Radiographers' role in radiological reporting: a model to support future demand

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ABSTRACT

- The demand for diagnostic imaging services has grown faster than the supply of radiologists in Australia. Given the predicted ageing of the population and contraction of the health care workforce, the current workforce model is not sustainable.
- Extending the role of radiographers in a specific range of radiological reporting tasks may help meet demand, relieving some pressure on radiologists.
- Experience overseas suggests that radiographer reporting can reduce patient waiting times, release radiologists for other duties and improve the retention of radiographers.
- Evidence shows that, with appropriate education and training, the accuracy of radiographers in interpreting plain x-rays is comparable to that of radiologists.
- Australian universities are well placed to offer radiographers postgraduate education in image interpretation.

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The Productivity Commission's recent enquiry into Australia's health workforce[1] was motivated by recognition of a widening gap between the demand for services and the capacity to meet that demand. This problem is likely to worsen, with the population now ageing at an unprecedented rate. It is predicted that there will be an increase in the incidence of chronic diseases and in hospital admission rates.[2] Meanwhile, retirement of "baby boomer" health professionals is expected to cause a significant contraction of the workforce.[2,3]

Duckett[2] and others have argued that health professionals and bureaucrats cannot assume that current models of practice will meet the future health care needs of the population. Hence, there are increasing calls to redesign Australia's health care workforce based on models involving "task transfer" as a key component.[2,4,5] One potential change suggested by Duckett[6] is that radiographers could report on some plain radiographic examinations usually reported by radiologists.

However, the diagnostic imaging workforce in Australia remains structured according to a hierarchical model that has existed since the 1920s. It is well evidenced in the literature that the existing workforce model has developed under the influence of professional dominance of radiologists over radiographers,[7-9] which has constrained radiographers from achieving their potential. We therefore argue the case for better use of Australian radiographers' knowledge and skills in providing a circumscribed range of radiological reporting services.

Supply and demand

With about 65 radiologists per million population,[10] Australia should be better able to meet the demand for radiological services than is the case in countries such as the United Kingdom, whose ratio of radiologists to population is about half that of Australia. In the UK it is estimated that, on average, consultant radiologists report between 18 000 and 20 000 examinations a year, which is considered excessive, while in Australia the estimate is 13 000 to 14 000 examinations a year (similar to the number in the United States).[11] Nevertheless, there seems little doubt that the Australian radiology workforce is under pressure.[10]

In a 2004 Australian radiologists' workforce survey, 65% of respondents believed there was a shortage of radiologists and 57% believed this would continue to be the case for the subsequent 3–5 years.[10] It was also found that, although the number of radiologists had increased between 2002 and 2004, their full-time equivalent value was limited by reduced working hours, with an increase in the proportion of radiologists working less than 40 hours per week from 21% to 28%.[10] Further, 25% of respondents indicated that they intended reducing their working hours to accommodate personal lifestyle choices.[10] There was also evidence of high levels of dissatisfaction, which correlated positively with the number of hours worked. Forty-five per cent of respondents said they felt their workload was too heavy.[10]

Data from the Australian Department of Health and Ageing show that diagnostic imaging services in Australia increased by about 15% in the 4 years to 2004–2005, with an average annual growth rate of 3.5%.[12] During the same period, however, the number of radiologists in the workforce increased by only 11%, with an average annual growth rate of 2.7%.[10] Thus, demand has consistently grown at a faster rate than supply over recent years, a trend that can reasonably be predicted to continue.

It might be expected that recent growth in radiological services would be mainly in the areas of ultrasound, computed tomography, magnetic resonance imaging and interventional procedures. But analysis of Medicare statistics shows substantial growth in the requirement for plain radiography. In the 6 years between July 2000 and June 2006, the number of rebated plain radiography examinations (including mammography) increased by almost 16%, with an average annual growth rate of 3%.[13] It is in interpreting and reporting on the images produced in these examination types that radiographers may complement the radiologists' reporting role, thus easing radiologists' workloads while providing valuable support to referring clinicians.

In one US study,[14] it was found that missed radiological diagnoses were reduced from 3.0% to 0.3% when accident and emergency x-rays were viewed by radiologists, as opposed to non-radiologist physicians, within 12 hours of the examination being performed. While such a quality improvement would be desirable, it is unlikely that emergency departments in Australia can expect radiologists to be able to provide a service of this standard if the demand for examinations requiring a report continues to increase at a faster rate than the supply of radiologists. However, on the basis of evidence that radiographers are capable of accurately reporting on plain radiographic images in clinical practice,[15] it would seem feasible to teach senior, experienced radiographers to

provide reports that would help referring medical practitioners to identify abnormalities.

Overseas experience

It is now common in the UK National Health Service (NHS) for postgraduate-trained radiographers to deliver a range of services that were previously delivered by radiologists.[16,17] In a growing number of NHS trusts, radiographers have been educated and credentialled to report on musculoskeletal, chest and abdominal plain x-rays, as well as reporting on other imaging modalities and performing various other extended clinical roles.[16,17] A survey of NHS trusts found that radiographers were reporting plain film examinations of the appendicular skeleton at 81 of the 177 trusts surveyed and of the axial skeleton at 70 trusts, as well as barium enemas and ultrasound examinations at 78 and 146 trusts, respectively.[17] Benefits have been claimed in terms of reduced patient waiting times, freeing up of radiologists for other duties, cost-effectiveness, and greater potential for recruitment and retention of radiographers, with higher levels of job satisfaction.[16]

The reform of the diagnostic imaging workforce in the UK has been jointly overseen by both the Royal College of Radiologists (RCR) and the Society and College of Radiographers and subject to extensive, ongoing evaluation.[15,17,18] Brealey et al[18] found that there was no statistically significant difference between the reporting accuracy of clinical specialist radiographers and consultant radiologists when reporting on plain radiographic examinations requested by accident and emergency departments or general practitioners. Several other studies have found similar results. A meta-analysis of 12 studies found that radiographers report plain film radiographs in clinical practice with 92.6% sensitivity and 97.7% specificity compared with radiologists.[15] With selective training of radiographers in image interpretation, there was no significant difference in their reporting accuracy compared with that of radiologists.

In the US, career development opportunities for radiographers were boosted in 1997 with the establishment of the positions of mid-level radiology practitioner assistant (RPA) and, more recently, radiologist assistant (RA). Although they work under the supervision of radiologists, compared with other radiographers, both RPAs and RAs have extended clinical roles with regard to "patient assessment, patient management and.. a broad range of radiology diagnostic and interventional services".[19] They may be certified to perform procedures traditionally performed by radiologists and to provide technical reports to assist radiologists and referring medical officers. However, the supervising radiologists retain the responsibility for final image interpretation, diagnosis and issuing of written reports.

The radiographer's report

By virtue of their lengthy education and training, radiologists are the "gold standard" experts on image interpretation. Therefore, we are not arguing that radiographers should replace radiologists in the health care system, but rather that limited task transfer could help meet the demand for immediate ("hot") reporting.

However, a distinction must be drawn between a radiologist's and a radiographer's report. Following the establishment of a Special Interest Group in Radiographic Reporting in the UK,[20] the RCR released a statement on the delegation of radiological reporting in which it distinguished between a "descriptive (or technical)" report and a "medical (or diagnostic)" report.[21]

The descriptive report amounts to the recording of observations with no medical interpretation. The RCR stated that a radiographer may provide such a report, although the responsibility for the patient's management would continue to rest with the referring physician or the delegating radiologist.

The medical report includes both observations and a medical interpretation and can only be provided by a radiologist.

Although radiologists' reports are the benchmark against which radiographers' reporting accuracy was measured in the studies cited above, Berlin[22] has reported that errors made by radiologists are of the order of a surprising 30%. Supporting the distinction between descriptive and medical reporting, radiological errors can be categorised into perceptual errors, in which the abnormality is simply not seen by the radiologist, and cognitive errors, in which the abnormality is seen but its nature is misinterpreted.[22] Perceptual errors account for 80% of missed radiological diagnoses,[22] suggesting that a substantial proportion of errors can be avoided if the observer is competent at correctly identifying the presence of an abnormality, as opposed to knowing the precise diagnosis.

It must also be acknowledged that, in many cases, the radiologist's report is only part of the algorithm that leads ultimately to the patient's managing physician making a diagnosis. Radiological evidence may or may not contribute significantly to the diagnosis, depending largely on whether the radiologist's report agrees with the physician's interpretation of other diagnostic information. Further, in spite of their limited training in the radiological aspects of image interpretation, radiographers already play an important (but understated) role in calling abnormalities to the attention of doctors in front-line care. The "red dot system", by which the radiographer flags a suspected abnormality with an adhesive red dot, has been widely used since the mid-1980s.[23] A considerable opportunity exists to formalise radiographers' non-medical, descriptive reporting role.

Meeting the challenge

Australian universities are generally well placed to offer radiographers postgraduate training in image interpretation. Radiographer education in Australia is of a high standard. Most of the eight universities offering undergraduate degrees also offer postgraduate programs in diagnostic imaging, mostly in ultrasonography. Three universities currently offer postgraduate courses specifically in image interpretation. The universities seem increasingly aware of the need to engage radiographers in postgraduate study if they are to gain recognition for providing services that fall outside their officially sanctioned role.

A recent discussion paper on role evolution in the diagnostic imaging team calls attention to the need to put in place processes for managing legal risks and for the continuing education of non-medical members of the team.[24] Both are important considerations, beyond the basic education and credentialling of radiographers to perform a limited reporting role. Indeed, it may be readily argued that mandatory quality monitoring and evaluation, as well as a program of continuing education, should be required of all health professionals who practise across professional boundaries. Thus, there is a clear need for stakeholder consultation and collaboration in developing education and research agendas in this field.

Conclusion

Given what we know about radiological reporting, it seems probable that a proportion of medical errors may be attributable to missed, incorrect or delayed radiological diagnosis. Therefore, to suggest that the current 80-year-old diagnostic imaging workforce model is not in need of reform would be inappropriate, when the weight of evidence is to the contrary. Evidence suggests that, if carefully planned, implemented and evaluated, the transfer from radiologists to radiographers of some radiological reporting tasks would maintain or improve the quality of patient care. Indeed, it is somewhat sobering to reflect that arguments in favour of the more effective application of the knowledge and skills of radiographers have been reported in Australia since the 1980s.[25] Then, as now, it could be argued that the ongoing shortage of radiographers may be partly addressed if they are utilised in a way that is commensurate with their level of education and training. There appears to be no reason why some radiographers could not reach the academic standard needed to provide descriptive reports on a defined range of radiographic examination types.

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Competing interests

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