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An Experience in Teleradiology:

A Canadian Solution for Collaboration and Quality Assurance in Radiology

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Key Points

- The government push for the deployment of countrywide electronic patient records has facilitated the adoption of teleradiology;
- A number of Canadian radiologists have joined forces to organise the provision of teleradiology services;
- Quality control is now a priority for radiologists and hospitals.

In a country as vast as Canada, it is natural that telemedicine and teleradiology in particular are essential components of the healthcare system. Although the majority of the population lives on a border strip 200km wide in the south, residents of remote communities are often several hours away from a specialist.

The Opportunity For Teleradiology

Since the first point-to-point communication by Dr. Albert Jutras in Montreal in 1959, the evolution of technology and the spread of the Internet have greatly facilitated the development of teleradiology.

Another dominant factor in the rapid growth of teleradiology services was the Canadian strategy for electronic patient records, with the creation of Canada Health Infoway (CHI) (https:// www.infoway-inforoute.ca) in 2001 by the ten provinces and three territories of Canada in the form of a nonprofit society. The objective of Canada Health Infoway is to promote and accelerate the development and adoption of Electronic Health Records (EHR) based on standards and compatible communication technologies. One of the first tasks of Infoway was to make information available in a digital format, starting with radiology. All imaging exams from hospitals, and later, private practices must be stored in regional image databases and kept for life. The plan that called for the creation of 18 image banks, DI-r Digital Imagesrepository, is nearing completion, most of the DI-r being now functional.

The eventual aim is to improve the quality of care for all Canadians by facilitating access by health professionals to essential medical data of their patients, especially images and reports, in the whole country and without delay.

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The provincial governments' priority is to reduce wait times, and they have invested a lot of money to improve emergency services and accelerate the rotation of patients. Radiology has been identified as a bottleneck, because the reports are not available quickly enough or because of the lack of radiologists at night or on weekends. In addition, due to the shortage or unequal distribution of radiologists, some centres are late in delivering their interpretations, which creates delays in care and treatment.

One of the solutions proposed by the Canadian government was to use teleradiology to interpret exams. International teleradiology companies were then approached, and this is what prompted us to create a structure that would allow Canadian radiologists to control themselves the organisation of teleradiology before it started to be outsourced and imposed by the administration.

Thus started an initiative by Canadian radiologists willing to cooperate for their mutual benefit in order to facilitate their professional life by allowing them to share the workload, have more flexibility in how they work to better balance their professional and personal lives, while increasing their income and giving them the opportunity to benefit from the increased value of their shares in the company.

Some factors were immediately favourable to the adoption of teleradiology, such as a shortage of radiologists,

a well established infrastructure of consultations, based on couriers, the early digitalisation of radiology equipment, the existence of a quotation for teleradiology acts, and of course, the size of the country, not to mention the travel expenses of the radiologist, covering multiple sites, and more recently improved access to good Internet connections and the increased availability of PACS.

Barriers to Entry

But it is also a healthcare system run by the governments of ten provinces, three territories and the federal government. Each province or territory has its own regulations: some do not even allow for the moment that the act is performed by a medical doctor based outside the province where the patient resides, even if the doctor is licensed and accredited in that province.

With regard to radiologists, we, of course also clashed with the usual obstacles, whether fear of change, competition and loss of income, loss of quality of the reports, and even fear that the 'virtual locum' could be better appreciated by referring physicians than the radiologist being replaced.

It became important to deal only with onsite radiologists, and never to contact or respond to hospital administration demands when there is a radiologist or radiology department in the facility. A clause in our contracts with the site producer of images also specifies that the contract is only valid if accepted and signed by the site chief radiologist.

We also met with groups and associations of radiologists, who felt sometimes rightly that they have the monopoly of radiology in their province. As anyway we never intended to go against local radiologists, we limited then our contribution to the provision of software tools enabling the distribution of cases within their group or association, or allowing them to themselves provide a teleradiology service, irrespective of the location of their radiologists.

As odd as it may seem in retrospect, our biggest problem was then technological. Why a technological problem, at a time when more and more sites, 100% in Canada, are computerised and modalities are digital? The problem was not the digitalisation or remote reading but the organisation and automation of remote collaboration.

A Collaboration Solution

So, we developed a management and collaboration tool, a software solution that allows us to automate the distribution of exams among radiologists wishing to be replaced and those replacing them. The software had to be PACS vendors, modalities and RIS neutral. Radiologists had to be able to indicate their availabilities and requests for replacement in an online calendar, the software ensuring the distribution of work based on the agendas but also each of their specialties, their licences to practise in the province of the patient and their accreditations in the hospital or clinic. It had to be built expressly to automate and optimise all processes in multi-site, multi-PACS, multi-jurisdiction teleradiology networks, to be in compliance with local and national regulations and of course be bilingual.

After two years of development, our collaboration software was ready. We launched the service, first with ten Canadian radiologists based in different provinces.

In recent years, the team of radiologists has increased to more than sixty, covering all specialties, some working in academic centres, others in the private sector.

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The demand for teleradiology services has considerably changed. We always give final interpretations, contrary to what has long been done in the United States. However, demand has evolved from night and weekend shifts to day and specialty shifts. Clearly, for many hospitals, clinics and groups of radiologists, it is not in their financial interests to have to hire a new radiology specialist full-time when the service could be provided by a remote specialist on-demand.

The Need for Quality

The second major change was the evolution toward quality control. Indeed teleradiology has often been criticised and considered as a commoditisation of radiology, a lower quality of radiology. We had to prove that we are as good or better, and thus add to our internal process quality control, hence the development of new software grafted on to our web platform and now an indispensable tool for teleradiology quality.

First used internally, it has proved to be useful later in other circumstances. On several occasions over the past years, Canadian radiologists have made newspaper headlines when the health authorities of their provinces questioned the quality of their work as a result of complaints arising from diagnostic errors (CBC 2009). Authorities wanted to review the reports of the radiologists and RealTime Medical won the tender to carry out some of these quality control reviews. For this purpose we used a different version of our software, meeting the demands of the Health Authorities of the provincial government responsible for the investigation, but still applied to remote readings.

Originally developed for providing through teleradiology retrospective control of quality of the radiologist's work, the software was later modified to enable pro-active controls of the reports' accuracy (Keen, 2012). Our workflow-driven solution is easily integrated into the routine work of the radiologist without increasing or too much increasing the workload, whether the radiologist is a partner in a group, department or practising alone.

The original radiologist is immediately informed of diagnostic errors that may have implications in the treatment of patients so he/she may take the necessary steps, correct the report before it is sent to the referring physician or add an addendum if the report has already been signed, and inform in a timely fashion the referring physician or patient. Contrary to retroactive QA control programmes, it is not perceived as a punitive process but as a learning experience that helps identify areas of weakness.

Conclusion

Our Canadian experience with teleradiology has rapidly evolved into the development of collaborative and quality control solutions allowing us to help our colleagues to establish their own teleradiology networks. Moreover, as our platform was deliberately designed to be viewer agnostic, it is not only applicable to radiology but also cardiology, pathology, dermatology, ophthalmology, etc. This may in the future enable better collaboration between clinicians on a single platform.

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