

University of Groningen

Unread Second-Opinion Radiology Reports

Heinz, Sabine A; Kwee, Thomas C; Yakar, Derya

Published in:
 American Journal of Roentgenology

DOI:
[10.2214/AJR.19.22662](https://doi.org/10.2214/AJR.19.22662)

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

Document Version
 Publisher's PDF, also known as Version of record

Publication date:
 2020

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):

Heinz, S. A., Kwee, T. C., & Yakar, D. (2020). Unread Second-Opinion Radiology Reports: A Potential Waste of Health Care Resources. *American Journal of Roentgenology*, 215(4), 934-939.
<https://doi.org/10.2214/AJR.19.22662>

Copyright

Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

The publication may also be distributed here under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license. More information can be found on the University of Groningen website: <https://www.rug.nl/library/open-access/self-archiving-pure/taverne-amendment>.

Take-down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Downloaded from the University of Groningen/UMCG research database (Pure): <http://www.rug.nl/research/portal>. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.



Unread Second-Opinion Radiology Reports: A Potential Waste of Health Care Resources

Sabine A. Heinz¹
Thomas C. Kwee
Derya Yakar

OBJECTIVE. The purpose of this study was to investigate how frequently second-opinion radiology reports are not read by clinicians and to identify reasons why reports are not read.

MATERIALS AND METHODS. This retrospective study included 4696 consecutive second-opinion reports of external imaging examinations that were authorized by subspecialty radiologists at a tertiary care institution over a 1-year period.

RESULTS. Of 4696 second-opinion reports, 537 were not read by a clinician, corresponding to a frequency of 11.4% (95% CI, 10.6–12.3%). On multivariate logistic regression analysis, five variables were significantly and independently associated with the second-opinion report not being read: inpatient status (odds ratio [OR], 163.26; $p < 0.001$), sonography as the imaging modality (OR, 5.07; $p = 0.014$), surgery (OR, 0.18; $p < 0.001$) or neurology (OR, 2.82; $p < 0.001$) as the requesting clinician's specialty, and interventional radiology as the subspecialty of the radiologist who authorized the second-opinion report (OR, 3.52; $p = 0.047$). We found no significant independent associations between the clinician not reading the second-opinion report and patient age, patient sex, or time between submission of the second-opinion request and finalization of the report.

CONCLUSION. A considerable proportion of second-opinion reports are not read by clinicians, which represents an appreciable but potentially reversible waste of health care resources. The reasons why clinicians do not read reports need to be investigated in future studies. If subspecialty radiologists and clinicians take the proven determinants into account, the amount of second-opinion readings with limited additional clinical value may be reduced.

In tertiary care centers, clinicians often ask subspecialty radiologists to reinterpret an imaging examination that was conducted and interpreted elsewhere [1, 2]. These second-opinion readings have been reported to improve diagnostic interpretation and change clinical management in a substantial proportion of cases [2–9]. The practice also avoids redundant imaging examinations at tertiary care centers that may result in associated costs, patient burden, and side effects from the use of ionizing radiation and the administration of contrast agents [1, 4, 10].

Growth rates from 4.3% to 35.7% have been reported for second-opinion readings in the United States between 2003 and 2016 [10]. A record review at our tertiary care center revealed that the number of reinterpretations in our institution has risen by 150% over the past 5 years. Thus, burdens imposed by second-opinion readings on tertiary care

radiology departments are increasing. Importantly, to ensure the clinical value of a second-opinion reading, the report filed by the radiologist should be read by the clinician who requested the report [11, 12]. Many clinicians receive more than 10 radiology reports per week [13]. Consequently, their inclination to read a particular report may depend on patient and clinical circumstances. Data are lacking about how often clinicians do not read second-opinion reports and what determinants may influence a clinician's decision to not read a report. This information may be valuable to radiology departments and health care policy makers to gain insight into the utility of second-opinion readings and to identify potential opportunities to improve the efficacy of this practice.

Therefore, the purpose of this study was to investigate the frequency and determinants of clinicians not reading second-opinion radiology reports.

Keywords: diagnostic imaging, health information exchange, referral and consultation

doi.org/10.2214/AJR.19.22662

Received December 5, 2019; accepted after revision January 31, 2020.

¹All authors: Department of Radiology, Medical Imaging Center, University Medical Center Groningen, University of Groningen, Hanzeplein 1, PO Box 30.001, 9700 RB Groningen, The Netherlands. Address correspondence to D. Yakar (d.yakar@umcg.nl).

AJR 2020; 215:1–6

ISSN-L 0361–803X/20/2154–1

© American Roentgen Ray Society

Materials and Methods

Study Design

Institutional review board approval was obtained and informed consent was waived for this single-center, retrospective study. A total of 4843 consecutive requests for second-opinion reports of imaging examinations performed elsewhere were submitted to the Department of Radiology at the University Medical Center Groningen between January 1 and December 31, 2018, and were potentially eligible for inclusion in this study. For each second-opinion request, a report was made only after the requesting clinician consulted with a subspecialty radiologist, which allowed the latter to assess the appropriateness of the request and approve it. Furthermore, the imaging examination findings had to be uploaded to the local PACS, and the original radiology report from the institution where the examination was performed had to be added to the electronic patient file system (Epic, Epic Systems). Second-opinion reports were included in this study if they were authorized by a radiologist and excluded if they were authorized by a resident because of the lack of certified subspecialization among residents. If a request for a second-opinion reading was approved and registered but no report was made, the request was also excluded.

Data Extraction

For each second-opinion report, the following variables were extracted: patient age, patient sex, hospitalization status (in- or outpatient) at the time of the second-opinion report, imaging modality (CT, MRI, nuclear medicine [including scintigraphy and PET with and without concomitant CT], radiography [including conventional radiography, dual-energy x-ray absorptiometry, and fluoroscopy], and sonography), specialty of the clinician who submitted the second-opinion request, subspecialty of the radiologist who authorized the second-opinion report, and the time between submission of the request and finalization of the report. Clinicians were allocated to one of the following specialties: ear, nose, and throat medicine; gynecology and obstetrics; internal medicine; neurology; ophthalmology; pediatrics; radiation therapy; surgery; urology; and other (any other specialty with fewer than 20 second-opinion reports during the study period). Subspecialties of the authorizing radiologists included the following categories: abdominal, breast, cardiothoracic, interventional, neuroradiology (head and neck), musculoskeletal, pediatric, and nuclear medicine. The digital log files of all second-opinion reports, which were stored in the electronic patient file system, were then scrutinized to determine whether a second-opinion report was read or not read by a clinician. After a second-opinion report

is authorized, it becomes immediately available in the electronic patient file system, and the clinician who requested the second-opinion reading receives an automatic notification that the report is available. This notification remains highlighted until the requesting clinician opens the report. The minimum follow-up time to determine whether a second-opinion report had been read or not was 8 months after the authorization. Also, images associated with a report are linked to the report in the electronic patient file system and cannot be viewed without opening the report. Therefore, if a clinician did not open a second-opinion report, that implied that clinician also did not view the corresponding images.

Statistical Analysis

The frequency of unread second-opinion reports was calculated as a proportion of the total amount of second-opinion reports as well as for each imaging modality, each clinical subspecialty that requested a reinterpretation, and each radiologic subspecialty. Univariate and multivariate logistic regression analyses were performed to determine the association between a clinician not reading the second-opinion report and the following variables: patient age, patient sex, hospitalization status, imaging modality, specialty of the requesting clinician, subspecialty of the radiologist who authorized the second-opinion report, and time between submission of the request and finalization of the report. Statistical significance was determined by *p* values less than 0.05. All statistical analyses were performed using Statistical Package for the Social Sciences (version 26, IBM).

Results

Second-Opinion Reports and Patients

Of the 4843 requests for radiologic reinterpretations, 128 second-opinion requests were excluded because they were authorized by a resident only, and 19 were excluded because no report was made even though the request was approved and registered. Thus, 4696 second-opinion reports were included in this study. The imaging modality involved in most of these second-opinion reports was either CT (45.9%) or MRI (43.6%), and most second-opinion readings were requested by clinicians in the surgical specialties (40.2%) (Table 1). The highest amounts of second-opinion reports were authorized by abdominal radiologists (*n* = 2621 [55.8%]) and neuroradiologists (*n* = 1163 [24.8%]) (Table 1). The second-opinion reports involved 2374 female patients and 2322 male patients with a mean age ± SD of 57.7 ± 19.3 years (range, 0–95 years). The majority of patients were outpa-

TABLE 1: Number of Second-Opinion Reports (*n* = 4696) According to Imaging Modality, Requesting Clinician Specialty, and Radiologist Subspecialty

Variable	No. (%)
Imaging modality	
CT	2156 (45.9)
MRI	2046 (43.6)
Nuclear medicine ^a	416 (8.9)
Radiography ^b	46 (1.0)
Sonography	32 (0.7)
Requesting clinician specialty	
Surgery ^c	1890 (40.2)
Internal medicine ^d	1012 (21.6)
Neurology	623 (13.3)
Gynecology and obstetrics	512 (10.9)
Ear, nose, and throat medicine	240 (5.1)
Urology	171 (3.6)
Pediatrics	77 (1.6)
Radiation therapy	28 (0.6)
Ophthalmology	22 (0.5)
Other	121 (2.6)
Radiologist subspecialty	
Abdominal	2621 (55.8)
Neuroradiology (head and neck)	1163 (24.8)
Nuclear medicine	430 (9.2)
Musculoskeletal	274 (5.8)
Pediatric	89 (1.9)
Cardiothoracic	64 (1.4)
Breast	32 (0.7)
Interventional	23 (0.5)

^aIncludes scintigraphy and PET with and without concomitant CT.

^bIncludes conventional radiography, dual-energy x-ray absorptiometry, and fluoroscopy.

^cIncludes general, cardiothoracic, maxillary, plastic, and orthopedic surgery and neurosurgery.

^dIncludes allergology, cardiology, geriatrics, general internal medicine, pulmonology, gastroenterology, and rheumatology.

tients (93.4%), and the mean time between the second-opinion report request and authorization was 3.7 ± 6.5 days (range, 0–127 days).

Frequency of Reports Not Being Read

Of the 4696 second-opinion reports, 537 were not read by a clinician, corresponding to a frequency of 11.4% (95% CI, 10.6–12.3%). The imaging modality with the highest rate of not being read was sonography

Unread Second-Opinion Radiology Reports

TABLE 2: Readings and Nonreadings of Second-Opinion Reports (n = 4696) According to Imaging Modality, Requesting Clinician Specialty, and Radiologist Subspecialty

Variable	No. (%) Read	No. (%) Not Read
Imaging modality		
CT	1910 (88.6)	246 (11.4)
MRI	1822 (89.1)	224 (10.9)
Nuclear medicine ^a	375 (90.1)	41 (9.9)
Radiography ^b	40 (87.0)	6 (13.0)
Sonography	12 (37.5)	20 (62.5)
Requesting clinician specialty		
Surgery ^c	1811 (95.8)	79 (4.2)
Internal medicine ^d	832 (82.2)	180 (17.8)
Neurology	491 (78.8)	132 (21.2)
Gynecology and obstetrics	453 (88.5)	59 (11.5)
Ear, nose, and throat medicine	217 (90.4)	23 (9.6)
Urology	162 (94.7)	9 (5.3)
Pediatrics	51 (66.2)	26 (33.8)
Radiation therapy	28 (100.0)	0 (0.0)
Ophthalmology	22 (100.0)	0 (0.0)
Other	92 (76.0)	29 (24.0)
Radiologist subspecialty		
Abdominal	2416 (92.2)	205 (7.8)
Neuroradiology (head and neck)	972 (83.6)	191 (16.4)
Nuclear medicine	387 (90.0)	43 (10.0)
Musculoskeletal	240 (87.6)	34 (12.4)
Pediatric	56 (62.9)	33 (37.1)
Cardiothoracic	48 (75.0)	16 (25.0)
Breast	29 (90.6)	3 (9.4)
Interventional	11 (47.8)	12 (52.2)

^aIncludes scintigraphy and PET with and without concomitant CT.

^bIncludes conventional radiography, dual-energy x-ray absorptiometry, fluoroscopy, and radiography performed during radiologic interventions.

^cIncludes general, cardiothoracic, maxillary, plastic, and orthopedic surgery and neurosurgery.

^dIncludes allergology, cardiology, geriatrics, general internal medicine, pulmonology, gastroenterology, and rheumatology.

(20/32 [62.5%]), the requesting specialty with the highest rate was pediatrics (26/77 [33.8%]), and the radiologic subspecialty with the highest rate was interventional radiology (12/23 [52.2%]) (Table 2).

Determinants for Clinicians Not Reading Second-Opinion Reports

Univariate logistic regression showed a significant association between the second-opinion report not being read and the following 13 variables: patient age (odds ratio [OR], 0.98 per 1-year increase in age; $p < 0.001$); inpatient status (OR, 133.21; $p < 0.001$); sonography as an imaging modality (OR, 13.37;

$p < 0.001$); surgery (OR, 0.22; $p < 0.001$), internal medicine (OR, 2.02; $p < 0.001$), neurology (OR, 2.44; $p < 0.001$), urology (OR, 0.42; $p = 0.012$), or pediatrics (OR, 4.10; $p < 0.001$) as the specialty of the requesting clinician; and abdominal (OR, 0.45; $p < 0.001$), pediatric (OR, 4.80; $p < 0.001$), cardiothoracic (OR, 2.63; $p = 0.001$), or interventional radiology (OR, 8.62; $p < 0.001$) or neuroradiology (head and neck) (OR, 1.81; $p < 0.001$) as subspecialties of the radiologist who authorized the second-opinion report (Table 3). None of the other variables showed a significant association with the second-opinion report not being read (Table 3). On multivariate analy-

sis, five variables remained significantly and independently associated with the second-opinion report not being read: inpatient status (OR, 163.26; $p < 0.001$), sonography as an imaging modality (OR, 5.07; $p = 0.014$), surgery (OR, 0.18; $p < 0.001$) or neurology (OR, 2.82; $p < 0.001$) as the specialty of the requesting clinician, and interventional radiology as a subspecialty of the radiologist who authorized the second-opinion report (OR, 3.52; $p = 0.047$) (Table 4).

Discussion

The results of this study show that a substantial proportion (537 of 4696 [11.4%]) of second-opinion reports were not read by clinicians in our institution, which provides tertiary care to approximately 2.2 million people in the northeast of The Netherlands, over a 1-year period. The National Healthcare Authority of The Netherlands allows up to €100 to be charged for each second-opinion reading. Furthermore, a typical second-opinion reading takes approximately 15 minutes. Therefore, the 537 unread second-opinion reports translate to as much as €53,700 and approximately 134.25 hours of radiologist interpretation time. Although these numbers appear modest, they pertain to a single institution during a 1-year time period. Cumulative nationwide figures would raise these totals, possibly substantially. Furthermore, given the projected rise in future second-opinion requests, the number of unread second-opinion reports will likely increase as well [10]. This potentially reversible waste of health care resources is cause for concern. Requesting feedback from clinicians to determine why these reports are not read may allow more definitive conclusions on whether this practice is a waste of health care resources. Our study has exposed the nonnegligible magnitude of this issue; therefore, it should be taken seriously by health care policy makers, including governmental bodies and insurance companies.

Interestingly, five independent variables were significantly associated with the second-opinion report not being read. Inpatient status had the strongest association, with an OR of 133.21. We hypothesize that clinicians act swiftly when patients are referred for hospitalization and, according to departmental protocols, may request patient files and imaging examinations from other institutions along with an in-house second-opinion reading by a subspecialty radiologist without considering whether the latter is actually

TABLE 3: Univariate Logistic Regression Analysis of the Association of Clinical and Second-Opinion Report Variables With Clinician Nonreading

Variable	Univariate Analysis		
	Odds Ratio	95% CI	<i>p</i>
Patient age (y) ^a	0.98	0.97–0.98	<0.001
Patient sex (male vs female)	0.87	0.73–1.04	0.130
Hospitalization status (inpatient vs outpatient)	133.21	90.91–195.19	<0.001
Imaging modality			
CT vs others	1.00	0.83–1.20	0.960
MRI vs others	0.92	0.77–1.10	0.357
Nuclear medicine vs others	0.83	0.60–1.17	0.290
Radiography vs others	1.16	0.49–2.76	0.731
Sonography vs others	13.37	6.50–27.51	<0.001
Requesting clinician specialty			
Surgery vs others	0.22	0.18–0.29	<0.001
Internal medicine vs others	2.02	1.66–2.45	<0.001
Neurology vs others	2.44	1.96–3.03	<0.001
Gynecology and obstetrics vs others	1.01	0.76–1.35	0.947
Ear, nose, and throat medicine vs others	0.81	0.52–1.26	0.356
Urology vs others	0.42	0.21–0.83	0.012
Pediatrics vs others	4.10	2.53–6.63	<0.001
Radiologist subspecialty			
Abdominal vs others	0.45	0.37–0.54	<0.001
Neuroradiology (head and neck) vs others	1.81	1.50–2.19	<0.001
Nuclear medicine vs others	0.85	0.61–1.18	0.327
Musculoskeletal vs others	1.10	0.76–1.60	0.602
Pediatric vs others	4.80	3.09–7.45	<0.001
Cardiothoracic vs others	2.63	1.48–4.67	0.001
Breast vs others	0.80	0.24–2.64	0.714
Interventional vs others	8.62	3.78–19.63	<0.001
Time between request and finalization of report (d) ^a	1.00	0.99–1.01	0.874

^aBecause this variable is measured on a continuous scale, the odds ratio indicates the increase or decrease of odds per unit of the scale (i.e., per year or per day).

necessary for clinical decision making. The clinician may also ask for a second-opinion reading out of an abundance of caution or as reassurance [14]. Whatever the reason, second-opinion reports for inpatients were often not deemed vital for clinical decision-making and were thus disregarded. Although their odds ratios were smaller, second-opinion reports with sonography as the imaging modality, neurology as the requesting specialty, and interventional radiology as the subspecialty of the authorizing radiologist were also significantly prone to remaining unread. In contrast, second-opinion reports that were requested by the surgical specialties, were significantly more frequently read.

We speculate that sonographic examinations from other institutions are frequently followed by in-house follow-up sonography or other cross-sectional imaging (CT, MRI, PET) and that clinicians typically are underconfident in the interpretation of sonographic images without the formal radiologic report. Hence, they may tend to neither read the second-opinion report nor view the sonographic images. Why neurologists frequently ignore the second-opinion report is unclear. Even though a good interpretation of an imaging examination is necessary to identify the clinical pathway, requests for second-opinion reports without considering the actual clinical need for a second-opinion reading and more

frequent oral communication between neurologists and radiologists at our institution may be responsible for this finding [15]. The opposite may apply to the surgical specialties that were shown to read the second-opinion report significantly more often than other requesting specialties. Preparation for a surgical intervention also requires a meticulous review of all available relevant medical information, including the second-opinion report. Finally, second-opinion reports issued by interventional radiologists often remained unread. This result may be because interventional radiology examinations performed elsewhere are primarily of interest to the interventional radiologists themselves for diagnostic and treatment planning purposes and not to the requesting clinician, whose primary function in these situations is to coordinate care.

Several studies have examined various aspects of second-opinion reports, with most finding that they offer benefits in terms of diagnosis, treatment planning, or prognostication [1–9]. However, to our knowledge, the frequency of clinicians not reading requested second-opinion reports has not been reported. Nevertheless, a few studies on this topic have been conducted for primary reports. Two studies on primary reports of neuroradiology examinations reported that 13.1% and 8.4% of reports are not read, and one study on primary reports of musculoskeletal MRI reported that 28.1% of reports are not read [16–18]. However, comparing reported frequencies of unread reports with the frequency found in the current study is not very meaningful because of the inherent differences between primary and second-opinion reports in terms of patient population, clinical setting, and general complexity [19]. Furthermore, none of these previous studies performed a comprehensive analysis to identify potential determinants influencing the clinician's decision not to read the radiology report.

The current study had some limitations. First, the rate of reports not being read that we found (11.4%) is likely an underestimation, because opening the report in the electronic patient file system does not necessarily mean that the clinician actually read the report. Furthermore, the images can only be viewed after the report is opened, and clinicians may have looked only at the images. In addition, we could not evaluate whether the clinician who viewed the report was involved in the actual care of the patient. Some reports may also have been read for research,

TABLE 4: Multivariate Logistic Regression Analysis of the Association of Clinical and Second-Opinion Report Variables With Clinician Not Reading Report

Variable	Multivariate Analysis		
	Odds Ratio	95% CI	p
Patient age (y) ^a	1.00	0.99–1.01	0.797
Hospitalization status (inpatient vs outpatient)	163.26	105.08–253.66	< 0.001
Imaging modality			
Sonography vs others	5.07	1.39–18.52	0.014
Requesting clinician specialty			
Surgery vs others	0.18	0.12–0.28	< 0.001
Internal medicine vs others	1.36	0.97–1.89	0.071
Neurology vs others	2.82	1.78–4.47	< 0.001
Pediatrics vs others	0.70	0.25–2.01	0.511
Radiologist subspecialty			
Abdominal vs others	1.18	0.79–1.76	0.431
Neuroradiology (head and neck) vs others	0.84	0.51–1.40	0.503
Pediatric vs others	2.19	0.73–6.57	0.162
Cardiothoracic vs others	1.00	0.38–2.65	0.997
Interventional vs others	3.52	1.02–12.19	0.047

^aBecause this variable is measured on a continuous scale, the odds ratio indicates the increase or decrease of odds per unit of the scale (i.e., per year or per day).

educational, or training purposes. Second, the clinician may have received the information in the second-opinion report through verbal communication with the subspecialty radiologist (e.g., during multidisciplinary meetings), but this could not be tracked. These issues should be the topics of investigation for future prospective studies.

In conclusion, clinicians do not read a considerable proportion of second-opinion reports, a situation that can be regarded as an appreciable but potentially reversible waste of health care resources. Future studies need to investigate the reasons why reports are not read. If subspecialty radiologists and clinicians take proven determinants into account, the amount of second-opinion readings with limited additional clinical value may be reduced.

References

1. Lu MT, Hallett TR, Hemingway J, Hughes DR, Hoffmann U, Duszak R. Secondary interpretation of CT examinations: frequency and payment in the Medicare fee-for-service population. *J Am Coll Radiol* 2016; 13:1096–1101

2. Huicochea Castellanos S, Corrias G, Ulaner GA, et al. Detection of recurrent pancreatic cancer: value of second-opinion interpretations of cross-sectional images by subspecialized radiologists. *Abdom Radiol (NY)* 2019; 44:586–592

3. Dudley RA, Hricak H, Scheidler J, et al. Shared patient analysis: a method to assess the clinical benefits of patient referrals. *Med Care* 2001; 39:1182–1187

4. Lindgren EA, Patel MD, Wu Q, Melikian J, Hara AK. The clinical impact of subspecialized radiologist reinterpretation of abdominal imaging studies, with analysis of the types and relative frequency of interpretation discrepancies. *Abdom Imaging* 2014; 39:1119–1126

5. Alves I, Cunha TM. Clinical importance of second-opinion interpretations by radiologists specializing in gynecologic oncology at a tertiary cancer center: magnetic resonance imaging for endometrial cancer staging. *Radiol Bras* 2018; 51:26–31

6. Lakhman Y, D’Anastasi M, Miccò M, et al. Second-opinion interpretations of gynecologic oncologic MRI examinations by sub-specialized radiologists influence patient care. *Eur Radiol* 2016;

26:2089–2098

7. Shetty AS, Mittal A, Salter A, Narra VR, Fowler KJ. Hepatopancreaticobiliary imaging second-opinion consultations: is there value in the second reading? *AJR* 2018; 211:1264–1272

8. Corrias G, Huicochea Castellanos S, Merkow R, et al. Does second reader opinion affect patient management in pancreatic ductal adenocarcinoma? *Acad Radiol* 2018; 25:825–832

9. Wibmer A, Vargas HA, Donahue TF, et al. Diagnosis of extracapsular extension of prostate cancer on prostate MRI: impact of second-opinion readings by subspecialized genitourinary oncologic radiologists. *AJR* 2015; 205:[web]W73–W78

10. Rosenkrantz AB, Glover M, Kang SK, Hemingway J, Hughes DR, Duszak R Jr. Volume and coverage of secondary imaging interpretation under Medicare, 2003 to 2016. *J Am Coll Radiol* 2018; 15:1394–1400

11. Berlin L. Legal outcome of a failure to communicate an unexpected finding. *J Am Coll Radiol* 2018; 15:1356–1358

12. Berlin L. Referring physician’s receipt of radiology report with abnormal findings may be guaranteed, but is the report read and action taken? *AJR* 2019; 212:[web]W106

13. Camilo DMR, Tibana TK, Adôrno IF, et al. Radiology report format preferred by requesting physicians: prospective analysis in a population of physicians at a university hospital. *Radiol Bras* 2019; 52:97–103

14. Mezrich JL. Hiding in the hedges: tips to minimize your malpractice risks as a radiologist. *AJR* 2019; 213:1037–1041

15. Gupta RT, Saunders RS, Rosenkrantz AB, Paulson EK, Samei E. The need for practical and accurate measures of value for radiology. *J Am Coll Radiol* 2019; 16:810–813

16. Alvin MD, Shahriari M, Honig E, Liu L, Yousem DM. Clinical access and utilization of reports and images in neuroradiology. *J Am Coll Radiol* 2018; 15:1723–1731

17. Galinato A, Alvin MD, Yousem DM. Lost to follow-up: analysis of never-viewed radiology examinations. *J Am Coll Radiol* 2019; 16:478–481

18. Mayer M, Sebro R. An important and often ignored turnaround time in radiology: clinician turnaround time—implications for musculoskeletal radiology. *J Belg Soc Radiol* 2019; 103:49

19. Khoshpouri P, Khoshpouri P, Yousem KP, Yousem DM. How do American radiology institutions deal with second opinion consultations on outside studies? *AJR* 2020; 214:144–148

FOR YOUR INFORMATION

This article has been selected for *AJR* Journal Club activity. The accompanying Journal Club Study Guide can be found on the following page.

Study Guide

Unread Second Opinion Radiology Reports: A Potential Waste of Healthcare Resources

Joseph J. Budovec¹, Alan Mautz²

¹Medical College of Wisconsin, Milwaukee, WI.

²The Aroostook Medical Center, Presque Isle, ME.

*jbudovec@mcw.edu, amautz@emhs.org**

Introduction

1. How common are second opinion requests in radiology? What is the American College of Radiology policy regarding second opinion consultations?
2. What questions does this study intend to address? What was the rationale for the study? Does the study address a gap in the literature?

Methods

3. What research design was used in this study?
4. What are the limitations inherent in this type of study? Were these limitations adequately acknowledged and discussed?
5. What were the inclusion criteria for the study? What were the exclusion criteria?
6. What data were collected?
7. What types of data analysis were conducted?

Results

8. Were the research questions answered?
9. What does this study intend to accomplish? Did the study achieve that goal?

Health Care Policy

10. What are the costs and benefits of secondary imaging interpretation? What are some of the determinants of the costs and benefits of a second opinion consultation?

Discussion

11. What questions does this study raise?
12. Are there specific subcategories of studies that may benefit more from a second opinion consultation? Would establishing specific criteria for second opinion interpretations improve the timeliness and added value of second opinion consultations?
13. How does your institution or practice handle requests for second opinions? How might the results of this study influence or modify your practice?
14. If you were to design a similar study, what other or additional data might you wish to collect and analyze?

Background Reading

1. Khoshpouri P, Khoshpouri P, Yousem KP, Yousem DM. How do American radiology institutions deal with second opinion consultations on outside studies? *AJR* 2020; 214:144–148
2. Rosenkrantz AB, Glover M, Kang SK, Hemingway J, Hughes DR, Duszak R Jr. Volume and coverage of secondary imaging interpretation under medicare, 2003 to 2016. *J Am Coll Radiol* 2018; 15:1394–1400

*Please note that the authors of the Study Guide are distinct from those of the companion article.