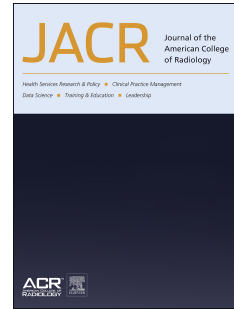


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The New Normal or a Return to Normal: Nationwide Remote Radiology Reading Practices after Two Years of the COVID-19 Pandemic

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**The New Normal or a Return to Normal:
Nationwide Remote Radiology Reading Practices after Two Years of the
COVID-19 Pandemic**

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Keywords: Remote Reading; Radiology; COVID-19; Teleradiology; Workflow

Word Count: 1,346 words (excluding references, tables, and figures)

DESCRIPTION OF THE PROBLEM

On March 11, 2020, the World Health Organization declared the coronavirus disease 2019 (COVID-19) outbreak a pandemic¹. Standard established workflows were interrupted in virtually every industry as social distancing mandates were issued by government and public health officials. While many medical specialties were unable to adopt a remote work model, Diagnostic Radiology was well-positioned to adjust, as remote reading already was a reality in many practices. Previous surveys assessed the national prevalence of remote reading among radiologists^{2,3}, with the most recent survey in March 2020, during the initial stage of the COVID-19 pandemic³. At that time, radiologists from the Northeast were more likely to have implemented remote reading practices compared to other regions of the country³, attributed to the Northeast experiencing the greatest healthcare disruption during the initial COVID-19 outbreak⁴. However, as the COVID-19 pandemic persisted and impacted every region of the country, no follow-up studies have updated the prevalence of remote reading. The purpose of this survey is to assess the nationwide utilization of remote reading over two years after the start of the COVID-19 pandemic. Such information can be useful to help predict the future of remote reading.

WHAT WE DID

An online questionnaire gauging respondents' perceptions of remote reading, specifically in relation to the COVID-19 pandemic, was created by four practicing radiologists and a medical student. The survey was further refined by administrators and statisticians at the American College of Radiology (ACR) with experience in survey distribution. The questionnaire (online appendix) was sent via email to a representative sample of 7,407 ACR members. Data collection occurred between June 10 and July 5, 2022. Two email reminders were sent to those who had not yet

responded to the prior invitation about the questionnaire. A total of 345 questionnaires were completed among qualified respondents (4.7% response rate). Data analysis took place by ACR staff. SurveyMonkey (Momentive, San Mateo, California) and Excel (Microsoft, Redmond, Washington) were used for statistical analysis. The margin of error for results at the 95% confidence interval is 5.8%. Significance testing was achieved through t-testing. Results were determined to be statistically significant at the 95% confidence level if $t \geq \pm 1.96^5$.

OUTCOMES

91% of respondents (314/345) report their organization enabled remote reading during the COVID-19 pandemic. 53% (168/315) of these organizations had remote reading prior to the COVID-19 pandemic, while 44% (139/315) first implemented remote reading during the pandemic. 30% (32/106) of academic radiologists indicate their organization allowed remote reading prior to the pandemic, compared to 65% (136/209) of those working in non-academic settings. In contrast, 67% (71/106) of academic radiologists' departments began remote reading during the pandemic, compared to 33% (68/209) in non-academic settings.

Among radiologists who have read remotely in these organizations, 54% (134/247) had their remote workstation installed prior to the COVID-19 pandemic, while 44% (109/247) had their workstation installed during the pandemic. 39% (28/71) of academic radiologists had their personal remote workstation installed prior to the pandemic, compared to 60% (106/176) of radiologists working in non-academic settings. In contrast, 61% (43/71) of radiologists working in academics had their personal workstation installed during the COVID-19 pandemic, compared to 38% (66/176) of those not working in academic settings. 21% (65/315) of radiologists report that while their organization enables remote reading, they do not remote read themselves.

Among radiologists who read remotely, 48% (78/163) indicate that over half of their reads this year have been performed remotely, with 32% (52/163) interpreting greater than 75% of remote reads. Fewer than a quarter of reads are done remotely for 37% (61/163) of radiologists. For 38% (43/112) of radiologists working in non-academic settings, greater than 75% of their reads are done remotely, compared to 18% (9/51) of academic radiologists.

20% (17/84) of practice leader radiologists, speaking on behalf of their respective organizations, indicate greater than 50% of their organization's reads are done remotely. 46% (39/84) report fewer than a quarter of their organization's image interpretations are performed remotely. 27% (17/64) of practice leaders in non-academic organizations report greater than 50% of their organization's reads are done remotely, compared to 0% (0/20) of practice leaders in academic departments.

41% (67/163) of radiologists whose organization enabled remote reading note that their share of image interpretations performed remotely has increased over the past year, while 40% (65/163) describe no significant change, and 19% (31/163) cite a decrease. Practice leaders, speaking on behalf of their respective organizations, report similar trends, with 52% (44/84) indicating their organization's proportion of remote reads has increased over the past year, while 36% (30/84) report no significant change, and 12% (10/84) document fewer remote reads. However, when comparing responses from practice leaders in academics versus non-academics, 35% (7/20) of academic organizations decreased the amount of reads interpreted remotely over the past year, compared to 5% (3/64) of non-academic practices.

Among respondents who have read remotely during the pandemic, 16% (49/314) are now expected to return to on-site reading, while 84% (265/314) report continued remote reading practice (online appendix). 27% (31/113) of academic radiologists are expected to report back to

on-site reading from remote work, compared to 8% (18/232) of those in non-academic settings (online appendix). In contrast, 65% (74/113) of radiologists in academic settings plan to continue remote reading, compared to 82% (191/232) of those not working in academics.

Since academic departments are more likely to have radiologists return to on-site work, the degree of remote reading could become a factor that recently-trained radiologists consider when deciding between pursuing an academic versus a private practice career. According to a recent nationwide poll, millennials are more likely than any other generation to desire a remote work option, with 84% rating remote work as important⁶. This sentiment seems to be consistent among Radiology trainees, as 77% of residents with remote workstations at one residency program indicated they would be interested in a job that offers a remote work option in the future⁷.

Academic Radiology departments must balance the advantages of remote reading with its potential drawbacks, perhaps most importantly because of the impact on radiologic training. At one academic institution, 81% of first- and second-year Radiology residents reported that remote work during the pandemic had either a negative or very negative effect on their education⁷.

According to 84% (208/247) of radiologists who have read remotely, remote reading will be a permanent change to their organization's workflow post-pandemic in some capacity (many radiologists likely will do hybrid readings), with no significant differences between radiologists in academic and non-academic settings. Overall, radiologists' predictions for the proportion of reads done remotely over the next year are similar to the proportion of reads done remotely from the previous year.

The most attractive features of remote reading include improved lifestyle (279/345 indicating a primary or important factor, 81%), no commute to work (261/345, 76%), and fewer interruptions and distractions (237/345, 68%) (Figure 1). However, a decreased sense of

camaraderie with colleagues and referring physicians was the biggest drawback of remote reading (184/345, 54%), followed by lack of consultation with colleagues (152/345, 44%), and increased isolation (143/345, 41%) (Figure 2). Among radiologists who read remotely, 87% (142/163) report a positive impact on job satisfaction, while 8% (13/163) and 5% (8/163) note a neutral and negative impact, respectively.

The lack of interpersonal contact inherent with remote reading has little to no impact on the patient-physician relationship for 80% (131/163) of respondents who remote read. 75% (122/163) and 63% (103/163) of radiologists indicate remote reading has little to no impact on their relationship with referring physicians and technical staff, respectively. Finally, 57% (93/163) report remote reading has little to no impact on their relationship with other radiologists.

There are several limitations to our study. Our data are susceptible to response bias. Additionally, the survey does not query in what situations remote reading is utilized most frequently, such as during evening, weekend, or overnight shifts. Finally, our survey has a relatively small sample size and low response rate.

In conclusion, the COVID-19 pandemic catalyzed the implementation of remote reading, especially in academic departments that were less likely to have remote reading prior to the pandemic, while remote reading likely has become a permanent part of Radiology workflow.

Keywords: Remote Reading; Radiology; COVID-19; Teleradiology; Workflow

Word Count: 1,346 words (excluding references, tables, and figures)

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TABLES:

Table 1: Results of survey on remote reading

Variable		Overall Results	Radiologists in Academic Settings	Radiologists in Non-Academic Settings
Departments with remote reading during pandemic		91% (314/345)	93% (105/113)	91% (209/232)
1st Remote Reading Pre-Pandemic		53% (168/315)	30% (32/106)	65% (136/209)
1st Remote Reading During Pandemic		44% (139/315)	67% (71/106)	33% (68/209)
Proportion of Reads Performed Remotely by Radiologists	<25% of reads	37% (61/163)	37% (19/51)	38% (42/112)
	25-49%	15% (24/163)	20% (10/51)	13% (14/112)
	50-75%	16% (26/163)	25% (13/51)	12% (13/112)
	>75%	32% (52/163)	18% (9/51)	38% (43/112)
Change in Remote Reads by Radiologists over Past Year	Increase	41% (67/163)	35% (18/51)	44% (49/112)
	No change	40% (65/163)	37% (19/51)	41% (46/112)
	Decrease	19% (31/163)	27% (14/51)	15% (17/112)
Departments' Current Attitudes towards Remote Reading	Allows	77% (265/345)	65% (74/113)	82% (191/232)
	Allowed remote reading during pandemic, but now expected to return to on-site work	14% (49/345)	27% (31/113)	8% (18/232)
	Does not allow	8% (29/345)	6% (7/113)	9% (22/232)

FIGURES:

Figure 1: Perceived advantages of remote reading

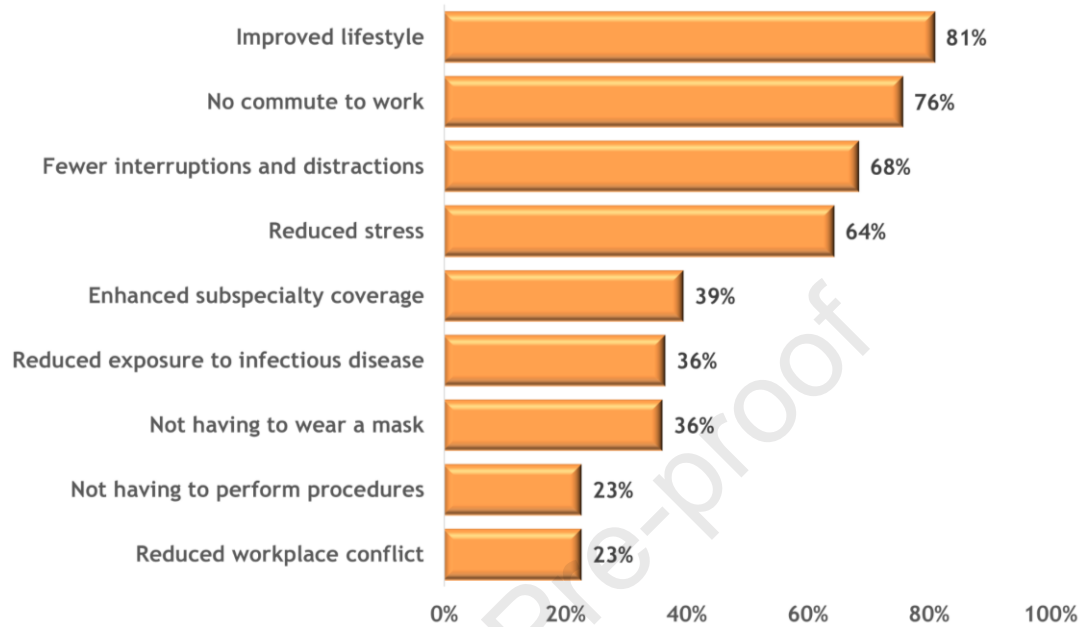
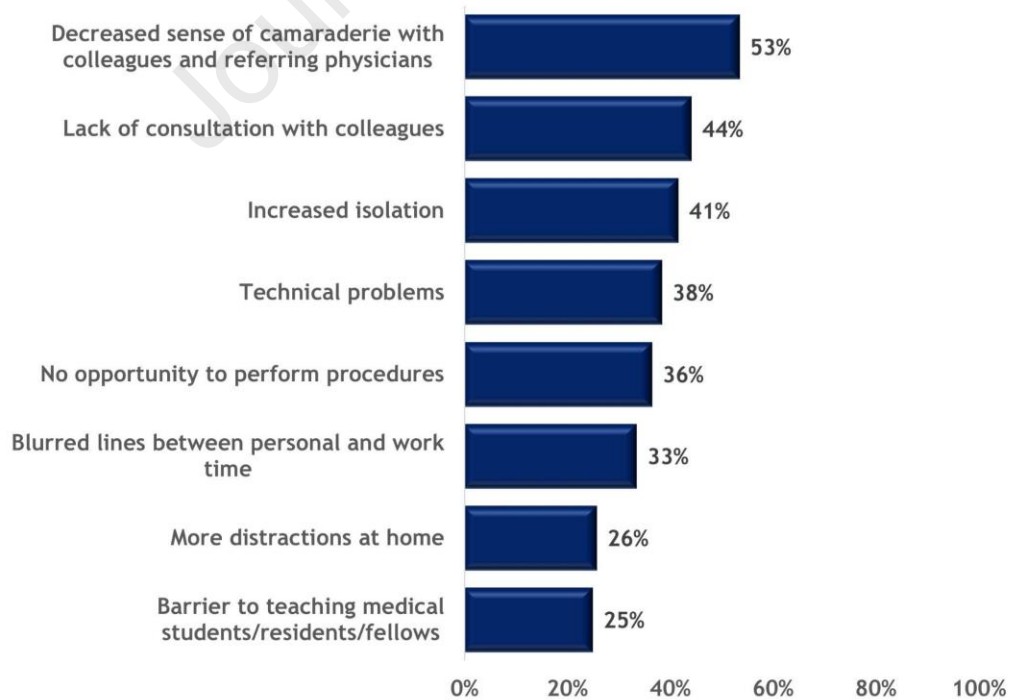


Figure 2: Perceived drawbacks of remote reading



ONLINE APPENDIX:

Table 1: Survey

1. Which of the following best describes your primary job responsibility? If you 'wear multiple hats', please select the one in which you spend a majority of your time.
 - a. I am a practicing physician
 - b. I am in training (Residency or Fellowship)
 - c. I am retired *DISQUALIFIED*
 - d. Other (please specify) *DISQUALIFIED*
2. Which of the following best describes your primary focus or specialty?
 - a. Diagnostic Radiologist
 - b. Interventional Radiologist
 - c. Nuclear Medicine Physician
 - d. Other (please specify)
3. Which of the following best describes you?
 - a. I am a practice/department leader
 - b. I am not a practice/department leader
 - c. I am not sure
4. Which of the following statements best reflect your organization policy/behavior regarding remote reading?
 - a. My organization allows/ enables remote reading
 - b. My organization does not allow / enable remote reading
 - c. My organization enabled remote reading during the pandemic but Radiologists are now expected to return to the organization/practice
 - d. I am not sure

If NOT a practice leader (Q3) and organization allows remote reading, continue to Q5

If NOT a practice leader (Q3) and organization does NOT allow remote reading or not sure, skip to Q21

If NOT a practice leader (Q3) and organization did allow remote reading during pandemic, continue to Q5

If NOT a practice leader (Q3) and does not know if organization allows remote reading, skip to Q21

If a practice leader and organization allows remote reading, skip to Q25

If a practice leader and organization does NOT allow remote reading or not sure, skip to 35

If a practice leader and organization allowed remote reading during pandemic, skip to Q25

If a practice leader and does not know if organization allows remote reading, skip to Q35

If not sure if practice leader and organization allows remote reading, continue to Q5

If not sure if practice leader and organization does not allow remote reading, skip to Q21

If not sure if practice leader and organization allowed remote reading during pandemic, continue to Q5

If not sure if practice leader and does not know if organization allows remote reading, skip to demos (Q39)

5. When did your organization begin remote reading?
 - a. Prior to the COVID-19 pandemic (Pre-2020)

- b. During the COVID- 19 pandemic
 - c. Not sure when
6. Do you, personally, remote read?
 - a. Yes *continue to Q7*
 - b. No *skip to Q17*
 - c. Unsure *skip to Q17*
7. When was your remote workstation first installed?
 - a. Prior to the COVID-19 pandemic (e.g., 2019 or earlier)
 - b. During the COVID-19 pandemic (2020 through today)
 - c. Unsure
8. Of the total reads you complete currently, what percent are remote and what percent are in-person/not remote? Please provide only numbers (no ranges or decimals) and you do not need to include the % sign.
9. Thinking back over 2021, to what degree have your remote reads increased, decreased, or stayed the same? Please choose the answer below that best represents that change.
 - a. My remote reads have increased significantly since this time in 2021
 - b. My remote reads have increased somewhat since this time in 2021
 - c. My remote reads have not really changed since 2021
 - d. My remote reads have decreased somewhat since this time in 2021
 - e. My remote reads have decreased significantly since this time in 2021
10. How likely is it that your Radiology department / practice will make remote reading a permanent change post-pandemic?
 - a. Very likely
 - b. Somewhat likely
 - c. Neutral - neither likely nor unlikely
 - d. Somewhat unlikely
 - e. Very Unlikely
11. To what degree has the ability to remote read impacted your job satisfaction? Remote reading has had a...
 - a. Significantly positive impact
 - b. Somewhat positive impact
 - c. Neither positive nor negative impact
 - d. Somewhat negative impact
 - e. Significantly negative impact
12. How much has being able to work remotely impacted your ability to achieve your preferred lifestyle as a radiologist?
 - a. Significant impact
 - b. Some Impact
 - c. Not a lot of impact
 - d. No impact
13. Below is a number of potential reasons why some Radiologists may enjoy interpreting studies remotely. For each, please indicate if that reason is a primary factor, an important factor, a minor factor, or not a factor for you.
 - a. No commute to work
 - b. Improved lifestyle (ability to structure workday around personal life)
 - c. Fewer interruptions and distractions

- d. Enhanced subspecialty coverage
 - e. Reduced exposure to infectious disease
 - f. Reduced stress
 - g. Reduced workplace conflict
 - h. Not having to wear a mask
 - i. Not having to perform procedures
14. Below is a number of potential drawbacks of reading remotely. For each, please indicate if that drawback is a primary factor, an important factor, a minor factor, or not a factor for you.
- a. Barrier to teaching medical students/residents/fellows
 - b. More distractions at home
 - c. Lack of consultation with colleagues
 - d. Decreased sense of camaraderie with colleagues and referring physicians
 - e. Technical problems
 - f. Increased isolation
 - g. Blurred lines between personal and work time
 - h. No opportunity to perform procedures
15. After the COVID-19 pandemic ends, what percent of your reads do you predict will be done remotely? Please enter any number (or use the slider) from 0% to 100%
16. To what degree, if any, has the lack of interpersonal contact inherent with remote reading impacted your relationships with the following? Options choices include A great deal, A lot, A moderate amount, A little, None at all
- a. Other Radiologists *skip to demographics questions (Q39)*
 - b. Referring physicians *skip to demographics questions (Q39)*
 - c. Patients *skip to demographics questions (Q39)*
 - d. Technical staff *skip to demographics questions (Q39)*
17. How likely are you to remote read in the next 12 months?
- a. Very likely
 - b. Somewhat likely
 - c. Neutral - neither likely nor unlikely
 - d. Somewhat unlikely
 - e. Very Unlikely
18. Why do you feel this way?
19. Below is a number of potential reasons why some Radiologists may enjoy interpreting studies remotely. For each, please indicate if that reason is a primary factor, an important factor, a minor factor, or not a factor for you.
- a. No commute to work
 - b. Improved lifestyle (ability to structure workday around personal life)
 - c. Fewer interruptions and distractions
 - d. Enhanced subspecialty coverage
 - e. Reduced exposure to infectious disease
 - f. Reduced stress
 - g. Reduced workplace conflict
 - h. Not having to wear a mask
 - i. Not having to perform procedures

20. Below is a number of potential drawbacks of reading remotely. For each, please indicate if that drawback is a primary factor, an important factor, a minor factor, or not a factor for you.
- Barrier to teaching medical students/residents/fellows *skip to demographics questions (Q39)*
 - More distractions at home *skip to demographics questions (Q39)*
 - Lack of consultation with colleagues *skip to demographics questions (Q39)*
 - Decreased sense of camaraderie with colleagues and referring physicians *skip to demographics questions (Q39)*
 - Technical problems *skip to demographics questions (Q39)*
 - Increased isolation *skip to demographics questions (Q39)*
 - Blurred lines between personal and work time *skip to demographics questions (Q39)*
 - No opportunity to perform procedures *skip to demographics questions (Q39)*
21. How likely is your Radiology department / practice to enable remote reading in the next 12 months?
- Very likely
 - Somewhat likely
 - Neutral - neither likely nor unlikely
 - Somewhat unlikely
 - Very Unlikely
22. Why do you feel this way?
23. Below is a number of potential reasons why some Radiologists may enjoy interpreting studies remotely. For each, please indicate if that reason is a primary factor, an important factor, a minor factor, or not a factor for you.
- No commute to work
 - Improved lifestyle (ability to structure workday around personal life)
 - Fewer interruptions and distractions
 - Enhanced subspecialty coverage
 - Reduced exposure to infectious disease
 - Reduced stress
 - Reduced workplace conflict
 - Not having to wear a mask
 - Not having to perform procedures
24. Below is a number of potential drawbacks of reading remotely. For each, please indicate if that drawback is a primary factor, an important factor, a minor factor, or not a factor for you.
- Barrier to teaching medical students/residents/fellows *skip to demographics questions (Q39)*
 - More distractions at home *skip to demographics questions (Q39)*
 - Lack of consultation with colleagues *skip to demographics questions (Q39)*
 - Decreased sense of camaraderie with colleagues and referring physicians *skip to demographics questions (Q39)*
 - Technical problems *skip to demographics questions (Q39)*
 - Increased isolation *skip to demographics questions (Q39)*

- g. Blurred lines between personal and work time *skip to demographics questions (Q39)*
 - h. No opportunity to perform procedures *skip to demographics questions (Q39)*
25. When did your organization begin remote reading?
- a. Prior to the COVID-19 pandemic (Pre-2020)
 - b. During the COVID- 19 pandemic
 - c. Not sure when
26. When was your remote workstation first installed?
- a. Prior to the COVID-19 pandemic (e.g., 2019 or earlier)
 - b. During the COVID-19 pandemic (2020 through today)
 - c. Unsure
27. Of the total reads your organization or practice completes currently, what percent are remote and what percent are in-person? Please provide only numbers (no ranges or decimals) and you do not need to include the % sign.
28. Thinking back over 2021, to what degree has your organization's/practice's remote reads increased, decreased, or stayed the same? Please choose the answer below that best represents that change.
- a. My organization's remote reads have increased significantly since this time in 2021
 - b. My organization's remote reads have increased somewhat since this time in 2021
 - c. My organization's remote reads have not really changed since 2021
 - d. My organization's remote reads have decreased somewhat since this time in 2021
 - e. My organization's remote reads have decreased significantly since this time in 2021
29. How likely is it that your Radiology department / practice will make remote reading a permanent change post-pandemic?
- a. Very likely
 - b. Somewhat likely
 - c. Neutral - neither likely nor unlikely
 - d. Somewhat unlikely
 - e. Very Unlikely
30. To what degree has the ability to remote read impacted your radiologists' satisfaction and retention? Remote reading has had a...
- a. Significantly positive impact
 - b. Somewhat positive impact
 - c. Neither positive nor negative impact
 - d. Somewhat negative impact
 - e. Significantly negative impact
31. Below is a number of potential reasons why some Radiologists may enjoy interpreting studies remotely. For each, please indicate if that reason is a primary factor, an important factor, a minor factor, or not a factor for your organization/practice.
- a. No commute to work
 - b. Improved lifestyle (ability to structure workday around personal life)
 - c. Fewer interruptions and distractions
 - d. Enhanced subspecialty coverage
 - e. Reduced exposure to infectious disease

- f. Reduced stress
 - g. Reduced workplace conflict
 - h. Not having to wear a mask
 - i. Not having to perform procedures
32. Below is a number of potential drawbacks of reading remotely. For each, please indicate if that drawback is a primary factor, an important factor, a minor factor, or not a factor for your organization/practice.
- a. Barrier to teaching medical students/residents/fellows
 - b. More distractions at home
 - c. Lack of consultation with colleagues
 - d. Decreased sense of camaraderie with colleagues and referring physicians
 - e. Technical problems
 - f. Increased isolation
 - g. Blurred lines between personal and work time
 - h. No opportunity to perform procedures
33. After the COVID-19 pandemic ends, what percent of your organization's reads do you predict will be done remotely? Please enter any number (or use the slider) from 0% to 100%.
34. To what degree, if any, has the lack of interpersonal contact inherent with remote reading impacted your organization's relationships with the following? Options choices include A great deal, A lot, A moderate amount, A little, None at all
- a. Other Radiologists *skip to demographics questions (Q39)*
 - b. Referring physicians *skip to demographics questions (Q39)*
 - c. Patients *skip to demographics questions (Q39)*
 - d. Technical staff *skip to demographics questions (Q39)*
35. How likely is your organization/ practice to enable remote reading in the next 12 months?
- a. Very likely
 - b. Somewhat likely
 - c. Neutral - neither likely nor unlikely
 - d. Somewhat unlikely
 - e. Very Unlikely
36. Why do you feel this way?
37. Below is a number of potential reasons why some Radiologists may enjoy interpreting studies remotely. For each, please indicate if that reason is a primary factor, an important factor, a minor factor, or not a factor for your organization/practice.
- a. No commute to work
 - b. Improved lifestyle (ability to structure workday around personal life)
 - c. Fewer interruptions and distractions
 - d. Enhanced subspecialty coverage
 - e. Reduced exposure to infectious disease
 - f. Reduced stress
 - g. Reduced workplace conflict
 - h. Not having to wear a mask
 - i. Not having to perform procedures

38. Below is a number of potential drawbacks of reading remotely. For each, please indicate if that drawback is a primary factor, an important factor, a minor factor, or not a factor for your organization/practice.
- Barrier to teaching medical students/residents/fellows
 - More distractions at home
 - Lack of consultation with colleagues
 - Decreased sense of camaraderie with colleagues and referring physicians
 - Technical problems
 - Increased isolation
 - Blurred lines between personal and work time
 - No opportunity to perform procedures
39. Which of the following best reflects your current site or place of employment or training? If you have multiple sites, please think about the site at which you spend the majority of your time. Please select one answer.
- Academic practice (university, medical center, municipality, state, or medical school)
 - Independent private practice radiology group
 - National radiology practice/entity, which is supported by private equity or venture capital
 - Hospital, hospital system, or hospital-affiliated physician practice group
 - Non-hospital affiliated physician practice group or multi-specialty entity
 - Uniformed Services – Army, Navy, Air Force, Marines, Coast Guard, Public Health
 - VA or other government practice
 - Teleradiology
 - Locum Tenens
 - Other (please specify)
40. How long have you been in practice?
- 0, I am still in training
 - 1-5 years
 - 6 to 9 years
 - 10 to 19 years
 - 20 to 29 years
 - 30 to 35 years
 - 36 or more years
 - Prefer not to answer
41. Would you describe the setting of your practice or employment to be primarily...
- Urban
 - Suburban
 - Rural
 - not sure
42. In what state or U.S. territory is your practice/organization located? If you are a teleradiologist, please provide the state or US territory in which you reside.
43. Which of the following includes your age?
- 24 or under
 - 25-34

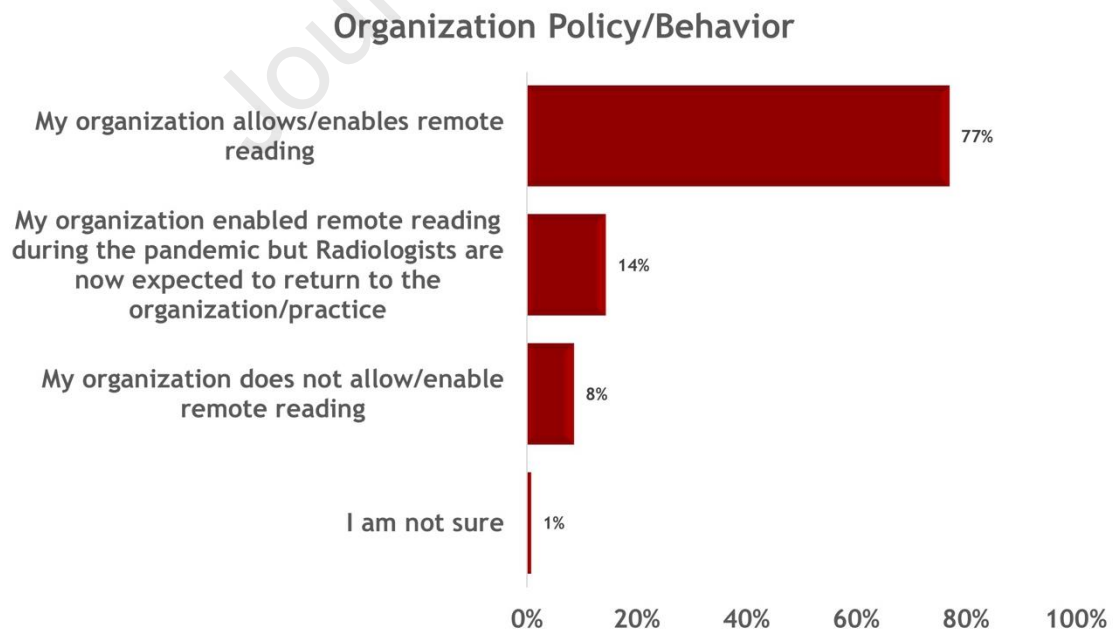
- c. 35-44
 - d. 45-54
 - e. 55-64
 - f. 65 or older
 - g. Prefer not to answer
44. How do you identify?
- a. Male
 - b. Female
 - c. Non-Binary
 - d. Transgender
 - e. Other
 - f. Prefer not to answer
45. Would you be interested in having someone associated with this research to contact you about your thoughts and feedback?
- a. Yes
 - b. No
46. Please provide your name and email, and thank you!

Table 2: Respondent demographics

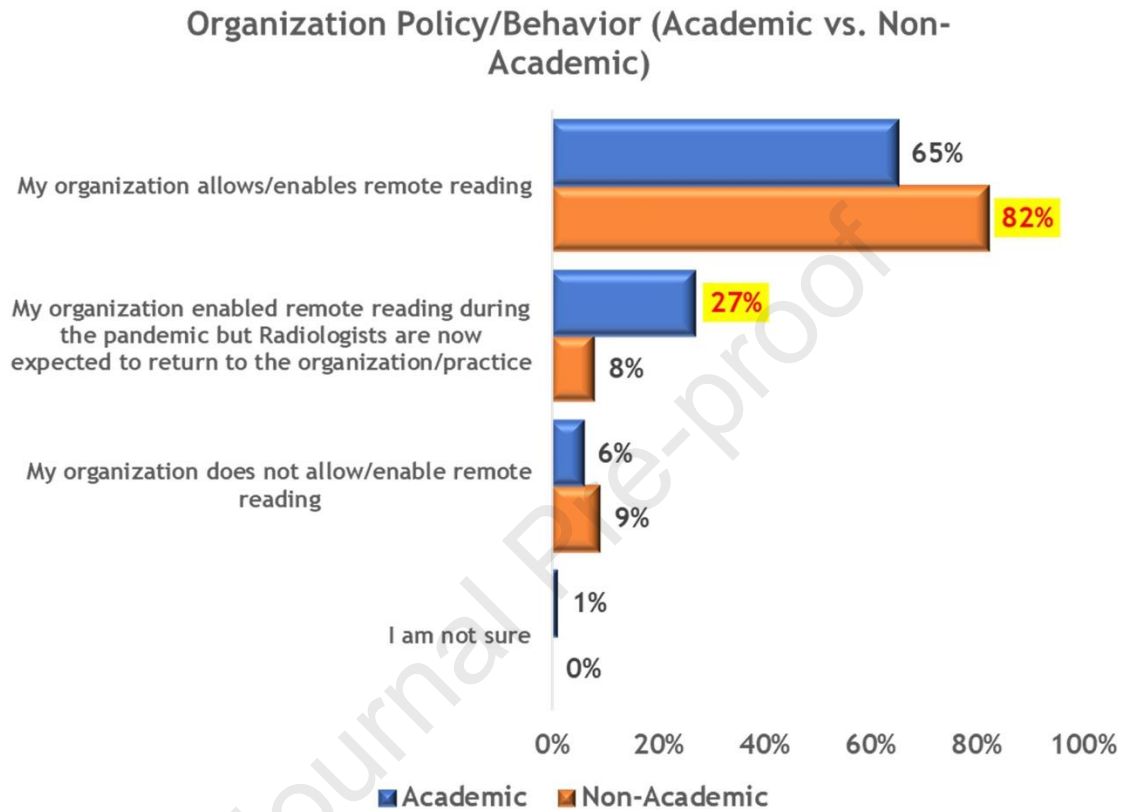
Variable	No. of Respondents (%)
Gender	
Male	254 (74%)
Female	73 (21%)
Prefer not to answer	18 (5%)
Age	
25-34	33 (10%)
35-44	107 (31%)
45-54	109 (32%)
55-64	75 (22%)
65+	18 (5%)
Prefer not to answer	3 (1%)
Primary Job Responsibility	
Practicing Physician	309 (90%)
Resident/Fellow	36 (10%)
Practice Setting*	
<i>Academics</i>	
Academic setting	113 (33%)
<i>Non-Academics</i>	
Independent private practice	113 (33%)
Hospital, hospital system, or hospital-affiliated physician practice group	71 (21%)
National radiology practice/entity	22 (6%)
Uniformed services	7 (2%)
Teleradiology	7 (2%)
Non-hospital affiliated physician practice group or multispecialty entity	7 (2%)
VA or other government practice	1 (0.3%)

Other	4 (1%)
Leadership Status	
Practice/department leader	95 (28%)
Not a practice/department leader	243 (70%)
Not sure	7 (2%)
Region	
Urban	150 (43%)
Suburban	162 (47%)
Rural	27 (8%)
Not sure	6 (2%)
*ACR practice setting classification	

Supplementary Figure 1: Distribution of responses regarding the policy/behavior towards remote reading by respondents' organization



Supplementary Figure 2: Distribution of responses regarding the policy/behavior towards remote reading by respondents' organization, comparing radiologists working in academic versus non-academic settings



**Measures in Red are significantly higher at a 95% confidence level*

