than clinical functions	34
Computers in the consultation would interfere with the doctor-patient relationship	33

*C 42 I'm going to read out a number of statements about the use of computers for clinical functions. For each one tell me whether you agree or disagree with the statement. .... Is that strongly agree/disagree or agree/disagree?*

The same battery of statements were used in the Administrative interview, and the table below compares the opinions of Clinical and Administrative users. Just like Clinical users, Administrative users consider that computers are becoming a necessity in general practice. At the same time they also agreed strongly that computers are of more benefit for administrative than for clinical functions. The latter view is probably to be expected, as this reflects their current pattern of computer usage.

While they may consider computers are increasingly necessary in general practice, and that they can enhance patient care, Administrative users express clear reservations about the impact of computers on the doctor-patient communication and the length of the consultation.

Administrative users were uncertain how patients would respond to computers. Only one in four (26%) actively disagreed with the statement tested, but many (32%) didn't express any point of view, perhaps because they lacked the personal experience on which to form a judgement.

The majority disagreed with the view that electronic records offer better security and more value, but there was again some uncertainty evident about these issues (35% and 25% respectively).

Six out of ten Administrative users consider that financial incentives will be necessary to achieve widespread adoption, and this is in line with opinion among Clinical users.

**Table 47: Attitudes to Clinical Use (Clinical Users & Administrative Users)**

Attitudes to Clinical Use (% Strongly agree/agree)	Clinical Users n = 108 %	Administrative Users n = 109 %
Computers create a good impression with patients	79	43
Computers are becoming a necessity in general practice	74	77
Computers can significantly improve patient care	74	61
Widespread adoption won't occur until the govt. provides an incentive	61	61
Electronic records are more valuable than paper files	41	27
Using a computer means a longer consultation	41	53
Records are more secure on computer	37	11
Computers are of more benefit for administrative than clinical functions	34	74
Computers in the consultation would interfere with the doctor-patient relationship	33	66

*C 42 I'm going to read out a number of statements about the use of computers for clinical functions. For each one tell me whether you agree or disagree with the statement. .... Is that strongly agree/disagree or agree/disagree?*

## PERCEIVED BENEFITS OF COMPUTERS

Clinical users were asked to comment on the benefits of clinical use for GPs. The question was open-ended and they were free to answer as they wished.

Numerous benefits were mentioned, but the leading advantage related to script writing. As previously indicated this was the most widely used clinical function, and it seems this is due to the benefits of greater speed and accuracy.

The interest in script writing was higher among younger doctors, and those with relatively less years of clinical experience.

Other benefits frequently mentioned were ease of information access and retrieval, improved opportunities for patient education and better legibility.

**Table 48: Perceived Benefits of Clinical Use**

Perceived Benefits for GPs	Clinical Users n = 108 %
Script writing/faster/more accurate	45
Ease/speed of retrieval/easily reproducible notes	28
Ease of access to information/journals	19
Better patient education/communication	19
Legibility - notes/ scripts	18
Time saving	15
Efficient/better records management	12
Good for patient summaries	11
Drug data base/interactions/side effects	10
Clinical decision support	9
Storage of information/records	9
Improved quality of care	9
Can keep up to date	8
Less paper/ less space/less filing	7
Easier billing/accounts management	6
Easy to send information to other doctors/places	6
Audit of disease/disease register	5
Other	13
None	2

C41 *In the clinical area, what do you see as the main benefits of computers for GPs?*

# COMPUTER SKILLS AND RESOURCES

## COMPUTER SKILLS

The Clinical users were asked to assess their level of keyboard skills and their self confidence in using a computer.

Six out of ten (60%) consider their skills are either 'good' or 'very good'. Keyboard skills appear to be stronger among

- those with more years of clinical experience (78%)
- females (71%)
- and younger doctors( 66%)

**Table 49: Level of Keyboard Skills**

Keyboard Skills	Clinical users n = 108 %
Very good	13
Good	47
Poor	31
Very poor	9

*C58 How would you rate your keyboard skills?*

Self confidence about operating a computer was more positive, with 85% expressing confidence. Confidence levels were somewhat lower among females (30% unsure) than males (12%).

**Table 50: Level of Confidence Using a Computer**

Level of Confidence	Clinical users n = 108 %
Quite confident	52
Confident	33
Somewhat unsure	15

*C57 How confident do you feel about operating the computer. Are you ...*

## COMPUTERS PRESENT AT HOME

Both Clinical and Administrative users were asked whether there were computers at home, and if so, how many. Clinical users were more likely to have computers in their home than Administrative users, and the average number of computers in the home is higher.

**Table 51: Computers Present at Home**

Number of Computers	Clinical users n = 108 %	Administrative users n = 109 %
None	6	15
One	60	52
Two	25	20
Three	7	9
Four or more	3	3
<b>Mean Number</b>	<b>1.4</b>	<b>1.3</b>

C65/Q31 *How many computers are there at home?*

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**SECTION 5**  
**ADMINISTRATIVE USERS SURVEY**

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# **PATTERNS OF COMPUTER USE WITHIN PRACTICE**

## **PENETRATION OF COMPUTERS**

In the practices with which Administrative users were associated the average number of computers in use was 3.2.

The incidence of computers was related to practice size, with the average number per practice being:

<b>Practice Size</b>	<b>Av. No. of PCs</b>
One doctor	1.3
Two doctors	1.5
3 - 4 doctors	2.3
5 or more doctors	4.5

On average computers had been used for administrative tasks for 5.3 years.

## **USE OF COMPUTER BY DOCTOR**

Within the sample of Administrative users, half (50%) indicated that they use a computer on occasion at the practice. Those more likely to use a computer were:

- males (59%)
- those under 40 years (71%)
- those in smaller or solo practices (65%)

## COMPUTER FUNCTIONS USED IN THE PRACTICE

A wide range of functions were read to Administrative users, and they were asked whether in their practice computers were used for these tasks. The list included both administrative and clinical functions. The table below shows the full list, with responses in rank order. (Clinical functions are marked with an asterisk.)

As would be expected, administrative tasks were far more common than clinical tasks. Patient registrations, word processing and finances were the primary functions. Of the clinical functions, recall was the most common, being mentioned by 42%. This is well ahead of the other clinical functions which all received low levels of mention. Script writing was present in 12% of practices, and electronic storage of patient information was similar (11%).

Three out of ten practices (29%) were making Medicare claims electronically.

The average number of functions per practice was 5.6. The range of functions was related to practice size, with larger practices generally using more functions.

**Table 52: Computer Functions Used in the Practice**

Computer Functions	Administrative users n = 109 %
Registration of patient details	93
Word processing	92
Issuing patient accounts/billing	87
Managing practice finances	82
Payroll	47
Running a recall system*	42
Making Medicare claims electronically	29
Scheduling appointments	22
E-mail	14
Internet access	13
Writing prescriptions*	12
Receiving/storing information electronically*	11
Stock and stores control	10
Recording patient summaries*	4
Recording consultation notes*	2

Q2 I'm going to read out a range of computer tasks and for each one I'd like to know whether computers are used for this function in your practice.

Within the sample of 109 practices a blend of clinical and administrative tasks was

common. Just over half the practices (52%) were using at least some clinical functions, while the balance were using computers exclusively for administrative functions.

In the Administrative survey while the doctor being interviewed was not a Clinical user, his/her colleagues may have been. When the number of doctors in these practices is compared with the number of Clinical users, it indicates that less than one in ten of the doctors (8%) in these practices are Clinical users.

## COMPUTER FUNCTIONS USED BY DOCTOR

Where a function was carried out using a computer in the practice, the doctor was asked whether he/she ever used the computer themselves for these tasks. The sample base is not shown in the right hand column, as it varies for each function; the doctor was only asked about his use of a given function where that function existed within the practice. By definition Administrative users were not using any clinical functions, hence these are blank in the table below.

E-mail and Internet access were the primary computer activities of Administrative users. Secondary tasks were word processing and making patient appointments.

**Table 53: Computer Functions Used By Doctors**

Computer Functions	Functions in Practice n = 109 %	Functions by Doctor n = 109 %
Registration of patient details	93	15
Word processing	92	36
Issuing patient accounts/billing	87	19
Managing practice finances	82	19
Payroll	47	6
Running a recall system	42	-
Making Medicare claims electronically	29	10
Scheduling appointments	22	37
E-mail	14	57
Internet access	13	58
Writing prescriptions	12	-
Receiving/storing information electronically	11	-
Stock and stores control	10	8
Recording patient summaries	4	-
Recording consultation notes	2	-

Q3..do you personally ever use a computer for these tasks?

## USE AND PERCEPTIONS OF MEDCLAIMS

Those practices using Medclaims were asked how satisfactory they found the system. At 63% satisfaction levels were high, and one in four consider the system is 'very' satisfactory. Many (29%) could give no comment as they are not involved in the process of making claims. Only 13% expressed any dissatisfaction with Medclaims. (Note the sample size is limited.)

**Table 54: Satisfaction With Medclaims**

Level of Satisfaction	Medclaims Used in Practice n = 32 %
Very satisfactory	24
Satisfactory	39
Unsatisfactory	4
Very unsatisfactory	9
Don't know	29

Q5 *How satisfactory do you find the Medclaims system?*

Those who had not used Medclaims were asked about their future intentions. Opinion is divided, with 47% considering uptake is likely, and 41% considering it unlikely.

**Table 55: Likelihood of Using Medclaims in Future**

Likelihood of Using Medclaims	Never used Medclaims n = 72 %
Very likely	28
Likely	19
Unlikely	29
Very unlikely	12
Don't know/not sure	12

Q6 *How likely is it that this practice will start using Medclaims in the next 12 months?*

## FUTURE INTENTIONS

Administrative users were asked about their future intentions with regard to clinical applications. There is very strong intention to take up clinical use; two out of three Administrative users consider they are likely to do so in the next two years. Opinions on this issue were decisive; only 2% showed uncertainty in answering this question.

The positive intentions to take up clinical use are confirmed by the responses in the attitudinal section, where three out of four agreed that computers were becoming a necessity in general practice.

**Table 56: Likelihood of Clinical Adoption in Next 2 Years**

Likelihood of Clinical Adoption	Administrative Users n = 109 %
Very likely	33
Likely	30
Unlikely	29
Very unlikely	6
Don't know	2

*Q12 How likely is it that you yourself will start using a computer for any clinical functions in the next two years?*

Those who said they were unlikely to move into clinical functions were asked their reasons. The question was open-ended, and respondents could answer as they wished. A wide range of reasons were given, however the major barrier was lack of computer skills and confidence. Without these, computer use would be slow, and fewer patients could be seen. Cost and confidentiality were also significant concerns (21% and 18% respectively). It is interesting to note that while concern was expressed elsewhere about the impact on the doctor-patient relationship, when it comes down to the reasons for not adopting, this appears to be only a minor consideration.

**Table 57: Reasons For Not Adopting Clinical Functions**

Reasons For Not Adopting Clinical Functions	Those Unlikely to Adopt n = 40 %
Time consuming/too slow for notes	26
Poor/no typing skills	24
Not computer literate	23
Too expensive	21
Concerns about security/privacy of information	18
Unnecessary/happy with present system	16
No time or interest	14
Medico legal concerns/altering notes after the event	13
Interfere with doctor-patient relationship	12
Not my decision/others are not keen	10
Software needs improving/not user friendly	9
Loss of personal touch/notes more personal	7
Age/over 70/retiring soon	7
Patients wouldn't like it	4
Other	6

Q13 *Could you tell me why you're unlikely to use computers for clinical functions?*

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**APPENDIX A**  
**QUESTIONNAIRE**

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NG 2132

6/10/97

**COMPUTERS IN GENERAL PRACTICE  
Screening Interview**

NSW	1	Tas	5
ACT	2	SA	6
Qld	3	NT	7
Vic	4	WA	8

Good morning/afternoon, my name is ....and I'm calling from ACNielsen·McNair, the research organisation. We are conducting an important national study on behalf of the Department of Health and Family Services, about the use of computers in general practice. It will only take a few minutes.

S1. Could I speak with either the Practice Manager, receptionist or Dr.... USE FIRST NAME LISTED. ESTABLISH WHO YOUR RESPONDENT IS.  
IF RESPONDENT IS NOT ANY OF THE ABOVE THREE ASK  
Are you a doctor, and if so could I ask your name? IF IT IS A LISTED DOCTOR RECORD BELOW AS CODE 3, 4, 5, 6 OR 7. IF IT IS AN UNLISTED DOCTOR RECORD AS CODE 8. IF IT IS SOMEONE ELSE RECORD AS CODE 9

Respondent is Practice Manager or receptionist 1 GO TO S2

Respondent is the (first) Doctor listed 2

A. The General Practice Branch is very keen to hear doctors' views about the role of computing in general practice. Is it convenient for us to talk now?.

Yes 2 GO TO S12

No 2 ARRANGE A CALLBACK TIME.

Respondent is another doctor listed

Doctor (2nd name listed) 3

Doctor (3rd name listed) 4

Doctor (4th name listed) 5

Doctor (5th name listed) 6

Doctor (6 th name listed) 7

B. Is Dr....(FIRST NAME LISTED) still with this practice?

Yes 1 ARRANGE A CALLBACK TIME TO CONTACT THE FIRST DOCTOR LISTED

No 2

C. IF NO Your name was also drawn in the sampling process. Is it convenient for us to talk now?

Yes 1 GO TO S12

No 2 ARRANGE A CALLBACK TIME FOR THE DOCTOR YOU ARE TALKING WITH NOW

Respondent is a doctor not on the list 8 GO TO S2

Respondent is someone else (none of the above) 9 GO TO S2

S2 IF ONLY ONE DOCTOR LISTED ASK

Dr .....’s name has been chosen for this study. Is he/she still with this practice?

IF MORE THAN ONE DOCTOR LISTED ASK

Two/several doctors from your practice have been chosen for the study, and I just need to check if they’re still with the practice. TAKE FIRST NAME LISTED Is

Dr..... still at this practice?

Yes 1

No 2 IF ONLY ONE DR LISTED, TERMINATE. THANK & CLOSE

Don’t know 3 ARRANGE A CALLBACK TIME

S3 Is he/she working there over the next week or so?

Yes 1

No. 2 IF ONLY ONE DR LISTED, TERMINATE. THANK & CLOSE

IF BOTH S2 & S3 ARE CODE 1, SKIP TO S12

IF MORE THAN ONE DOCTOR LISTED ASK S6 & S7

S6 TAKE SECOND NAME LISTED What about Dr .... Is he/she still with the practice?

Yes 1

No 2

Not sure 3 ARRANGE A CALLBACK TIME

S7 Is he/she working there during the next week

Yes 1

No 2

IF BOTH S6 & S7 ARE CODE 1, SKIP TO S12

IF MORE THAN TWO DOCTORS LISTED ASK S8 & S9

IF NO OTHER NAME AVAILABLE, TERMINATE. THANK & CLOSE.

S8 TAKE THIRD NAME LISTED What about Dr .... Is he/she still with the practice?

Yes 1

No 2

Not sure 3 ARRANGE A CALLBACK TIME

S9 Is he/she working there during the next week

Yes 1

No 2

IF BOTH S8 & S9 ARE CODE 1, SKIP TO S12

IF MORE THAN THREE DOCTORS LISTED ASK S10 & S11

IF NO OTHER NAME AVAILABLE, TERMINATE. THANK & CLOSE.

S10 TAKE FOURTH NAME LISTED What about Dr .... Is he/she still with the practice?

Yes 1

No 2 TERMINATE. THANK & CLOSE

S11 Is he/she working there during the next week?

Yes 1

No 2 TERMINATE. THANK & CLOSE

Not sure            3 ARRANGE A CALLBACK

IF BOTH S10 & S11 ARE CODE 1, SKIP TO S12

S12 How many General Practitioners work at this practice location?

RECORD RESPONSE

Don't know        9 ARRANGE A CALL BACK

IF ONE DOCTOR IN THE PRACTICE (S12), SKIP S13, S16, S24 & S25

S13 How many of the GPs would consider this to be their main practice location?

RECORD RESPONSE

S14 Are any computers used in your practice? IF NECESSARY CLARIFY It can be to do with either the practice or the patients.

Yes                1

No                 2 GO TO S20

S15 I'm going to read out a range of tasks and for each one I'd like you to tell me whether in your practice computers are used for these tasks always, usually, sometimes or never. READ OUT EACH TASK.

	Always	Usually	Sometimes	Never	DK
a) Issuing patient accounts	1	2	3	4	9
b) Managing the practice finances	1	2	3	4	9
c) Stock and stores control	1	2	3	4	9
d) Scheduling appointments	1	2	3	4	9
e) Recording patient details	1	2	3	4	9
f) Running a recall or reminder system eg for smear tests or immunisations	1	2	3	4	9
g) Writing prescriptions	1	2	3	4	9
h) Keeping doctors' notes	1	2	3	4	9
i) Receiving pathology results electronically	1	2	3	4	9
j) Storing information electronically such as pathology results and reports	1	2	3	4	9

S16 Do any of the GPs in this surgery personally use computers for any of the following functions on a regular basis? ASK FOR EACH FUNCTION LISTED BELOW.

S17 THIS QUESTION ASKS ABOUT THE DOCTOR IDENTIFIED IN S2 - S11, AS BEING WITH THE PRACTICE AND AVAILABLE IN THE NEXT WEEK  
Does Dr (.....) personally use a computer on a regular basis for any of these functions? ASK FOR EACH FUNCTION LISTED BELOW.

	S16			S17		
	Yes	No	DK	Yes	No	DK
a) A recall or reminder system for patients	1	2	9	1	2	9
b) Writing prescriptions	1	2	9	1	2	9
c) Storing information like pathology results & reports	1	2	9	1	2	9
d) Recording clinical notes/records	1	2	9	1	2	9

IF DK GIVEN TO ALL QUESTIONS AT S17, ARRANGE CALLBACK.

S18 IF ANY CLINICAL FUNCTIONS GIVEN (ANY CODE 1 FOR S16 OR S17)

How many of the GPs use computers for any of the clinical functions I just mentioned?

None 0

RECORD RESPONSE.....

S19 How many computers or computer screens are there in use in the practice? (whether for clinical or administrative functions)

None 0

RECORD RESPONSE.....

S20, S21 & S22 ARE FOR THOSE WITH NO COMPUTERS (S14, CODE 2)  
OTHERS GO TO S23

S20 To your knowledge, have the doctors in this practice ever seriously considered getting a computer?

Yes 1

No 2

DK 9

S21 How likely do you think it is that the practice will acquire a computer in the next two years?

Very likely 1

Likely 2

Unlikely 3 GO TO S23

Very unlikely 4 GO TO S23

DK 9 GO TO S23

S22 IF LIKELY Is that likely to be for the doctors to use in their work with patients, for administrative functions, or for both?

For doctors with patients 1

Administrative functions 2

Both 3

DK 9

S23 IF ONLY ONE DR IN PRACTICE (S12) Does the doctor/do you work full-time or part-time?

Full-time 1

Part-time 2

S24 IF MORE THAN ONE DR IN PRACTICE (S12) How many of the GPs are full-time, and how many are part-time?

Full-time RECORD RESPONSE.....

Part-time RECORD RESPONSE.....

S25 IF MORE THAN ONE DR IN PRACTICE (S12) Do any of the GPs in this practice share patients ?( do they see each others patients)

Yes 1

No 2

S26 What proportion, if any, of the patients are bulkbilled?  
RECORD RESPONSE .....

S27 Are there facilities for faxing in the practice?  
Yes 1  
No 2

S28 IF COMPUTERS IN PRACTICE (S14, CODE 1) Does the practice have a modem?  
(it allows you to communicate electronically with computers at other locations)  
Yes 1  
No 2

S29 THIS QUESTION ASKS ABOUT THE DOCTOR IDENTIFIED IN S2 - S11  
RECORD SEX OF DOCTOR Could you tell me whether Dr .... is male or female?  
Male 1  
Female 2

S30 Which of these age groups is he/she in? Your best estimate will be fine.  
21 - 30 yrs 1  
31 - 40 2  
41 - 50 3  
51 - 60 4  
61 - 70 5  
Over 70 6

S31 LOCATION What is your postcode?  
RECORD .....

IF ANY CODE 1 FOR S17 a,b,c, OR d, HE/SHE QUALIFIES FOR THE CLINICAL INTERVIEW.  
IF NO TO ALL OF S17 (CODE 2, S17 a,b,c AND d) AND CODE 1,2 OR 3 GIVEN TO S15 a,b,c,d,OR e, THEN HE/SHE QUALIFIES FOR THE ADMINISTRATIVE INTERVIEW.

S 32 ELIGIBILITY  
Clinical user 1  
Administrative user 2  
Neither of the above 3 TERMINATE. THANK & CLOSE

CHECK QUOTAS. IF QUOTA IS NOT FULL, PROCEED TO RECRUIT.

S33 Thank you for your help with that information. From what you've told me we'd really like to include Dr ... 's views in this study. (THE DOCTOR IDENTIFIED IN S2 - S11) The interview doesn't take long (Admin - 10 minutes, Clinical - 15 minutes) Would Dr... be available now?  
Yes 1 PROCEED TO APPROPRIATE INTERVIEW  
No 2 ARRANGE A CALLBACK TIME

If he/she is not available now, when would be a good time for me to call back.

Doctor's Name.....

Date .....

Time .....THANK AND CLOSE

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CLINICAL INTERVIEW

DON'T READ OUT THIS INTRODUCTION TEXT IF THIS INTERVIEW IS TO BE CONDUCTED WITH THE SAME DOCTOR THAT COMPLETED THE SCREENING INTERVIEW.

Good morning/afternoon Dr .... My name is .... from the research organisation ACNielsen.McNair. We are doing a study today about the use of computers for the General Practice Branch of the Commonwealth Department of Health and Family Services. It will take about 15 minutes, which is a lot to ask because I'm sure you're busy, but there are very few practices using computers for clinical functions as yet, so we would like very much to include your views in the research. Is it convenient now? IF SO, PROCEED. IF NOT When would be a suitable time for me to call back.  
RECORD CALLBACK DETAILS

Name \_\_\_\_\_  
Date \_\_\_\_\_  
Time \_\_\_\_\_

As we go through the questions I'd like you to answer just in terms of this practice, and your current usage of computers, at this point in time.

C1 Do you personally ever use a computer for any of the following functions? READ OUT

	Yes	No
a) Running a recall system to remind patients to return for routine tests	1	2
b) Writing prescriptions	1	2
c) Receiving or storing information electronically such as pathology results or specialists reports	1	2
d) Preparing referral letters for patients	1	2
e) Accessing educational materials for patients	1	2
f) Recording consultation notes	1	2
g) Recording patient summaries	1	2
h) Using decision support functions to help you solve diagnostic problems or make decisions about dispensing or treatment	1	2

PROCEED IF CODE 1 GIVEN TO C1,a,b,c,d,e,f,g, OR h, OTHERWISE TERMINATE

C2 Are you likely to extend the range of clinical functions you carry out on computer in the next 12 months?

Yes 1  
No 2 GO TO C4  
DK 9 GO TO C4

C3 Which additional functions are you considering taking up? DON'T READ OUT

Running a recall system	1
Writing prescriptions	2
Receiving/storing information e.g pathology results & reports	3
Preparing referral letters	4
Accessing educational materials	5
Recording consultation notes	6
Recording patient summaries	7
Using a decision support system to help you evaluate patient's problems	8
E-mail	10
Internet access	11
None	12
Other (Specify).....	98

C4 Is there anything that would encourage you to use computers for a wider range of clinical tasks? PROBE Any other factors?

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C5 Including yourself, how many GPs work at your practice location, full or part-time?

RECORD RESPONSE ....

C6 Including yourself, how many of the GPs use computers for any of these clinical functions? RECORD RESPONSE

C7 IF THE NUMBER USING COMPUTERS IS LESS THAN THE TOTAL NUMBER OF DRS How likely is it that any of the non-users will start using computers for clinical tasks, in the next two years?

Very likely	1
Likely	2
Unlikely	3
Very unlikely	4
DK	5

C8 Do you have a computer or computer screen in your consulting room?

Yes	1
No	2

**Recall** IF C1a IS CODE 1

C9 You said you run a recall system for patients. For which procedures does the computer generate reminders? DON'T READ OUT

Smear tests	1
Mammography	2
Immunization (child or adult)	3
Other (Specify) ...	8

C10 Who mainly enters the recall information - is it yourself or the administrative

staff?

Entered by self/Dr	1
Entered by administrative staff	2
Both	3

C11 How often do you use the recall function as a reminder system to yourself, for example to check whether tests have come back, or a patient has been to see a specialist?

Often	1
Occasionally	2
Never	3

**Scripts** IF C1b IS CODE 1

C12 What proportion of your prescriptions are written using the computer?  
RECORD RESPONSE .....

C13 Do you review your prescribing patterns eg to see how many patients you might have on any given drug?

Yes	1
No	2
DK	9

**Data Storage** IF C1c IS CODE 1

I'd like to know how you receive certain types of information, and how that information is stored. Let's start with pathology results.

C 14 Do you usually get them on paper, via a fax machine, or electronically via modem? RECORD BELOW

C15 And do you usually file them in paper form, on computer or both?

	<b>14 Receive Info</b>			<b>15 Store Info</b>		
	Paper	Fax	Modem	Paper	Computer	
Both						
a) <u>Pathology results</u>						
Received via	1	2	3			
Filed as				1	2	3
b) <u>Discharge summaries</u>						
Received via	1	2	3			
Filed as				1	2	3
c) <u>Specialist reports</u>						
Received via	1	2	3			
Filed as				1	2	3

C16 IF ANY INFO IS STORED ELECTRONICALLY ( C15a, b OR c, CODE 2 OR 3) If there is information on paper which must be kept for the patient records, which of the following do you usually do? READ OUT

Keep it on file in paper form	1
Scan the document in	2
Or type in the main details	3

C17 Do you electronically record test results from external devices such as spirometry or ECG?

Yes	1
No	2

C18 Do you ever send patient records electronically to other health practitioners?

Yes

No GO TO C21

C19 To whom do you send such information? DONT READ OUT

Specialists 1

Hospitals 2

Other GPs 3

Other health professionals 4

Other (Specify) .....

C20 Do you take any measures so that patient information is kept private? (eg encryption)

Yes 1

No 2

**Notes** IF C1f IS CODE 1

C21 In the last week for what proportion of your consultations were notes recorded electronically? Would it be READ OUT

All 1

Most 2

Some 3

Or None 4

C22 Do you usually record your notes only on computer, or are they recorded on both paper and computer?

On computer 1 GO TO C24

On paper and computer 2

C23 Why do you keep notes on both paper and computer.....PROBE Any other reason?

---

---

C24 Is it yourself or the secretary that usually types in the details of the consultation?

Entered by the self/doctor 1

Entered by the secretary 2

C25 What proportion of your clinical notes are presently held on computer. Would it be READ OUT

All records 1

About three quarters 2

About half 3

About a quarter 4

Less than a quarter 5

DK

C26 Does your computer system have different levels of security for different members of staff?

Yes 1

No 2

DK 3

**Patient Summaries** IF CODE 1 AT C1g

C27 For what proportion of your patients would you have an up to date patient summary. Would it be ...READ OUT

All records	1	GO TO C29
About three quarters	2	
About half	3	
About a quarter	4	
Less than a quarter	5	
DK	9	

C28 Do you plan to progressively enter details to the summary as patients attend?

Yes	1
No	2

C29 Is it yourself, the secretary or someone else that usually enters the patient summary?

Entered by the self/doctor	1
Entered by the secretary	2
Entered by someone else (Specify).....	8

C30 Do you use the patient summaries to generate referral letters ?

Yes	1
No	2

**Decision Support** IF C1h IS CODE 1

How often do you use the decision support functions to help you solve diagnostic problems or make dispensing or treatment decisions? READ OUT

Frequently	1
Quite often	2
Sometimes	3
Never	4

**Educational Materials** IF C1e IS CODE 1

How often do you access educational materials for patients via computer? READ OUT

Frequently	1
Quite often	2
Sometimes	3
Never	4

C33 ASK ALL Do you use the computer to conduct any clinical audit or analysis concerning your patients?

Yes	1
No	2

C34 Does your practice have READ OUT

	Yes	No	DK
a)E-mail	1	2	9
b)Internet access	1	2	9

C35 From your consulting desk do you have READ OUT

Yes	No
-----	----

- a)E-mail 1 2
- b)Internet access 1 2
- c)Access to a CD-Rom drive 1 2

IF HAS INTERNET AT C34 OR C35, ASK C38 & C39  
 IF NO INTERNET ACCESS AT C34 OR C35, AND NO E-MAIL AT C35, GO TO  
 C 41

C36 IF E-MAIL AVAILABLE (C34a or C35a, CODE 1) Do any of your patients  
 communicate with you via e-mail?

- Yes 1
- No 2

C37 IF E-MAIL ON DESK (C35a, CODE 1) How often do you use e-mail? READ  
 OUT

- Frequently 1
- Quite often 2
- Sometimes 3
- Never 4

C38 IF INTERNET ACCESS FROM DESK (C35b, CODE 1) Are your electronic  
 records secure and protected from outside access?

- Yes 1
- No 2
- DK 9

C39 IF DR HAS INTERNET ACCESS (C34b or C35b, CODE 1) Do you use the  
 Internet mainly for personal interests or for activities relating to your profession?

- Don't use Internet 1 GO TO C41
- Mainly personal interests 2 GO TO C41
- Mainly related to profession 3
- Both equally 4

C40 For what activities related to your profession do you use the Internet? DON'T  
 READ OUT

- E-mail 1
- Accessing Medline 2
- Accessing medical journals 3
- Interest groups 4
- Contact professional associations 5
- Continuing education/further studies 6
- Professional development 7
- Finding information to help patients 8
- Consultation with colleagues 9
- Other (Specify)..... 98

C41 In the clinical area, what do you see as the main benefits of computers for GPs  
 ?PROBE Anything else?

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C42 I'm going to read out a number of statements about the use of computers for **clinical** functions. For each one tell me whether you agree or disagree with the statement, and remember we are only talking about clinical applications. ROTATE AND READ OUT. IF RESPONDENT SAYS AGREE, ASK Is that strongly agree or agree? IF RESPONDENT SAYS DISAGREE, ASK Is that strongly disagree or disagree?

Strongly Agree Neutral Disagree Strongly DK  
 Agree Disagree

- Computers are becoming a necessity in general practice
- Computers create a good impression with patients
- The use of computers can significantly improve the quality of patient care
- Patient records are more secure when kept on computer
- Using a computer during the consultation would interfere with the doctor-patient relationship
- There won't be widespread adoption of computers until the government provides an incentive
- Using a computer means longer consultations
- Computers are of more benefit for administrative than clinical functions
- Electronic clinical records are of more value than paper files

C43 Do you keep a card system in the front office, with the patient's record details?

- Yes 1
- No 2

C44 Are computers used in this practice for administrative or front office tasks?

- Yes 1
- No 2 GO TO C46

C 45 IF YES How long has this practice been using computers for administrative functions?

C 46 ASK ALL How long have computers been used for clinical functions?

C 47 How long have you yourself been using computers for clinical functions?

	45) Admin	46) Clinical	47) Personal
Less than a year	1	1	1
1-2 years	2	2	2
3-4 years	3	3	3
5-6 years	4	4	4
7-8 years	5	5	5
9-10 years	6	6	6
More than 10 years	7	7	7
DK	9	9	9

C 48 What software is used for the clinical functions?

- Amfac Medrecord 1
- Doctors Desktop 2
- Jam 3

Locum	4	
Medical Director	5	
Medipak	6	
Medical Spectrum	7	
MIMS Script	8	
RX Medical/Healthcare	9	
Practice '97		10
The Doctor	11	
Other (Specify).....	98	
Don't know	99	

C 49 How many computers or computer screens are there in use in this practice?  
 (whether for clinical or administration functions)  
 RECORD RESPONSE.....  
 IF ONLY ONE GO TO C52

C50 Are the computers networked?  
 Yes 1  
 No 2 GO TO C 52

C51 Is there a dedicated file server? IF NECESSARY CLARIFY This is a computer  
 which just supports the network. It is not used as a workstation.  
 Yes 1  
 No 2  
 DK 9

C52 Which operating system do you have? IF RESPONSE IS WINDOWS NFI, TRY  
 AND CLARIFY WHETHER IT IS WINDOWS '95 OR AN EARLIER VERSION  
 OF WINDOWS  
 DOS 1  
 Windows (pre '95) 2  
 Windows '95 3  
 Windows NFI 4  
 Unix 5  
 OS/2 6  
 Macintosh 7  
 Other (Specify)..... 8  
 DK 9

C53 Are any of the following technologies used in this practice? READ OUT

	Yes	No
a) Facsimile machine	1	2
b) CD Rom drive	1	2
c) Modem	1	2
d) Scanner	1	2
e) Laser printer	1	2
f) Ink jet printer	1	2
g) Dot matrix printer	1	2
h) Laptops	1	2

C54 In total, what's the approximate cost of the present computer system? IF

NECESSARY CLARIFY Cost includes printers, scanners and modems

Less than \$5,000	1
\$5,000 - \$9,000	2
\$10,000 - \$19,000	3
\$20,000 - \$29,000	4
\$30,000 - \$39,000	5
\$40,000 - \$49,000	6
\$50,000 - \$59,000	7
\$60,000 - \$69,000	8
\$70,000 or more	9
DK	99

C55 How often are back ups done for the practice? IF NECESSARY CLARIFY For clinical or administrative

Several times a day	1
Daily	2
Every few days	3
Weekly	4
Monthly	5
Every few months	6
DK	9

C56 Is there a disaster recovery plan for electronic data?

Yes	1
No	2
DK	9

C57 How confident do you feel about operating the computer ? Are you READ OUT

Quite confident	1
Confident	2
Or somewhat unsure	3

C58 How would you rate your keyboard skills? Do you consider they are READ OUT

Very good	1
Good	2
Poor	3
Very poor	4

And finally some questions about yourself.

C59 RECORD SEX OF RESPONDENT

Male	1
Female	2

C60 Which of these age groups are you in ?

21-30 years	1
31- 40	2
41-50	3
51-60	4
61-70	5
Over 70	6

C61 IF MORE THAN ONE DR IN THE PRACTICE (C5) In this practice are you a partner, an associate, an employee, a consultant or a Registrar?

Partner	1
Associate	2
Employee	3
Consultant	4
Registrar	5
Other	8

C62 Do you work full-time or part-time in this practice?

Full-time	1 GO TO C 65
Part-time	2

C63 At how many other practices do you work?

One	1
Two	2
Three	3
Four	4
None	5 GO TO C 65

C64 IF WORKING AT OTHER PRACTICES At how many of those practices do you use computers for clinical functions?

One	1
Two	2
Three	3
Four	4
None	5

C65 How many computers are there at home?

One	1
Two	2
Three	3
Four or more	4
None	5

C66 LOCATION What is your postode?

RECORD .....

Thank you very much for your time, and for your cooperation in answering the questions.

6/10/97  
NG2132

### ADMINISTRATIVE USERS

IF THIS INTERVIEW IS TO BE CONDUCTED WITH THE SAME DOCTOR THAT COMPLETED THE SCREENING INTERVIEW, DON'T READ OUT THIS INTRODUCTION TEXT

Good morning/afternoon Dr .... My name is .... from the research organisation ACNielsen.McNair. We are doing a study today about computer usage for the General Practice Branch of the Commonwealth Department of Health and Family Services. It will only take ten minutes, and we'd like very much to include your views in the research even if you're not a computer user yourself. Is it convenient now? IF SO, PROCEED. IF NOT When would be a suitable time for me to call back. RECORD CALLBACK DETAILS

Name \_\_\_\_\_  
Date \_\_\_\_\_  
Time \_\_\_\_\_

Q1 Do you yourself ever use a computer in the practice?

Yes  
No

Q2 I'm going to read out a range of computer tasks, and for each one I'd like to know whether computers are used for this function in your practice, and if so

Q3 whether you personally ever use a computer for these tasks.

READ OUT EACH TASK

	Q2 Tasks in practice			Q3 Tasks by Dr	
	Yes	No	DK	Yes	No
a) Issuing patient accounts/billing	1	2	3	1	2
b) Making Medicare claims electronically	1	2	3	1	2
c) Managing the practice finances	1	2	3	1	2
d) Stock and stores control	1	2	3	1	2
e) Scheduling appointments	1	2	3	1	2
f) Payroll	1	2	3	1	2
g) Wordprocessing	1	2	3	1	2
h) Registration of patient details	1	2	3	1	2
i) Running a recall system to remind patients to return for routine tests	1	2	3	1	2
j) Writing prescriptions	1	2	3	1	2
k) Receiving or storing information electronically such as pathology results and reports	1	2	3	1	2
l) Recording consultation notes	1	2	3	1	2
m) Recording patient summaries	1	2	3	1	2
n) E-mail	1	2	3	1	2
o) Internet access	1	2	3	1	2

IF CODE 1 GIVEN TO Q3 i,j,k,l OR m THIS IS A CLINICAL USER. SWITCH TO THE CLINICAL INTERVIEW.

PROCEED ONLY IF CODE 1 GIVEN TO Q2a,b,c,d,e,f,g OR h

IF MEDICARE CLAIMS ARE MADE ELECTRONICALLY GO TO Q5. DK GO TO Q7

Q4 IF MEDICARE CLAIMS NOT MADE ELECTRONICALLY (Q2b, CODE 2)

Have you ever used Medclams?

Yes	1
No	2 GO TO Q 6

Q5 ASK THOSE USING MEDCLAIMS ( Q2b, CODE1 & Q4, CODE 1) How satisfactory do you/did you find the Medclams system?

Very satisfactory	1
Satisfactory	2
Unsatisfactory	3
Very unsatisfactory	4
DK/Can't say	9

Q6 IF MEDCLAIMS NEVER USED ( Q4, CODE 2)How likely is it that this practice will start using Medclams in the next 12 months?

Very likely	1
Likely	2
Unlikely	3
Very unlikely	4
DK/Can't say	9

Q7 ASK ALL How long has this practice been using computers for administrative functions?

Less than a year	1
1-2 years	2
3-4 years	3
5-6 years	4
7-8 years	5
9-10 years	6
More than 10 years	7
DK	9

Q8 I'm going to read out a number of statements about the use of computers for **clinical** functions. For each one tell me whether you agree or disagree with the statement, and remember we are only talking about clinical applications. ROTATE AND READ OUT. IF RESPONDENT SAYS AGREE, ASK Is that strongly agree or agree? IF RESPONDENT SAYS DISAGREE, ASK Is that strongly disagree or disagree?

Strongly Agree Neutral Disagree Strongly DK  
Agree Disagree

Computers are becoming a necessity in general practice  
Computers create a good impression with patients  
The use of computers can significantly improve  
the quality of patient care  
Patient records are more secure when kept on computer  
Using a computer during the consultation would  
interfere with the doctor-patient relationship  
There won't be widespread adoption of computers  
until the government provides an incentive  
Using a computer means longer consultations  
Computers are of more benefit for administrative  
than clinical functions  
Electronic clinical records are of more value  
than paper files

Q9 Including yourself, how many GP's work at your practice, full or part-time?

One 1 GO TO Q 12  
More than one 2 RECORD RESPONSE...

Q10 If clinical functions on computer are defined broadly as writing scripts, and  
keeping medical records, patient reports and test results on computer, how many  
doctors in your practice are currently using computers for clinical functions?  
RECORD RESPONSE .....

Q11 IF THE NUMBER OF DRS USING COMPUTERS (Q10) IS LESS THAN  
THE NUMBER IN THE PRACTICE (Q9) How likely do you think it is that any of  
the other doctors in this practice will start using a computer for any clinical functions  
in the next two years?

Very likely 1  
Likely 2  
Unlikely 3  
Very unlikely 4  
DK/Can't say 9

Q12 ASK ALL How likely is it that you yourself will start using a computer for any  
clinical functions in the next two years?

Very likely 1 GO TO Q14  
Likely 2 GO TO Q 14  
Unlikely 3  
Very unlikely 4  
DK/Can't say 9 GO TO Q15

Q13 IF UNLIKELY (Q12, CODE 3 OR 4) Could you tell me why you're unlikely to  
use computers for clinical functions? PROBE Any other reasons?

---

SKIP TO Q15

Q14 IF LIKELY (Q12, CODE 1 OR 2) What clinical functions are you considering  
using the computer for? PROBE Anything else? DONT READ OUT

Running a recall system	1
Writing prescriptions	2
Receiving/storing information e.g pathology results & reports	3
Preparing referral letters	4
Recording consultation notes	5
Recording patient summaries	6
Using a decision support system to help you evaluate patient's problems	7
E-mail	8
Internet access	9
Other (Specify).....	98

Q15 What software is used for administrative functions?

Amfac Medrecord	1
Jam	2
Medical Spectrum	3
Medipak	4
Practice Innovators	5
RX Healthcare	6
MYOB	7
Other (Specify).....	98
Don't know	99

Q16 Is that a software specially designed for medical settings or is it a general business management software?

Specially designed	1
General business software	2
Other (Specify)	98
DK	99

Q17 IF CLINICAL FUNCTIONS IN THE PRACTICE (Q2, i - m) What software is used for clinical functions?

Amfac Medrecord	1
Doctors Desktop	2
Jam	3
Locum	4
Medical Director	5
Medipak	6
Medical Spectrum	7
MIMS Script	8
RX Medical/Healthcare	9
Practice '97	10
The Doctor	11
Other (Specify).....	98
Don't know	99

Q18 In all, how many computers are there in use in this practice?

IF NECESSARY CLARIFY whether its for administrative or clinical functions

RECORD RESPONSE

IF ONLY ONE GO TO Q21

Q19 Are the computers networked?

Yes 1  
No 2

Q20 Is there a dedicated file server?

Yes 1  
No 2  
DK 9

Q21 Which operating system do you have? IF RESPONSE IS 'WINDOWS NFI', TRY AND CLARIFY IF IT'S WINDOWS '95 OR AN EARLIER VERSION OF WINDOWS

DOS 1  
Windows (pre '95) 2  
Windows '95 3  
Windows NFI 4  
Unix 5  
OS/2 6  
Macintosh 7  
Other (Specify)..... 8  
DK 9

Q22 Are any of the following technologies used in this practice? READ OUT

	Yes	No	DK
a) Facsimile	1	2	9
b) CD Rom drive	1	2	9
c) Modem	1	2	9
d) Scanner	1	2	9
e) Laser printer	1	2	9
f) Ink jet printer	1	2	9
g) Dot matrix printer	1	2	9
h) Laptops	1	2	9

Q23 Do you have access to the Internet, whether from here or elsewhere?

Yes 1  
No 2 GO TO Q25

Q24 Do you use the Internet mainly for personal interests, or for activities relating to your profession?

Don't use Internet 1  
Mainly personal interests 2  
Mainly related to profession 3  
Both equally 4

Q25 And finally some questions about yourself.

RECORD SEX OF RESPONDENT

Male 1  
Female 2

Q26 Which of these age groups are you in ?

21-30 years 1  
31-40 2  
41-50 3

51-60	4
61-70	5
Over 70	6

Q27 IF MORE THAN ONE DR IN THE PRACTICE (Q9) In this practice are you a partner, an associate, an employee, a consultant or a Registrar?

Partner	1
Associate	2
Employee	3
Consultant	4
Registrar	5
Other	6

Q28 Do you work full-time or part-time in this practice?

Full-time	1 GO TO Q 31
Part-time	2

Q29 At how many other practices do you work?

One	1
Two	2
Three	3
Four	4
None	5 GO TO Q 31

Q30 IF WORKING AT OTHER PRACTICES At how many of those practices do you use computers for clinical functions?

One	1
Two	2
Three	3
Four	4
None	5

Q31 How many computers are there at home?

One	1
Two	2
Three	3
Four or more	4
None	5

Q32 LOCATION What is your postode?

RECORD .....

Thank you very much for your time, and for your cooperation in answering the questions.

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**APPENDIX B**  
**SAMPLE PROFILES**

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Details are provided below of the sample on which this study was based. The first table shows composition of the sample in the Screening survey, then the following table contrasts the sample for the Clinical and Administrative surveys.

The figures in both these tables are unweighted.

<b>SCREENING SURVEY SAMPLE Unweighted</b>	<b>n = 1018 %</b>
<b>Region</b>	
Urban	75
Rural	15
Remote	10
<b>Practice Size</b>	
One doctor	29
Two doctors	24
3 - 4 doctors	28
5 or more doctors	19
<b>Status of Selected GP</b>	
Clinical user	16
Administrative user	24
Neither Clinical or Administrative	60
<b>Computers in Practice</b>	
Yes	45
No	55

Comparing the two samples below it can be seen that the Clinical users were more likely to be males, in the country and working in solo or small practices. Administrative users were more likely to be in large practices in urban areas. Females were more common, as were part-time doctors.

<b>SAMPLE PROFILE (Unweighted)</b>	<b>Clinical Users n = 108 %</b>	<b>Administrative Users n = 109 %</b>
<b>Gender</b>		
Male	79	71
Female	21	29
<b>Age</b>		
21 - 30 years	-	3
31 - 40 years	31	30
41 - 50 years	49	46
51 - 60 years	14	13
61 - 70 years	6	6
Over 70 years	-	3
<b>Employment Status</b>		
Full-time	89	81
Part-time	11	19
<b>Location</b>		
Urban	56	65
Rural	21	19
Remote	22	16
<b>Practice Size</b>		
One doctor	26	6
Two doctors	24	18
3 - 4 doctors	24	30
5 or more doctors	26	46

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**APPENDIX C**  
**MARGIN OF ERROR TABLE**

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## MARGIN OF ERROR TABLE

(95% Confidence Level)

(Percentages given a particular answer)

% Agree	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%
Disagree	95%	90%	85%	80%	75%	70%	65%	60%	55%	50%
Sample Size	Confidence interval in % points, either side of mean									
50	6.2	8.5	10.1	11.3	12.2	13.0	13.5	13.9	14.1	14.3
100	4.4	6.0	7.1	8.0	8.7	9.2	9.5	9.8	9.9	10.0
150	3.6	4.9	5.8	6.5	7.1	7.5	7.8	8.0	8.1	8.2
200	3.1	4.2	5.0	5.7	6.1	6.5	6.7	6.9	7.0	7.1
250	2.8	3.8	4.5	5.1	5.5	5.8	6.0	6.2	6.3	6.4
300	2.5	3.5	4.1	4.6	5.0	5.3	5.5	5.7	5.7	5.8
400	2.2	3.0	3.6	4.0	4.3	4.6	4.8	4.9	5.0	5.0
500	1.9	2.7	3.2	3.6	3.9	4.1	4.3	4.4	4.4	4.5
600	1.8	2.4	2.9	3.3	3.5	3.7	3.9	4.0	4.1	4.1
700	1.6	2.3	2.7	3.0	3.3	3.5	3.6	3.7	3.8	3.8
800	1.5	2.1	2.5	2.8	3.1	3.2	3.4	3.5	3.5	3.6
900	1.5	2.0	2.4	2.7	2.9	3.1	3.2	3.3	3.3	3.4
1000	1.4	1.9	2.3	2.5	2.7	2.9	3.0	3.1	3.1	3.2
1500	1.1	1.5	1.8	2.1	2.2	2.4	2.5	2.5	2.6	2.6
2000	1.0	1.3	1.6	1.8	1.9	2.0	2.1	2.2	2.2	2.3
3000	0.8	1.1	1.3	1.5	1.6	1.7	1.7	1.8	1.8	1.9

*Note:* If it is known/assumed that 50% of respondents agree/disagree with an attribute the for a sample of say 500, there are 95 chances in 100 of the sample falling between the 45.5 and 54.5 percentile points, ie  $50\% \pm 4.5\%$ . As can be seen from the table, the larger then sample chosen, the smaller the standard error range.