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Relevance of Electronic Health Information to Doctors in the Developing World: Results of the Ptolemy Project's Internet-based Health Information Study (IBHIS)

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Abstract The aim of this study was to determine the current usage, relevance, and preferences for electronic health information (EHI) in the participant surgeons' clinical, research, and teaching activities. The Internet-Based Health Information Survey (IBHIS) was conducted from August to December 2003. Thirty-seven doctors (primarily practicing in East Africa) participated, all of whom had been using the Ptolemy resources for at least 6 months. Survey questions concerned time spent reading medical literature, preferred information sources, preferred type of publication, relevance, preference for western versus local medical literature, and academic productivity. Among the 75 eligible participants, 37 (48%) responded. From these responses it was found that African surgeons with access to EHI read more than articles than they did before they had such access, and they find that the information obtained is highly relevant to their clinical, teaching, and research activities. They prefer electronic journals to textbooks and are more inclined to change their practice based on information found in western journals than local journals. Ptolemy resources helped the respondents who reported academic work write a total of 33 papers for presentation or publication. Overall, access to EHI enables doctors in Africa to read more, is relevant, and contributes directly to academic productivity; thus Western medical literature is useful in the developing world, and EHI delivery should continue to expand.

The ptolemy Project, named for Ptolemy I Sotor who during the third century BC, founded the great library in Alexandria to house the written learning of the African, Mediterranean, and Middle Eastern worlds, is a research partnership between the University of Toronto and the Association of Surgeons of East Africa [1]. It works by appointing African surgeons as research affiliates of the University of Toronto with electronic, password-protected. Internet access to the University of Toronto Library's entire collection of full-text resources and assesses how they use the information they receive [1]. Ptolemy is not only a low cost example of how electronic health information (EHI) can be delivered to practitioners

in developing countries, also it functions as a research tool to investigate how EHI is used in Africa. Another important characteristic of Ptolemy is that it links participants with a large collection of medical literature originating in developing countries through partnerships with Bioline International and a variety of related links [2]. Other initiatives, such as the World Health Organization's Health Internetwork Access to Research Initiative (HINARI) program, share similar aims with different mechanisms [3]. A criticism common to all such programs is that the material provided, which is largely produced in Western countries, may not be relevant to clinical practice in the developing world [4-9]. The Internet-Based Health Information Survey (IBHIS) was designed to assess how much East African surgeons use EHI, which collections of resources are most relevant to them, which types of publication are most popular, and what impact EHI has had on their work. It also assessed the relative usefulness of Western versus locally produced medical literature to surgeons practicing in developing countries [10, 11].

Methods

All Ptolemy participants who had at least 6 months experience using the resource and whose e-mail addresses remained active were included in the survey. Those who had reported major connectivity problems were excluded. Informed consent was obtained from each participant via a form the participants completed and returned either electronically or by post. A 17-item survey was created and distributed to all participants who met these study criteria. Two questions were administrative (prompting responses on the participants' access to the Ptolemy Project and interest in future initiatives), and the remainder concerned the time spent reading medical literature, preferred information sources, preferred type of publication, relevance, preference for Western versus local medical literature, and academic activities resulting from access to the Ptolemy resources. The survey period extended from July to December 2003.

In August 2003, there were 114 registered Ptolemy participants. From this list of participants, 16 were identified as having less than 6 months' experience with the resource, and so were excluded (Fig. 1). From the list of the 98 remaining participants, 75 were eligible to receive the survey via e-mail. Response rates for IBHIS were calculated according to the standards of the American Association of Public Opinion Research [12]. Three reminders were sent to reduce response bias [13]. A total of 37 participants completed and returned their surveys by e-mail, yielding a response rate of 48%.

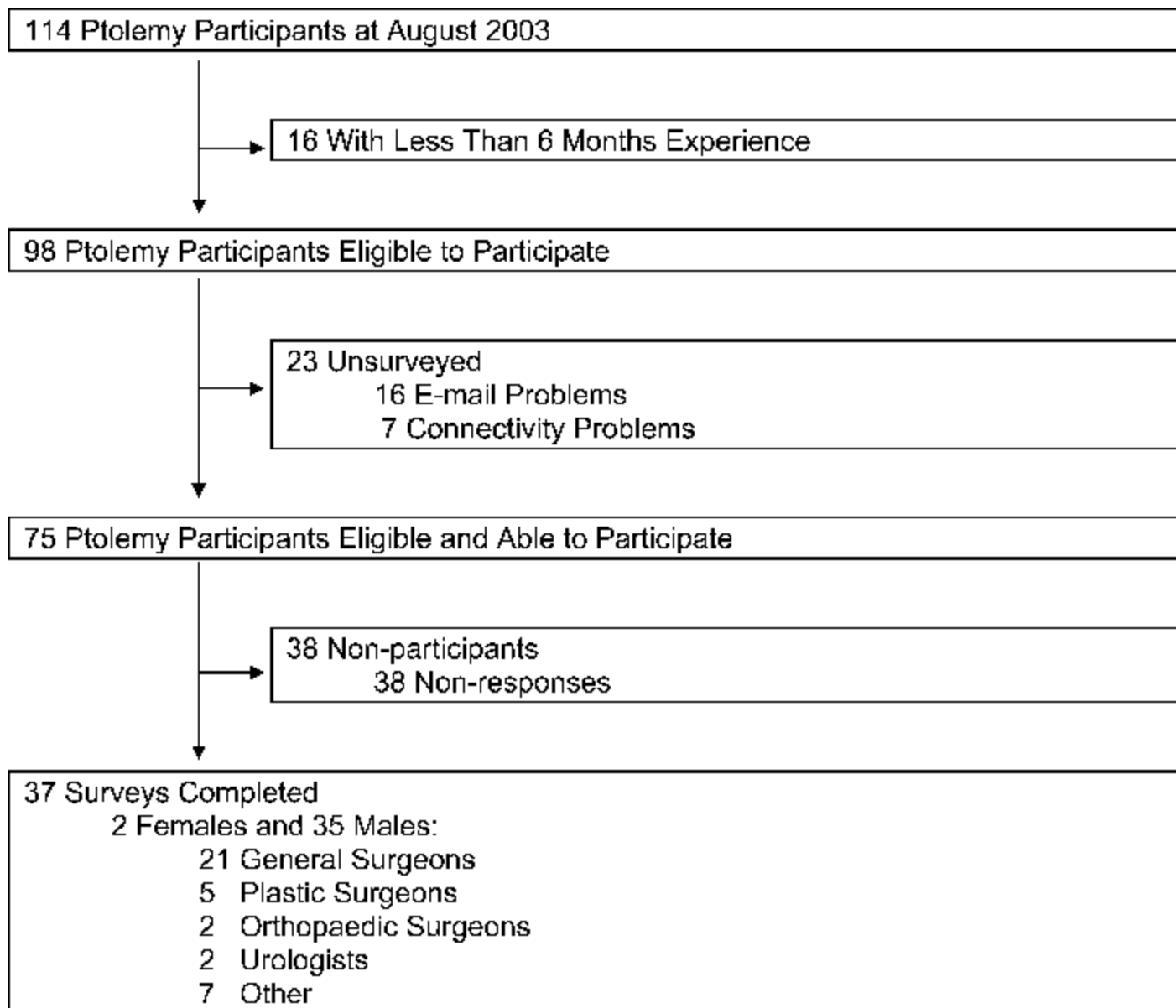


Figure 1 Survey sample.

Results

Demographics

Twenty-nine respondents were surgeons practicing in East Africa, and the remaining eight were from other developing countries who joined Ptolemy before it gained its East African focus. Twenty-one were general surgeons, two were orthopedists, two were urologists, five were plastic surgeons, and seven were from other specialties (Fig. 1).

Usage

Altogether, 27 (73%) respondents reported that they spent more than 7 hours a month reading medical literature in both printed and electronic form, and 29 (78%) reported that they retrieved half or more of their medical information from electronic sources. As a whole, the group estimated that they obtained 61% of their medical information in electronic form and 39% in print form. A total of 30 (81%) spent 3 hours or more monthly using Ptolemy and 15 (41%) spent 7 hours or more a month using it.

Participants indicated that the EHI available through Ptolemy was highly relevant to their clinical practice, teaching, and research activities; and 31 (84%) reported that they read a larger volume of medical literature now than before they had access to Ptolemy. All but one was familiar with other (non-Ptolemy) sources of EHI, and of these the most popular sites were Medscape, the World Health Organization, and MD Consult (Table 1).

Table 1 Usefulness of Internet-based health resources

Resource	No. of responses			
	No. familiar with site ^a	Seldom useful	Sometimes useful	Frequently useful
Ptolemy	34	1	5	28
Medscape	23	2	9	12
MD Consult ^b	17	1	8	8
World Health Organization	23	8	7	8
Royal College sites	17	5	9	3
Healthnet	9	1	5	3
BioMed Central	10	6	4	-
HINARI	10	4	3	3
Satellife	4	1	2	1
INASP	4	1	2	1
SciELO	2	1	1	-
Bioline	2	1	1	-
International				

^aOnly 34 respondents answered this question.

^bMD Consult is a subscription service available free through Ptolemy.

Publication Types

Altogether, 84% of the respondents indicated that the electronic health resources they seek most often are journals. The next most accessed resource is electronic textbooks (32%). With respect to the specific journals accessed most often using their Ptolemy accounts, the respondents listed (1) *British Journal of Surgery* (22%); (2) *The Lancet*, *The New England Journal of Medicine*, and *Annals of Surgery* (each at 14%); and (3) *Journal of the American Medical Association* (5%). Eleven respondents reported using the Cochrane Collaboration reviews, which is a marked increase from our last survey, where none reported using Cochrane [1]. In terms of the relevance of journals from specific geographic regions, Western journals (defined as being published within the United Kingdom, United States, or Canada) were indicated as being the most useful by most of the respondents in their clinical (76% of respondents),

teaching (73%), and research (68%) activities. Local journals, defined as those being from the region where the physicians practice, were regarded as most useful by far fewer respondents for their clinical (22%), teaching (14%), and research (11%) activities. A total of 62% said that they would change their practice based on Western journal information, in contrast to only 11% who would change it based on information from local journals. Finally, a number of free-text comments regarding the impact of the Ptolemy resource were gathered from the respondents (Table 2).

Table 2 Comments regarding impact of the Ptolemy electronic health resources on clinical, teaching, and research activities.

1. "Laparoscopic surgery is fast developing and textbooks are not able to keep up with it. Before doing a complex laparoscopic surgery I read all the material on the subject available in the journals through this account and then make my plan. Frequently you will find descriptions and tips which are not in books."
2. "Four weeks ago I had to do penile reconstruction (after amputation for carcinoma). I searched abstracts and text to find about recent methods of reconstruction that is not involving microvascular surgery. I found several articles that helped me to make up my mind what to do."
3. "The Ptolemy health resource provides me with access to all the leading medical journals and important textbooks in my specialty with a number of search tools and indexes which facilitates quick, easy and thorough accrual of all the relevant information on the topic of interest. After getting access to Ptolemy my lectures and presentations have become more complete—replete with all the recent data and international perspectives and are very well appreciated by my peers and students alike."
4. "Ptolemy resources on a weekly basis are extremely helpful, especially review articles."
5. "As a resource for teaching it is invaluable. I am expected to be a "generalist" still and to produce appropriate information across a wide range of specialties is very difficult without this source of resources."
6. "I am now studying for M.Sc. in health systems as well as implementing major reforms in my area; and I use the site to access information."
7. "I am more up to date with clinical data interpretation and patient management especially where it concerns cancer chemotherapy and reconstructive surgery."
8. "I am now in a position to write a lot of papers since I can assess access the references I need. It has made my academic life prosper and I have no regrets coming back here to Africa to work as my academic progress is assured in line with colleagues in developed countries."
9. "(1) To keep me updated on treatment of war injuries (surgery, antibiotics, etc.) for teaching purposes: previously I had no access to e-journals; (2) to prepare original articles on war surgery: now I can find references."

Academic Productivity

Nineteen respondents (51%) reported creating a total of 33 academic articles, presentations, and lectures using Ptolemy resources. Academic output included 11 articles (submitted or in process), one textbook chapter, and at least four articles recently published in international journal [14–17].

Discussion

Caution must be exercised when generalizing the findings of a survey with a 48% response rate among an already select group. Ptolemy participants are a self-selected group that includes opinion leaders,

teachers, and researchers of the region. Thus it is possible that their valuation of Western literature is higher than that of other surgeons practicing in Africa. Nonetheless, this is the first survey to address the questions of how surgeons in Africa use EHI, which resources they find most useful, and how EHI affects academic productivity. Our participants may have the most Internet savoir faire among the 400 surgeons who care for a population of more than 200 million people in East Africa. They now obtain most of their medical information from electronic sources and a high percentage (84%) read more now than they did before they had access to Ptolemy. Their feedback may indicate the direction of future demand for EHI in developing countries.

It is not surprising that Ptolemy participants find Ptolemy the most useful gateway to the literature (devotees of other services may be just as loyal), but perhaps the most dramatic expression of the impact EHI is having in Africa is found in the respondents own comments (Table 2). It is interesting to see that the other sites they find most useful focus on access to Western literature. Although this may reflect the small number of local medical journals, Western journals were identified as the most useful for all three core activities (clinical practice, teaching, research) by most of the respondents. Western journals were also rated as being more credible and influential in changing practice. Finally, the academic productivity of the African surgeons often involved publishing in Western journals, once they had such access [14–17]. Some have argued that textbooks and evidence-based reviews such as Cochrane should be the most valuable sources of information for medical practitioners in developing countries, but clearly our respondents still like to read major journals such as the *British Journal of Surgery*, *The Lancet*, the *New England Journal of Medicine*, and the *Annals of Surgery* [18].

HINARI is a large project involving a consortium of publishers, the World Health Organization (WHO) and the British Medical Journal publishing group, which aims to make medical literature available in institutions around the developing world [19]. Unfortunately, although there has been a link to HINARI on the Ptolemy site since December 2001, only 10 of our correspondents have accessed it and only 6 found it sometimes or frequently useful. The Shaughnessy equation holds that “The usefulness of any source of information is equal to its relevance multiplied by its validity, divided by the work required to extract the information” [20]. HINARI allows only institutional membership, and we believe it is much more convenient for busy doctors to access Ptolemy from home than to use HINARI from a library terminal. No one knows how EHI will be delivered to developing countries in 10 years’ time, but it is likely that, as is the case now, there will be a number of models, each adapted to a particular niche. It is only by open and transparent comparison of models for delivering EHI that we will learn how it can be done best.

The total of 33 papers and lectures presented and published by our participants using Ptolemy-derived information may appear small by some standards, but it is the first measure relating EHI and the academic productivity of doctors in the developing world. We hope in the future to show an increase in both the quantity and quality of academic output built on Ptolemy-derived information. The enormous health problems of Africa will eventually be solved by African researchers located in Africa because it is they who know the questions to ask that will yield practicable answers. Yet if African researchers are to move forward, they need both to be able to read and to publish in the medical literature. Access to resources such as Ptolemy will not alone build a surgical research community in Africa, but without these resources the research community will not grow at all.

Conclusions

Access to accurate, up-to-date, relevant medical information is considered fundamental to good clinical practice, teaching, and research in developed countries; yet this information is practically unobtainable

for most doctors working in developing countries [4, 6, 21–23]. The cost of an individual journal subscription may rival a doctor's official salary in Africa; and institutional subscriptions, often costing thousands of dollars each, are well beyond the budgets of most African medical libraries [24–26]. Huge inequities exist regarding access to the medical literature [27, 28]. The Internet provides an economical mechanism for redressing this information gap; and although Internet access remains limited in Africa, the surgeons there are rapidly becoming connected [26, 29, 30]. Often their personal (home) Internet connection is faster and more reliable than their institutional connection; and on a practical level, most surgeons are busy during the day and do their academic work at home in the evenings [1]. A previous Ptolemy Project survey revealed that two-thirds of Ptolemy participants access EHI from home and pay less than \$50 per month for Internet and related telephone charges [1]. Two-thirds of the world's doctors are trained in developing countries; and of the 50 million people who die each year around the world, it has been estimated that more than 60% could have been saved through the application of unavailable, yet existing, knowledge [5, 10]. Although many Western doctors may feel overwhelmed by the volume of contemporary Western medical information, doctors in the developing world envy this “plight” [10, 31].










It has been suggested that providing access to reliable health information for health workers in developing countries is potentially the single most cost-effective and achievable strategy for sustainable improvement in health care [32]. Information and communication technology can contribute to overcoming the disparities between the developed and developing world and can link health and medical professionals to the information they need to solve local problems [33]. The distribution of journal content to doctors caring for people in the poorest countries does not diminish the sale value of the information, as they cannot afford regular subscriptions; yet doing so helps to achieve maximum use-value of the information for the global community [34]. The medical profession responds strongly to moral and humanitarian imperatives. We should creatively and securely share our literature with those who need it but cannot yet afford it. Ptolemy is a useful way to “move” electronic journals and materials from the University of Toronto library directly to the desks of practicing surgeons in Africa. What this article emphasizes is that the information they need and the information we have overlap substantially. Western medical literature is useful in the developing world. The Ptolemy model for delivering it to our research affiliates in Africa is replicable by any interested university library and could be widely adopted [1]. Electronic access to the medical literature for doctors in countries too poor to afford it can be mediated through research affiliations involving access to Western university libraries. This is practical and should continue to expand.

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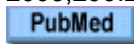
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