

## ► The evidence base of telemedicine: overview of the supplement

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Despite the growing ubiquity of computer networks and the Internet, as well as advocacy for more use of information technology (IT) in health care,<sup>1</sup> telemedicine continues to fall short of its potential. Many reasons for this have been put forward, but one of them is certainly the lack of high-quality evidence to convince clinicians, policy-makers and others that this technique deserves more widespread use in health care. A continuing question is how to overcome this problem.

This supplement contains the papers from a workshop held on 30 and 31 March 2005. The workshop was commissioned by the US Agency for Healthcare Research and Quality (AHRQ) and the Centers for Medicare and Medicaid Services (CMS) to assess the evidence for the efficacy of telemedicine services, identify the barriers to building the evidence base and develop solutions to overcome those barriers. In developing the workshop agenda, we prepared a framework of questions. We then commissioned papers from experts in the field. Each expert presented a draft of his or her paper at the workshop, followed by discussion. The papers in this supplement represent the final versions of those papers.

When considering telemedicine in an evidence-based framework, the first question to be asked is about the state of the evidence. The first paper in this supplement updates a systematic review originally published in 2001.<sup>2</sup> The conclusions of the update are essentially the same, which is that the quality of the evidence continues to be uneven and for the most part poor. Based on the peer-reviewed literature, we are led to the conclusion that there is strong evidence for the efficacy of telemedicine only in a handful of clinical specialties. This does not mean that telemedicine is not efficacious in other specialties, but rather that the quality of studies assessing it do not allow us to draw conclusions.

Despite the inconsistent evidence for the efficacy of telemedicine, a number of US states (Medicaid) and some private insurers are covering its use. In the second paper of this supplement, Brown<sup>3</sup> reviews what telemedicine

services are being covered by US states and what is their rationale for that coverage. The following paper by Ohinmaa<sup>4</sup> looks at telemedicine programmes in other countries that might provide insights into its adoption in the USA.

While the published evidence provides information about the usefulness of this tool for meeting clinical needs, telemedicine is an emerging technology with a great deal of variability and ongoing innovation. Rheuban<sup>5</sup> assesses telemedicine studies from the standpoint of fostering innovation in addressing specific health-care challenges. She addresses, in particular, access, specialty shortages and changing patient care needs.

Another point of view is to assess successful telemedicine uses in a diffusion of innovations framework to see if it can be applied to other, less-successful areas. In their analysis, Dimmick and Ignatova<sup>6</sup> assess the adoption and use of teleradiology as a case study and ask whether this experience can be applied to other specialties.

Telemedicine does not exist in an IT vacuum. It may well provide synergistic benefit in concert with the larger national plan for health-care IT, e.g. electronic health records and the National Health Information Infrastructure (NHII). Speedie and Davies<sup>7</sup> assess how this work can augment the use of telemedicine and *vice versa*, i.e. how telemedicine can enhance the growth of the NHII.

Nonetheless, if the case for telemedicine is to be made, better evidence for its efficacy must be obtained. Because telemedicine is a technique and not a specific test or treatment, we probably need to consider other research methodologies to gather that evidence. Whitten<sup>8</sup> addresses the issue of what sources of clinical/patient data exist, either in telemedicine-specific registries or in general electronic health record systems, that would allow us to analyse it for research on the efficacy of telemedicine interventions. Yellowlees and Harry<sup>9</sup> discuss what standards should be developed for collection of data about telemedicine encounters to facilitate research. Grigsby and Bennett<sup>10</sup> assess what types of study designs (other than randomized controlled trials) may be realistic in the evaluation of telemedicine and have potential for contributing to the evidence base for telemedicine in the near future.

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Ultimately, however, the most effective use of telemedicine may come when health delivery system changes lead to integration of telemedicine into existing treatment flows of information and patients. Shea<sup>11</sup> explores the workflow, productivity and resource issues from this perspective.

What themes emerge from this group of papers? Probably the main theme is that telemedicine has unfulfilled potential for improving the delivery of health care. While the rationale for its use is still strong and studies do not appear to show it to be a source of harm to patients, the lack of a substantial evidence base makes its benefits unrealized. The corollary is that further evaluative research is necessary. There is a need for robust clinical trials to test its efficacy in its most promising clinical domains, such as dermatology, psychiatry and home health care. However, there may be other means to improve the evidence base. In particular, the growing use of electronic health records will facilitate systematic data collection that will permit strong observational studies to assess the efficacy of telemedicine.

An additional theme is that the growing use of health IT in general will aid in both the use and evaluation of telemedicine. The growing availability of broadband networks will assist in deploying telemedicine systems, while the proliferation of electronic health records will ease the collection of data to assess its use. Telemedicine can and should be part of an NHII that aims to improve the quality of health care through IT. The AHRQ, as the leading US research agency on health-care quality, safety, efficiency and effectiveness, has played a critical role in the drive to adopt health IT. Research by the AHRQ supports the development of secure and private electronic health records, making health information available electronically when and where it is needed, and strengthens the role of health IT in improving quality and efficiency of health care.

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