ORIGINAL RESEARCH

Rural New Zealand health professionals' perceived barriers to greater use of the internet for learning

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A B S T R A C T

Introduction: The purpose of this research was to investigate rural North Island (New Zealand) health professionals' attitudes and perceived barriers to using the internet for ongoing professional learning.
Methods: A cross-sectional postal survey of all rural North Island GPs, practice nurses and pharmacists was conducted in mid-2003. The questionnaire contained both quantitative and qualitative questions. The transcripts from two open questions requiring written answers were analysed for emergent themes, which are reported here. The first open question asked: 'Do you have any comments on the questionnaire, learning, computers or the Internet?' The second open question asked those who had taken a distance-learning course using the internet to list positive and negative aspects of their course, and suggest improvements.
Results: Out of 735 rural North Island health professionals surveyed, 430 returned useable questionnaires (a response rate of 59%). Of these, 137 answered the question asking for comments on learning, computers and the internet. Twenty-eight individuals who had completed a distance-learning course using the internet, provided written responses to the second question. Multiple barriers to

greater use of the internet were identified. They included lack of access to computers, poor availability of broadband (fast) internet access, lack of IT skills/knowledge, lack of time, concerns about IT costs and database security, difficulty finding quality information, lack of time, energy or motivation to learn new skills, competing priorities (eg family), and a preference for learning modalities which include more social interaction. Individuals also stated that rural health professionals needed to engage the technology, because it provided rapid, flexible access from home or work to a significant health information resource, and would save money and travelling time to urban-based education.

Conclusions: In mid-2003, there were multiple barriers to rural North Island health professionals making greater use of the internet for learning. Now that access to broadband internet is available in all rural towns in New Zealand, there is a clear need to address the other identified barriers, especially the self-reported lack of IT skills, which are preventing many in the rural health workforce from gaining maximum advantage from both computers and the internet.

Key words: attitude to computers, distance education, family physicians (GPs), internet, pharmacists, rural health services.

Introduction

Rural health professionals have traditionally been geographically disadvantaged in accessing current health information and professional development because urban centres are the usual locations for medical libraries and courses. Lack of access to ongoing education has been reported to cause difficulties in both recruiting and retaining rural general practitioners (GPs)[1]. The rapid growth of the internet in the last decade should now, in theory, enable rural health professionals to access online resources including medical journals, medical texts and educational courses.

However, although most New Zealand (NZ) North Island rural health professionals have access to computers and the internet when consulting with patients, few appear to use websites as a frequent source of health information[2-4], and less than 10% of rural GPs are accessing the internet more than twice a week, regarding patient care[5]. Underutilisation of the internet by GPs has also been described in Switzerland[6] and Glasgow[7]. This article aims to understand the reasons for this underutilisation by analysing the written responses of rural health professionals to two questions asking for their comments about learning, computers and the internet.

Methods

A population-based cross-sectional study design was used with mixed methods: specifically, qualitative research methods (a general inductive approach) were used to identify, describe and interpret the salient themes emerging from respondents' written responses, and quantitative methods (simple descriptive and inferential statistics) were applied to responses from the same self completed survey. Using both sets of methods gives pragmatic insights that neither type of analysis can provide alone.

The methodology for this study has been detailed previously[4]. In summary, all rural North Island GPs, practice nurses and pharmacists were posted a questionnaire. In addition to posing quantitative questions, it contained a general open-ended question requesting written comments: 'Do you have any comments on the questionnaire, learning, computers or the Internet?' Additionally, those who self-identified as having taken a distance-learning course using the internet were asked to list positive and negative aspects of their course, and to suggest improvements. The 6 page (38 item) questionnaire was new and not validated. It was, however, reviewed and endorsed by both the NZ Rural General Practice Network and the Pharmacy Guild of NZ. This study received approval from the Auckland Ethics Committee.

ll North Island rural GPs had been identified from the workforce database of the NZ Institute of Rural Health in Hamilton. A 'rural' GP was defined by a score of 35 points or greater on the NZ Rural Ranking Scale[8]. Practice nurses were defined as 'rural' if they worked with a rural GP, and pharmacists were 'rural' if they worked in the same town as a rural GP. 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. Data collection was closed on 31 August 2003. Information on broadband access in rural North Island localities was obtained from Seager Mason, Telecom Rural Investment Team (pers. comm., 2005).

The database for this article consisted of the transcripts of the written responses to the general question asking for comments about learning, computers and the internet, as well as the written responses about internet distance-learning from individuals who had undertaken a formal course. These written responses were read multiple times by RJ, and then analysed using a general inductive approach (facilitated by HyperResearch® qualitative analysis tool, version 2.6, ResearchWare Inc, Randolph, Massachusetts, USA) to reveal emergent themes regarding attitudes towards, and experiences of, computers, the internet and formal internet distance learning. Agreement that the themes were credible was achieved through discussion within the research team.

Results

Response rate

Questionnaires were sent to 735 rural North Island health professionals: 289 GPs, 289 practice nurses and 157 pharmacists in 81 identified rural localities. Completed questionnaires were received from 430 health professionals: 175 GPs (61%), 138 practice nurses (48%), and 117 pharmacists (75%), for an overall response rate of 59%. Of those returning completed questionnaires, a total of

137 rural health professionals (32%) answered the general open-ended question about learning, computers, and the internet: 56 GPs, 48 practice nurses, and 33 pharmacists. Additionally, 28 individuals (7%) provided written comments about an internet distance-learning course they had completed: 13 GPs, 6 practice nurses, and 9 pharmacists.

Qualitative data

Themes were organised under three headings: (a) the internet, (b) the individual professional, and (c) internet distance learning. For each main theme there were sub-themes (for example, under 'the internet' theme, findings are presented under 5 sub-themes: computer access; connection speed; connection security and cost; comfort; and internet content). For each sub-theme, perceived barriers and facilitators were identified to using the internet for education. The written responses revealed a very wide range of experience with IT, with sometimes contrasting perspectives regarding the internet. The professionals with the least IT skills were apprehensive about using the internet, while those comfortable with this technology were already using the internet for distance learning. Not unexpectedly, the individuals with the least IT skills and experience reported the most barriers to using the internet.

The internet

To be able to use the internet, an individual first needs access to a computer with an internet connection.

Computer access: Nurse [N]83 had internet access at her clinic where the latest 'info is easier to retrieve than using books or libraries for assignments'. For others, while their workplace had an internet connection, it was not easily accessible: 'Internet at work is difficult to get to physically and timewise' (Pharmacist [P]60) and 'I find it too busy at work to use internet, as only one computer has access which is our reception one' (N66).

Access to computers and the internet at home was an important issue, especially for some nurses: 'I would be very

eager to have the opportunity of doing courses through distance learning from my home. Having access to a computer would be great' (N63); 'There must be lots of nurses like me without personal computers and still like to up date our learning skills' (N73); and 'As a rural practice nurse I would love to be able to learn - update on the internet in my own time' (N229). Even for those with home internet access, there were problems with access: 'With college-aged children at home, actually being allowed to use the computer is an issue' (P81).

Connection speed: Many of the rural health professionals mentioned the lack of highspeed (broadband) internet as an important barrier to their greater use of the internet: 'In the rural area I work, high-speed internet access is not available' (Doctor [D]25); 'Computers are vital to practice, but for rural areas without access to fast internet… it is very difficult' (D173); and 'We are currently trying to get 'Jetstream' which will greatly enhance internet use - however cost is a worry!' (P198). Even someone close to an urban centre reported being unable to access high-speed home internet: 'The Jetstream option is not very available (eg I live 5 km from [major urban centre] but it is not possible to get it on)' (D260). Without broadband access, home internet use ties up the phone line: 'So busy at work that look to "wind down" at home. Too busy at work to do during day. Never home before 6.00 pm. Home limitations - reluctant to tie up home telephone and miss incoming calls' (P9).

Connection security and cost: The cost of initial or additional hardware/software, and concerns about security, were clearly identified as issues by doctors and pharmacists: '…cost and security of high-speed connections is an issue' (D201); 'Internet is a very useful information bank! But it does have security and privacy gaps!' (D203); 'Fear of virus contamination or corruption of files means it would have to be a totally separate system if installed at work - problems of extra space for another terminal and costs' (P117); 'Would have to be a stand-alone facility so as not to compromise dispensary computer info (ie, accuracy for payments), and separate terminal for access - therefore costs!' (P118); 'Time

and cost against capital gain - information is great but it doesn't earn a living' (P169).

Comfort: A barrier for a number of respondents was discomfort about using computers. Too much time in front of a computer screen was seen as a negative according to P193, who did not want to be: 'staring at a computer screen, which we do most of the day at work anyway'. Similarly, 'I use computers all day at work for dispensing and accountancy, so do not use them much at home' (P67); and 'Use computer at work - don't enjoy looking at screen' (D34).

For others in this rural workforce there were physical discomforts:

> *Unfortunately, I have not found the internet as great as I'd thought. It seems to take a long time to view a few things, my eyes get tired of looking at the screen, my back aches, and my hands go numb on the mouse/keyboard, I get cold* (N201)

And, 'I have medical problems; makes working on computer for long periods painful and difficult' (D220).

Internet content: Respondents recognised the internet as a vast reservoir of information ('a very useful information bank!' D203), which was frequently more up to date than other sources of information available to them: '…info is easier to retrieve than using books or libraries for assignments. Up to date articles, specific to topic through the net' (N83). However, balanced against these benefits was the time needed to find the information sought, as D243 commented, 'Computer information is all there, but sometimes time-consuming to find'; and 'Computer based learning would be a valuable tool if I was generally more experienced with computer work. I find it very time consuming to search for information on the internet' (N287). This time-consuming aspect of finding information appeared to reflect both a lack of IT skill and having to use dial-up internet access.

The individual professional

Besides requiring internet access, use requires that individuals perceive as valuable the need to devote time to learning new IT skills, and then to find additional time in which to apply these skills to further learning. This, as well as a need for a change in attitude towards computers and the internet, is nicely illustrated in a comment from D237:

> I feel that I would need to put in a lot of time and energy initially to get anything out of learning from the internet. I learn better in an interactive environment and can imagine that if I had to spend hours on the computer trying to tackle a long involved course I would either fall asleep or give up in frustration.

IT skills/experience: Comments revealed that many rural health professionals have minimal IT skills. So learning to use the technology must precede using the technology to learn. 'I am comfortable with computers but don't use internet and am not comfortable with it' (P197);

> I feel the biggest problem I have living in a small rural area and working, is getting adequate skills to confidently use our computer at home. The first course I would need to do would be use of internet and email. My children are more competent than I (N87).

'I would value advice on how to become more computer literate at home' (D60).

Time/travel: It is difficult, if not impossible, for busy rural health professionals to take time away from work in order to travel to urban areas and access information or education. For that reason, many immediately saw advantages in being able to access information and learn from home, including time and cost savings, flexibility and convenience. 'No travel time away from whanau [family], especially in my situation with 2 under 5 year olds' (N83); 'Internet learning would

suit me in terms of convenience, time, budget and family concerns' (P95); 'I have never thought of the possibility of doing a medical course by internet but I feel this is certainly a way forward especially for more isolated GPs, as it is difficult to attend conferences' (D63).

However, not all busy rural health professionals were certain about the benefits of internet learning. Just finding the time or energy for learning was difficult for many: 'Would like to do more with the internet but have time constraints, with complications of getting someone to come when I have a computer problem' (P75); and:

> My main obstacle to learning is the difficulty getting time out from busy work, having family commitments and other community responsibilities (eg meetings, talks, etc; ie family/community) take precedent and time at work is hectic seeing patients. Getting more doctors in rural areas would help (D256).

For some, the internet was a frustrating time-waster: 'I find searching for information on the internet frustrating, slow and frequently feel I have wasted precious time that I could have spent better on other aspects of my life!!' (D60). Others were concerned about the cost of internet learning at home, and about it occurring on their own time: 'Internet learning is good but cost is a factor - we do all our studies in our own time - evening courses, weekend courses' (N139). Some noted a surplus of education with which internet learning would have to compete: 'So much stuff to wade through and so much education available anyway, if I had the time, that anything new would need to be fresh, snappy and not expensive' (D17).

Learning style: Individuals expressed different preferences for, or styles of, learning. Those comfortable with a certain style were reluctant to try something new. Some preferred interactive learning in person, being able to discuss matters with course participants face to face, while others preferred printed material to reading off a screen. 'I prefer to be able to discuss things with course participants face to face mostly' (N125); 'Personally still prefer to learn via reading a book or

pages rather than off a screen' (D209); and 'I still prefer personal contact or even receiving written info to study, rather than staring at a computer screen, which we do most of the day at work anyway (P193).

Rural isolation appeared to lead many of these health professionals to prefer personal interaction. P109 said: 'Prefer contact with other pharmacists when doing courses, because of the limited time spent with colleagues in this area'. It is difficult to assess whether these individuals were open to a new method of both socialising and learning.

For those who had acquired the necessary IT skills, using a computer was seen as a positive activity: 'I sometimes read Medscape, easier than reading magazines, not so much paper lying around home. Computer [is] easy to learn/read off' (N210); and 'I enjoy using my computer for educational requirements' (N142).

Cost: Although accessing the internet has setup costs, the significant costs of attending urban conferences may encourage people to take an internet course: 'For me as a part time GP the cost of conferences are also prohibitive (taking into account childcare, etc)' (D63); and:

> 'As a rural GP, working EVERY Saturday, most courses in a city (eg Auckland) cost me around $800 in travel/accommodation and lost income before I pay a course fee. It also takes up my scarce personal and family time (D56).

Attitude: Negativity towards computers and the internet was evident from many of the written comments: 'For me a computer lacks flexibility. A book or magazine can be read in the garden or sitting on the beach' (D66); and:

> Computers are great when they do what they are supposed to do - but when a problem comes up I'm stuck (except if my 16 year old son is home!). So I tend to avoid them - same with internet (D170).

However, many comments also expressed a willingness to undertake continuing professional education using the internet, and for some this was a new concept: 'I would be keen to try a course via the internet.' (N162); and:

> I have never thought of the possibility of doing a medical course by internet but I feel this is certainly a way forward, especially for more isolated GPs as it is difficult to attend conferences (D63).

There was also an acknowledgement that the internet is already important and will only play an even more significant role for learning in the future: 'Use of computers and internet is increasing exponentially - we all therefore need to get to learn and use it sooner rather that later' (D120).

Internet distance learning

The potential positive aspects of the internet as a learning tool were seen by a number of rural health professionals, like P95:

> Internet learning would suit me in terms of convenience, time, budget and family concerns. I really need to become involved in some continuing education programmes, but always seem to miss them for one reason or another.

Other individuals reported actively using internet search engines to locate answers to questions arising in practice: 'I use the internet to search particular subjects' (D81); or to access specific health websites for self-directed learning: 'There are numerous sites available already for online learning and accessing these may be better than a structured course' (D264). A number of individuals reported having favourite websites: 'www.doctors.net is excellent, also love having BMJ access' (D261). For those at the more advanced level of formal internet courses, a number of additional themes emerged regarding formal courses over the internet.

Interaction with others: As discussed under learning styles, there was a concern that the positive social interaction of attending a course or conference would be lacking in an internet course:

> ...when I make the effort to go to a course I get just as much from rubbing shoulders with my colleagues as from the course content. I would be concerned with internet learning that this investment aspect would be lacking (N26).

> Sitting at a computer lacks the 'full' element achieved by getting away on a course and socialising. These factors are important because when you spend long hours in your job you require strong motivating factors for CME (D66).

> We need to mix and contact more. Usually most difficult in rural areas. So sitting in front of a computer is a real negative (P16).

While D226 commented that a positive aspect of his internet course was 'interactions with other participants - net meeting etc', many of those who had taken an internet course cited the lack of interaction between course participants as one of the main negatives: 'No professional interaction. Hard to ask questions. Not really "fun"' (P62). Providing more interaction was frequently included in suggestions to improve these courses: 'Better use of "chat room" facilities with lecturer and other students' (D38); 'A video conference perhap.' (P49); 'Send list to everyone on course so can network' (N9). Even those who had not taken an internet course had suggestions on how social interaction could be incorporated: 'Perhaps a weekend away with each course would help with discussion and meeting of others to enrich a personal viewpoint, or a study group available if required' (N51); and 'Combination of teleconference and internet. It's good to hear voices, or have weekend or 2 in the course to meet other students' (D272). D189 suggested the courses be 'made interactive with feedback'.

Cost: Keeping up to date with health information has associated costs, whether monetary or simply finding the necessary time, and this was reflected in a number of comments: 'Any courses have to be to the point, related directly to retail pharmacy, at a reasonable price, short and concise, and interesting.' (P180); 'It would be in the country's interest if these [internet] courses were freely available to all rural docs' (D134); and:

> Cost of courses is always an issue and I would like to think computer courses are a cheaper option, however I would never allow cost to prevent me continuing my professional development' (N170).

Availability: While there is an increasing number of learning opportunities on the internet, for those already accessing the internet, there can be too much choice: 'So much stuff to wade through and so much education available anyway if I had the time, that anything new would need to be fresh, snappy and not expensive' (D17); and 'Internet learning needs to be relevant, appropriate and enjoyable. There are numerous sites available already for online learning, and accessing these may be better than a structured course' (D264). However, those lacking the necessary IT skills are left wondering what is available: 'Would like very much to know whether there are any distance-learning courses available for practice nurses' (N271); 'I have never been offered an internet based learning course' (D162); and 'Not aware of any internet distance learning courses' (D208).

Quality: To those already searching the internet for learning opportunities, it was important that courses be of a high quality and practical: 'Internet learning needs to be relevant, appropriate and enjoyable' (D264); 'Computer courses are good and can be user-friendly and intuitive, if well written - clarity and a lack of ambiguity is needed' (P7); and 'Enjoy continuing education as long as the material is relevant and practical - important that it is of practical use' (P172).

Improvement to aspects of the course quality was also mentioned by those who had taken an internet course, with a number commenting on difficulties with the technology:

> *Frustrations due to complexities of course design which used Java scripts, animations and audio files that frequently did not work, or took an unacceptable time to download. I strongly believe that the software demands and file sizes of course material should be simplified/minimized* (D166).

'Had trouble receiving attachment' (P171); and 'Computer failure. Programmes down when you need them' (N188).

Continuing medical education (CME) credit: Written comments made it clear that there is a need for internet courses to provide credits to assist NZ health professionals meet the reaccreditation requirements of their professional bodies: 'If there was a high quality, interactive site/course relevant to general practice that gained CME points and taught me in a time-effective fashion I would use it' (D35); and:

> *As a rural practice nurse I would love to be able to learn - update on the internet in my own time, but would like to think that it would go towards something ie certification* (N229).

Support: For those lacking IT skills, a need was expressed for support, both for the technology and the course: 'I like the idea of providing certified courses on the internet, providing you have supportive tutors that are accessible, helpful and understanding' (N67). Even for those on a formal course, many expressed a lack of adequate support from the tutor: 'Do not feel connected with a tutor' (N128).

Slow internet speed: As commented on previously, slow internet speed made doing an internet course more difficult: 'Slow internet access (can't get Jetstream)' (D122); and 'Slow internet access. Unreliable internet access' (P55).

Time: The positive aspects of flexibility and time savings of an internet course were clearly noted by many individuals,

including D262: 'Time of my choice - no traveling - no time away from family'.

Discussion

The written comments about learning, computers and the internet revealed multiple barriers to rural North Island health professionals making greater use of the internet for learning. The two key barriers identified in our previously published quantitative findings regarding GPs[5], were poor availability of high speed internet and lack of sufficient IT skills. Specifically, only 27% of rural GPs had high speed internet access at work (12% had high speed access at home) and a majority of rural GPs (59%) self-rated their computer skills as 'amateur'. These two barriers were again clearly identified from the qualitative analysis of rural health professional's written comments.

However, the written comments disclosed additional important barriers not revealed by the quantitative approach. Barriers relating to internet technology were reported to include: poor access to computers at work and home; concerns related to IT costs and internet security; difficulty finding quality information; and discomfort related to using a computer (eg too much time staring at a screen). Barriers relating to the individual professional included: lack of time to access the internet; lack of motivation or energy; lack of knowledge of what was available on the internet; more important competing priorities (eg family); a preference for other styles of learning; and a desire for the socialising aspect of courses or conferences. Internet security, a concern raised by the rural health professionals in this study, has also been highlighted by the Medical Council of NZ, which warns doctors to take adequate precautions to ensure their computers and patient files are safe from hackers[9].

Other studies have also examined barriers to internet use. Although 75% of Swiss GPs surveyed had internet access available during consultations, only 7% had used it[6]. These Swiss GPs cited 'time pressure' and 'concern about potential negative interaction with physician-patient communication'[6].

GPs and nurses in Glasgow referred to 'time restraints' and 'concerns they lack the necessary skills' as their reasons for not using the internet[7]. Despite the multiple barriers identified, many NZ North Island rural health professionals saw significant positive aspects to internet learning. Being able to study from home at times that suited the individual; savings on travel, time and conference costs; and immediate access to up-to-date information were all expressed as positive reasons for acquiring the skills to use this technology.

Inducements may be required to address the extra costs of information technology, and to encourage rural healthcare business owners to overcome perceived technology barriers (eg privacy issues, viruses), as well as their reluctance to invest in something when they lack the skills to use it efficiently. Using inducements to encourage GPs to connect to the internet has been very successful in Scotland[10]. In NZ, the Accident Compensation Corporation (ACC) is trialling an inducement by offering GPs $1200 for installing broadband internet before February 2006 and submitting their ACC claims electronically.

While no significant correlation between GP age and work internet access emerged from our quantitative results[5], the written responses from this ageing NZ rural health workforce (mean age of GPs 45.8 years[5], nurses 47.8 years, pharmacists 47.5 years; authors' unpubl. data, 2003) indicate that many lack proficient IT skills. This is a concern, because older health professionals require specific additional training to gain the skills and confidence to effectively use their computers and the internet[11].

The 'lack of computer access at work' barrier is diminishing, because over 89% of rural North Island GPs[5], practice nurses and pharmacists (authors' unpubl. data, 2003) now report having access to computers when consulting. The 'lack of fast internet' barrier has been virtually eliminated, as Telecom NZ reported that as of April 2005, it was providing broadband internet access to all rural towns on the North Island (S Mason, pers. comm., 2005). District Health Boards (DHB) are increasing their investment in primary care IT.

For example, during 2005, the West Coast DHB on the South Island, one of 21 DHB in NZ, connected all of its rural medical practices and nursing clinics using broadband internet (G Coster, pers. comm., 2005). This has allowed interconnectivity between the DHB and the practices, facilitating improved access to patient information within the DHB region, as well as providing access to internet-based education for isolated rural professionals. Therefore, with workplace computers and broadband internet now widely available, it is the remaining barriers we have identified that appear to be preventing rural health professionals from making greater professional use of the internet.

Strengths and limitations

Only one in every three professionals who returned completed questionnaires answered the general question asking for comments about learning, computers, and use of the internet. However, this is not problematic given the qualitative analysis of this question. What matters is not the response rate (or from our perspective the number of times that concerns were raised) but rather the richness of the insights that were provided in response to the question posed. Although respondents were not purposively selected, their large number and variation by profession suggests that they have the experience to represent a range of perceived barriers to increased use of the internet for learning. Their insights were indeed able to enhance understanding of the experiences of the rural health professionals, and generate further concepts to investigate. We have reported direct quotations to enhance the trustworthiness of the research, and all team members agreed on the final interpretations. A further limitation is that the rapid pace of IT change, means that our data collected during mid-2003, now almost certainly underestimate the extent to which NZ rural health professionals are using the internet professionally.

Implications: The need to use IT in health and education is continuing to grow, and rural health professionals require these skills. Government, universities and professional colleges have an important role to play in teaching health professionals these skills, enabling them to stay abreast of

advances in knowledge. An excellent example in Australia is 'Chaos to Clarity: GP internet training manual' developed by Monash University to teach GPs how to find clinical, evidence-based information on the internet (www.monashdivision.com.au/services and information /evidenced-based medicine/internet training program)[12].

Unanswered questions include whether internet access during patient consultations has any effect (positive or negative) on the doctor-patient relationship, the consultation time, the patient's care or health outcomes, and whether the additional costs of internet access will affect consultation charges.

Conclusion

This 2003 study has identified a number of barriers to NZ rural health professionals making greater use of the internet for learning. They included lack of access to computers, poor availability of broadband (fast) internet access, lack of IT skills/knowledge, lack of time, concerns about IT costs and database security, difficulty finding quality information, lack of time, energy or motivation to learn new skills, competing priorities (eg family), and a preference for other learning modalities which may include more social interaction. Now that broadband access has penetrated all rural towns in New Zealand, and computers are widely available in the workplace, it is these other barriers that need to be addressed with specific IT training for the rural health workforce. Without this education and training, many rural health professionals will not acquire the IT skills they need to get maximum advantage from both computers and the internet. Greater use of the internet will potentially enable them to reduce their professional isolation and improve the health services they offer.

Acknowledgements

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