



## Editorial

## Challenges faced by women in radiology during the pandemic - A summary of the AAWR Women's Caucus at the ACR 2020 annual meeting



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## ABSTRACT

The COVID-19 pandemic has dramatically altered the professional and personal lives of radiologists and radiation oncologists. This article summarizes the 2020 American Association for Women in Radiology (AAWR) Women's Caucus at the American College of Radiology (ACR) Annual Meeting. The caucus focused on the major challenges that women in radiology have faced during the pandemic.

### 1. Introduction

The American Association for Women in Radiology (AAWR) was founded in 1981 to address the problems and barriers unique to women in radiology [1]. Over the past decade, the AAWR has partnered with the American College of Radiology (ACR) to host the annual Women's Caucus at the ACR meeting [2]. These historically in-person meetings provide a forum to discuss the challenges faced by women radiologists and radiation oncologists and to find solutions and appropriate approaches to combat the raised issues. In response to the COVID-19 pandemic, the 2020 caucus was transitioned into the virtual platform during the ACR annual meeting. The virtual 2020 AAWR Women's Caucus was very well attended with more than 120 participants including 20 men and 100 women radiologists and trainees. The caucus was structured as a panel of speakers followed by an open question and answer session. Panelists included AAWR Executive Committee members and others with an interest in addressing the major challenges that women in radiology have faced during the COVID-19 pandemic.

### 2. Challenges faced by women in leadership

Women leaders have faced many challenges during the pandemic. Challenges include providing and communicating policies and guidelines to staff, preparing disaster teams, canceling and postponing elective procedures and diagnostic imaging studies, maximizing personal protective equipment (PPE), building and repurposing different parts of hospitals and departments, and adjusting staffing and coverage of clinical services [3]. In addition, leaders have witnessed the increased level of anxiety and emotional burden of the pandemic among staff demonstrated as increased burnout, fear of infection or transmitting the virus to friends and family, and the possibility of pay cuts and losing jobs. In order to find the most appropriate and timely solutions during these unprecedented times and to communicate the policies and updates in a timely and transparent fashion, it is critical for leaders to listen and respond to the concerns and questions of the faculty and trainees [4].

### 3. Challenges faced by women in practice

Institutional and departmental policy and guideline changes have drastically altered the daily work routine for many women in radiology [3]. Given the cancelation and postponement of many imaging studies and procedures, both private practice and academic institutions have faced significant economic challenges. These factors have resulted in the possibilities of pay cuts, redeployment, furloughs, transition to part-time employment and remote work [5]. The economic impact of COVID-19 has disproportionately affected private practices and hospitals of smaller size [6].

In academic institutions, remote read-out has created new challenges for attending radiologists and trainees. Challenges include modified resident schedules, adapting to virtual platforms for reviewing imaging studies, and teaching and providing feedback to the trainees [5]. Women across all medical fields, including radiology and radiation oncology, are concerned about the impact of COVID-19 on academic productivity. Examination of the impact of the pandemic on academic productivity in medicine has identified a gender gap. A recent analysis by Anderson et al. estimated a 23% reduction in women's first authorships, 16% reduction in women's last authorships and 16% reduction in general representation of women per author group in COVID-19 publications from those published in the same journals earlier that year. This suggests that the productivity of women has been more greatly affected than that of men [7]. Increased demands on women at home, including caring for children and elderly family members, may limit women's time available for research and other academic activities and partially account for this developing gender disparity. Additionally, rescheduling the backlogged imaging and procedures after the COVID-19 surge may increase the clinical workload and possibly working hours for radiologists and radiation oncologists. This could ultimately lead to even less academic productivity for women in radiology and further widen the gender gap.

Supportive work environments and lactation facilities are ongoing challenges for women in different practice settings [8]. While some institutions have been more proactive in providing private space for breastfeeding and pumping, the majority of radiology and radiation

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oncology practices either have inadequate dedicated lactation facilities or no lactation facility at all [9]. Given the precautions for social distancing in the era of COVID-19, availability and cleanliness of lactation rooms and equipment have become more problematic and pose increased anxiety to breastfeeding mothers. This challenge may affect more working mothers in radiology and radiation oncology as facilities re-open and physicians return to on-site readouts and procedures.

Radiation oncology services are essential and delay in care can lead to poor outcomes. Many centers have seen a decline in patients undergoing treatment due to fear of contracting COVID-19 while traveling daily for radiation therapy. However, the majority of practices have continued to serve patients using heightened safety measures. As cancer patients are immunocompromised, social distancing and hygiene practices in the department have been multifold. Safety measures include routine testing of patients at various time points in the treatment process, treating COVID-19 positive patients at the very end of the day followed by rigorous cleaning of linear accelerators, rotating healthcare personnel to protect workers and re-distributing workload in case someone becomes ill, converting all tumor boards and meetings to virtual formats, allowing one accompanying visitor for patients requiring a chaperone (otherwise, no visitors) and teleconferencing any visit that does not require a physical exam [10,11]. Many centers have reported an initial decrease in volume followed by an uptrend. There is high concern that patients will present with more advanced stages in the coming months as those who have deferred treatment present for delayed care.

#### 4. Challenges faced by trainees

##### 4.1. Challenges of trainees in radiology

Since the early phases of the COVID-19 pandemic, residents and fellows have been instructed to continuously modify schedules for daily readouts, calls and didactics. Based on the discretion of program directors, education committees of radiology departments, Graduating Medical Education (GME) Office and institutional guidelines, the majority of trainees were instructed to stay at home, with only a minimum necessary number of trainees covering essential on-site rotations [4]. Some institutions implemented guidelines for the mandatory or voluntary redeployment of residents to help medicine and COVID floors, and non-clinical activities such as distributing masks or assisting with paperwork [4]. Departments that provided a remote system for interpreting imaging studies arranged remote readouts for trainees who worked from home via phone calls or a virtual platform [5]. This necessary transformation of the traditional reading room set up affects junior trainees to a greater degree than the senior residents and fellows. Junior trainees are less experienced at interpreting studies and need more teaching and direct direction during the readouts. This may be even more pronounced when the junior residents are scheduled on new or busier rotations given their unfamiliarity with the staff, exams and workflow. In addition, technical challenges during remote image interpretation and readout are unavoidable. Incoming first year residents will again likely be the trainees most significantly impacted by these challenges. Limited in-person communication will slow their adaptation to workflow and dynamic institutional guidelines, education, and preparation for call.

Cancellation and postponement of elective procedures and imaging studies has limited the number and variety of pathologies that trainees are exposed to in daily readouts. To compensate for this shortfall, residency and fellowship programs have provided a wide variety of learning opportunities for trainees. These include but are not limited to increasing the number of lectures provided by home or outside institutions, webinars and case conferences by greater imaging communities. Despite these efforts, trainees continue to face uncertainties about their work and study schedules. Furthermore, there are increasing concerns about the possibility of delayed graduation due to

inability to fulfill the requirements. The American Board of Radiology (ABR) has postponed and rescheduled the Core, subspecialty and certifying examinations multiple times in the recent months [12], with the possibility of moving the future examinations to a virtual format. Continuous changes and uncertainties on the time and format of examinations and travel restrictions have significantly affected optimal scheduling for the trainees' clinical rotations and examination preparation, as well as multiple aspects of women residents' personal lives including the family planning, work-life balance and emotional health.

##### 4.2. Challenges of trainees in radiation oncology

Similar to radiology trainees, COVID-19 has impacted radiation oncology residents at every level of training. An online resource documenting how residency programs are adjusting resident responsibilities and education demonstrates that the majority have transitioned to online didactics for radiation biology, physics and clinical radiation oncology. Some programs have extended access to invited speaker talks broadly in a public forum, allowing a wider reach [13]. Most recently, graduation ceremonies have been moved to an online format or with limited attendees in rooms with physical distancing measures.

With respect to the clinic, some programs are alternating in-person duties weekly while others utilize a rotating resident-of-the-day system to address in-house issues. Some programs have transitioned to a system where only the attending physician physically sees the patient. Less than 10 reported programs have experienced mandatory redeployment to medicine floors and a few programs have been promised hazard stipends for this work. From an educational standpoint, the highest priority is given to the patients about to start radiation and discussions regarding cases are continuing remotely between the trainees and attendings [14]. Some programs were able to offer remote contouring and planning so that residents could remain involved with the treatment decisions, review the plans with the dosimetrist and attending, and view the same image set with the entire care team simultaneously.

The ABR has rescheduled written qualifying exams to December 2020 while the oral certification exam has been rescheduled to 2021 in a virtual format with ongoing stakeholders' discussion regarding the administration of all the exams.

##### 4.3. Challenges of medical students

COVID-19 has necessitated major changes to medical education. Pre-clinical and clinical electives for many have been placed on hold or transitioned online due to the concerns for patient and student safety in the setting of inadequate COVID-19 testing, limited PPE, and the prioritization of urgent clinical needs over education [15]. While medical schools and professional organizations have skillfully developed online resources for remote learning, these unfortunately are not an equivalent substitute for authentic patient care experiences.

The impact of COVID-19 has been most profound on rising third and fourth year medical students who face delayed clerkships, an unprecedented virtual interview season, and challenges in licensing exam scheduling. Many rising fourth year students will be unable to complete sub-internships or away rotations in time for residency applications. A primary concern of medical students for this interview season is how to assess program culture and fit from a distance. Clarity from residency programs about interview arrangements and multimedia recreation of program experiences therefore will be of utmost importance. An increasing number of programs in radiation oncology and radiology have transitioned to virtual clerkships.

Numerous students scheduled to take their Step 1 and Step 2 CK exams have received unclear communications from the National Board of Medical Examiners (NBME) and its test delivery vendor Prometric, including last-minute cancellations, multiple rescheduled dates, limited exam site options, and challenges in securing Americans with Disability

Act-protected accommodations [16]. These unpredictable cancellations compound the personal and financial stress inflicted by COVID-19 on students, some of whom may be caring for children or sick family members, or may come from low-income communities of color hardest hit by COVID-19.

Recruitment of women medical students will likely be affected by the recent cancellation of in-person radiology elective rotations. Cancellation of in-person electives limits opportunities for interaction with radiologists and radiation oncologists and decreases the visibility of women in radiology. Opportunities to interact with women radiologists and radiation oncologists have often encouraged women medical students to pursue the field of imaging [17]. Without these opportunities, women medical students may be less familiar with and less likely to pursue the fields of radiology and radiation oncology. New pipeline initiatives should be considered to combat the long-standing underrepresentation of women in radiology [18–20] and overcome this new challenge.

In the face of these challenges, medical students have demonstrated admirable moral leadership. Understanding the critical importance of physical distancing, fourth year medical students celebrated both match day and graduation virtually at home. Some took up the call to join the frontlines early. Across America, medical students have spearheaded initiatives to support their local communities, including but not limited to coordinating PPE drives, helping healthcare workers with childcare, volunteering at food banks, and assembling multilingual educational resources on COVID-19 [21,22].

## 5. Work life harmony challenges

The COVID-19 pandemic has impacted every aspect of life. This includes changes in both work and home routines, altered expectations at work and at home, more limited human interactions, change in salary or job and travel restrictions [23]. There is additional emotional stress and burden brought on by dealing with illness and death of family members, colleagues and staff who are afflicted by COVID-19. Altogether, these impacts have increased the emotional burden on all healthcare workers, including women in radiology and radiation oncology.

The cancellations of child-care facilities and schools may more profoundly affect women in radiology and radiation oncology than men. Despite the increase in men's contributions to domestic childcare when compared to earlier generations, women continue to bear the majority of childcare burden [24]. Recent studies on the impact of COVID-19 demonstrate that in families with two working parents, women are disproportionately bearing the burden of domestic work, potentially by up to 20 more hours per week than men [25,26]. It is therefore crucial that the medical community provides well-being and mindfulness programs to support healthcare workers, especially working mothers [27].

## 6. Job market challenges

While the job market was near optimal for radiologists and radiation oncologists in the pre-pandemic era, the job market after COVID-19 poses a particular challenge for graduating radiologists and radiation oncologists [28]. For those already committed to positions for July 2020 start dates, many have had start dates delayed and/or compensation contracts renegotiated. For those who had not secured a position for July 2020 before shelter-in-place restrictions in March, the job market was frozen for the desired timeline of starting in July. Lastly, for those planning to apply for positions for July 2021 start dates, news of widespread hiring freezes at academic medical centers is unsettling and reflective of the negative financial outlook at all medical practices. This leaves many graduating residents to consider other options such as fellowship, which is not a typical path for radiation oncology, additional fellowships for radiology residents and fellows, and consideration

of part-time positions. Ultimately, COVID-19 has brought uncertainty to the lives of currently or soon to be graduating trainees entering the job market [28].

## 7. Conclusion

COVID-19 has significantly impacted the professional and personal lives of women in imaging. The greater radiology and radiation oncology communities should consider providing more policies to support healthcare workers, specifically women radiologists and radiation oncologists. This includes ABR board examination plans and policies that meet the needs of women trainees and residency and fellowship programs conducting virtual interviews beyond the pandemic to provide a more fair and family-friendly process for applicants with less emotional and financial costs. The unique challenges presented by the COVID-19 pandemic provide an opportunity to initiate positive changes to support our community and advocate for the needs of women in radiology and radiation oncology [29,30].

## Declaration of competing interest

Drs. SAE, AL, CE, SA and LBS serve on the executive committee of American Association for Women in Radiology (AAWR).

## References

- [1] Spalluto LB, Arleo EK, Macura KJ, Rumack CM. 35 years of experience from the American Association for Women Radiologists: increasing the visibility of women in radiology. *J Am Coll Radiol* 2017;14:426–30. <https://doi.org/10.1016/j.jacr.2016.10.011>.
- [2] Angtuaco TL, Macura KJ, Lewicki AM, Rosado-de-Christenson ML, Rumack CM. Radiologic history exhibit: the American Association for Women Radiologists (AAWR): 25 years of promoting women in radiology. *Radiographics* 2008;28:573–82. <https://doi.org/10.1148/rg.282075132>.
- [3] Mossa-Basha M, Meltzer CC, Kim DC, Tuite MJ, Kolli KP, Tan BS. Radiology department preparedness for COVID-19: radiology scientific expert panel. *Radiology* 2020:2009988 <https://doi.org/10.1148/radiol.20202009988>.
- [4] Spalluto LB, Planz VB, Stokes LS, Pierce R, Aronoff DM, McPheeters ML, et al. Transparency and trust during the coronavirus disease 2019 COVID-19 pandemic. *J Am Coll Radiol* 2020. <https://doi.org/10.1016/j.jacr.2020.04.026>.
- [5] Matalon SA, Souza DAT, Gaviola GC, Silverman SG, Mayo-Smith WW, Lee LK. Trainee and attending perspectives on remote radiology readouts in the era of the COVID-19 pandemic. *Acad Radiol* 2020. <https://doi.org/10.1016/j.acra.2020.05.019>.
- [6] Khullar D, Bond AM, Schpero WL. COVID-19 and the financial health of US hospitals. *JAMA* 2020. <https://doi.org/10.1001/jama.2020.6269>.
- [7] Andersen JP, Nielsen MW, Simone NL, Lewiss RE, Jaggi R. COVID-19 medical papers have fewer women first authors than expected. *Elife* 2020;9. <https://doi.org/10.7554/eLife.58807>.
- [8] Belay B, Allen J, Williams N, Dooyema C, Foltz J. Promoting women's health in hospitals: a focus on breastfeeding and lactation support for employees and patients. *J Womens Health (Larchmt)* 2013;22:1–4. <https://doi.org/10.1089/jwh.2012.4040>.
- [9] Arleo EK, Parikh JR, Wolfman D, Bluth E. Lactation facilities in US radiology practices. *J Am Coll Radiol* 2017;14:733–6. <https://doi.org/10.1016/j.jacr.2016.11.025>.
- [10] Belkacemi Y, Loaganadane G, Grellier N, Fonteneau G, Zaoui G, Coraggio G, et al. Radiation therapy department reorganization during the coronavirus disease 2019 (COVID-19) outbreak: keys to securing staff and patients during the first weeks of the crisis and impact on radiation therapy practice from a single institution experience. *Adv Radiat Oncol* 2020. <https://doi.org/10.1016/j.adro.2020.04.039>. In Press.
- [11] Noticewala SS, Koong AC, Bloom ES, Choi S, Chronowski G, Ghafar RA, et al. Radiation oncology strategies to flatten the curve during the coronavirus disease 2019 (COVID-19) pandemic: experience from a large tertiary cancer center. *Adv Radiat Oncol* 2020;21:567–72. <https://doi.org/10.1016/j.adro.2020.04.038>.
- [12] Radiology ABR. Coronavirus information. <https://www.theabr.org/announcements/coronavirus-updates>.
- [13] @RadOncVVPN. Network VVP. Oncology UoCDoR. <https://twitter.com/RadOncVVPN>.
- [14] Mohammadi H, De Leo AN, Asher D, Malouff TD, Waddle MR, Figura NB, et al. The Florida radiation oncology resident experience during Coronavirus-19: perspectives and recommendations. *Adv Radiat Oncol* 2020. <https://doi.org/10.1016/j.adro.2020.05.002>.
- [15] Whelan A, Prescott J, Young G, Catanese VM, McKinney R. Guidance on medical students' participation in direct patient contact activities. <https://www.aamc.org/system/files/2020-04/meded-April-14-Guidance-on-Medical-Students->

- [Participation-in-Direct-Patient-Contact-Activities.pdf](#); 2020.
- [16] Durst M, Ellithorpe M, Shin K, Curran N, Bruncko D, Cerjanic A, et al. UMSC open letter to the heads of NBME and FSMB on ongoing disruptions to USMLE step 1, step 2CS and step 2CK exams. <https://uofi.app.box.com/s/lvb8w7n6jq5ulk177nq3ys69k5p5n6zq>; 2020.
- [17] Spottswood SE, Spalluto LB, Washington ER, Donnelly EF, Birch AA, Bradshaw ML, et al. Design, implementation, and evaluation of a diversity program for radiology. *J Am Coll Radiol* 2019;16:983–91. <https://doi.org/10.1016/j.jacr.2018.12.007>.
- [18] Weigel KS, Kubik-Huch RA, Gebhard C. Women in radiology: why is the pipeline still leaking and how can we plug it? *Acta Radiol* 2020;61:743–8. <https://doi.org/10.1177/0284185119881723>.
- [19] Potterton VK, Ruan S, Sunshine JH, Applegate K, Cypel Y, Forman HP. Why don't female medical students choose diagnostic radiology? A review of the current literature. *J Am Coll Radiol* 2004;1:583–90. <https://doi.org/10.1016/j.jacr.2004.02.023>.
- [20] Jalilianhasanpour R, Charkhchi P, Mirbolouk M, Yousem DM. Underrepresentation of women on radiology editorial boards. *J Am Coll Radiol* 2019;16:115–20. <https://doi.org/10.1016/j.jacr.2018.08.017>.
- [21] Virtual radiation oncology for medical students. <https://www.radoncvirtual.com;2020>.
- [22] Pollom EL, Sandhu N, Frank J, Miller JA, Obeid J, Kastelowitz N, et al. Continuing medical student education during the coronavirus disease 2019 (COVID-19) pandemic: development of a virtual radiation oncology clerkship. *Adv Radiat Oncol* 2020. <https://doi.org/10.1016/j.adro.2020.05.006>. In Press.
- [23] Planz VB, Spalluto LB, Savoie B, Bradshaw M, Motuzas C, Block JJ, et al. Together-apart during coronavirus disease 2019 (COVID-19): inclusion in the time of social distancing. *J Am Coll Radiol* 2020. <https://doi.org/10.1016/j.jacr.2020.05.009>.
- [24] Jolly S, Griffith KA, DeCastro R, Stewart A, Ubel P, Jagsi R. Gender differences in time spent on parenting and domestic responsibilities by high-achieving young physician-researchers. *Ann Intern Med* 2014;160:344–353. <https://doi.org/10.7326/M13-0974>.
- [25] Alon TDM, Olmstead-Rumsey J, Tertilt M. The impact of COVID-19 on gender equality. *CRC TR 224 discussion paper series crctr*. 2020. p. 62–85.
- [26] Li N, Hill KS, Elferink LA. Analysis of receptor tyrosine kinase internalization using flow cytometry. *Methods Mol Biol* 2008;457:305–17.
- [27] Fessell D, Cherniss C. Coronavirus disease 2019 (COVID-19) and beyond: micro-practices for burnout prevention and emotional wellness. *J Am Coll Radiol* 2020;17:746–8. <https://doi.org/10.1016/j.jacr.2020.03.013>.
- [28] Heitkamp DE, Gupta Y, Patel TY. Economic recession from the Covid-19 pandemic signals recruiting difficulty ahead for radiology residency programs. *Curr Probl Diagn Radiol* 2020. <https://doi.org/10.1067/j.cpradiol.2020.05.003>.
- [29] Spalluto LB, Arleo EK, Lewis MC, Oates ME, Macura KJ. Addressing needs of women radiologists: opportunities for practice leaders to facilitate change. *Radiographics* 2018;38:1626–37. <https://doi.org/10.1148/rg.2018180023>.
- [30] Canon CL. Invited commentary on “addressing needs of women radiologists”. *Radiographics* 2018;38:1637–8. <https://doi.org/10.1148/rg.2018180189>.
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