



Few rural general practitioners use the Internet frequently in regard to patient care

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Abstract

Aims To benchmark North Island rural general practitioner (GP) access to computers and the Internet, both at work and home, and assess whether rural GPs are using the Internet in regard to patient care.

Methods Cross-sectional postal survey of all North Island rural GPs in mid-2003.

Results 175 of 289 GPs (60.6%) returned useable questionnaires. Most (89.0%) reported computer availability at work when consulting, but even more had access to a computer at home (97.1%, $p < 0.01$). Access to the Internet was also lower at work (68.6%) than at home (98.8%, $p < 0.01$). Fewer GPs ($p < 0.05$) reported ever using the Internet at work in regard to patients (56.5%) than at home (71.9%). Less than 10% of all GPs used the Internet three or more times a week at work (6.9%) or home (8.6%) in regard to patients. Of those with Internet access at work, 27.0% had broadband (fast Internet) access. Predictors of having (versus not having) work Internet access were computer availability in consultations ($p = 0.04$).

Conclusions Few North Island rural GPs use the Internet frequently in regard to patient care, despite increasing access to computers and the Internet, both at work and home.

Medical education is a lifelong journey, requiring a commitment to the acquisition of new knowledge, skills and attitudes. Urban centres have traditionally been the location of educational meetings and medical libraries, disadvantaging rural general practitioners (GPs) in accessing continuing medical education (CME) and health information. This disadvantage has contributed to difficulties in recruiting and retaining rural GPs.¹

With the rapid growth of the Internet in the previous decade, rural GPs can now access online resources including medical journals, medical texts, and CME programmes. Additionally, the health sector is increasingly moving information electronically. Therefore, GPs now require hardware, software, and Internet access—as well as the knowledge and skills to both find and send information. To usefully use the Internet during consultations, they will also require broadband (or fast Internet) access.

In New Zealand (NZ), a 1998 regional study² showed that 36% of Otago and Southland GPs (rural and urban combined) had access to the Internet at work. Furthermore, in two national NZ studies in late 1999-early 2000, 39% of rural GPs reported Internet access at work,³ while 47% of rural GPs reported email access at work.¹ Internet or email access at home, compared with work, was higher in all three studies: 55%,² 73%,³ and 72%.¹

In comparison, among Scottish GPs (West Lothian) in 1997, 12% had Internet access at work, with twice as many (24%) having access at home.⁴ Within 2 years, access to the Internet at work for Scottish GPs had increased to 92% of practices, partly because of government support and funding.⁵ A 2001 Swiss study of primary care physicians found that 75% had access to the Internet at work, although only 7% reported using it during patient consultations.⁶

This paper aims firstly to provide a 2003 benchmark of North Island rural GP access to computers and the Internet, at work and home; secondly, to assess whether rural GPs are using the Internet in regard to patient care; and thirdly, to account for whether practices have work Internet access. The paper forms part of a larger study that compares and contrasts North Island rural health professionals' (GPs, practice nurses, and pharmacists) attitudes towards, and experiences of, computers, the Internet, and distance learning.⁷⁻⁹

Methods

The methodology for this cross-sectional study has been reported previously.⁹ In summary, all North Island rural GPs (practice nurses and pharmacists) were posted a questionnaire requesting self-reported information about their attitudes towards, and experiences of, computers, the Internet and distance learning. The questionnaire had been reviewed and endorsed by the Rural General Practice Network (and the Pharmacy Guild of New Zealand). The study was approved by the Auckland Ethics Committee.

All North Island rural GPs had been identified from the workforce database of the Institute of Rural Health, in Hamilton. A 'rural' GP was defined by a score of 35 points or greater on the Rural Ranking Scale.¹⁰ Numbered questionnaires, each with a self-addressed, stamped return envelope, were mailed in April 2003. Non-respondents were posted a reminder card in May, a reminder questionnaire in June and another reminder card in July, before receiving a final reminder by telephone. The data collection was closed on August 31, 2003. Data on broadband access in rural North Island localities were obtained from Seager Mason, Telecom Rural Investment Team (personal communication) for June 2003 and June 2004.

A statistical software package (Stata version 7.0) was used to conduct the analysis. This includes fitting a logistic regression model to account for whether or not GPs reported having Internet access at work. Predictor variables for this model reflected our prior analysis of the data. Effects for the model are expressed as changes in the 'odds of access' versus 'no access'. Adjustment was made for clustering by practice. Cases were deleted if they had values missing on any variables in the model (listwise deletion).

Results

Response rate—Questionnaires were sent to 289 North Island rural GPs in 81 identified rural localities; 175 (60.6%) of these GPs (from 70 of the localities) returned completed questionnaires.

Table 1 summarises the sample: only 27.4% were female, the mean GP age was 45.8 years, and only 43.4% had graduated from medical school in NZ. Almost two-thirds of rural GPs owned their business (63.4%), while 17.7% were employed and 13.1% were locums. On average, the GPs worked 45.2 weeks in the last year, worked 49.2 hours in a typical week, and had been working in NZ for 12.8 years.

Table 1. Characteristics of GP sample

DEMOGRAPHICS		
Age in years (mean)		45.8 (174)
	25-34	5.8% (10/174)
	35-44	42.5% (74/174)
	45-54	35.6% (62/174)
	55-64	13.8% (24/174)
	65-74	2.3% (4/174)
Gender: Female		27.4% (48/175)
PROFESSIONAL EDUCATION AND WORK		
Graduation year		
	≤1959	1.1% (2/175)
	1960-69	7.4% (13/175)
	1970-79	26.3% (46/175)
	1980-89	49.7% (87/175)
	≥1990	15.4% (27/175)
Country of professional graduation		
	New Zealand	43.4% (76/175)
	Great Britain	30.3% (53/175)
	South Africa	15.4% (27/175)
	Australia	1.1% (2/175)
	Other	16.0% (17/175)
Number of years working in rural NZ (mean)		12.8 (172)
Professional work – employment		
	Business owner	63.4% (111/175)
	Employee	17.7% (31/175)
	Locum	13.1% (23/175)
	Other	5.7% (10/175)
Weeks worked in last year (mean)		45.2 (173)
Hours worked in typical week (mean)		49.2 (169)

Table 2. Computerisation at work and home

	WORK	HOME	Difference (%)	95% CI
Computer availability: at work (when consulting) or home	89.0 (154/173)	97.1 (169/174)	8.1	2.8 to 13.4
Workplace sends information via a modem	83.0 (142/171)	-		
Workplace receives information via a modem	76.3 (132/173)	-		
Internet access: work or home	68.6 (118/172)	98.8 (163/165)	30.2	23.0 to 37.3
'High speed' Internet access: work or home	27.0 (31/115)	11.8 (19/161)	15.2	5.6 to 24.7
Internet used at work or home in regard to patients	56.5 (65/115)	71.9 (115/160)	15.4	3.9 to 26.8
Frequency of Internet use in regard to patients				
Daily	12.7 (8/63)	1.8 (2/112)	10.9	2.3 to 19.5
3 or more times/week	6.4 (4/63)	11.6 (13/112)	5.3	-3.2 to 13.7
1–2 times/week	36.5 (23/63)	21.4 (24/112)	15.1	0.9 to 29.2
Less than weekly	44.4 (28/63)	65.2 (73/112)	20.7	5.6 to 35.8

CI=Confidence Interval

Table 3. Rural GP self-assessment of computer competence

	%	(n)
Illiterate: I will use them reluctantly, if at all, and only if forced	3%	(5)
Amateur: I'm comfortable with certain areas, but get out of my depth easily	59%	(102)
Confident: I enjoy working with computers and learning new programmes and skills	25%	(43)
Experienced: Computers are a part of my life; others come to me to sort out problems	13%	(22)

Table 4. GP Internet access at work. Logistic regression model (n=110)

Dependent variable		f	Z	P > z
Work Internet access	No = 0 Yes = 1			
Predictor variables				
Computer available when consulting	No = 0 Yes = 1	8.4	2.0	0.04
Frequency of home Internet use	Less than weekly = 0 At least weekly = 1	2.6	1.9	0.06
Hours spent learning in a typical week	< 2 = 0 ≥ 2 = 1	0.5	-1.1	0.27
Days spent learning away from clinical work in the last year	0-5 = 0 ≥ 6 = 1	1.6	0.9	0.36
Competence with computers	Illiterate or amateur = 0 Confident or experienced = 1	0.8	-0.6	0.55
Graduation year		1.0	-0.7	0.47

Pseudo-R² (goodness of fit) = 10.1; $\chi^2 = 13.2$, $P > \chi^2 = 0.04$

Z = z-score for test of $f = 1$

P > |z| = p value for z-test

Computer usage—Table 2 documents computerisation at work and home. Most GPs (89.0%) reported having computers available at work when consulting, but even more had computer access at home (97.1%, $p<0.01$). Although most rural general practices send (83.0%) and receive (76.3%) information via a modem, Internet access at work (68.6%) was much lower than at home (98.8%, $p<0.01$).

Likewise, fewer GPs ($p<0.05$) reported ever using the Internet at work in regard to patients (56.5%), than at home (71.9%)—and those who reported using it at work, showed greater ($p<0.05$) daily Internet use in regard to patients (12.7%) than those who reported using it at home (1.8%).

Overall, of the 175 rural GP respondents, 12 (6.9%) used the Internet more than twice-a-week at work in regard to patients, while 15 (8.6%) did so at home. Internet access, when available, was more commonly 'high-speed' ($p<0.01$) at work (27.0%) than home (11.8%).

Computer competence—Table 3 shows the self-assessed computer competence of respondents. Over half the rural GPs (59%) identified themselves as computer 'amateurs': *'I'm comfortable with certain areas, but get out of my depth easily.'*

Broadband Internet access—Rural GPs from 21 rural localities reported having broadband Internet access. As of June 2003, Telecom NZ Ltd was providing broadband Internet access to 53 of the 81 rural localities on the North Island (and this increased to 71 localities as of June 2004).

Table 4 shows that in the logistic regression fitted, computer availability when consulting increases the odds of work Internet access by a factor of 8.4 ($p=0.04$), holding all other variables constant. Other predictor variables were not statistically significant at the 0.05 level. However, the effect of at least weekly home Internet use was only marginally non-significant statistically ($p=0.06$). Broadband access at work, and the age and gender of the GP, each had no effect (and are not reported).

Moreover, no interaction effects were detected. The pseudo- R^2 (goodness of fit) of the model as a whole was 10.1%, but this measure provides only a rough index of the adequacy of the model.

Discussion

This study has described North Island rural GP access to computers and the Internet (both at work and home), and assessed the frequency of Internet use by this provider group in regard to patient care. The age, gender, and country of graduation of the GPs in this study agree closely with the New Zealand Rural General Practitioners 1999 Survey.^{1,11} This suggests that our results may be generalisable to all NZ rural GPs.

The GPs' mean age (of 45.8 years) is of interest, as the common perception is that older rather than younger GPs frequently lack the confidence and skills to use computers and the Internet.¹² However, in our study, GP age did not predict work Internet access, indicating that this may be becoming incorrect.

Key findings—Access to computers when consulting with patients was reported by 89.0% of North Island rural GPs, which is close to the near universal access in the UK.¹³ Internet access at work in NZ has increased from 39% of rural GPs in 1999-2000³ to 68.6% of North Island rural GPs as of mid-2003 in this study. However, this

is still lower than the 92% reported for Scotland⁵ in 1999 and the 75% reported in Switzerland⁶ in 2001.

Just over half (56.5%) of the rural GPs in this study with work Internet access reported having ever used it at work in regard to patients. While two-thirds of the rural GPs reported having Internet access at work, only 12 GPs (6.9% of all respondents) reported using the Internet at work more than twice-a-week in regard to patient care, possibly explained by the time constraints of consultations. This is similar to the low percentage (7%) of Swiss GPs who reported using the Internet during a consultation.⁶

The only statistically significant ($p < 0.05$) factor to predict Internet access at work in this study was availability of computers *when consulting with patients/clients*. However, the frequency of home Internet use ($p = 0.06$) almost achieved statistical significance.

Internet access for these rural North Island GPs was more common at home than work ($p < 0.05$), similar to other GPs studied.²⁻⁴ Despite almost universal Internet access at home (98.8%), only 8.6% of all respondents used the Internet more than twice-a-week at home in regard to patient care. This would suggest that rural GPs do not yet consider the Internet a necessary source of health information in regard to patient care (even when the time constraint during consultations is not present), or that there are other barriers to Internet use.

Broadband access was more common at work (27.0%) than home (11.8%), which may help to explain why the small percentage of GPs who reported using the Internet daily in regard to patients, did so more frequently from work.

Strengths and limitations—We surveyed all rural North Island GPs and obtained a reasonable response rate of 61%. Demographically, our sample appears to be representative since it resembles that from the NZ Rural GP 1999 Survey.¹ A limitation of this study is the reliance on self-reported data. The rapid pace of change means that our data from mid-2003 probably now underestimate the extent to which Internet use in regard to patient care has penetrated the workplace and home environment of rural GPs.

Implications: With 89.0% of rural North Island GPs in this study reporting computer availability when consulting, the most expensive component of accessing the Internet is in place. The two other necessary components are a high-speed Internet connection and GPs with the knowledge and skills to use the technology.

In our multivariate analysis, broadband access alone did not predict access to the Internet at work. Logic suggests that use of the Internet in regard to patient care during a consultation will not increase until all three necessary components are in place. This is because the time constraint imposed by consultations necessitates that GPs have the knowledge and skills to be able to rapidly access high quality scientific information (if this information is to influence decision-making in real time).

However, we were unable to find any randomised controlled trials examining the effects of Internet access during patient consultations on patient outcomes. Irrespective of whether the Internet is accessed during a consultation, having Internet access is becoming increasingly necessary for information sharing with government agencies (claims, forms, etc).

As of June 2004, Telecom NZ Ltd was providing broadband Internet access to 71 of the 81 rural localities on the North Island.. Therefore, the 'high-speed Internet access' component is now available to most North Island rural GPs, thereby offering them the potential during consultations (if they have the knowledge and skills) to rapidly access quality scientific information via the Internet.

With computers and broadband Internet now widely available, and with our finding that 59% of rural GPs self-rate their computer skills as 'amateur', future research should focus on the third necessary component to accessing health information on the Internet: the knowledge and skills of GPs in using information technology. Also needing investigation is the question of whether other factors related to the Internet or broadband access may also be inhibiting the use of this technology.

Swiss GPs⁶ cited 'time pressure' and 'concern about potential negative interaction with physician-patient communication' as their reasons for not using the Internet, while GPs and nurses in Glasgow¹⁴ referred to 'time restraints' and 'concerns they lack the necessary skills.'

Additional factors might include concern about: hackers accessing private health information; Internet viruses disrupting systems; employees accessing inappropriate sites; a negative effect on work productivity; or other concerns. All these issues must be addressed if GPs are to be expected to invest in information technology, and acquire Internet skills.

In addition, research should examine whether Internet access during consultations has any effect on doctor-patient communication, patient care, or health outcomes—and should include a cost analysis of accessing the Internet during consultations. It may be appropriate for Government to consider inducements, as in Scotland,⁵ to help integrate the Internet into everyday general practice. Government, universities, and professional colleges could play a pivotal role in providing education for GPs to enable them to make this transition.

Conclusion—This study provides a 2003 benchmark of North Island rural GP access to computers and the Internet, both at work and home. It confirms that the availability of computers and the Internet during consultations in NZ rural general practice is increasing. The only factor predicting Internet access at work was computer availability during consultations. Despite the increasing availability of computers and the Internet, less than 10% of the GPs surveyed used the Internet more than twice-a-week, either at home or at work, as a health information resource in regard to patient care.

(The views expressed in this paper are the authors' alone.)

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