Information in practice

Internet based consultations to transfer knowledge for patients requiring specialised care: retrospective case review

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BMJ 2003;326:696-9

Abstract

Objective To assess whether transferring knowledge from specialists at centres of excellence to referring doctors through online consultations can improve the management of patients requiring specialised care.

Design Retrospective case review of the first year of internet based patient initiated consultations between referring doctors and consulting specialists.

Setting US teaching hospitals affiliated with an organisation providing internet based consultations.

Participants Doctors in various settings around the world engaging in internet based consultations with specialists.

Main outcome measures New recommendations for treatment, change in diagnosis, and turnaround time for consultation compared with time to see a specialist.

Results 79 consultations took place. 90% (n=71) of consultations were for services related to oncology. 90% of consultations involved new recommendations for treatment. The most common recommendation was a new chemotherapeutic regimen (68%, n=54). Diagnosis changed in 5% (n=4) of cases. The average turnaround time was 6.8 working days compared with an average of 19 working days to see a comparable specialist.

Conclusions Internet based consultations between specialists at centres of excellence and referring doctors contribute to patient care through recommendations for new treatment and timely access to specialist knowledge. Although change in diagnosis occurred in only a few cases, the prognostic and therapeutic implications for these patients may be profound.

Introduction

Health care in the United States varies widely by geography.¹⁻³ A key factor in this variability is the doctor's preference for practice.⁴ In many cases research to guide clinical decision making exists but is not put into practice.^{5 6}

We hypothesised that transferring knowledge through online consultations from specialists at academic medical centres to referring doctors could

improve patient care by delivering the most current information. To test this we launched Partners Online Specialty Consultations. This service allows patients around the world to initiate consultations with specialists at centres of excellence. Consultations are conducted through the patient's doctor to maximise the quality of information exchanged. Partners Health-Care is a non-profit making service located in Boston, MA. It was founded by Massachusetts General Hospital and Brigham and Women's Hospital, both affiliated with Harvard Medical School. Partners also has affiliations with other organisations, including the Dana-Farber Cancer Institute. The service was established to extend the knowledge of over 4000 specialists to doctors and patients around the world. We chose the internet to deliver the consultations because of its widespread and growing use by patients and their relatives.⁷

We believe that our model is unique among telemedicine applications. Although telemedicine is used for both clinical and educational purposes, traditionally programs comprise models that are based on geography, population, or specialty.⁸⁻¹² One barrier to the development and implementation of telemedicine programs is the limited dissemination of quantitative outcomes.¹² We review the first year of Partners Online Specialty Consultations.

Methods

Before a consultation can take place the patient must register on the Partners Online Specialty Consultations website (econsults.partners.org) and confirm that his or her doctor practices in a state or country that is serviced by Partners Online Specialty Consultations. Some states are excluded because of statutory limitations, and certain countries are excluded because of restrictions on commerce imposed by the US government.

A menu shows the costs of services offered (table 1). The price of consultations is comparable to similar services in a hospital or clinic setting. Patients may enter details of their credit card when they initiate a consultation or when their record is complete and ready for review. Patients are made aware that the service is unlikely to be reimbursed by insurance.

Details of the website's properties, change in diagnosis, and geographical source of referral appear on bmj.com

Table 1 Costs of services

Service	Fee (\$)
Specialist opinion	350
Assessment of imaging studies	225
Assessment of pathological images	225
Specialist opinion, assessment of pathological images and imaging studies	600
Special staining of tissue samples, additional services	Individual assessment

\$1 (£0.61; €0.93).

A letter is generated by the website for the patient to give to his or her doctor. The letter asks the referring doctor to provide relevant medical information. Before entering information on a patient, the referring doctor must agree to certain terms and conditions. The website contains a sample patient consent form, outlining security measures and privacy.

The referring doctor enters the patient's history, physical examination details, and any specific questions. He or she may upload pathology images and imaging studies relevant to the patient. Hard copies, slides, or tissue blocks may be posted. A coordinator for Partners Online Specialty Consultations collects the materials and credit card details before triaging the case. The referring doctor may request a specific consulting specialist, or the coordinator will work with a team of doctors to triage the case. When the consultation is complete the referring doctor is notified by email that the details are available on the website. The referring doctor may telephone the consulting specialist to discuss the case.

Review of case record

The first year of internet based consultations (30 June 2001 to 1 July 2002) were reviewed to identify treatment recommendations made by the consulting specialist that either were not mentioned by the referring doctor or were mentioned as an uncertain approach. Recommendations contingent on the results of further testing, disease progression, or patient preference were included. Drugs were included if a specific name was given or if the drug could be readily identified.

Consultations were also reviewed to identify changes in diagnosis, as determined by the consulting specialist. IK and HBB independently reviewed the cases. Discrepancies were resolved by JCK. Reviewers were blinded to each other's decision.

Turnaround time, follow up, and storage of data

The turnaround time for a consultation was the time between collection of relevant materials, including payment, and completion of the consultation. The number of working days was averaged to determine the turnaround time.

In 2002 we conducted a telephone survey of a total of 12 specialists and outpatient specialty clinics affiliated with the Dana-Farber Cancer Institute, as well as the practice manager of the cancer centre at the Massachusetts General Hospital, to determine the average lead time to see a specialist. Practices were asked when the next non-urgent appointment was available. We specifically selected oncologists because 90% of consultations had been for services related to this specialty.

We searched our databases to see if any patients had registered at a Partners institution after their online consultation. If a patient was identified, we contacted the consulting specialist to determine if the patient had been seen.

All electronic correspondence is stamped according to time and stored in a relational database. A relational database stores data in tables that have common values, allowing the tables to relate to one another. Electronic images are maintained in the format and size they are sent and stored on a storage device (Data Mover; EMC; Hopkinton, MA). Hard copies of imaging studies that are not requested back by patients or referring doctors are kept in long term storage.

Results

During the first year of service there were 21 243 unique visitors to the Partners Online Specialty Consultations' website. By 1 July 2002, 954 patients, 376 referring doctors, and 427 consulting specialists had registered. Overall, 79 consultations were conducted online. A variety of services were provided in these consultations (table 2). Change in diagnosis occurred in 5% (n=4) of cases. These changes resulted from a review of the pathology images (see table A on bmj.com). New treatment was recommended in 90% (n=71) of cases, the most common being a new chemotherapeutic regimen (68%, n=54; table 3). The mean time from collection of materials to completion of the consultation was 6.8 (SD 7.2) working days whereas the mean time to see a Partner's oncologist for a non-urgent appointment was 19.0 (SD 10.4) working days (P=0.001 by unpaired two tailed *t* test).

Overall, 53% (n=42) of patients were men and 47% (37) were women. The mean age of patients was 51 (SD 17; range 9 to 80) years. Patients were from several continents, with over half from North America (see table B on bmj.com). There was no predominance of consultations from any one state in the United States. Most consultations were for oncology related services (table 4). One patient registered at a Partners institution after the date of consultation. This patient

Table 2 Service provided

Service	No (%)
Specialist opinion	37 (47)
Specialist opinion, assessment of imaging studies, assessment of pathological images	16 (20)
Specialist opinion, assessment of imaging studies	14 (18)
Specialist opinion, assessment of pathological images	11 (14)
Assessment of pathological images	1 (1)

Table 3 Recommendations for new treatment in 79 online consultations

Recommendation	No (%)
New chemotherapeutic regimen	54 (68)
New medical regimen (non-chemotherapeutic)	19 (24)
Surgery	13 (16)
Radiation	11 (14)
Stop drug	3 (4)
Change dose	2 (3)
Other*	5 (6)

Several recommendations may have been made for one patient.

*Includes chemoembolisation, cryoablation, radiofrequency ablation, bone marrow transplant, and physiotherapy.

Table 4 Specialty mix of 79 online consultations

Specialty	No (%) of cases
Oncology	71 (90)
Neurology	2 (3)
Orthopaedics	1 (1)
Ophthalmology	1 (1)
Surgery	1 (1)
Cardiology	1 (1)
Neurosurgery	1 (1)
Nephrology	1 (1)

was seen in clinic by the specialist who consulted on his case through Partners Online Specialty Consultations.

Discussion

Internet based specialist consultations contribute to patient care through change in diagnosis, new recommendations for treatment, and timely access to specialist knowledge. Follow up of patients using the Partners Online Specialty Consultations website for consultations remained local, with only one patient registering with a Partners's institution after the consultation.

A previous study of internet based specialist consultations found that new recommendations for treatment were made in 71% of cases, similar to our findings. The study evaluated 150 randomly selected online consultations through WorldCare International, a profit making organisation that has contracts with several academic medical centres, including Partners (N Lugn, personal communication, 2002). Another study reported the benefits of a second opinion on pathology review provided by a large referral hospital.¹³ Change in diagnosis occurred in 1.4% (86 of 6 171) of cases. The criteria for change in diagnosis included a major change in prognosis or therapy. The authors noted that although the number of cases was not high, the potential implications for patients and cost of care were profound.

Most of the consultations with Partners Online Specialty Consultations were for oncology related services. Patients with cancer may represent early adopters of the service who, faced with a life threatening illness, are most willing to embrace an unconventional approach to seeking medical knowledge.

The number of consultations was small compared with the number of visitors. The website and its service were not heavily publicised. Factors that may have contributed to non-submission of a consultation include severity of illness, cost of the consultation, and openness to the internet as a vehicle to obtain a consultation with a physician.

Limitations

Our study had several limitations. The consulting specialist's recommendations were assumed to reflect the most current medical knowledge but were not evaluated for this. Also, some recommendations may be attributable to the consulting specialists feeling compelled to add something to the patient's care because of their role as consultants. Moreover, the definition of new recommendations for treatment was broad, inclusive of recommendations contingent on various factors. We did not measure the implementation of the recommendations and their effect on

What is already known on this topic

Telemedicine could improve health care by transferring knowledge from centres of excellence to patients' doctors

Few studies have systematically assessed the value of such internet based specialty consultations

What this study adds

Patients can benefit from internet based consultations between their doctor and consulting specialists

New recommendations for treatment were discussed in 90% of cases, and change in diagnosis occurred in 5% of cases

Patients can access a specialist's opinion more quickly than waiting to see a specialist

clinical outcomes, steps important for assessing improvements in quality of care. Another limitation of our study was the relatively small sample size.

Although we compared the waiting time for an office visit with the turnaround time for an online consultation, the comparison is inexact as services rendered and the patient experience will be different in these encounters. The comparison illustrates that Partners Online Specialty Consultations provides patients with an alternative way to navigate the health-care system. As a result, patients may get the opinion of a specialist quicker than if they waited to see a specialist.

Implications

Online consultations between consulting specialists and referring doctors are one approach to decreasing the geographical variability of care, by transferring up to date clinical knowledge from centres of excellence to doctors around the world. Partners Online Specialty Consultations does, however, have several hurdles to overcome before its service can be more widely adopted. Most consumers are still not aware that they may access specialist knowledge online. Moreover, many may be unable to pay directly for a consultation. Insurance coverage for telemedicine is minimal in the United States at present, but growing.^{14 15} The receptivity of physicians to online consultations is another challenge, but seems to be growing as electronic imaging systems and electronic medical records increasingly become part of routine patient care.

We thank John Glaser for his continued support of the program and Eric Menn for his editorial support.

Contributors: IK generated hypotheses, drafted the article, and performed data analysis and interpretation. JLT is responsible for operational oversight of Partners Online Specialty Consultations as well as research and data collection. CEW contributed to the design of the Partners Online Specialty Consultations application, the business model, data analysis, and manuscript review. KMK was responsible for data collection. HBB performed data analysis. JCK is responsible for the overall vision of the program, funding, and conception of the study design and methodology. He will act as guarantor for the paper. Funding: Partners HealthCare's information system's research and development budget.

Competing interests: All authors are either employed by or have a consulting arrangement with Partners HealthCare. Partners gains revenue from online consultations.

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(Accepted 20 January 2003)

Corrections and clarifications

Multifactorial intervention after a fall in older people with cognitive impairment and dementia presenting to the accident and emergency department: randomised controlled trial

Two address errors (one postal, one email) crept into this paper by Fiona E Shaw and colleagues after proof stage (11 January, pp 73-5). Dr Shaw's full postal address for correspondence is the Department of Geriatric Medicine, Newcastle General Hospital, Westgate Road, Newcastle upon Tyne NE4 6BE, and her email address is fionaeshaw@aol.com [note the "e"].

Aspirin could be used to prevent cancer

Reading the *BMJ* in mid-March, you may have thought that our news was a bit old—this aspirin report by Owen Dyer (15 March, p 565) appeared to be based partly on two papers published in 2002. This was the result, however, of an editing slip; the correct reference in the second paragraph should have read: "*New England Journal of Medicine* (2003;348:883-90 and 891-9)."

Combined aspirin and clopidogrel treatment improves outcomes, study finds

At a late stage in the publication process we changed a URL in an attempt to publish the most useful web address for the online publication reported in this News article by David Spurgeon (1 March, p 464). However, the change made to the electronic proof introduced an extraneous "dot." The correct URL is <http://circ.ahajournals.org/>

Visible signs of illness from the 14th to the 20th century: systematic review of portraits

In this article by C Als and colleagues in the Christmas issue of the *BMJ* (21-28 December, pp 1499-501), we mistakenly reproduced the portrait of the Swiss novelist Jeremias Gotthelf as a mirror image.

"I'm sorry for your trouble"

My father had been called back to rural Ireland to represent the family at a funeral. I must have been 6 years old and was holding my father's hand as we stood in line to pass the recently bereaved family. I strained to hear what was being whispered to the widow as she shook hands with the people who filed past the front row. It came to our turn, and my father leant across, almost touching the widow's face furrowed with the pain of loss. Five simple words were exchanged: "I'm sorry for your trouble." This was the seemingly secret code that was passed between the bereaved and the mourners filing past.

During the ensuing years I, too, was to repeat those words in funerals. My experience of Irish culture is one of stoicism in suffering. These five words, "I'm sorry for your trouble," let the bereaved know that people are thinking of them in their loss but allow the messenger to communicate that without engaging in an emotionally awkward dance with the bereaved. This cultural code can be a double edged sword if emotions are kept at arms length throughout the bereavement process.

Years later, soon after I had qualified, a teenager had been rushed to the casualty department with horrific injuries after a road crash. His death was inevitable. I still recall the frantic click of the mother's heels on the polished floor: her footsteps seemed to resonate through the noise and activity the department. I had been "elected" to break the bad news—my senior colleagues

having been called to another emergency—and I located the mother's regional Irish accent as I desperately tried to recall all those lessons on breaking bad news I had learnt at medical school. I took a seat, and, as she read my face, she knew her son had died. I wanted something anodyne to say but couldn't think what I could only blurt out, "I'm sorry for your trouble."

"I know, doctor, thank you," she said as I left the room, emotionally drained. Some months later she wrote a very touching letter to the nursing staff and me.

Perhaps this wasn't the most successful introduction to breaking bad news in real life. Doctors and patients engage in intense emotional experiences, drawing from their own personal experiences and influenced by their culture, and professionals also drawing from what has been learnt experientially and what has been learnt from textbooks.

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We welcome articles up to 600 words on topics such as *A memorable patient, A paper that changed my practice, My most unfortunate mistake*, or any other piece conveying instruction, pathos, or humour. If possible the article should be supplied on a disk. Permission is needed from the patient or a relative if an identifiable patient is referred to.