

A Comparison of Internet Usage Between Two Residency Programs in the United Kingdom and the United States

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Original Article

Abstract

Background: The Internet is a potentially useful tool in medical education. The patterns of its usage and availability among anesthesia residents have not been surveyed. This survey, conducted in 2000, attempts to gain insight into and quantify its usage.

Methods: After ethics committee approval, a postal questionnaire of attitudes and usage was sent to trainees in Anesthesiology in two training programs: the University of New Mexico, USA (UNM) and the North West Regional Health Authority, UK (NWR). A repeat questionnaire was sent to non-responders after four weeks. Telephone interviews were conducted with hospital administration to determine availability and cost of the Internet.

Results: Response rates were 67% (82/122) from the NWR and 83% (25/31) from UNM. Compared to UNM, residents at UNM used the Internet longer for general (median 3 vs. 2 years, $p < 0.001$) and medical (median 2 vs. 1.2 years, $p < 0.001$) purposes. All (31/31) UNM trainees and 73% (89/122) of NWR trainees had Internet access. More NWR trainees who had Internet access at work (98%; 60/61) used it for medically related purposes than those work access (17/21, 81%) ($p < 0.001$). More UNM trainees (76%; 19/25) accessed web sites other than those of official national organizations than NWR trainees (40/82, 49%) ($p = 0.046$). Approximately 75% of all trainees access web sites of the Association of Anaesthetists and Royal College of Anaesthetists (in the NWR) the American Society of Anesthesiologists and American Board of Anesthesiology (in UNM) and on-line journals. The most favorite sites were GASNET (NWR) and ASA (UNM). Both UNM and NWR trainees perceived the Internet as supplying useful and accurate information.

Conclusions: If the reported survey results are representative of Internet use among anesthesia residents in the USA and UK, access at work is associated with greater Internet use for medical purposes perhaps in part because residents perceive it as a convenient and accurate resource.

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Introduction

The Internet is a global system of connections between millions of computers that allows almost instantaneous access to and dissemination of information. Its seed was planted in 1958 as part of the US Defense Advanced Research Projects. It has grown from a Department of Defense Network to a vast public/private network since it's deregulation in 1993.

In the USA over 35,000,000 adults, nearly 50% of all those online use the Internet to collect health information ¹. This number is growing twice as fast as the overall online population. In the United States, regular Internet use by physicians has increased 300% in the past 2 years ². 95% of these doctors use the Internet to seek medical information ³. A specific website for anesthetists, GASNET, has existed since 1992.

Although guides to usage of the Internet ⁴⁻⁷, descriptions of successful teleconferences ^{8,9}, and analyses of usage of specific web sites ^{10,11} exist in the medical literature, no survey of Internet usage and availability among trainee physicians exists. This postal survey aims to assess the usage of, availability of and attitudes to the Internet among Anesthesia trainees in the North West Region of the UK and at The University of New Mexico, USA.

Method

With ethics committee approval, questionnaires were sent by post to all specialist registrars in anaesthesia in the North West Region of the UK (NWR) as well as to all anesthesiology residents and fellows in the University of New Mexico Anesthesiology (UNM) programs. Individuals who had not responded were sent a follow-up questionnaire after one month. The survey was carried out between January and August 2000. See Appendix for the survey.

The survey form (see Appendix) sought information on demographic data, availability of the Internet at home and work, how long trainees had used the Internet, with what frequency they used the Internet, what purpose they used it for, what sites were visited and their attitudes to those sites.

A telephone survey of all training hospitals in the studied regions was made to determine Internet access at each hospital.

A financial statement of the cost of providing Internet service to trainees was obtained from the largest training hospital in the UK North West Region, Hope Hospital. Unfortunately, UNM was not able to provide a similar cost analysis.

Results were tabulated and analyzed using descriptive statistics and 2-tailed non-parametric tests (Mann-Whitney U-test, Chi-square and Fisher's Exact) with SPSS statistics package (SPSS Inc., Chicago, IL) and StatXact-4 (Cytel Software Corporation, Cambridge, MA). P-values <0.05 were considered statistically significant.

Results

Survey responses were received from 67% (82/122) of NWR trainees and 83% (25/31) of UNM trainees. Replies were uniformly distributed by year of training for each program (see table 1).

The results of Internet use frequency and pattern are shown in tables 2 and 3. Based on the hospital survey, 73% of NWR trainees and 100% of UNM trainees had access to the Internet at work. All further analyses are based on the trainee survey replies received. UNM trainees, compared to NWR trainees, used the Internet more often at work. Furthermore, NWR trainees with Internet access at work used the Internet more often to research medical information than those who did not have access at work ($p < 0.001$). Approximately 70% of NWR and UNM trainees accessed online medical journals. Recreational Internet use was approximately 80% and not different between the NWR and UNM. 42/82 (51%) of NWR trainees compared to 6/25 (24%) of UNM trainees never accessed medical sites written by groups other than their professional organizations ($p = 0.01$).

Trainees at NWR and UNM held similar beliefs as to the accuracy and usefulness of the medical information available on the Internet. 71/82 (87%) of NWR and 24/25 (96%) of UNM trainees believed the information useful while 55/82 (67%) of NWR and 19/25 (76%) of UNM believed it to be accurate. The website named as “favorite” most often by NWR trainees was Gasnet (www.gasnet.org) and by UNM trainees, American Society of Anesthesiologists (www.asahq.org).

An example of the setup and annual costs of providing hospital Internet access is provided (see Table 5).

A post hoc power analysis indicates the sample sizes are adequate to detect a 20% difference between NWR and UNM. This is for base percentages in the 75% and above range with 80% power and $\alpha = 0.05$.

Discussion

Our survey reports, for the first time, Internet use patterns of anesthesia residents. UNM trainees had greater access to the Internet at work and had used it for more years for both recreational and work related purposes than NWR trainees. Based on comparisons within and between programs, Internet access at work was associated with greater use for medical purposes. This may also have been facilitated by the belief by the majority of both UNM and NWR trainees that medical information on the Internet was useful and accurate.

Response rates to the survey were high and responses were received in the same proportions from trainees in all years of training. However, it is not known if Internet users were more likely to answer the questionnaire than non-users. When interpreting the results of our survey, one needs to bear in mind that it only solicited responses from trainees at two training programs, UNM in the USA and NWR in the UK, and thus may not be representative of all anesthesia residents in these countries. To assess generalizability of our results better, it would have been

useful to ask for more demographic information such as sex, age and socio-economic background of the respondents.

Questions specifically designed to discern association between Internet usage and learning or decision-making would have added further to the value of the survey. Such questions might include “what have you learned from the Internet that improved your practice?”, “name a source of information obtainable only on the Internet.”, “how could improved access to the Internet alter your practice?” or “has using the Internet enabled you to understand and feel comfortable with developing computer technology?”

Trainees in the NWR have not used the Internet as long as UNM residents for either medical purposes or general use. This reflects the fact that the Internet was born in the USA and access at work is easier at UNM. Duration of Internet use appeared not to affect how anesthesia residents used it.

Trainees from the NWR had less access to the Internet at work than their UNM counterparts. If these data are representative of their respective country’s training programs, Internet access at UK training hospitals may be less than at their US counterparts. Although sympathetic to the issue and requiring computer access for all trainees in the UK, neither the Royal College of Anaesthetists nor the Association of Anaesthetists has stated detailed recommendations addressing Internet access for trainees. Hospital authorities in the UK decide independently how to allow Internet access. Some allow it only in libraries while others allow it in offices and non-working areas. With the improvement of “firewall” technology more hospitals state the objective of increasing access although “firewalls” may also restrict or slow access to useful sites. No NWR hospital would comment in detail on why access was limited but cost, fear of improper use and fear of security breaches were mentioned.

The most important result of the survey is that trainees that had greater access to the Internet at work used it more often for work related purposes. UNM trainees had 100% access to the Internet at work and used it more often than NWR trainees. In the NWR, trainees with Internet access at work used the Internet more frequently to access medical information than those without access at work. Our survey results suggest that Internet access at home does not lead to more frequent researching of medical information. Physicians in an academic setting have an unexpected daily need for information at work¹². Having Internet access at work, when medical problems are more on the mind, may be one of the important factors explaining trainees’ greater use of the Internet for medical purposes.

Most anesthesia residents believed that information they access is useful and accurate. This may be because they exercise good judgment in their choice of Web sites. The speed of retrieval and reliability of the information is greatly dependent on the experience and quality of both the questioner and the source of the response. All the sites listed as “favorites” were from the highest quality organizations or universities. There is only an advantage in having rapid access to information, if it is accurate. There has been concern about the quality of medical information on the Internet¹³. Attention to the quality of the source as well as noting whether the site is up to date and peer reviewed should allays many concerns. Doctors should, however, be aware of the vast array of unsubstantiated medical information that is available to the general public. Patients

use the Internet as a means of communication with each other and for exchanging ideas¹⁵. It is important that anesthesiologists have access to the same material as their patients who are coming to rely on the Internet as a source of medical information and expect their doctors to be aware of techniques and theories published on the Internet.

Allocation of resources is always difficult in an institution with a tight budget. The annual cost at Hope Hospital, Salford, the largest training hospital in the NWR, was substantial, about 33,000 UK Pounds (\$49,500) or 137 UK Pounds (\$210) per year per registered user, though the number of actual users far exceeds those registered. Since a large proportion of costs are fixed, cost per unit user decreases dramatically with increased use. The costs identified in table 5 account only for hardware and software necessary for providing Internet service to hospital employees and trainees. They do not include costs for additional computers. Still, the cost of setting up and maintaining Internet services in a training hospital is a small fraction of its annual expenditure. While this survey did not attempt to demonstrate cost savings from Internet usage, possibilities include savings from a reduced need for library storage space and journal subscriptions, time saved by meeting electronically instead of face-to-face, and from faster communication. Most of those hospitals in the North West Region without access for trainees are considering or pursuing the provision of easy Internet access.

Studies in the primary care¹⁴ and academic¹² settings show that physicians have a need for information on a daily basis. Traditionally, textbooks, journals and discussions have met that need with colleagues. . Benefits of Internet use in the clinical setting have been demonstrated; examples exist of improved emergency patient care resulting from rapid Internet access to information in children with rare diseases¹⁵. Medline and Internet sources such as the Cochrane Collaboration (www.cochrane.org) provide answers to clinicians' questions. Although electronic mail is probably the most widely used facility of the Internet, many general medical and anesthesia resources are available. The large list includes discussion groups, libraries, continuing medical education courses, commercial sites, on-line versions of text journals and exclusively on-line peer-reviewed journals such as "Educational Synopses in Anesthesiology and Critical Care Medicine" (www.gasnet.med.yale.edu/esia/) and "Journal of Education in Perioperative Medicine" (www.jepm.org).

The anesthesia trainees surveyed use the Internet at work and they use it to research medical information, which they consider useful and accurate. More importantly, those who have access at work use it more often for medically related purposes than those without access at work. Knowledge of this should be useful to educators and to those responsible for developing resident training resources. The financial costs to a hospital are relatively small and provision of Internet access at work encourages its use for researching medical information. Benefits to anesthesia trainees may arise not just from the information itself but also from training in an atmosphere, where rapid access to and dissemination of accurate knowledge is valued. Learning best occurs when trainees willingly use the opportunities presented to them. This appears to be true for the Internet. Educators should consider how to build on this positive feature and provide further training to residents on how to assess and apply Internet-derived medical information as part of the curriculum.

Table 1: Number of respondents (%) by training level beyond internship

	First year	Second year	Third year	Fourth year
UNM Trainees N=25	8 (32)	6 (24)	5 (25)	6 (24)
NWR Trainees N=82	24 (29)	19 (23)	19 (23)	20 (24)

Table 2: Location of Internet access for trainees and years of Internet usage. Values are number of trainees (%) and median years (interquartile range)

	UNM Trainees N=25	NWR Trainees n=82	p values
Access to Internet at Home*	20 (80)	72 (88)	0.323
Access to Internet at Work *	25 (100)	61 (74)	0.004
Years using the Internet ¶	3 (2.5-5)	2 (0.8-3)	0.001
Years using the Internet for medical education purposes ¶	3 (1-4)	1.2 (0.5-2)	0.001

*Chi-square test

¶Mann-Whitney test

Table 3: Patterns of Internet use by anesthesia trainees (NWR vs. UNM). Values are number of trainees (%)

	NWR Trainees	UNM Trainees	P value*
Trainees using Internet at work more often than monthly	42/82 (51)	22/25 (88)	<0.001
Trainees seeking medical information on Internet more often than monthly	62/82 (76)	20/25 (80)	0.20
Trainees using the Internet for recreational purposes	70/82 (85)	20/25 (80)	0.19

* Fisher's Exact Test

Table 4: Web sites accessed by trainees. Values are number of trainees (%)

	UK	USA
	n=82	n=25
Association of Anaesthetists	63 (77)	-
Royal College of Anaesthetists	64 (78)	-
American Board of Anesthesiology	-	19 (76)
American Society of Anesthesiologists	-	18 (72)
GASNET	41 (50)	19 (76)
On-line journals	58 (71)	18 (72)

Table 5: Sample cost in British Pounds (US Dollars) for setup and maintenance of Internet access for employees (Hope Hospital, Salford, UK[@])

Item	Cost [#]
Setup	
Original NHS Net/Internet set up costs (hardware and software) (\$60,000)	40,000
Annual Support	
Subcontractors (Line rental, Syntegra hardware and software)	18,000 (27,000)
Clinical Informatics Support	15,000## (22,500)
Total Annual Cost	33,000 (49,500)
Number of current registered users*	240

*It is not necessary to be registered to use Internet services if using a designated computer.

#Figures do not include additional costs for Intranet, security manpower, personal computers and software support.

675 hours at 22 Pounds per hour

@Figures are courtesy of Hester Dunn, Business Manager, Department of Clinical Information, Hope Hospital, Salford, UK.

Appendix

Internet Usage Questionnaire

All trainees in the North West region have received this and a parallel questionnaire is being sent to trainees at the University of New Mexico in America.

With the results I hope to be able gain a picture of Internet usage in order to improve Internet access and learning opportunities.

The results will be confidential and anonymous.

I have enclosed a self-addressed envelope for return of the questionnaire.
(If you send it in hospital post there will be no charge.)

	Never	Less than every every 3 months	Every 3 Months	Monthly	Weekly	Every two days
I use the Internet at work						
I use the Internet at home						
I use the Internet to research medical information						
I use the Internet for educational purposes						
I use the Internet recreationally						

Now, please answer the
questions on the back of this form

John Sanders FRCA

I use the following web pages:	Never	Less than every every 3 months	Every 3 Months	Monthly	Weekly	Every two days
Royal Collage of Anesthetists*						
Association of Anesthetists*						
Gasnet						
Wisedocs 2000						
Other Anaesthesia Sites						
Other Medical Sites						
On line journals						

What year SPR are you?

Have you passed the FRCA?

What is your favorite Anesthesia web site?

For how long have you used the Internet?

How long have you used the Internet for medical education or research purposes?

I find medical Internet information useful Yes/No

I find medical Internet information accurate Yes/No

* In UNM (United States) questionnaires frequency of access of websites for the American Society of Anesthesiologists and the American Board of Anesthesiology were sought.

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