The Teaching of Chest Auscultation During Primary Care Training: Has Anything Changed in the 1990s?

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Has Anything Changed in the 1990s?

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Objective: **To survey the teaching time and importance given to cardiopulmonary auscultation during internal medicine (IM) and family practice (FP) residencies, and to compare current practices to those of the early 1990s.**
Design: **A nationwide mail survey of IM and FP program directors (PDs).**
Setting: **All Accreditation Council for Graduate Medical Education-accredited IM and FP residencies.**
Participants: **A total of 538 of 939 PDs (57.5%).**
Measurements and main results: **In contrast to the early 1990s, when there had been no significant difference in teaching practices between IM and FP programs, more IM than FP residencies taught cardiopulmonary auscultation in 1999 (cardiac auscultation: IM residencies, 48%; FP residencies, 29.2% [$p < 0.001$]; pulmonary auscultation: IM residencies, 23.7%; FP residencies, 12.2% [$p < 0.001$]). Across the decade there also had been a significant increase in the percentage of IM programs offering structured education in chest auscultation (cardiac auscultation increase, 27.1 to 48% [$p < 0.001$]; pulmonary auscultation increase, 14.1 to 23.7% [$p < 0.02$]), but no significant changes for FP residencies. IM PDs gave more clinical importance to auscultation and expressed a greater desire for expanded teaching than did their counterparts in FP programs.**
Conclusions: **This study indicates a significant gain over the last decade in the percentage of IM residencies offering structured teaching of cardiopulmonary auscultation. This same gain did not occur for FP programs. Whether these differences in attitudes and teaching practices will translate into improved auscultatory proficiency of IM trainees will need to be determined.**
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Key words: cardiac auscultation; medical education; pulmonary auscultation; residency training

Abbreviations: ABIM = American Board of Internal Medicine; ACGME = Accreditation Council for Graduate Medical Education; FP = family practice; IM = internal medicine; PD = program director; PDA = patent ductus arteriosus

Evidence gathered during the 1990s[1–3] has indicated that essential clinical skills such as physical diagnosis may be waning in our times of highly sophisticated diagnostic technology. Many factors may be contributing to this decline, as follows: our ever-increasing reliance on "tests"[4]; the erosion of bedside teaching[5]; time-constraints during residency[6]; and, possibly, the absence of an objective assessment of clinical skills during board certification examination.

The practice of chest auscultation, a time-honored art and the very symbol of physical diagnosis, especially has eroded. Although program directors (PDs) continue to value this skill, and even wish for more teaching of it, in the early 1990s cardiac auscultation was taught by only one fourth of internal medicine (IM) or family practice (FP) residency programs.[7,8] Fewer programs (10%) offered teaching of pulmonary auscultation.[9] Not surprisingly, trainees' proficiency has suffered.[10] In one study,[11] primary care residents had great difficulty in identifying commonly encountered cardiac events, were incorrect

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four of five times, improved little with a year of training, and were not significantly more accurate than a group of third-year students. Similar rates of errors were documented for pulmonary auscultation among trainees,[12] and for both cardiac and pulmonary auscultation among practitioners.[13,14]

Since cost-effective medicine demands the use of clinical skills like auscultation, their loss is a concern.[15,16] Calls for remediation have indeed prompted various actions, as follows: (1) the Society of General Internal Medicine formed a focus group on physical diagnosis; (2) the *Journal of the American Medical Association* published a series on the "Rational Clinical Exam"; and, very recently, (3) The American College of Physicians-American Society of Internal Medicine introduced a continuing medical education program on clinical skills at its annual meeting.

To determine whether this refocusing on clinical skills might have changed trainees' education, we surveyed all Accreditation Council for Graduate Medical Education (ACGME)-accredited FP and IM residencies. We selected chest auscultation as the paradigm for physical diagnosis and set the following four goals for our study: (1) to identify the time and importance given to chest auscultation during training; (2) to ascertain teaching and attitudinal differences about pulmonary vs cardiac auscultation; (3) to compare current data with surveys from the early 1990s; and (4) to establish a clinical ranking of cardiac and pulmonary auscultatory findings.

Materials and Methods

Design and Intervention

We invited all ACGME-accredited IM and FP residencies to complete a one-page questionnaire that was identical to those we used in the early 1990s.[7–9] To avoid bias, we used a non-American Board of Internal Medicine (ABIM) letterhead and had letters signed only by the non-ABIM investigator (SM). We mailed all questionnaires between January and June 1999, and sent all nonrespondents a second copy 1 month later.

We asked for the age and year of graduation of the PD, the number of trainees, university affiliation, and presence of structured teaching of cardiopulmonary auscultation. Lectures, seminars, and other modalities were included in our definition of "structured teaching," while teaching during rounds was specifically excluded.

The questionnaire included a 6-point Likert scale (1, strongly disagree; 4, slightly agree; 6, strongly agree) to ascertain the PD's opinions regarding the following three statements: (1) "Cardiac (or pulmonary) auscultation is an extremely important tool for any practicing physician"; (2) "More time should be devoted to the teaching of cardiac (or pulmonary) auscultation during FP (or IM) training"; and (3) "The recognition of the following cardiac (or pulmonary) events is extremely important and should be mastered by all practicing physicians." This last statement listed 24 findings (11 cardiac findings; 13 pulmonary findings).

Statistical Analysis

Statistical analysis consisted of χ^2 tests to relate dichotomous and nominal variables, Mann-Whitney *U* test and Kruskal-Wallis rank test to compare two or more groups on the several scale measures, and Spearman rank correlations to correlate scales and other numeric variables. All ratings by PDs were reported as the mean ± SD, with 6 being the highest rating, and 1 being the lowest. To compare the importance of ratings of murmurs and extra sounds, we created a *murmur-mean* for the five murmurs and a *sound-mean* for the six extra sounds. Analysis of these means was carried out by paired *t* test and analysis of variance. We followed the same procedure to compare PDs' ratings of "lung sounds" and "extra sounds." Finally, to compare attitudes toward lung auscultation and cardiac auscultation, we created a mean importance rating for each set of events (*ie*, respiratory and cardiac) and for each group of respondents (*ie*, IM and FP programs). Thus, we calculated a cumulative mean of all the importance ratings for the 13 respiratory sounds (called the *pulmonary auscultation average*) and compared it to a *cardiac auscultation average* that was computed similarly. Analysis of these means was performed by paired *t* test.

Results

The response rate for 1999 was 538 of 939 programs (57.3%.) Respondents included 280 of 505 FP residencies (55.4%) and 258 of 434 IM residencies (59.4%). We shall now present data pertaining to cardiac and pulmonary auscultation.

Cardiac Auscultation

Presence of Auscultatory Teaching: More IM programs (48%) than FP programs (29.2%) taught cardiac auscultation in 1999 ($p < 0.001$). There had been no significant differences in the early 1990s, when 27.1% of IM programs and 24.6% of FP programs had done so. Thus, the percentage of residencies offering teaching increased significantly across the decade for IM programs (from 27 to 48%; $p < 0.001$), but not for FP programs (from 24.6 to 29.2%; $p = 0.177$). Different didactic methods and varying amounts of teaching time were committed to structured education (Table 1). Lectures remained the most common modality (1999 survey: IM programs, 54.4%; FP programs, 70.3%), although IM programs used lectures significantly less in 1999 than in 1990. Overall, IM programs offered more teaching hours than did FP programs (8.3 ± 14.4 vs 5.2 ± 5.6 h, respectively; $p < 0.03$).

Non–university-affiliated IM programs, but not FP programs, offered more structured teaching of auscultation. This association was weak in the early 1990s ($p = 0.07$) and became stronger in 1999 ($p = 0.04$). Non–university-affiliated IM programs also offered more structured teaching than did their FP counterparts. This difference was present both at the beginning and at the end of the decade, becom-

Table 1—*Teaching Modalities of Cardiac and Pulmonary Auscultation Used by Programs Providing Structured Auscultatory Training to House Staff

Teaching Methods	IM		FP	
	1990	1999	1993	1999
Heart auscultation				
Lecture	64/89 (71.9)†	67/123 (54.4)†	51/62 (82.2)	57/81 (70.3)
Seminar	18/89 (20.2)	25/123 (20.3)	14/62 (22.6)	20/81 (24.7)
Audiotapes	43/89 (48.3)	52/123 (42.3)	29/62 (46.8)	36/81 (44.4)
Others	29/89 (32.6)	47/123 (38.2)	8/62 (12.9)	20/81 (24.7)
Lung auscultation				
Lecture	24/40 (60)‡	45/61 (73.8)	13/26 (50)	25/34 (73.5)
Seminar	6/40 (15)	17/61 (27.9)	8/26 (30.1)	5/34 (14.7)
Audiotapes	12/40 (30)	16/61 (26.2)	8/26 (30.1)	5/34 (14.7)
Others	2/40 (5)	14/61 (22.9)		10/34 (29.4)

*Values given as No. of programs responding positively/No. of programs responding (%). Because some programs used more than one teaching modality, percentages do not total 100.
†$p = 0.01$.
‡Values in this column are from 1993 survey.

ing more significant over time. Auscultatory teaching was offered in the early 1990s by 30.7% of non–university-affiliated IM programs and by 21.9% of non–university-affiliated FP programs ($p = 0.04$). In 1999, however, this percentage had increased to 53.7% for IM programs and 30.2% for FP programs ($p < 0.001$). Overall, there was a significant increase in the teaching of auscultation across all IM programs. Even for university-affiliated residency programs, the percentage of programs teaching auscultation rose from 21.9% in 1990 to 40.2% in 1999 ($p = 0.003$). The increase in teaching among FP residencies (from 21.9 to 30.2%; $p = 0.052$) was instead limited to non–university-affiliated programs. For the programs with university affiliations, there was actually a decline.

While in the early 1990s IM residencies teaching cardiac auscultation were smaller in size and predominantly outside the northeast United States, by 1999 these differences had entirely disappeared.

Opinions of PDs Regarding Cardiac Auscultation

Internists felt more strongly (rated on a Likert scale of 1 to 6) than family practitioners about the need for increased auscultatory teaching during residency, and this difference was independent of survey year (late 1990s: IM programs, 5.2 ± 0.9; FP programs, 4.6 ± 1.2 [$p < 0.001$]; early 1990s: IM programs, 4.9 ± 1.0; FP programs, 4.5 ± 1.3 [$p < 0.001$]). In 1999, IM PDs also assigned greater clinical importance to cardiac auscultation than their FP colleagues (IM PDs, 5.6 ± 0.6; FP PDs, 5.4 ± 0.7; $p < 0.001$). In fact, the importance attributed to cardiac auscultation and the need for more teaching increased significantly during the decade only among IM PDs (both $p < 0.005$). The importance for FP PDs remained unchanged.

Older IM PDs assigned greater importance to cardiac auscultation ($r = 0.118$; $p = 0.07$) and also greater need for teaching ($r = 0.109$; $p = 0.09$). These correlations had been even stronger at the beginning of the decade ($p < 0.02$). For FP PDs, such correlations were not found, independently of survey year. IM PDs, but not FP PDs, who offered auscultation in their programs also wanted more time for it ($p = 0.03$.). This finding was present both in the early and late 1990s.

Ranking of Cardiac Auscultatory Skills by Clinical Value

Table 2 displays the change over the decade in the opinions of PDs regarding the importance of 11 cardiac findings. Although all events on our list were rated as clinically very relevant, PDs assigned significantly more importance to the murmurs than the extra sounds ($p < 0.001$ [paired t test for both groups of PDs and both survey periods]), with the only exceptions being the S3 gallop and the pericardial friction rub (which were ranked as high as the murmurs), and the patent ductus arteriosus (PDA) murmur (which was ranked by IM PDs as low as the extra sounds). An analysis of variance combining responses from IM PDs and FP PDs showed that murmurs were rated the highest ($p < 0.001$) and that internists as a group gave higher ratings than family practitioners ($p < 0.001$). Of interest, 1999 IM PDs rated 7 of the 11 findings significantly lower than their 1991 counterparts. Conversely, the ratings of FP PDs remained more consistent over the decade.

Table 2—*Clinical Importance Scores for Cardiac Sounds as Perceived by PDs in Surveys

Variables	Cardiac Auscultation					
	IM			FP		
	1991	1999	p Value	1993	1999	p Value
Value of all cardiac sounds	5.41 ± 0.55	5.21 ± 0.56	< 0.001	5.02 ± 0.83	4.98 ± 0.60	0.45
Value of all cardiac murmurs	5.53 ± 0.59	5.32 ± 0.59	< 0.001	5.12 ± 0.90	5.10 ± 0.66	0.74
Value of all cardiac extra-sounds	5.31 ± 0.60	5.13 ± 0.62	< 0.001	4.95 ± 0.83	4.87 ± 0.64	0.29
S3 gallop	5.70 ± 0.64	5.66 ± 0.62	0.44	5.32 ± 0.98	5.35 ± 0.69	0.76
Aortic stenosis	5.72 ± 0.60	5.64 ± 0.54	0.11	5.27 ± 0.93	5.35 ± 0.66	0.25
Mitral regurgitation	5.70 ± 0.57	5.61 ± 0.56	0.05	5.21 ± 0.93	5.22 ± 0.73	0.91
Aortic regurgitation	5.69 ± 0.58	5.53 ± 0.64	0.001	5.09 ± 0.96	5.02 ± 0.85	0.35
Pericardial friction rub	5.76 ± 0.54	5.51 ± 0.67	< 0.001	5.30 ± 0.92	5.26 ± 0.69	0.61
Mitral stenosis	5.59 ± 0.72	5.26 ± 0.92	< 0.001	4.99 ± 1.04	4.88 ± 0.89	0.19
S4 gallop	5.28 ± 0.96	5.23 ± 0.91	0.51	5.00 ± 1.05	5.03 ± 0.85	0.72
Mid-systolic click	5.29 ± 0.81	4.99 ± 0.83	< 0.001	4.95 ± 0.95	4.77 ± 0.87	0.02
Opening snap of mitral stenosis	5.30 ± 0.91	4.95 ± 1.04	< 0.001	4.66 ± 1.04	4.53 ± 1.03	0.15
PDA	4.92 ± 1.17	4.54 ± 1.16	< 0.001	5.07 ± 1.05	5.05 ± 0.87	0.77
Early-systolic (ejection) click	4.52 ± 1.15	4.42 ± 1.08	0.28	4.39 ± 1.11	4.30 ± 1.01	0.33

*Values given as mean ± SD on a 6-step scale (6, extremely important). Significance is reported for difference in PD opinions between the early and late 1990s.

Figure 1 compares the 1999 ratings of IM and FP PDs for the same 11 cardiac auscultatory events. There was a tendency for IM PDs to give each event higher clinical importance than their FP colleagues.

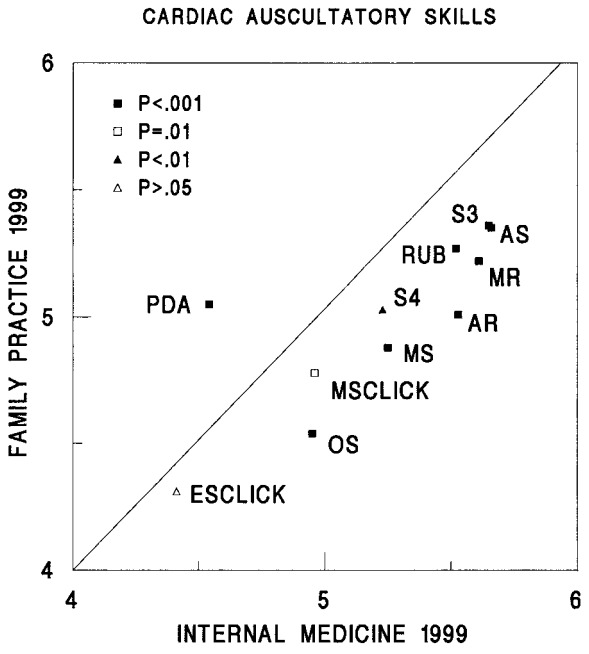

FIGURE 1. Clinical importance scores for 11 cardiac sounds and murmurs, as perceived by PDs in IM and FP during the 1999 survey. Scores are reported as the mean on a 6-step scale (6, extremely important). The diagonal line indicated identity between the opinions of PDs. Significance is reported for differences of opinion between the two groups of PDs. MR = mitral regurgitation; AS = aortic stenosis; AR = aortic regurgitation; MS = mitral stenosis; RUB = pericardial rub; S4 = S4 gallop; S3 = S3 gallop; OS = opening snap of mitral stenosis; MSCLICK = midsystolic click; ESCLICK = early systolic click.

This difference was significant for all findings, except the PDA murmur and the early-systolic click. Similar differences among PDs, albeit not as strong, had also occurred in the early 1990s.

Pulmonary Auscultation

Presence of Auscultatory Teaching: More IM programs (23.7%) than FP programs (12.2%) taught pulmonary auscultation in 1999 ($p < 0.001$). There had been no significant differences in the early 1990s. Thus, the percentage of IM residency programs offering teaching increased from 14.1% (in 1993) to 23.7% (in 1999) [$p = 0.02$]. The values for FP residency programs remained not significantly different (1993, 9.7%; 1999, 12.2%; $p = 0.5$). Half as many IM and FP residency programs taught pulmonary auscultation compared to cardiac auscultation ($p < 0.005$). IM programs also gave significantly fewer hours to the teaching of pulmonary auscultation compared to the teaching of cardiac auscultation (4.8 ± 4.4 and 8.3 ± 14.4 h, respectively; $p < 0.001$). Lectures remained the most common method of teaching (IM programs, 73.8%; FP programs, 73.5%) [Table 1]. In the early 1990s, IM residency programs had provided more teaching hours than FP programs, but in 1999 these differences disappeared (IM programs, 4.8 ± 4.4 h; FP programs, 4.8 ± 7.1 h [across the 3 years of training]).

For IM programs, structured auscultatory teaching was offered more frequently in non–university-affiliated residency programs (27.8%) than in university-affiliated programs (17.8%; $p = 0.07$). This trend, albeit less pronounced, had also been noted in

the 1993 survey. Neither the size of a program nor its geographic location was correlated with the offering of auscultatory teaching. This occurred among both IM and FP residency programs.

Opinions of PDs Regarding Pulmonary Auscultation

As in previous surveys, PDs agreed on the clinical importance of pulmonary auscultation (IM PDs, 5.6 ± 0.7; FP PDs, 5.6 ± 0.6; $p = 0.23$). However, 1999 IM PDs wanted more teaching compared to their 1993 counterparts (5.1 ± 1.0 and 4.7 ± 1.2, respectively; $p < 0.001$). While in 1993 IM PDs had rated pulmonary auscultation significantly higher than cardiac auscultation, in 1999 they rated them as being of equal importance. FP PDs, on the other hand, consistently rated pulmonary auscultation as being more important than cardiac auscultation ($p < 0.01$). They also wished for more teaching time for pulmonary auscultation than for cardiac auscultation ($p < 0.01$). The age of PDs, location of the program, or university affiliation had no influence on the importance attributed to auscultation or the perceived need for more teaching.

Ranking of Pulmonary Auscultatory Skills by Clinical Value

The opinions of PDs regarding the statement "the recognition of the following pulmonary events is extremely important and therefore should be mastered by all practicing physicians" are reported in Table 3 and Figure 2. Overall, PDs rated all listed events as being clinically relevant. Yet, on average, IM PDs rated breath sounds higher than extra sounds ($p < 0.005$ [paired *t* test], while FP PDs gave the opposite rating ($p < 0.005$ [paired *t* test]). Of interest, the lowest scores in all of our surveys were consistently attributed to some of the oldest pulmonary findings (the transmitted voice sounds, all named and described by Laennec in 1819 and 1826), but also to one of the most recent additions to the literature (the late-inspiratory squeak of pulmonary fibrosis, described by Earis et al[17] in 1982).

When compared to family practitioners, internists rated the 13 pulmonary events on the list as significantly higher (IM PDs, 5.2 ± 0.6; and FP PDs, 4.9 ± 0.6; $p < 0.001$). Similarly, they gave higher ratings to all three of the following main categories of pulmonary events: (1) breath sounds; (2) adventitious lung sounds; and (3) transmitted voice sounds (all $p \leq 0.001$). IM PDs also gave higher individual ratings than their FP colleagues to each pulmonary event of our list (Fig 2). These differences actually increased over the decade, reaching statistical significance for 10 of the 13 pulmonary events in 1999, compared to seven 7 of 13 events in 1993. While the ratings of FP PDs did not significantly change over the decade, the ratings of IM PDs increased significantly for 5 of 13 pulmonary findings (Table 3). This increase contrasts with the decline observed for cardiac findings, where internists' ratings significantly decreased over time, while FP ratings remained unchanged.

Table 3—*Clinical Importance Scores for Respiratory Sounds, as Perceived by PDs in Surveys**

	Pulmonary Auscultation					
	IM			FP		
Variables	1993	1999	p Value	1993	1999	p Value
Value of all lung sounds	5.05 ± 0.75	5.16 ± 0.64	0.09	4.92 ± 0.82	4.94 ± 0.64	0.78
Value of all breath sounds	5.20 ± 0.97	5.35 ± 0.84	0.06	4.97 ± 0.99	4.88 ± 0.95	0.28
Value of all adventitious sounds	5.12 ± 0.71	5.23 ± 0.61	0.06	5.07 ± 0.86	5.09 ± 0.63	0.75
Value of all voice sounds	4.80 ± 1.12	4.85 ± 0.98	0.62	4.46 ± 1.06	4.54 ± 0.93	0.40
Stridor	5.65 ± 0.68	5.69 ± 0.55	0.52	5.38 ± 0.98	5.48 ± 0.74	0.17
Wheezes	5.40 ± 0.84	5.53 ± 0.67	0.05	5.30 ± 0.90	5.42 ± 0.65	0.08
Pleural friction rub	5.47 ± 0.76	5.43 ± 0.76	0.56	5.15 ± 1.02	5.18 ± 0.76	0.73
Bronchial breath sounds	5.28 ± 0.97	5.39 ± 0.86	0.18	4.99 ± 1.01	4.95 ± 0.93	0.61
Vesicular breath sounds	5.12 ± 1.09	5.32 ± 0.88	0.03	4.96 ± 1.04	4.83 ± 1.03	0.14
Early-inspiratory crackles	5.07 ± 0.99	5.32 ± 0.80	< 0.01	5.09 ± 1.03	5.08 ± 0.87	0.89
Rhonchi	5.22 ± 0.91	5.30 ± 0.83	0.23	5.19 ± 0.92	5.30 ± 0.79	0.13
Egophony	5.11 ± 1.13	5.17 ± 0.96	0.51	4.61 ± 1.11	4.71 ± 0.95	0.25
Late-inspiratory crackles	4.98 ± 0.99	5.16 ± 0.88	0.03	5.03 ± 1.05	5.01 ± 0.89	0.89
Midinspiratory crackles	4.81 ± 1.08	5.04 ± 0.95	0.01	4.92 ± 1.08	4.85 ± 0.94	0.43
Bronchophony	4.69 ± 1.23	4.74 ± 1.12	0.64	4.41 ± 1.08	4.49 ± 0.97	0.34
Whispered pectoriloquy	4.61 ± 1.32	4.64 ± 1.21	0.80	4.36 ± 1.17	4.42 ± 1.06	0.55
Late-inspiratory squeak	4.38 ± 1.23	4.43 ± 1.25	0.78	4.49 ± 1.18	4.42 ± 1.09	0.53

*Values given as mean ± SD on a 6-step scale (6, extremely important). Significance is reported for difference in PD opinions between the early and late 1990s.

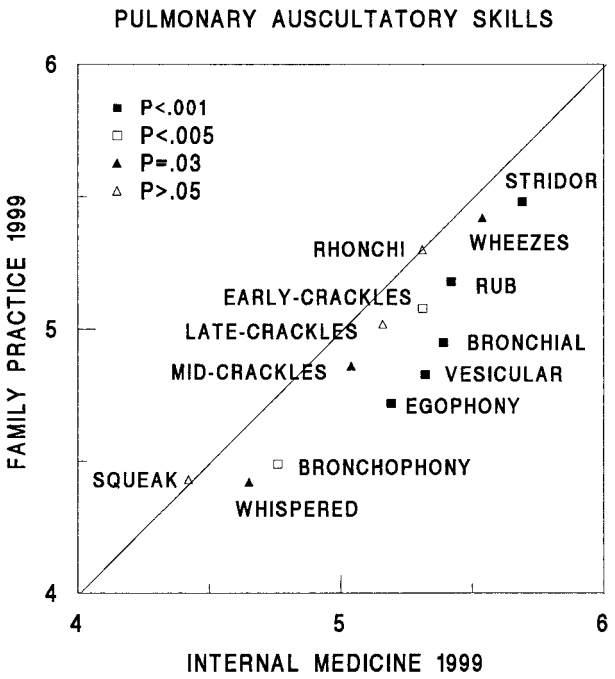

FIGURE 2. Clinical importance scores for 13 respiratory sounds, as perceived by IM and FP PDs during the 1999 survey. Scores are reported as the mean on a 6-step scale (6, extremely important). The diagonal line indicates identity between the opinions of PDs. Significance is reported for differences of opinion between the two groups of PDs. See legend of Figure 1 for abbreviations not used in the text.

DISCUSSION

We surveyed the teaching practices and attitudes toward chest auscultation of IM and FP residency programs, because this skill is the centerpiece of physical diagnosis and is also a fundamental tool for screening organic disease.[18] A well-performed cardiovascular examination can still accurately determine the origin of a systolic murmur[19] and remains the most cost-effective method for a murmur's initial evaluation.[20] Similarly, auscultation of the lungs also provides important clues to the identification of disease[21] and remains a key component of a patient's evaluation. Proficiency in these basic clinical skills has become even more crucial in our times of cost-containment, a shift toward generalism, and the scrutinized use of resources.

Accurate chest auscultation, however, is quite difficult to master, accounting for one third of all errors in physical diagnosis.[22] It requires the detection of feeble sounds packed into short time intervals and is traditionally learned at the bedside, through direct experience with patients under the supervision of seasoned clinicians. Yet, few trainees regularly encounter the variety of patients needed to develop adequate proficiency. Limited exposure is further compromised by a shift away from the bedside,[5,23] hence the need for more structured teaching of these skills during residency training.

In this regard, we found significant differences between primary care programs. Twice as many IM programs as FP programs provided structured teaching of chest auscultation. In fact, the percentage of IM programs offering teaching of chest auscultation nearly doubled during the 1990s, while remaining constant for FP programs. IM PDs rated the teaching of auscultation more highly than did their FP colleagues, offered more teaching hours, and gave greater clinical value to a series of commonly encountered auscultatory events.

Various reasons might underlie the differences in attitudes and teaching practices between the two disciplines. FP PDs, for example, might have greater confidence in the proficiency of their residents. Since FP is primarily an outpatient discipline, PDs might perceive their trainees' exposure to bedside skills as already being adequate, and thus may feel less of a need for supplemental teaching. IM and FP residents, however, have equal difficulties in the recognition of important cardiopulmonary events.[11,13] In fact, similar deficiencies in physical examination are present not only among trainees, but even among primary care practitioners.[12]

The difference in interventions carried out by regulators of IM and FP programs also might have contributed to the difference in attitudes and teaching practices detected by our survey. For example, the IM Residency Review Committee of the ACGME requires all IM residency programs (effective as of July 1998) to include bedside teaching during inpatient teaching rounds, and that these ". . . teaching sessions must include demonstration and evaluation of each resident's interview and physical examination skills." This regulation may have contributed to changing the educational experience of IM residency programs. No comparable emphasis on bedside teaching was present in the July 1997 Residency Review Committee "Requirements For Family Practice."[24]

Finally, it is also possible that some of the initiatives promoted by the ABIM over the 1990s might have contributed to focusing the attention of IM PDs on physical diagnosis and chest auscultation. Among these initiatives were the following: (1) a nationwide survey of PDs and practitioners to rank the importance of physical diagnosis skills (S Mangione, S Peitzman; unpublished list of essential skills in physical diagnosis; 2002), which informed the 1997 resource guide to curriculum development of the Federated Council for Internal Medicine for IM PDs[25]; (2) the search for new methods to teach physical diagnosis during residency[2]; (3) the creation

and field testing of a logbook on physical diagnosis that is aimed at increasing awareness among residents of important physical findings[3]; and, most recently, (4) the addition to the IM recertification examination of a multimedia self-assessment module in physical diagnosis.[26]

In addition to differences in attitudes and teaching practices among IM and FP programs, we found differences between university-affiliated and non–university-affiliated residency programs. Community hospitals with small programs appeared to be more involved in the teaching of auscultatory skills and offered more learning opportunities than their university-affiliated counterparts. We had found similar differences in a previous assessment of IM trainees' attitudes and practices toward physical diagnosis.[3] In that study, house staff from programs based in small community hospitals had more favorable attitudes about the role of physical diagnosis than their university-affiliated colleagues. These data may reflect the influence of easy access to technology on physicians' interests and practices.

In summary, this study indicates that the percentage of IM residencies with structured teaching of chest auscultation nearly doubled over the last decade. This increase was not found in FP programs. IM PDs rated the clinical importance of this skill higher than did PDs of FP residencies. They also expressed a greater desire for teaching these skills. Whether these differences in attitudes and teaching practices will translate into an improved auscultatory proficiency of physicians-in-training will need to be determined.

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