

REVIEW

# Teleradiology: threat or opportunity?

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The rapid advances in information technology and communication bandwidth have spawned an equally rapid development of clinical teleradiology. Current computer technology and communication capability allow easy transfer of diagnostic images, of any complexity, to any location in the world. This provides the opportunity to acquire swift primary and secondary diagnostic opinions from the remotest of locations, often at economically attractive rates, with the potential for easing the burden on hard-pressed departments of radiology. However, this comes at the potential cost of distancing the clinical radiologist from the patient, with consequent impact upon direct clinical care. As this technology advances across the world, it is vital that UK radiologists are familiar with the clinical implications, the medicolegal framework within which the field operates and the associated governance issues. This paper reviews current practice and discusses the associated risks.

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## Introduction

*"Technology is just a tool." Bill Gates 1997*

Ever since Alexander Graham Bell invented the telephone in 1876, science has enabled us to use electronic communication to share information and to refer for specialist advice and opinion over distances. However, the revolution in information technology over the past two decades has spawned a hitherto unimaginable extension of this science, now allowing communication of ever greater volumes of information over ever greater distances, with speed and clarity that are set to make profound changes to the way in which a data-based specialty such as radiology is practised. Teleradiology is the point-to-point communication of radiographic images from one location to another for the purposes of interpretation or consultation. International telemedicine is expanding rapidly, and currently is limited only by our imagination.

Teleradiology is moving at such a rate that it is vital for UK radiologists to have a broad understanding of the professional, clinical, ethical and legal implications of this development.

## Background

The first widely available clinical images in digital format arrived with the development of CT in the 1980s, heralding the first opportunity to transmit digital data from one location to another, initially for specialist neuroradiological advice. Teleradiology was in its infancy, and the principle of image data transmission was ready for development. Whereas digital technology expanded hand in hand with hardware developments in cross-sectional imaging, teleradiology came under consideration for transmission of plain film, and a number of projects arose in the UK, allowing access to radiology opinion from more remote locations on the UK mainland and in the Scottish Highlands and Islands. The British Defence Medical Services were making technological advances, using teleradiology to link to remote overseas locations as part of a more comprehensive telemedicine service.

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Throughout the 1990s, an almost exponential growth in computer technology produced rapid advances in data storage and transmission, data compression algorithms and availability of broader communication bandwidth. Meanwhile, hospital-based picture archiving and communication systems (PACS) were being developed, and the Hammersmith Hospital in London became the first filmless hospital. It was already possible to transmit high volumes of image data throughout a hospital, and to communicate images between hospitals. PACS provided a platform on which radiology would become a wholly digital practice; transmitting these data across great distances was now feasible, and totally in line with the government's agenda in *Information for health: an information strategy for the NHS*.<sup>1</sup> PACS would become a component of the electronic patient record and a key component of the National Programme for Information Technology.

In the government's drive to reduce NHS waiting lists, a number of strategies evolved in the period 2001-3. These included the establishment of centres for fast-track elective surgery and investigation, known as diagnostic and treatment centres, greater opportunities for primary care trusts to purchase diagnosis and treatment wherever waiting lists were shorter (Patient Choice)<sup>2</sup> and the contracting of surgical procedures (initially orthopaedic and ophthalmic) to overseas private medical companies, such as Netcare from South Africa. The process has now extended to include radiology, with opportunities for private companies in the UK to contract for diagnostic imaging services remote from the hospital trusts, and the launch of the Independent Sector Treatment Centres in the UK that will bring further opportunities to employ overseas radiology reporting. In June 2004, the Department of Health (DoH) contracted for the private sector to undertake 80,000 MRI examinations. This contract, which was advertised without dialogue with the radiology profession, was to be specifically provided outside existing NHS resources, and the opportunity arose for overseas companies to bid for the business, providing a reporting capacity potentially outside the UK. A large number of companies from countries in Europe, North America and Australasia were available and able to bid for the business. Within weeks of commencement of the service, concerns were raised with respect to reporting quality; the Royal College of Radiologists is now fully involved, and an audit of the practice has been instituted. Safe governance for the practice of teleradiology is essential, and the specific issues will be explored.

## International position

Although the UK has an overall shortage of consultants in clinical radiology, this position is not reflected throughout the world; among others, some European Union countries hold a surfeit of qualified radiologists. These overseas radiologists, whether working individually or within larger private companies, are ready and available to undertake overseas reporting. Considerable international teleradiology is now practised; there is currently provision in India for Boston US, and in Argentina for Spain. Meanwhile, Spanish and Belgian private companies, among others, seek to provide radiology services in the UK. The trend is likely to continue.

## The USA

In the USA, interstate teleradiology has been practised for many years, raising the issue of state licensure for out-of-state reporting radiologists. Since 1994, the American College of Radiologists (ACR), by means of the ACR Technical Standard for Teleradiology, has been issuing guidance on the use and practice of teleradiology.

In 1994, Nighthawk Radiology Services<sup>3,4</sup> was set up in the US to provide an out-of-hours reporting service. This has now extended to 46 states, with all reading services now provided from Sydney, Australia, raising ongoing challenges concerning credentials, licensing and liability. The ACR has been hard at work developing guidance, and produced the *Report of the ACR task force on international teleradiology* in April 2004,<sup>5</sup> recognizing the potential use of teleradiology overseas and the need to maintain standards of care. The latest statement was issued by ACR in August 2004,<sup>6</sup> addressing the licensing requirements for interpretation of images outside the US, and emphasizing that the "ACR is very concerned about the implications of overseas teleradiology". The ACR recommended that physicians who interpret images by teleradiology should:

1. be licensed to practice medicine in the state where the imaging examination is originally obtained, and possess any medical or other licensure required within the jurisdiction of the interpretation site
2. hold credentials as a providers and maintain appropriate privileges in the health facility or hospital in the United States where the examination was obtained
3. have appropriate medical liability coverage for the state in which the examination was obtained

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