

# Doctors and their Continuing Medical Education: *Interactions with the Internet*

Summer Studentship Project

Dylan Tapp

Supervisors: Dr. Helen Moriarty, Mr. Tony Egan

Funded by: Medical Council of New Zealand

With additional assistance from the Wellington Medical School  
Department of Primary Health Care and General Practice

## **Introduction:**

The march of Information Technology has had a significant effect on the way medicine is practiced. While it can be an integral tool to speed access to information and update knowledge[1, 2], Information Technology possesses its own set of challenges. Medicine has been becoming increasingly reliant on technology, but there are important questions to be answered regarding what gaps exist in how we utilise that technology[3].

Much of the progress regarding Information Technology and the internet has been made in the last ten to fifteen years, so we must consider whether a generational divide of “techno-literacy” has been created in the profession and what the implications of this may be[4, 5]. Questions remain over how significantly attitudes and abilities differ among doctors of different age groups, whether this is an issue, and if so, how it should be tackled.

As internet use by the medical profession has increased, there has been a proliferation of medical resources available online. Due to the volume of information, many of these resources focus on helping doctors seek out the information most relevant to them[6]. This added flexibility often comes with a price. Bodies such as District Health Boards and Professional Colleges have the capacity to provide access to a range of resources via group subscriptions. Professional Colleges overseas have sought to develop on-line portals to relevant information for their members in an effort to leverage group buying power[7, 8], something that Colleges in New Zealand are preceding down the road towards[9].

## **Aims:**

This project was designed to generate a picture of internet use among doctors of a variety of specialties in New Zealand. This includes attitudes, abilities, usage and barriers to do with the internet, to identify gaps in usage in New Zealand. This is of relevance to the Medical Council of New Zealand (MCNZ), District Health Boards, and the Professional Colleges alike. Additionally, it was designed to examine age-group and generational differences in internet uses and attitudes, since it was hypothesised that doctors closer to retirement would be less-familiar with internet resources and Information Technology.

## **Methods:**

The study was in three-stages: Firstly, brief interviews with a number of Key Informants and Stakeholders who had a role in Information Technology in medicine. Secondly, a questionnaire mail out, and thirdly, selected telephone interviews with volunteers.

### ***Questionnaire design***

The Key Informant and Stakeholder interviews, along with a literature search were to form the basis of the questionnaire. Calls were made to a variety of stakeholder organisations, including Professional Colleges (see acknowledgements).

Once written, the questionnaire was refined by consultation with informants and pre-testing by volunteer staff and students of the Wellington Medical School. The questionnaire was simplified and reduced in size as a result of these exchanges. The final questionnaire was a double-sided page consisting of 29 questions spread across four sections (demographics, information sources, professional connections and training).

The questionnaire was posted to 606 doctors randomly selected from the New Zealand medical register. Included with the questionnaire was a volunteer form for follow-up interviews. The questionnaire included a system to keep track of non-respondents: each questionnaire had a code. An independent person in the department kept the register of names against questionnaire code numbers. The code numbers of returned questionnaires were passed to the holder of the names to numbers register so participants who had returned their questionnaire could be deleted from the register. Once the questionnaires had been entered into the database (without the code) we were left with a computerised database of unlinked questionnaire responses and a list of non-respondents.

Once the first wave of questionnaires had been returned, a decision was made to send reminders out to non-respondents. There was a gap in data from older doctors, so the 60 non-respondents with the lowest MCNZ number were selected again for a reminder questionnaire and interview

volunteer form. This second wave of questionnaires was sent without the previous coding system, as the final mail-out would not track non-respondents.

**Interviews**

An interview volunteer form was designed and this was included with the questionnaire. Participants willing to have a phone interview were asked to provide a name and contact details. In returning the interview volunteer form, anonymity regarding the questionnaire was waived, but this was necessary for the semi-purposeful selection of interview participants with varying perspectives and backgrounds.

The intention was to complete at least ten interviews, each about twenty minutes long. Interview offers were sent to sixteen selected volunteers, along with consent documents explaining the interview and recording process. 10 of the 16 initial interview volunteers agreed to proceed with an interview. Interviews were 20 to 30 minutes long, conducted by phone and were taped. The interview tapes were listened to for content, but not transcribed. To maintain participant confidentiality, the tapes are to be kept securely at the Wellington Medical School for 5 years, then destroyed.

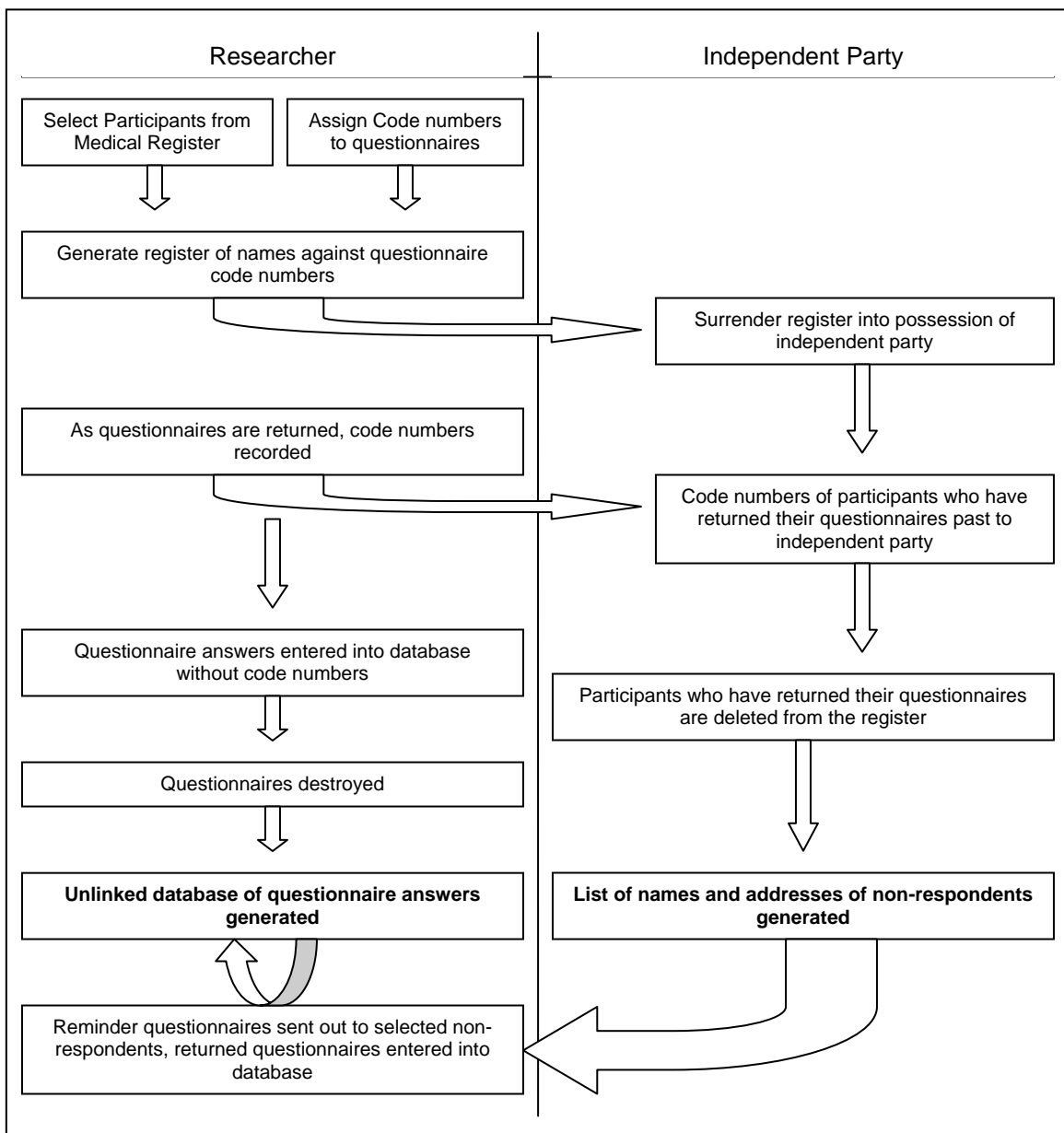


Figure 1: An illustration of the system used to allow reminders to be sent to questionnaire non-respondents, while maintaining participant anonymity.

**Results:**

**1. Response rate**

150 valid questionnaire responses were received, giving a participant response rate of 24.8%. 7 questionnaires which were returned after the cut-off date for inclusion in the data analysis and were not included in these results. 37% of questionnaire respondents were female and 63% were male, with an average age of 48 (female = 44, male = 50). 33% of respondents were overseas trained, while 67% trained in New Zealand.

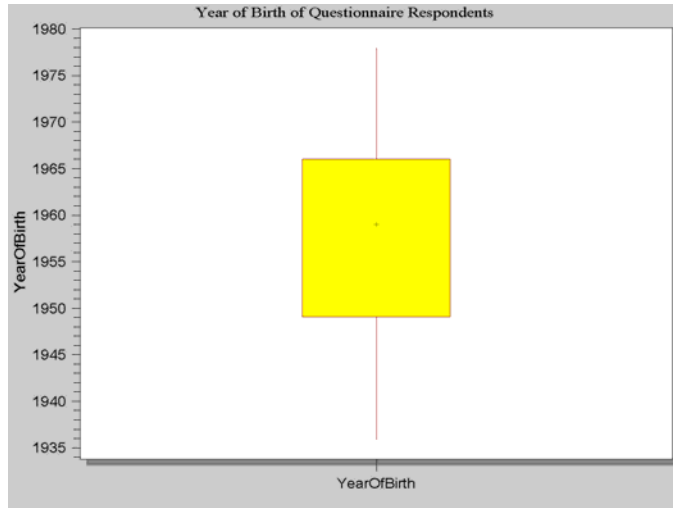


Figure 2: Graph of the Year of Birth of questionnaire participants

**2. Questionnaire Results**

On a Likert scale (from 1 meaning useless to 5 meaning extremely useful) participants were asked how valuable they found the internet. The mean was 4.03. It had been hypothesised that there would be a relationship between age and attitude towards the internet. Regression analysis relating year of birth to response to this question was carried out. Although a trend is present (as can be seen in the figure 3 below), the correlation coefficient of 0.09, means that age accounts for only a small amount of the variability in attitude.

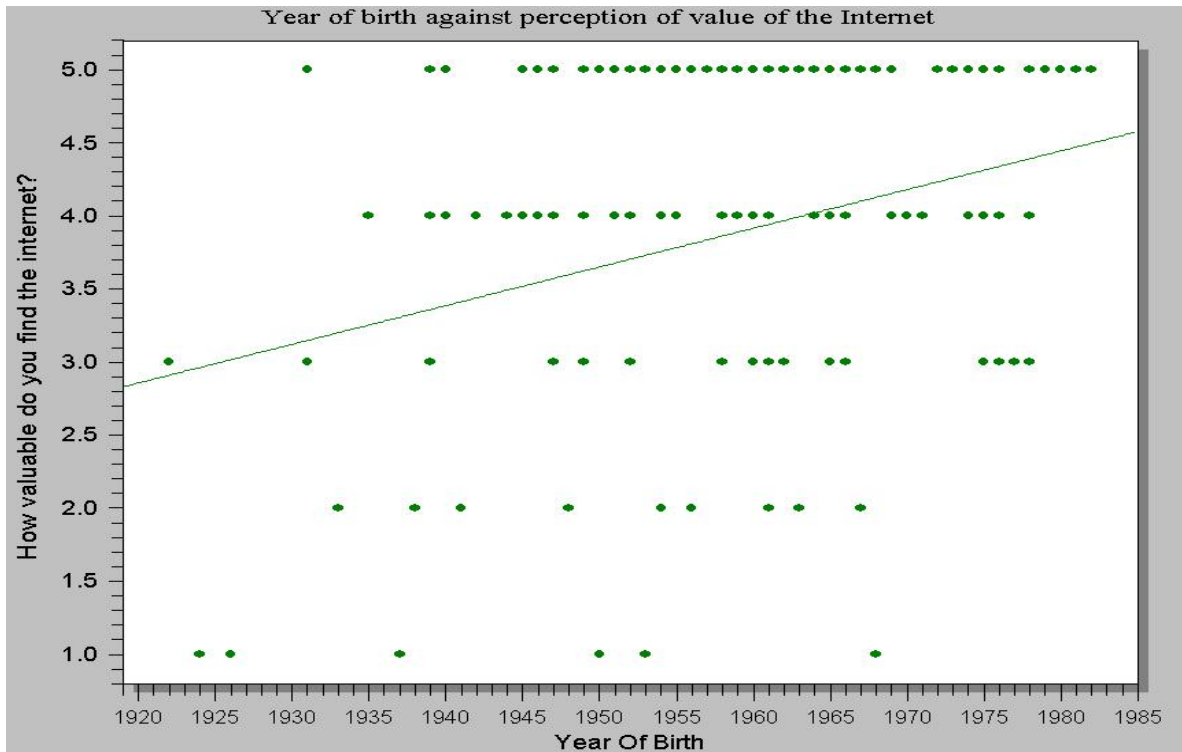


Figure 3: Graph of year of birth of participants against response to the question "How valuable do you find the internet?"

In response to the question "How often do you access the internet for work purposes?" 83% of participants identified themselves as using it more than monthly.

Participants were asked to identify Internet behaviours that they were aware of and those that they used. Figure 5

How often do you access the internet?	Frequency	Percent
Once a day or more	61	42.10%
Once a week or more	63	43.40%
Fortnightly	4	2.80%
Monthly	8	5.50%
Yearly	6	4.10%
Never	3	2.10%

Figure 4: "How often do you access the internet for work purposes?"

shows the proportion of respondents who answered positively, either to awareness of a given resource or regular use.

Type of resource	Aware (95% C.I.)	Use (95% C.I.)
Email with colleagues	96.6% (92.3, 98.9)	75.7% (67.9, 82.3)
Email with patients	75.7% (67.9, 82.3)	18.9% (13.0, 26.2)
Message board discussion with colleagues	66.2% (58.0, 73.8)	17.6% (11.8, 24.7)
General search engines	95.3% (90.5, 98.1)	82.4% (75.3, 88.2)
Online Journals	95.3% (90.5, 98.1)	63.5% (55.2, 71.3)
Free online article databases	89.2% (83.0, 93.7)	62.8% (54.5, 70.6)
Paid online article databases	78.4% (70.9, 84.7)	39.9% (31.9, 48.2)
Online pharmacology databases	70.3% (62.2, 77.5)	27.7% (20.7, 35.7)
EBM reviews	84.5% (77.6, 89.9)	42.6% (34.5, 51.0)
Voice/Video conferencing	67.6% (59.4, 75.0)	9.5% (5.3, 15.4)
Online CME	80.4% (73.1, 86.5)	35.1% (27.5, 43.4)
Multimedia educational resources	60.1% (51.8, 68.1)	13.5% (8.5, 20.1)
Electronic books	65.5% (57.3, 73.2)	14.9% (9.6, 21.6)

Figure 5: Proportion of questionnaire respondents who were aware/used these internet resources and tools.

While there were slight differences in the age structures of users versus non-users of any given resource, the confidence intervals for the differences in mean age lacked statistical significance.

Participants were asked whether there were any barriers preventing them from utilising internet resources more widely than they currently do. Figure 6 shows that 60% of respondents identified one or more barriers; the most significant barriers identified were cost (predominantly of subscription-based online resources), time, and not knowing what resources were available. There was no statistically significant difference in the ages of those who identified barriers versus those who did not.

Barrier	% Identified (95% C.I.)
Don't feel confident with computers	2.7% (0.7, 6.7)
Slow or old computer hardware	6.0% (2.8, 11.2)
No centralised portal	10.1% (5.7, 16.1)
Lack of internet understanding/training	11.4% (6.8, 17.6)
Slow internet access	12.1% (7.3, 18.4)
Prohibitive cost	13.4% (8.4, 20.0)
Don't know what resources are available	13.4% (8.4, 20.0)
Time	14.8% (9.5, 21.5)
None	39.6% (31.7, 47.9)

Figure 6: Factors identified as barriers to increased internet usage

Participants were asked what forms of internet access they had at home and work. They were given a range of options and asked to select any that applied. The results are in figure 7.

Type of Internet Access	% Identified (95% C.I.)
No access	1.3% (0.2, 4.8)
Don't know	0.7% (0.0, 3.7)
Dial up at home	32.2% (24.8, 40.4)
Dial up at work	11.4% (6.8, 17.6)
Broadband at home	53.7% (45.3, 61.9)
Broadband at work	48.3% (40.1, 56.6)
High speed over shared network	42.3% (34.2, 50.6)

Figure 7: Types of internet access available to participants

Participants were asked how confident they felt in a range of computer and internet skills. They were given a Likert scale for each skill and asked to select from 1 (Not confident at all) to 5 (very confident). The averages of the responses are in figure 8 below.

Type of Skill	Likert Averages
Confident using a mouse and keyboard	4.76
Confident connecting to the internet	4.74
Confident using an internet browser	4.51
Confident browsing websites	4.34
Confident using e-mail	4.73
Confident doing a general web search (Google, etc.)	4.55
Confident finding articles with databases	3.90
Confident critically appraising articles	3.51

Figure 8: Averages of Likert scores for respondents' feelings of confidence in these internet skills

Figure 9 shows that, given a range of options for internet skills training, 66% of respondents requested training in some form. The most commonly requested areas for training were finding medical resources on-line, learning to appropriately use those resources and critical appraisal training for evaluating material.

Type of Training	% Identified
Basic computer skills	2.7%
Basic internet/email skills	4.7%
Learning where to find useful medical information online	35.6%
Learning how to use websites for medical information	29.5%
Literature Searching with web databases	36.9%
Critical research appraisal techniques	34.2%
Colleague interaction	19.5%

Figure 9: Types of training in Information Technology requested by respondents

With regards to collegial contact over the internet (meaning email, message-boards etc.) about 40% were happy with the degree to which

Do you use the web for professional contact?	% Identified
Currently do	39.2%
Do but would like to more	25.9%
Don't but would like to	17.5%
No	17.5%

they were already doing this (figure 10). Approximately 43% were interested in either starting to do this, or increasing the amount of collegial contact over the internet that they participate in.

Figure 10: "Do you or would you use the internet as a means of maintaining professional contact?"

Participants were asked how strongly they agreed or disagreed with the statement "The Information Technology revolution has gone too fast for me". They responded on a Likert scale from 1 (strongly disagree) to 5 (strongly agree). The average of the responses was 2.20, with no significant trend relating strength of response and age of the respondent.

### 3. Interview Results

10 interviews were conducted with volunteers: 4 female and 6 male, with an average age of 49. Of the 10 interviewees, 3 worked exclusively in public sector roles, 3 exclusively in private and 4 in some mix of public and private work.

9 out of 10 interviewees believed that Information Technology proficiency was required for the best practice of Medicine. The areas identified as important were the ability to search literature databases and utilise other resources for Continuing Medical Education (CME), manage patient information, communicate with colleagues and find reliable information sources for patients. 8 out of 10 thought that the medical profession in New Zealand was making insufficient use of Information Technology and the internet.

When asked about whether some groups of doctors struggle more, 8 out of the 10 interviewees thought that older practitioners were more likely to lack internet skills. While 2 of those 8 thought that this could reflect a resistance to change, 8 of the 10 had a sense of dissatisfaction about the transition to use of Information Technology in Medicine. They felt there had been a lack of training support at the times when it was needed most.

*"I feel like I've had to fight tooth and nail every step of the way - alone. It's partially responsible for my desire to leave the profession."*

While these interviewees felt that certain doctors struggled with the internet, a number mentioned that some of their less Information Technology-proficient colleagues may feel that the internet is the answer to a question no one asked and that it provides little over and above what's available with journals. 2 interviewees thought that effective internet use was important enough that there should be guidelines in place recommending a mastery of certain Information Technology skills to encourage usage. Others felt that despite a slow move away from paper-based resources and the potential of the internet to help doctors' ongoing learning, the vast majority of doctors have no problems with Information Technology, and those that do are decreasing in number.

*“Some of my colleagues see what I can do with the Internet and say things like ‘Oh, that’s very useful’, but they don’t want to learn anything new.”*

*“I do struggle with computers, as do some of my other colleagues who are near retirement, but I think we’re a bit of a dying breed.”*

8 of the 10 interviewees identified information overload as a problem, and it frequently arose as a theme in comments provided on the questionnaire. Many had difficulties getting through the volume of relevant literature that the internet could provide, and had trouble finding the most reputable sources and definitive research on a given topic. Generally participants were aware of evidence-based review websites such as Cochrane and Up To Date, but these require subscriptions and those who didn’t use them currently were reluctant to spend money without being sure of the benefit.

*“I think the information overload is affecting all walks of life. Rather than more information we need access to selected information quickly.”*

In the provision of Internet resources, opinion was somewhat divided. While the range of resources available in public hospitals was generally complimented, the availability and quality of computer terminals was more varied. When the question was posed whether access to certain internet resources ever constitutes enough of a national interest for access to be provided (i.e. paid for) for all doctors, public and private, opinions varied. 7 of the 10 thought there should be some consideration of providing certain resources at a national level by public bodies, with participants nominating evidence-based review resources (such as Up To Date) as candidates. 1 participant was undecided on this issue, and two were opposed.

There were mixed feelings on the efforts of professional Colleges in New Zealand to provide tools to their members. This reflects the stages of development that different Colleges have achieved. 5 interviewees thought that the Colleges had been slow to adapt in comparison with similar organisations internationally. While 9 out of the 10 had a fair idea of what was available through their College’s website, only 3 of those 9 regularly visited. The most common suggestion was for Colleges to buy group subscriptions to a few selected relevant e-journals for their members. 7 of the 10 were open to the idea of paying a small amount more to their College for group buying power if it were cheaper to each doctor than paying for the services individually.

*“When I look at what’s available overseas then the only conclusion I can draw is that the Colleges here have been dragging their heels a bit.”*

Interviewees were asked whether small handbooks on particular skills (possibly including a CD-ROM tutorial) would be sufficient additional training, or whether face-to-face training would be necessary. Of the 10, 4 thought handbooks would suffice, 5 felt that face-to-face training was necessary for those who are in most need of help, and 1 was unsure.

## Discussion:

### *1. The project and findings*

There appeared to be some disparity between questionnaire results and interview results in terms of whether older doctors were more likely to struggle with the Internet and Information Technology. The questionnaire identified no statistically significant trends in terms of attitudes and usage against age, while 8 out of 10 interviewees felt that there was an age effect present, but with an average age of 49 this was group not skewed toward the older end of the workforce. This may mean that the perception is different from reality, or may be accounted for by a potentially biased sample, if those who were confident with the Internet were more likely to respond to the survey. Alternately, it may simply be a result of lack of statistical power of the questionnaire, as there were few respondents who were in the “near-retirement” age bracket.

The 25% response rate for the questionnaire can partly be attributed to time of year. The questionnaire was sent out shortly before Christmas, so some recipients would have been on vacation at that time. There may also be a lack of interest in the topic, reducing response rate. Although the mean age of participants and the male to female ratio is similar to the medical profession in New Zealand as a population, we must bear in mind the limited generalisability of the

questionnaire results due to possible bias. Interview participants were semipurposely selected to represent a range of perspectives, attitudes and ages.

The questionnaire results revealed low awareness and usage of message-boards, which contrasts with 43% of questionnaire responses wanting increased collegial contact over the internet. Technically, message boards are easy to set-up and run (with many simple services available to let website owners easily add the facility), so this seems a simple on-line service that Colleges could easily add to their website if they don't already. For any practitioners who feel professionally isolated, either due to geography or because they are practicing in a small sub-speciality, the message board service could be invaluable. It could also provide opportunities for virtual (versus face-to-face) peer review.

The large number of participants who felt they could benefit from additional training was intriguing given that the questionnaire findings showed they were relatively comfortable in a range of skills. There may be scope for additional research to determine more accurately in what areas doctors would like to improve their skills.

The proportion of questionnaire participants who had broadband access at home or work is well above the national average of 10% of households[10]. This suggests that either doctors are a more technology-literate population or that participants responding to the questionnaire were more likely to be well-skilled in Information Technology.

Subjectively, the tone of the interviews when talking about doctors who struggle with the internet was mixed. The general feeling was that many more senior doctors have had a small amount of trouble updating their Information Technology skills, but that it was a "do or die" scenario, and most are now proficient to some degree or other. Medical records, registration, communication and CME have moved online therefore doctors have had little choice but to update their computer skills. It was suggested that those who aren't proficient may not be interested or receptive to internet resources unless they can see a tool that would save them enough time (or provide an income advantage) to warrant the time invested in training.

While the professional Colleges were mentioned by a number of the interviewees, it should be noted that they are being compared with international counterparts with larger membership bases and a greater funding pool. Much has been achieved here. Royal New Zealand College of General Practitioners for example makes Cochrane Collaboration available to all its members and sends email round-ups of important material, amongst other initiatives[9]. The Royal Australasian College of Physicians has a Health Informatics committee to advise on information access to members[11]. As the "information-overload" was so uniformly identified as a problem, there is no need to provide an exhaustive list of relevant on-line resources – doing so would be inefficient. Rather, the target should be providing a small number of very relevant, easy to use, reliable, well-linked and comprehensive tools common to all disciplines. Providing access to evidence-based review websites, a small collection of journals relevant to each profession and e-mail alerts of important new material is a good starting point.

## *2. Reflections on studentship experience*

I would like to briefly reflect on the studentship experience. I feel very strongly that the process is a very valuable one. There is an art to study, questionnaire and interview design that one can not appreciate unless one has attempted them. I felt this was particularly true of my questionnaire, which, should I attempt to write again today would be very different from one sent out. There are a myriad of small lessons to learn and hurdles to clear, having done which puts me in a much stronger position to carry out research again.

I was very surprised (and admittedly, somewhat disillusioned initially) with the small handful (7) of particularly aggressive, and occasionally personally offensive questionnaire responses I received from some health professionals. I was unable to ascertain from these responses whether this was due to offence at some component of the study or reflection of the lack of time and high degree of stress some doctors are under. In any first-time project mistakes may be expected, but there are professional and appropriate ways of responding to this. A negative attitude from research respondents does nothing to encourage research interest in students these studentships hope to foster.

Recommendations:

1. That the Medical Council in association with Professional Colleges and other bodies such as the New Zealand Medical Association look into developing a range of small, uniform, easy-to-use guide pamphlets covering such areas as useful medical resources on-line, on-line literature searching, and quick tips for critical appraisal.
2. That the Medical Council in conjunction with the Professional Colleges assess the cost/benefit of providing national access to doctors of subscriptions to online medical resources such as the Cochrane Collaboration and Up to Date, and alert doctors to ways to access these.
3. That the Professional Colleges move to find the key evidence-based resources for their members and assess whether group subscriptions would make these more accessible. This would link-in with existing subscribers so the cost increase for the Colleges should be minimal.
4. That Professional Colleges move to encourage discussion boards to create communities of interest among members. This should be done in an integrated way across providers to create focal points for online discussion rather than having many boards on different websites covering similar material.
5. That more research be carried out into this field to examine different groups of practitioners, such as hospitals and regional groups. This is an area of high interest, and strong research helps create a clear image of what is needed for the future.
6. That the findings of this study as they apply to stakeholder organisations and professional Colleges be disseminated quickly to assist discussion in this high-interest field.

Acknowledgements:

Key informants: Elizabeth Finn (Education manager, HDC), Lynn Saul (RNZCGP), Ian St. George (RNZCGP), John Simpson (RACS), Steve Williams (RANZCOG)

Thanks to those who provided feedback during the questionnaire development process: The key informants, Louise Poynton, Rosemary Wyber, Jessica Robinson and Rob Willitts

Thanks to all the staff of the Wellington Medical School Department of Primary Health Care and General Practice for their time and expertise.

And thanks to the George Symmes and the Medical Council of New Zealand for their generous funding and support.

## References:

1. Curran, V.R. and L. Fleet, *A review of evaluation outcomes of web-based continuing medical education*. Medical Education, 2005. **39**(6): p. 561-7.
2. Fordis, M., et al., *Comparison of the instructional efficacy of Internet-based CME with live interactive CME workshops: a randomized controlled trial*. JAMA, 2005. **294**(9): p. 1043-51.
3. Bennett, N.L., et al., *Physicians' Internet information-seeking behaviors*. Journal of Continuing Education in the Health Professions, 2004. **24**(1): p. 31-8.
4. Eva, K.W., *The aging physician: changes in cognitive processing and their impact on medical practice*. Academic Medicine, 2002. **77**(10 Suppl): p. S1-6.
5. Eva, K.W., *Stemming the tide: cognitive aging theories and their implications for continuing education in the health professions*. Journal of Continuing Education in the Health Professions, 2003. **23**(3): p. 133-40.
6. Alper, B.S., et al., *How much effort is needed to keep up with the literature relevant for primary care?* Journal of the Medical Library Association, 2004. **92**(4): p. 429-37.
7. *American College of Physicians*. [Website] 2006 [cited 2006 20 March]; Available from: <http://www.acponline.org/>.
8. *Royal College of Psychiatrists*. [Website] 2006 [cited 2006 20 March]; Available from: <http://www.rcpsych.ac.uk/index.htm>.
9. *Royal New Zealand College of General Practitioners*. [Website] 2006 [cited 2006 20 March]; Available from: <http://www.rnzcgp.org.nz/>.
10. Point-Topic. *New Zealand Broadband Overview*. [Website] 2006 27 February [cited 2006 March 20]; An overview of the state of Broadband in New Zealand, published Feb 2006 by independent internet statistics company Point Topic]. Available from: <http://www.point-topic.com/content/operatorsource/profiles/new+zealand+broadband+overview.htm>.
11. *The Royal Australasian College of Physicians*. [Website] 2006 [cited 2006 March 20]; Available from: <http://www.racp.edu.au/>.

## Appendix: Questionnaire and Interview Volunteer Form

(See over Page)

