

Work From Home in Academic Radiology Departments: Advantages, Disadvantages and Strategies for the Future

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To achieve necessary social distancing during the Covid-19 pandemic, working from home was introduced at most if not all academic radiology departments. Although initially thought to be a temporary adaptation, the popularity of working from home among faculty has made it likely that it will remain a component of radiology departments for the long term. This paper will review the potential advantages and disadvantages of working from home for an academic radiology department and suggest strategies to try to preserve the advantages and minimize the disadvantages.

Keywords: Work from home; Covid; Teleradiology.

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INTRODUCTION

The Covid pandemic dramatically increased the number of radiologists working from home and the use of teleradiology in academic radiology departments (1,2). Working at home has proved very popular (2) and it is unlikely that a return to the traditional model of on-site work will return, even after the pandemic is no longer a factor. There are many potential advantages to working from home both for the individual and the department including: elimination of the need for commuting, leading to time savings and less negative impact on the environment; improved work-life balance; an increased feeling of autonomy; and an increase in the pool of potential faculty for an academic department. There are also however, many potential negative effects of working from home including: decreased integration of radiologists with the clinical care team, leading to an increase in “invisibility” of radiologists, both to referring physicians and medical students; decreased collaboration between radiologists; creation of real or perceived inequality between different subspecialties; loss of mentoring opportunities both for junior faculty and trainees; and decreased innovation due to lack of unplanned “water cooler” conversations. This paper will review these potential

advantages and disadvantages and suggest strategies to try to preserve the advantages and minimize the disadvantages.

WORK FROM HOME

Working from home was introduced in many industries in the 1970s due to the increased cost of gasoline as a result of the OPEC oil embargo (3). Remote work or teleradiology was not possible in radiology until the advent of PACS and the digitalization of images. Until the beginning of the Covid pandemic, teleradiology was mainly used to allow radiologists to increase their coverage during off hours such as nighttime and weekends and to allow increased subspecialized interpretation of images (4). During the pandemic however, working from home and teleradiology became the standard for many departments due to the need for social distancing (2). Most academic departments quickly distributed home workstations to faculty (5,6), and in some cases residents (7). Departments operated with a skeleton staff on site to provide services such as interventional radiology or diagnostic mammography that could not be done remotely. Remote education also became the norm for both didactic conferences and teaching at the workstation (8-12). Although initially work from home was thought to be a temporary adaptation that would end following the resolution of the pandemic, it has become clear that working from home is popular and is most likely here to stay.

The popularity of working from home is not unique to radiologists. Studies have shown that 80% of workers would like to work from home at least some of the time (13). A study of workers at Fujitsu showed that only 15% of workers

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considered the office to be the best place to work with 55% of workers favoring a mix of office and home based work (13). Working from home has also been shown to increase engagement and decrease attrition (3), two important issues facing academic radiology departments.

ADVANTAGES

There are multiple potential advantages for radiologists who work from home. First, there is no need to commute. Studies have indicated that commuting can be more stressful than their actual jobs for some workers, particularly those who live in crowded metropolitan centers (14). In the United States, 25 million workers spend more than 90 minutes commuting each day and much of the time is spent dealing with bumper to bumper traffic (14). A survey of workers in 2006 reported that commuting to work was the least enjoyable part of a worker's day (14). A 2014 study found that long commutes led to increased anxiety and decreased satisfaction with life (14). Given the reported high degree of burnout in radiologists (15), the removal of commuting stress is an obvious advantage. The lack of the commute may also be translated into increased productivity. If a radiologist is not spending 1–2 hours per day going to and from work, at least some of that time can be used to interpret images and increase productivity. Another significant advantage of eliminating or decreasing commuting time is the beneficial effect on our planetary health by decreasing greenhouse gas emission. It has been estimated that during the pandemic, Americans saved as much as 890 million miles of travel distance per day (1).

Working from home also affords radiologists increased autonomy and flexibility in determining when they work. If not on an emergency department rotation or required to read stat examinations, the radiologist can choose to read cases whenever is convenient for them during the day. They can choose to read cases early in the day or late at night, and be free for other life commitments such as school events for their children. Although most radiologists who work from home have a hybrid situation, where they split time between home and on-site, an increasing trend is to hire fully remote radiologists. This is in part due to the extremely tight job market and the difficulty many academic departments have been experiencing in hiring enough faculty to fully staff their departments. The ability to hire fully remote faculty significantly increases the pool of potential faculty. If fully remote, radiologists have the ability to live anywhere in the United States. This is an important consideration for two worker families since it is sometimes difficult to find jobs that are co-located. It is not infrequent that radiology faculty change jobs because their spouse has taken a position in another city or state. The lack of geographic restrictions also opens the door for faculty to choose to live in locations with a lower cost of living, a significant issue for many major cities like New York and San Francisco.

Studies have indicated that working from home increases productivity in many industries. A 2015 study showed a 13%

initial productivity gain for workers who were remote which increased to 22% over time (3). A study of pediatric neuro-radiologists compared turnaround time, volume of studies interpreted and error rates on rotations worked from home and in the hospital. Fifty-seven percent of participants had shorter turnaround times and were more productive when working from home with no increase in error rates (16).

Another advantage for a department in allowing radiologists to work from home is a decrease in the need for space. With multiple radiologists reading remotely, there is a reduced need for reading room space as well as potentially for faculty office space. While not a major concern in some locations, this is a major issue for academic departments located in major metropolitan centers with limited available on-site space.

POTENTIAL DISADVANTAGES

There are also multiple potential disadvantages with remote work for radiology departments, some of which are unique to an academic radiology department with trainees.

One of the major risks of allowing work from home is perceived inequality between different subspecialties as well as between onsite or hybrid radiologists and fully remote radiologists. Certain subspecialties lend themselves very easily to teleradiology such as cross sectional imaging and the interpretation of plain films. However, other subspecialties cannot be done remotely. Radiologists performing interventional procedures or covering fluoroscopy need to be onsite. Although screening mammography can be read offsite (albeit with more expensive workstations), most departments have not yet adopted remote diagnostic mammography. This can lead to a feeling of inequality between subspecialties especially when being onsite poses a significant health risk such as at the height of the Covid pandemic. Incorporating fully remote radiologists can further increase feelings of inequality. It is likely that fully remote faculty would not be able to perform the same tasks as on-site radiologists such as “curbside consults”, participation in multi-specialty teaching conferences, on-site contrast coverage, and the entire gamut of educational responsibilities. An additional potential disadvantage with attending radiologists reading remotely when residents or fellows are required to be on site is the perception by the residents that the attending physicians are able to preserve their own health and safety at the expense of the trainees.

A major concern for radiologists is the perception that radiology is an ancillary service that can be commoditized (17). This perception increased following the development of PACS. Prior to the rollout of PACS, it was common for referring physicians to spend time in the reading room going over images with the radiologist, discussing findings and recommended future imaging with their radiology colleagues. Following the rollout, these visits markedly decreased (18). This has led to an emphasis on demonstrating the value and importance of radiology to patient care and patient outcomes. An important component of these efforts is increasing the visibility of radiologists and their integration into clinical care

teams. This requires the onsite presence of radiologists who can interact with clinical care teams and be available for spontaneous questions and requests. The decreased number of onsite radiologists makes radiologists less visible and these interactions more difficult and less frequent. The increased ability of radiologists to work remotely also risks engendering resentment in other specialties over the perceived “advantage” of radiologists.

The lack of visibility of radiologists also has a potential negative impact on medical students’ interest in radiology as a career choice. If medical students do not have the chance to interact with radiologists and to experience their impact on patient care, there is a significant risk that radiology will be less attractive as a career choice leading to a worsening of the already present radiologist shortage.

A major concern when faculty are geographically separated is the potential loss of collaboration and mentorship (3,19). Although platforms such as zoom, teams or skype allow for virtual meetings, the lack of visual cues and in-person interaction remain limiting factors. Direct personal interaction has been found to encourage greater empathy between participants than virtual interactions. Finding convenient times for meetings can also be problematic if faculty are located across the country in different time zones. Perhaps more importantly, studies have shown that innovation and creativity often occur not at scheduled meetings but at unplanned “water-cooler” conversations. A study found that unplanned face-to-face interactions were the best predictor of productivity (20). The lack of direct personal interactions can also lead to feelings of social isolation and disconnectedness, factors that can increase burnout. Mentorship, which is an important consideration for junior faculty and trainees, is also limited without the ability to interact in person. The decrease in mentorship and professional development is a particular issue for diversity and gender equality. Studies have shown that women have a greater preference for working remotely than men do and that remote workers have lower rates of promotion than on site employees. There is already a significant gender gap in academic radiology (21) and any factor that could increase that gap is undesirable.

EDUCATION

Core elements to resident education are didactic and case conferences, workstation readouts, and mentorship, all of which are affected in varying degrees by increasing “virtuality”.

There are several advantages to a virtual format for didactic lectures. They can be watched by residents at different locations without the need to travel to a central site. They can be watched asynchronously if recorded, allowing residents who are on vacation or post call to “attend” (8). In addition, another potential advantage to virtual didactic conferences is the ability to share lectures between sites, allowing programs with a lower number of faculty to decrease the workload for each individual. This would also allow all residents to be

taught by the best lecturers, similar to the core lecture series presented by several subspecialty societies (22) and the Association of University Radiologists. One potential disadvantage of a shared lecture series is the negative impact on junior faculty’s development of speaking skills and career advancement if they are not afforded the opportunity to prepare and deliver lectures at their own program or as a visiting lecturer. A virtual format is more challenging for interactive case conferences. Although screen sharing allows the resident to see the case presented, the lack of direct personal interaction limits the ability to use body language and visual cues to make the experience more valuable.

Case readout at the workstation is a vital component of residency education. It not only allows the resident to learn how to interpret and dictate cases, it gives them an opportunity to observe how the attending physician approaches a case, interacts with colleagues and referring physicians, and interacts with other radiology faculty and technologists. During the early stages of the Covid pandemic, many institutions converted entirely to virtual readouts (8–11,23). There were two types of readouts utilized, synchronous, with attendings and residents utilizing a screen sharing solution, and asynchronous, where attendings reviewed reports previously prepared by a resident and sent them asynchronous feedback (11). Positive feedback regarding virtual readouts included increased flexibility of scheduling the readout and a greater feeling of autonomy by the resident. Negative comments included feelings of isolation and lack of camaraderie, decreased educational feedback particularly with asynchronous readouts, and the lack of non-verbal cues to determine resident engagement and understanding (11). Synchronous readouts were preferred by both residents and attendings (11, 23). It is interesting that junior residents were less positive about virtual readouts than more senior residents (9,11). It is likely this is due to their need for more instruction and feedback than more advanced senior residents. One major drawback noted with virtual readouts was the lack of direct personal interaction and informal conversation that normally allows residents and faculty to develop personal relationships, an essential component of mentorship and career development (23).

STRATEGIES FOR THE FUTURE

It is clear that working from home and teleradiology will continue to be a component of academic departments in the future. Six recommended strategies to maximize the advantages and minimize the potential disadvantages going forward are presented below.

1. *Develop a hybrid working environment where a critical mass of faculty from all subspecialty sections is onsite at all times*

Maintaining a significant onsite radiologist presence decreases the potential for radiologist “invisibility” to referring physicians, trainees and medical students. It will also ensure that onsite faculty do not feel overly burdened by

functions that can only be performed when onsite. Although the size of a department or division will determine the allowable amount of remote work, it is important to ensure that all faculty have some time for remote work.

2. *Work to ensure that all sections have opportunities to work from home.*

Although interventional faculty need to be onsite for their clinical rotation, allowing them to be home on their academic or administrative days will demonstrate that their work/life balance is equally important to the department as that of other faculty. Many practices are also developing solutions to allow breast imagers to work remotely, performing screening mammography, breast ultrasound, as well as remote diagnostic mammography.

3. *If fully remote faculty are incorporated into the department, develop strategies to compensate for those functions that onsite faculty have to perform that remote faculty do not.*

One strategy would be to set increased productivity benchmarks for remote faculty compared with on-site faculty to balance out the educational and consult tasks that on-site faculty have to perform. For example, onsite faculty who attend interdisciplinary conferences and work with trainees might be asked to reach the 40th percentile based on the AAARAD-SCARD productivity survey while remote faculty are asked to perform at the 60th or 70th percentile. It is important to be transparent to all faculty about the different responsibilities of on-site and remote or hybrid faculty.

4. *Ensure that if virtual education is utilized, it is incorporated into a hybrid environment.*

A hybrid approach incorporating a significant amount of personal interaction remains a vital and essential component of resident education. If virtual readouts are utilized, ensure that they are synchronous especially for junior residents. If virtual readouts are utilized, incorporate technology that allows the participants to see each other and interpret and respond to non-verbal cues.

5. *Develop strong mentoring programs for both junior faculty and residents that incorporate personal interactions.*

Be especially mindful of ensuring that career development opportunities are available to all faculty, both those who work onsite and those who work remotely. It is equally important to establish comprehensive mentoring programs for residents, particularly if there is extensive use of virtual education limiting direct in person interaction with attending faculty.

6. *Develop strong onboarding programs.*

This will ensure that new faculty and residents have a chance to learn important cultural components of the department that can be difficult to absorb in a virtual environment. Strong onboarding programs will also decrease the risk of feelings of isolation for new faculty and trainees.

SUMMARY

Teleradiology and working from home has become an integral component of radiology departments and is unlikely to go away in the future. There are multiple advantages to teleradiology including decreased stress, increased work-life balance, and increased feelings of autonomy. There are also multiple potential significant disadvantages, including the risk of decreased visibility of radiologists to referring physicians, decreased engagement, feelings of inequity, and negative effects on education and mentorships. Multiple strategies are presented to decrease the impact of these disadvantages while maintaining the advantages of teleradiology.

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