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A New Working Paradigm for Radiologists in the Post-COVID-19 World

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INTRODUCTION

Remote working has become common for many people to comply with social distancing to prevent the spread of coronavirus disease 2019 (COVID-19). Radiologists also have had to adapt their working habits. Working from home using teleradiology and virtual meetings has become the standard for many radiologists. This new working paradigm may increase the efficiency and job satisfaction of radiologists. However, there are potential downsides, including risk of decreasing social contacts. Nevertheless, we believe that they are outweighed by the benefits and potential for improvement. We discuss the technical recommendations, potential advantages, and potential disadvantages and pitfalls of the new working paradigm. We argue for a hybrid style of working and outline directions for future research and development.

TECHNICAL RECOMMENDATIONS FOR WORKING FROM HOME

Recommendations for an appropriate teleradiology working environment have been described elsewhere [1]. The minimal technical requirements for home PACS workstations and diagnostic monitors are identical to those in the hospital and need to meet the requirements as set by the ACR. For reading mammography, at least a 5-megapixel monitor should

be used. Workplace ergonomics, lighting, temperature, and surrounding noise level reduction should be optimized to prevent fatigue and to optimize reading efficiency and accuracy. Telephone setups should be considered. Proxy telephone services may facilitate better communication with patients and referring providers. A webcam and teleconferencing software allow virtual conferences. In our experience, integrated chat functionality in PACS is very useful to communicate with colleague radiologists, radiology residents, and technicians. Home network speed should be sufficiently high [2]. Close collaboration and local agreements with information services are essential to establish and maintain an optimal network connection.

POTENTIAL ADVANTAGES

The frequency of burnout among radiologists is among the highest of all physicians, and efforts should be made to reduce the risk [3]. Commuting is an important work-related stressor because it is time-consuming and it can involve tense road situations. Moreover, commuting distance is adversely associated with physical activity, cardiorespiratory fitness, adiposity, and indicators of metabolic risk [4]. Working from home more frequently reduces cumulative commuting time, which may be beneficial to long-term mental and

physical well-being. By not wasting time to commute, radiologists may be more productive. Increased autonomy and flexibility when working from home makes it easier to fit time in for private and social activities, which can improve work-life balance. Furthermore, an advantage of a home PACS workstation is the possibility to cover shifts from home. Lastly, there are important environmental benefits. We, as physicians, have a moral responsibility to contribute to global health and should do our best to reduce climate pollution. By working from home, greenhouse gas emissions will be reduced. As a result of giving up their daily commute during the COVID-19 pandemic, Americans saved as much as 890 million miles of travel distance per day [5].

POTENTIAL DISADVANTAGES AND PITFALLS

Isolation is a potential risk factor for burnout [6]. Before PACS was introduced, physical meetings between radiologists and clinicians were more common, which led to a radiologist's greater understanding of the clinical problem and how imaging results affect clinical management [6]. This resulted in more meaningful and impactful radiology reports and enhanced the radiologist's critical role and sense of belonging to the health care team

[6]. Working from home may lead to further isolation, a low sense of personal achievement, and depersonalization [6]. Another possible disadvantage is that some sections are very suitable to fit in working from home (eg, neuroradiology), but other sections (eg, interventional radiology or pediatric radiology) more often have hands-on procedures and therefore have to be on site. This may lead to inequalities between sections. We recommend to first make an inventory of who wishes to work from home, which may depend on travel distance to work and personal preferences, among other factors. Making clear agreements between and within specialized sections is key to prevent dissatisfaction. A potential pitfall when working from home is that boundaries between work and private life can become blurred, which may negatively affect work-life balance and distract radiologists from their tasks. The ease of performing virtual meetings may lead to more meetings being scheduled outside of typical work hours at the expense of more traditional family time or downtime. It is important to realize that stress linked to the balance between work and home is an important predictor of emotional exhaustion (one of the signs of burnout) among doctors [7].

HYBRID WORKING

A recent survey among US office employees and executives showed that working remotely during the COVID-19 pandemic has been a success, both in terms of productivity and the flexibility to manage family matters [8]. Over half of employees would prefer to work remotely at least 3 days a week once COVID-19 pandemic concerns recede [8]. Such a hybrid style of remote and on-site working is likely to become the norm for office employees [8]. We believe that a

hybrid working style can also be adopted by many radiology departments, provided that they can ensure that an appropriate number of radiologists is present on site to perform the necessary hands-on procedures and to perform patient consultations. Furthermore, in hospitals with a radiology residency program, there should be sufficient faculty presence for teaching and supervision. An alternating, hybrid schedule is needed to maintain a good balance for each radiologist and to countermeasure the potential disadvantages of only working from home.

FUTURE RESEARCH AND DEVELOPMENTS

More research is required to assess whether working from home during the COVID-19 pandemic has been as successful for radiologists as it has been for office workers [8] and to determine what can be optimized. Standard PACS workstations in their current form are relatively large. The use of a DICOM-calibrated laptop with diagnostic display can further improve the flexibility of the radiologist to work in any place. Telepresence is a relatively new digital video and networking technology that enables remote individuals to virtually interact as if being present in the same place. The main difference between telepresence and traditional video conferencing is audio and video quality. In telepresence, the video quality is crystal clear, and the meeting participants can be heard as if they were physically next to you. Telepresence may augment the visibility of the radiologist even when physically at a distance.

In conclusion, the COVID-19 pandemic has propelled a shift toward a new working paradigm. With current modern technology, working from home can easily be facilitated. Working from home is a strategy to give radiologists more autonomy and

freedom. We believe that it can improve morale, reduce risk of burnout, and enhance the performance of radiologists. However, others may argue the opposite. A balanced, hybrid working schedule can overcome the potential disadvantages of only working from home and is needed to ensure on-site coverage. It is presumed that we will have more hybrid teleradiology models here to stay as the paradigm has already shifted, and this communication may inspire others who have not done so to follow. As this further rolls out, evaluations are needed to determine what can be optimized. New teleworking technologies are upcoming, which may further enhance this new working paradigm. In conclusion, the COVID-19 pandemic has inspired many radiologists to permanently change their working habits, in a similar way as office workers around the world.

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