

Outside Financial Interests in Radiology Offices: Prevalence, Payment, and Practice Patterns in Involved Offices

Cynthia Deitch^{1,2}
Jonathan H. Sunshine¹
Swati Bansal¹

OBJECTIVE. The purposes of our study were to (1) investigate the prevalence of different patterns of outside financial interests in radiology offices and of different methods of compensating these interests and (2) determine how the professional, operational, and practice characteristics of the offices vary with the patterns of outside interest. The term "office" means nonhospital practice sites, including those called imaging centers or clinics; "outside interests" refers to parties other than physicians in the group of physicians who serve the office.

MATERIALS AND METHODS. Data are for 516 office sites served by radiology groups. Data were collected as part of a national, stratified random sample survey of radiology groups in the United States done by the American College of Radiology in 1992. Responses were weighted to make the results representative of all radiology groups in the United States with offices.

RESULTS. Parties other than the physicians in the practice serving an office had a financial interest in 41% of offices. In about half of these (20% of all offices), physicians in the practice had no financial interest at all. The most common categories of outside financial interest were referring physicians (21%), hospitals (19%), and non-physician entrepreneurs (12%); some offices reported more than one type of outside financial interest. All categories were more common in high-tech offices (offices that offered CT, MR imaging, or nuclear medicine studies) than in non-high-tech offices. Overall, 50% of high-tech offices and 35% of non-high-tech offices had outside financial interests. The most common method of compensating outsiders was giving them shares or dividends or a percentage of the profits. The average number of procedures per full-time-equivalent radiologist was higher in offices in which only outsiders (and not the group serving the office) had a financial interest than in other offices, and fewer of the former offices offered mammography. Offices with no outside interests were more likely than those with any outsiders to regularly do chest, spinal, gastrointestinal, and urologic procedures.

CONCLUSIONS. Outside financial interests, and the problems of cost and access they may engender, are fairly common in radiology offices. Nationally, joint ventures including referring physicians, which are now under legal attack, number more than 500. Differences in who owns radiology offices were associated with statistically significant variations among offices in workload, staffing, and types of procedures done.

AJR 1995;165:1331-1335

Received January 23, 1995; accepted after revision July 25, 1995.

¹Research Department, American College of Radiology, 1891 Preston White Dr., Reston, VA 22091. Address correspondence to J. H. Sunshine.

²Present address: Department of Sociology, George Washington University, Washington, DC 20052.

0361-803X/95/1656-1331

© American Roentgen Ray Society

In recent years, radiologists, policy makers, and the media have raised questions about who has a financial interest in radiology offices and about what implications, if any, outside interests have for medical practice. Joint ventures in which referring physicians have a financial interest in radiology offices or imaging centers have been the subject of public debate and legislation [1-3]. Although legislation to curb joint ventures (the so-called Stark II bill, a part of Public Law 103-66) went into effect in January 1995, it is not clear that this legislation will preclude legal strategies in which the referring physicians artificially make the office to which they refer a part of their "group." Also, legislative amendments to greatly

widen the exemptions for such pseudogroups are under active consideration. Other arrangements, in which parties such as nonphysician entrepreneurs and hospitals have financial interests in radiology offices, are also of interest.

To provide information on the prevalence of different types of outside financial interests in radiology offices, we analyzed data from a national survey of radiology groups conducted by the American College of Radiology. We use the term "office" for nonhospital practice sites, including those called imaging centers or clinics, and the term "outside interests" for parties other than physicians in the group of physicians who serve the office. The specific outside parties considered included referring physicians, hospitals, nonphysician entrepreneurs, radiologists outside the practice, and miscellaneous others. The questions we asked included the following: How are various types of financially interested parties compensated? Are variations in workload, staffing, or types of procedures performed associated with different patterns of financial interest?

Materials and Methods

Data are from the American College of Radiology's 1992 Group Practice Survey [4], in which a questionnaire was mailed to a stratified random sample of 675 radiology groups throughout the United States. A radiology group was defined as a practice with two or more radiologists; private groups, academic and multispecialty groups, and staffs of government facilities were included. The overall survey response rate was 69% (465 groups). Groups with offices were asked to complete a detailed two-page office information sheet, which included questions on financial interests in the office, for each of their offices or free-standing centers and clinics. According to the survey, collectively, groups practiced at a total of 679 offices. Information sheets were returned for 516 (76%) of these offices.

To make our data representative of all offices at which radiology groups practice, we weighted the responses from each group to account for differential sampling and response rates for groups of different types, sizes, and geographic areas. The following example illustrates how the weighting works. In the Northeast census region in 1992 (the time of the survey), approximately 245 private radiology (not academic or multispecialty) groups consisted of five to seven radiologists. This information was from the Census of Radiology Groups, a list of all known radiology groups in the United States that is maintained and updated by the American College of Radiology. We have surveys from 47 of these groups (we sent questionnaires to more than 47, but not all groups responded), so the weight for this specific category is 245/47, or 5.2.

When the responses are weighted, the 679 offices at which responding groups practiced represent the approximately 3200 offices in the United States that are served by radiology groups. The weighting used in the data analysis accounts for groups that did not respond to the survey at all, but not for possible nonaverage characteristics of offices at which groups responding to the survey practice but for which we did not receive office information sheets. A more detailed description of the sample, survey methods, and weighting for groups (not offices) has been reported elsewhere [4].

For differences in percentages, we used the chi-square statistic to indicate the probability that the variations observed among categories of offices arise by chance; $p \leq .05$ indicates a statistically significant difference. For differences in means (averages), we used t tests to compare two categories. For comparisons of more than two categories, we used analysis of variance to determine if variations among categories were statistically significant. For variables with more than

two categories, such as geographic region (Northeast, Midwest, South, and West), the statistics do not specifically indicate whether the differences between any two particular categories are significant, but only whether the overall variation by category is significant.

We were interested in whether outside financial interests were more common in those offices that do CT, MR imaging, or nuclear medicine studies. In the analysis, we designate these as high-tech offices, because these procedures require expensive high-technology equipment. About 40% of radiology offices were in the high-tech category.

Results

In the majority (79%) of radiology offices, physicians in the practice group that served an office had a financial interest in the office they served (Table 1). The categories of outside financial interest reported most often were, in order, referring physicians, hospitals, nonphysician entrepreneurs, radiologists not in the practice, and all others. Some offices had several different parties with a financial interest. The weighted numbers of offices shown in Table 1 indicate the estimated number of radiology offices in the United States that have any of each category of financial interest. The unweighted numbers are the actual number of offices of responding groups in our sample in each category. As noted earlier, some offices are represented in more than one category.

All categories of outside interest were more common in high-tech than in non-high-tech offices. For example, 27% of high-tech offices had referring physicians with financial interests compared with only 17% of non-high-tech offices. Nonphysician entrepreneurs were much more common in offices that did both diagnostic studies and radiation oncology (42%) than in ones that did diagnostic studies only (12%) or radiation oncology only (9%); however, less than 4% of offices offer both radiation oncology and diagnostic radiology. Hospitals were the outside party least likely to have a financial interest in offices served by multispecialty groups. For 5% of offices, parties other than nonphysician entrepreneurs, hospitals, referring physicians, or radiologists outside the practice had a financial interest (Table 1). This category includes health maintenance organizations, Blue Cross and Blue Shield, and private companies. In additional data analysis, we found that entities such as these fully owned about 3% of all offices at which radiology groups practice and about 19% of the offices in which physicians in the group serving the office have no financial interest.

The most common method of compensating all four categories of outsiders (nonphysicians, hospitals, referring physicians, and outside radiologists) was giving them shares or dividends or a percentage of profits (Table 2). Almost half (49%) of the offices in which referring physicians had a financial interest compensated these physicians as limited partners, and more than half (52%) of the offices in which radiologists outside the practice had a financial interest paid these outside radiologists professional fees. In 16% of the offices in which hospitals have a financial interest, the hospital owns the office, and the radiology group bills the hospital for its services. (In Table 2, the percentages for most outside-interest categories total more than 100% because some offices indicated more than one method of compensation for a given type of outside party.)

We grouped offices into three categories on the basis of who has a financial interest in them (Table 3). The first cate-

gory, offices in which only physicians in the practice hold a financial interest, accounted for 59% of all offices. Another 21% were in the second category, offices in which both physicians in the practice and outsiders have financial interests. The remaining 20% of offices were in the third category,

offices in which only outsiders have an interest. Variations, by office and group characteristic, in the percentage of offices in each of these three categories were significant. For example, 79% of offices providing only radiation oncology services had only practice members and no outsiders with financial inter-

TABLE 1: Parties with Financial Interest by Office Characteristic

Characteristic	Party with Financial Interest (%)					
	Practice Member	Nonphysician Entrepreneur	Referring Physician	Hospital	Other Radiologist	Other Parties
All offices	79	12	21	19	5	5
Type of office						
Diagnostic only	79	12	21	19	5	5
Oncology only	83	9	14	13	0	5
Mixed	77	42	34	15	0	7
$p \leq .05$	No	Yes	No	No	No	No
Region						
Midwest	65	6	26	28	0	1
Northeast	82	16	22	10	8	6
South	69	11	17	19	<1	11
West	92	14	20	15	8	1
$p \leq .05$	Yes	No	No	No	Yes	Yes
High-tech office ^a						
No	79	8	17	13	2	7
Yes	79	19	27	29	10	11
$p \leq .05$	No	Yes	Yes	Yes	Yes	Yes
Group size						
2-4 radiologists	76	10	16	12	4	7
5-7	81	20	29	24	9	0
8-10	75	4	18	20	5	5
11 or more	86	15	23	24	3	4
$p \leq .05$	No	Yes	No	Yes	No	No
Group type						
Academic radiology	95	22	23	20	12	6
Private radiology	78	13	23	20	5	4
Multispecialty	88	6	7	2	2	12
$p \leq .05$	No	No	No	No	No	No
Number of offices						
Weighted	2185	341	569	514	129	128
Unweighted	353	63	102	105	21	16

Note.—Percentages total more than 100% because some offices had several different parties with a financial interest.

^aOffice does MR imaging, CT, or nuclear medicine. Base for percentage excludes offices that do radiation oncology only.

TABLE 2: Methods of Compensation of Outsiders with a Financial Interest in Radiology Offices

Method of Compensation	Outside Party with Financial Interest (%)			
	Nonphysician Entrepreneur	Hospital	Referring Physician	Other Radiologist
Management fee	19	15	0	0
Percentage profit/dividend	80	63	55	62
Limited partner	5	1	49	0
General partner	0	2	14	0
Professional fee	0	2	0	52
Technical fee	0	0	0	31
Bill hospital	0	16	0	0
All other methods	8	17	8	3

Note.—Percentages for most outside interest categories add up to more than 100% because some offices indicated more than one method of compensation for a given type of outside party.

ests, compared with 58% of offices that offered diagnostic studies only and 28% of offices that offered both radiation oncology and diagnostic studies.

Additional analysis of the data (not given in the tables) showed that in most offices in which both practice members and outsiders had a financial interest, the outside interests included more than one type. The most common outside interests in offices in which both practice members and out-

siders had a financial interest were hospitals (54%), nonphysicians (45%), and referring physicians (38%). Among offices in which only outsiders had a financial interest, the most common patterns of outside interests were hospitals only (33%), referring physicians only (23%), and others only (19%); most of these offices had only one type of outsider involved.

The operational features of offices also varied depending on the pattern of financial interests involved in the office

TABLE 3: Characteristics of Radiology Group Offices by Type of Financial Interests Involved

Characteristic	All Offices	Financial Interests Involved			p Value
		Practice Members Only	Practice Members and Outsiders	Outsiders Only	
All offices	100	59	21	20	
Type of office (%)					≤ .05
Diagnostic only	100	58	21	21	
Oncology only	100	79	5	16	
Mixed	100	28	49	23	
Region (%)					≤ .05
Midwest	100	50	15	35	
Northeast	100	58	24	18	
South	100	57	12	31	
West	100	66	26	8	
High-tech office ^a (%)					≤ .05
No	100	65	14	21	
Yes	100	50	29	21	
Group size (%)					≤ .05
2-4 radiologists	100	64	12	24	
5-7	100	54	26	20	
8-10	100	61	14	25	
11 or more	100	55	31	14	
Group type (%)					≤ .05
Academic radiology	100	38	57	5	
Private radiology	100	57	21	22	
Multispecialty	100	79	7	14	
Diagnostic procedures per FTE radiologist ^b					≤ .05
Mean (1000s)	6.9	6.9	4.7	11.7	
SE	0.4	0.5	0.6	1.3	
25th percentile	1.1	1.0	1.1	2.4	
50th percentile	4.0	4.9	1.5	10.1	
75th percentile	11.1	11.1	7.2	21.8	
% of offices performing specific diagnostic procedures ^a					
Chest studies	73	80	64	64	≤ .05
Mammography	63	67	65	48	≤ .05
Gastrointestinal studies	57	67	43	46	≤ .05
Urologic procedures	39	49	34	23	≤ .05
Spinal imaging	69	78	56	60	≤ .05
CT	33	37	36	29	NS
MR imaging	32	25	46	41	≤ .05
Sonography	52	57	48	43	NS
Obstetric sonography	36	42	39	19	≤ .05
Nonobstetric sonography	42	47	43	29	≤ .05
Nuclear studies	14	14	11	22	NS
Office staffing ^b					
Number of radiologists					
Mean	5.2	5.3	5.9	4.0	≤ .05
SE	0.2	0.3	0.4	0.3	
FTE radiologists					
Mean	1.4	1.4	2.4	0.9	≤ .05
SE	0.1	0.2	0.5	0.1	

Note.—FTE = full-time equivalent, NS = not significant.

^aBase for percentage excludes offices that do radiation oncology only.

(Table 3). First, workload per radiologist, defined as number of diagnostic procedures per full-time-equivalent radiologist, was highest in offices in which only outsiders had a financial interest. Second, types of procedures regularly performed differed. Offices in which only members of the practice had a financial interest were more likely than the other offices to regularly provide chest, spine, gastrointestinal, and urologic procedures but less likely than offices with any outside interests to provide MR imaging. Offices in which only outsiders had a financial interest were the least likely to do mammography. Third, staffing varied. Offices in which both members of the practice and outsiders had a financial interest had the most individual radiologists and full-time-equivalent radiologists serving the office.

Discussion

Limitations of the Study

Our study included only offices (i.e., nonhospital settings) staffed by radiology groups that practice diagnostic radiology, radiation oncology, or both. Thus, offices staffed by solo practitioner radiologists are not included in our data. However, because more than 90% of radiologists practice in groups [5], we are confident that most of the radiology offices staffed by radiologists were represented in our sample.

Offices at which only nonradiologists do radiology procedures were also not included in our data. Data from a survey [6] by the American Medical Association indicate that approximately one fifth of all nonradiology groups, excluding multispecialty groups, have radiology equipment. This is clearly a prevalent pattern of financial interest by nonradiologists in offices that provide radiologic services; it is as significant a form of outside financial interest as the type discussed in this article, but it is beyond the scope of our data.

The data presented are from a 1992 survey. Some of the patterns observed may have changed as other aspects of radiology practice have changed. In particular, change may have occurred in response to increased public scrutiny and legislation on joint ventures involving referring physicians. Also, patterns of ownership and compensation are sometimes complex, and our survey probably does not fully reflect all their subtleties. Nonetheless, the data presented provide an overview and a useful baseline for assessing subsequent changes.

Our findings show statistically significant associations between patterns of financial interest and characteristics of the group or office. However, we cannot determine the direction of causation from the association. For example, outside financial interests are relatively common in radiology offices that offer MR imaging. This finding may occur because such offices are more likely than other offices to attract outside financial interests. Alternatively, these offices may have greater need for outside financial interests, or offices that already have outside interests may be in a better position to invest in MR equipment.

Billing Arrangements

Apart from radiologists who are not members of the group that serves an office, outsiders with a financial interest are

rarely, if ever, compensated by payment of technical or professional fees. This finding suggests that except when outside radiologists are involved, the radiology practice serving an office usually does all the billing for the office and then compensates those outsiders who have a financial interest in the office. The exception, as noted, is the arrangement in which a hospital owns the office; in those cases, the hospital does all the billing, and the radiology practice bills the hospital for its services.

Joint Ventures

As noted earlier, financial arrangements in which referring physicians have a financial interest in radiology offices or imaging centers have been the subject of public debate and legislation on health care policy. Research [1-3] indicates that joint ventures are associated with higher utilization of services and that they "cream-skim" paying patients, a practice that is likely to exacerbate problems in access to health care by the poor and uninsured. The Stark II legislation (mentioned in the introduction) was an attempt to curb joint ventures, but its ultimate effect and fate are uncertain.

Because of the interest in joint ventures, our findings on offices in which referring physicians have an outside interest merit additional discussion. We found that in 1992, referring physicians had a financial interest in about 21% of the offices at which radiology groups practice. This translates into more than 500 offices nationally. Further analysis of these 500 offices indicated that about two thirds of them were joint ventures with the physicians in the group serving the office. In another 22%, only the referring physicians (and not the group that served the office) had a financial interest. About 10% involved referring physicians and other outsiders, but no physicians in the group serving the office. These data provide a baseline that should be useful in future efforts to assess the impact of legislation enacted to curb joint ventures.

ACKNOWLEDGMENTS

Pam Kassing did extensive work during the survey and the data processing. Hal Owsley provided oversight and encouragement as chair of the Commission on General and Pediatric Radiology, American College of Radiology, the commission in charge of the survey.

REFERENCES

1. Mitchell JM, Sunshine JH. Consequences of physician's ownership of health care facilities: joint ventures in radiation therapy. *N Engl J Med* 1992;327:1497-1501
2. Swedlow A, Johnson G, Smithline N, Milstein A. Increased costs and rates of use in the California workers' compensation system as a result of self-referral by physicians. *N Engl J Med* 1992;327:1502-1506
3. Shikles JL. Physicians who invest in imaging centers refer more patients for more costly services. General Accounting Office (GAO) testimony before the Subcommittee on Health, Committee on Ways and Means, U.S. House of Representatives, April 20, 1993. Washington, DC: GAO, 1993. GAO/T-HRD-93-14
4. Sunshine JH, Bansal S. Operational characteristics of radiology groups in the United States in 1992. *Radiology* 1994;193:613-618
5. Bansal S, Sunshine J. Basic characteristics of radiology groups in the United States: results of a 1991-1992 census. *AJR* 1994;162:263-270
6. Havlicek PL, Eiler MA, Neblett OT. *Medical groups in the U.S.: a survey of practice characteristics*, 1993 edition. Chicago: American Medical Association, 1992