Self-Confidence in and Perceived Utility of the Physical Examination: A Comparison of Medical Students, Residents, and Faculty Internists

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BACKGROUND AND OBJECTIVES: Little is known about the differences in attitudes of medical students, Internal Medicine residents, and faculty Internists toward the physical examination. We sought to investigate these groups' self-confidence in and perceived utility of physical examination skills.

DESIGN AND PARTICIPANTS: Cross-sectional survey of third- and fourth-year medical students, Internal Medicine residents, and faculty Internists at an academic teaching hospital.

MEASUREMENTS: Using a 5-point Likert-type scale, respondents indicated their self-confidence in overall physical examination skill, as well as their ability to perform 14 individual skills, and how useful they felt the overall physical examination, and each skill, to be for yielding clinically important information.

RESULTS: The response rate was 80% (302/376). The skills with overall mean self-confidence ratings less than "neutral" were interpreting a diastolic murmur (2.9), detecting a thyroid nodule (2.8), and the nondilated fundoscopic examination using an ophthalmoscope to assess retinal vasculature (2.5). No skills had a mean utility rating less than neutral. The skills with the greatest numerical differences between mean self-confidence and perceived utility were distinguishing between a mole and melanoma (1.5), detecting a thyroid nodule (1.4), and interpreting a diastolic murmur (1.3). Regarding overall self-confidence, third-year students' ratings (3.3) were similar to those of first-year residents (3.4; p=.95) but less than those of fourth-year students (3.8; p=.002), upper-level residents (3.7; p=.01), and faculty Internists (3.9; p<.001).

CONCLUSIONS: Self-confidence in the physical exam does not necessarily increase at each stage of training. The differences found between self-confidence and perceived utility for a number of skills suggest important areas for educational interventions.

KEY WORDS: physical examination; clinical skills; medical education.
J Gen Intern Med 22(12):1725–30
DOI: 10.1007/s11606-007-0409-8

Received April 10, 2007
Revised September 7, 2007
Accepted September 25, 2007
Published online October 6, 2007

INTRODUCTION

The physical examination is essential for the physician's approach to diagnosing disease. Practicing physicians have reported that physical examination skills obtained during medical school and residency training had lasting value.[1] Despite the proliferation of medical technology and diagnostic tests, both Internists in practice and Internal Medicine program directors consider physical examination to be a highly valued skill essential to the practice of medicine.[2] Furthermore, patients expect that physicians will examine them during outpatient visits.[3]

However, it has been shown that the physical examination skills of primary care physicians have clinically important deficiencies,[4] and that the physical examination skills of medical school and residency graduates are lacking,[5,6] raising the concern that erosion of these skills may lead to a downward spiral in which those who are inadequately taught will be ill-prepared to teach the next generation of medical students and residents.[7] It is clear that improvement in physical examination instruction should be a priority for medical educators.

To achieve this goal, we must first recognize the obstacles present in our current method of teaching. Most physical examination textbooks and instructional syllabi do not explicitly distinguish elements that have proven clinical utility from those that do not, nor do they distinguish elements that are difficult to master, such as the fundoscopic exam, from those in which it is easier to achieve skill, such as measuring blood pressure. Furthermore, the skills of those who teach physical examination may not be consistent, given that instructors may include private physicians, full-time medical school faculty, subspecialty fellows, residents, and in some cases, fourth-year medical students. The ideal physical diagnosis teacher would have both high self-confidence in skill and a belief that the physical exam has high utility, in addition to demonstrated or actual skill in the physical exam. However, it is unknown how these teachers view their own competence in physical examination skills and the utility of these skills.

Regarding which specific physical examination skills should be emphasized, *JAMA* has published an ongoing series of critical reviews entitled the "Rational Clinical Examination,"[8–19] and this information can help guide the selection of specific skills that deserve emphasis. To identify those specific skills which should be targeted for improvement in instruction, we should know the skills in which physicians, residents, and medical students are least confident in their ability, as well as those skills that they view as being most important. These attitudes may

play an important role in how physical examination skills are both learned and taught.

In this study, we wished to investigate the self-confidence of medical students, Internal Medicine residents, and General Internists regarding the physical examination and selected specific components and how these attitudes varied among different levels of educational training. A second goal was to examine their perceived utility of the physical examination and these individual components, and how these attitudes varied among different levels of educational training. We sought to determine which skills had the largest differences between self-confidence and perceived utility. With this information, we hoped to identify physical examination areas that should be targeted for improvement in instruction.

METHODS

Based on topics from *JAMA*'s "Rational Clinical Examination" series, we designed a questionnaire addressing 14 components of the physical examination, including measuring blood pressure, measuring jugular venous pressure, interpreting a systolic murmur, interpreting a diastolic murmur, detecting a pleural effusion, detecting clubbing, detecting ascites, detecting splenomegaly, determining vertical liver span, distinguishing between a mole and melanoma, detecting a breast mass in a female patient, detecting a thyroid nodule, performing a nondilated fundoscopic examination using an ophthalmoscope to assess retinal vasculature, and detecting a positive straight-leg raise sign. Most skills were considered significant for investigation based on their prior study in *JAMA*, as well as from an informal consensus among Rhode Island Hospital Internal Medicine residents and faculty regarding physical examination skills commonly used in both the inpatient and outpatient settings. Using a 5-point Likert-type scale, respondents indicated how confident (1 = "Not at all Confident" to 3 = "Neutral" to 5 = "Very Confident") they felt in their overall physical examination skill, as well as in their ability to perform each of the 14 individual skills and how useful (1 = "Not at all Useful" to 3 = "Neutral" to 5 = "Very Useful") they felt the overall physical examination, and each skill, to be for yielding clinically important information. Age and gender were also collected for all respondents. The study was examined by Rhode Island Hospital's Committee on Protection of Human Subjects (Institutional Review Board) and determined to be exempt from review.

From October 2003 to January 2004, the survey was distributed to Brown Medical School (as it was then known) third- and fourth-year medical students, Internal Medicine and medicine–pediatrics residents, Internal Medicine chief residents, and general Internal Medicine faculty at Rhode Island Hospital, a tertiary care teaching hospital in Providence, RI. The survey was distributed via mail, e-mail, or on a face-to-face basis, but respondents' answers were recorded anonymously. Nonrespondents received 2 additional mailings in the same manner as originally solicited. The survey was pilot-tested on a convenience sample of second- and third-year Internal Medicine residents to gauge length, readability, comprehension, and face validity.

The primary focus of analysis was the difference in attitudes between medical students and interns, during which the learning curve is typically the steepest. Therefore, data were pooled for postgraduate years (PGY) 2 through 4. This created 5 training level categories, with the following numbers of subjects: third-year medical students (M3), 89; fourth-year medical students (M4), 95; PGY-1, 55; PGY-2 through 4, 94; and faculty Internists, 43. Mean self-confidence and perceived utility scores were computed for the overall group, as well as by training level. Relationships between scores and training level were assessed using the Spearman rank correlation. Differences in self-confidence scores among the training levels were determined using one-way analysis of variance with Scheffe's multiple comparison test. Finally, we computed for each exam component the difference between the self-confidence and perceived utility scores. All statistical analysis was performed using Stata version 8 (Stata, College Station, TX, USA).

RESULTS

The response rate was 80% (302/376). The mean age was 29 years and 54% (163/302) were female. Table 1 includes response rates, age, and gender by level of training.

Self-Confidence. Table 2 lists all mean self-confidence scores for overall physical examination skills and for each individual physical examination skill by training level. In terms of overall self-confidence, M3 students were lower than M4 students (p=.002), PGY-2 through 4 residents (p=.01), and faculty Internists (p<.001), but not compared to PGY-1 residents (p=.95). PGY-1 residents had lower overall self-confidence compared to faculty Internists (p=.01). There was a weak but significant positive correlation between mean overall self-confidence score and training level (r_s=.20, p<.001), and similar correlations were exhibited for most individual skills. Collectively and by training level, respondents reported the highest self-confidence in measuring blood pressure and lowest in the nondilated fundoscopic examination using an ophthalmoscope to assess retinal vasculature. Mean self-confidence of M3 students was below "Neutral" for 7 of the skills, and mean self-confidence of PGY-1 residents was below "Neutral" for 5 of the skills. Faculty Internists reported self-confidence above "Neutral" for all skills.

Table 3 shows the comparison of self-confidence in individual skills by training level, focusing on M3 students and PGY-1 residents. M3 students had lower self-confidence in 6 skills compared to M4 students, in 7 skills compared to PGY-2 through 4 residents, and in 13 skills compared to faculty Internists, but in only 1 skill compared to PGY-1 residents. PGY-1 residents had lower self-confidence in 4 skills compared to M4 students, in 2 skills compared to PGY-2 through 4 residents, and in 10 skills compared to faculty Internists.

Table 1. Respondent Demographics

Training level	Respondents (%)	Mean age (SD)	% Female
M3	66/89 (74)	26 [3.7]	47
M4	68/95 (72)	26 [2.3]	40
PGY-1	48/55 (87)	28 [3.4]	56
PGY-2–4	82/94 (87)	29 [2.6]	56
Faculty Internists	38/43 (88)	41 [7.3]	42
Total	302/376 (80)	29 [6.1]	54

Table 2. Mean Self-Confidence in Individual Physical Examination Skills by Training Level

Physical examination skill	All responders	M3	M4	PGY-1	PGY-2–4	Faculty Internists
Overall self-confidence in physical examination skills	3.6 [0.7]*	3.3 [0.7]	3.8 [0.6]	3.4 [0.5]	3.7 [0.6]	3.9 [0.7]
Measuring blood pressure	4.7 [0.6]	4.4 (1)† [0.7]	4.8 (1) [0.5]	4.4 (1) [0.7]	4.7 (1) [0.5]	4.9 (1) [0.2]
Detecting clubbing	4.2 [0.9]	3.9 (2) [1.1]	4.3 (2) [0.8]	4.2 (2) [0.8]	4.3 (2) [0.8]	4.5 (2) [0.8]
Detecting ascites	3.9 [0.8]	3.8 (3) [0.9]	4.1 (4) [0.7]	3.7 (3) [0.8]	3.9 (4) [0.8]	3.8 (8) [0.7]
Detecting a positive straight-leg raise sign	3.9 [1.0]	3.6 (4) [1.2]	4.3 (3) [0.9]	3.4 (6) [1.0]	3.9 (4) [0.7]	4.3 (3) [0.6]
Interpreting a systolic murmur	3.6 [0.8]	3.3 (5) [0.9]	3.6 (6) [0.9]	3.5 (4) [0.6]	3.9 (4) [0.7]	3.9 (6) [0.9]
Detecting a pleural effusion	3.5 [0.9]	3.1 (7) [1.0]	3.4 (8) [0.9]	3.3 (7) [0.9]	3.9 (4) [0.7]	4.0 (4) [0.8]
Determining vertical liver span	3.5 [1.0]	3.2 (6) [1.1]	3.3 (10) [0.9]	3.3 (7) [1.0]	3.7 (7) [0.9]	4.0 (4) [0.8]
Detecting a breast mass in a female patient	3.4 [0.9]	2.9 (9) [1.0]	3.7 (5) [0.9]	3.1 (9) [0.9]	3.4 (8) [0.8]	3.9 (6) [0.8]
Detecting splenomegaly	3.2 [0.9]	3.0 (8) [1.0]	3.5 (7) [0.9]	2.8 (11) [0.8]	3.3 (9) [0.8]	3.7 (10) [0.8]
Distinguishing between a mole and melanoma	3.2 [1.0]	2.8 (10) [1.1]	3.4 (8) [1.0]	3.5 (4) [0.9]	3.3 (9) [0.9]	3.5 (11) [0.9]
Measuring jugular venous pressure	3.0 [1.0]	2.7 (12) [1.0]	2.8 (12) [1.1]	2.8 (10) [0.9]	3.0 (11) [0.9]	3.8 (8) [0.8]
Interpreting a diastolic murmur	2.9 [0.9]	2.8 (10) [1.0]	2.8 (12) [1.0]	2.5 (11) [0.8]	3.0 (11) [0.8]	3.4 (12) [0.9]
Detecting a thyroid nodule	2.8 [0.9]	2.5 (13) [1.0]	3.1 (11) [0.9]	2.5 (11) [0.9]	2.9 (13) [0.7]	3.4 (12) [0.8]
Nondilated fundoscopic examination using an ophthalmoscope to assess retinal vasculature	2.5 [1.1]	2.3 (14) [1.1]	2.8 (12) [1.2]	2.3 (14) [1.1]	2.2 (14) [1.0]	3.2 (14) [1.1]

Self-confidence scale: 1 = "Not at all Confident"; 3 = "Neutral"; 5 = "Very Confident"
**Standard deviation is in brackets*
†*Relative ranking of self-confidence for each physical examination skill within each group is in parentheses*

Perceived Utility. Table 4 lists mean perceived utility scores for overall physical examination skills and for each physical examination skill by training level. Both groups of residents reported overall lower perceived utility compared to M3 students (PGY-1, p=.02 and PGY-2 through 4, p=.02) and M4 students (PGY-1, p=.006 and PGY-2 through 4, p=.004). Across all levels, measuring blood pressure had the highest perceived utility. For all levels except faculty Internists, detecting clubbing had the lowest perceived utility; for faculty Internists, the nondilated fundoscopic examination using an ophthalmoscope to assess retinal vasculature had the lowest perceived utility. No group rated the utility of any of the skills as less than "Neutral." There was a weak but significant negative correlation between mean overall perceived utility and training level (r_s=−.24, p<.001).

Comparison of Self-Confidence and Perceived Utility. Table 5 shows the collective self-confidence and perceived utility scores of the 14 physical examination skills surveyed and the differences between those means. The physical examination skills with the greatest differences between mean self-confidence and perceived utility were distinguishing between a mole and melanoma, detecting a thyroid nodule, interpreting a diastolic murmur, detecting a breast mass in a female patient, and the nondilated fundoscopic examination using an ophthalmoscope to assess retinal vasculature.

DISCUSSION

Our study demonstrates that, in one academic medical center, there are clearly differences in self-confidence regarding overall and individual physical examination skills from the perspective of medical students, Internal Medicine residents, and faculty Internists. It is reassuring that all groups reported greatest self-confidence in measuring blood pressure, as this is a frequently

Table 3. Differences in Self-Confidence of Individual Physical Examination Skills

Physical examination skill	M3 vs:				PGY-1 vs:		
	M4	PGY-1	PGY-2–4	Faculty Internists	M4	PGY-2–4	Faculty Internists
Measuring blood pressure	**.31 (.04)**	−.02 (1.00)	**.30 (.04)**	.51 (.001)	.33 (.05)	**.33 (.04)**	.53 (.001)
Measuring jugular venous pressure	.19 (.86)	.18 (.90)	.39 (.19)	**1.19** (<.001)	.00 (1.00)	.20 (.84)	**1.01 (<.001)**
Interpreting a systolic murmur	.30 (.34)	.18 (.85)	**.56 (.002)**	**.60 (.01)**	.12 (.97)	.38 (.17)	.42 (.23)
Interpreting a diastolic murmur	−.01 (1.00)	−.33 (.45)	.13 (.95)	**.60 (.03)**	.32 (.48)	.45 (.10)	**.93 (<.001)**
Detecting a pleural effusion	.38 (.18)	.19 (.86)	**.81 (<.001)**	**.91 (<.001)**	.19 (.85)	**.62 (.006)**	.72 (.007)
Detecting clubbing	.46 (.05)	.37 (.28)	**.47 (.03)**	**.66 (.006)**	.09 (.99)	.10 (.98)	.30 (.63)
Detecting ascites	.31 (.28)	−.09 (.99)	.12 (.94)	−.03 (1.00)	.40 (.14)	.21 (.73)	.06 (1.00)
Detecting splenomegaly	**.59 (.01)**	−.14 (.95)	.31 (.32)	**.70 (.004)**	**.73 (.001)**	.46 (.09)	**.85 (.001)**
Determining vertical liver span	.14 (.95)	.12 (.98)	**.51 (.04)**	**.83 (.001)**	.03 (1.00)	.39 (.27)	**.71 (.02)**
Distinguishing between a mole and melanoma	**.60 (.01)**	**.74 (.003)**	**.51 (.04)**	**.72 (.01)**	−.15 (.96)	−.23 (.78)	−.03 (1.00)
Detecting a breast mass in a female patient	**.80 (<.001)**	.19 (.86)	**.50 (.02)**	**1.00 (<.001)**	**.61 (.01)**	.31 (.45)	**.81 (.001)**
Detecting a thyroid nodule	**.57 (.009)**	.02 (1.00)	.37 (.19)	**.92 (<.001)**	**.55 (.03)**	.35 (.34)	**.90 (<.001)**
Nondilated fundoscopic examination using an ophthalmoscope to assess retinal vasculature	.51 (.14)	−.03 (1.00)	−.09 (.99)	**.87 (.006)**	.53 (.16)	−.06 (1.00)	**.89 (.008)**
Detecting a positive straight-leg raise sign	**.73 (<.001)**	−.16 (.93)	.29 (.47)	**.77 (.003)**	**.89 (<.001)**	.45 (.13)	**.93 (<.001)**

p-values in parentheses, significant p-values boldfaced

Table 4. Mean Perceived Utility of Individual Physical Examination Skills by Training Level

Physical examination skill	All responders	M3	M4	PGY-1	PGY-2–4	Faculty Internists
Overall perceived utility of physical examination skills	4.2 [0.7]*	4.4 [0.7]	4.4 [0.5]	3.9 [0.8]	4.0 [0.7]	4.1 [0.7]
Measuring blood pressure	4.9 [0.3]	4.8 (1)† [0.4]	4.9 (1) [0.3]	4.8 (1) [0.4]	4.9 (1) [0.4]	4.9 (1) [0.2]
Distinguishing between a mole and melanoma	4.7 [0.6]	4.7 (2) [0.6]	4.8 (2) [0.5]	4.7 (2) [0.6]	4.6 (2) [0.6]	4.7 (2) [0.5]
Detecting a breast mass in a female patient	4.6 [0.6]	4.5 (3) [0.7]	4.6 (3) [0.6]	4.5 (3) [0.6]	4.5 (3) [0.6]	4.7 (2) [0.5]
Detecting a pleural effusion	4.3 [0.7]	4.4 (4) [0.7]	4.5 (5) [0.6]	4.0 (6) [0.8]	4.3 (4) [0.7]	4.2 (5) [0.9]
Detecting ascites	4.3 [0.8]	4.3 (5) [0.6]	4.6 (3) [0.5]	4.1 (4) [0.8]	4.2 (6) [0.9]	4.2 (5) [0.8]
Detecting a thyroid nodule	4.2 [0.8]	4.2 (7) [0.8]	4.4 (6) [0.7]	3.9 (9) [0.8]	4.2 (6) [0.7]	4.2 (5) [0.6]
Interpreting a systolic murmur	4.2 [0.7]	4.3 (5) [0.8]	4.2 (9) [0.7]	4.0 (6) [0.8]	4.2 (6) [0.7]	4.1 (8) [0.7]
Interpreting a diastolic murmur	4.2 [0.8]	4.2 (7) [0.8]	4.3 (8) [0.8]	4.0 (6) [0.8]	4.2 (6) [0.8]	4.1 (8) [0.8]
Detecting splenomegaly	4.1 [0.8]	4.1 (9) [0.8]	4.4 (6) [0.6]	3.8 (10) [0.7]	4.1 (10) [0.7]	4.3 (4) [0.8]
Measuring jugular venous pressure	4.0 [0.9]	3.9 (10) [1.0]	3.9 (11) [0.8]	4.1 (4) [0.6]	4.3 (4) [0.8]	3.9 (10) [0.9]
Detecting a positive straight-leg raise sign	3.8 [0.9]	3.8 (11) [0.9]	4.0 (10) [0.9]	3.6 (12) [0.9]	3.6 (13) [0.9]	3.6 (12) [0.9]
Nondilated fundoscopic examination using an ophthalmoscope to assess retinal vasculature	3.7 [0.9]	3.8 (11) [1.0]	3.7 (13) [1.0]	3.7 (11) [0.9]	3.8 (11) [0.9]	3.5 (14) [0.8]
Determining vertical liver span	3.7 [0.9]	3.6 (13) [1.1]	3.8 (12) [0.9]	3.5 (13) [0.9]	3.8 (11) [0.8]	3.6 (12) [0.8]
Detecting clubbing	3.5 [1.1]	3.5 (14) [1.1]	3.6 (14) [1.0]	3.1 (14) [1.1]	3.5 (14) [1.1]	3.7 (11) [1.0]

Perceived utility scale: 1 = "Not at all Useful"; 3 = "Neutral"; 5 = "Very Useful"
**Standard deviation is in brackets*
†Relative ranking of perceived utility for each physical examination skill within each group is in parentheses

performed key vital sign measurement. It is worrisome that some skills, such as the nondilated fundoscopic exam to assess retinal vasculature, detecting a thyroid nodule, and interpreting a diastolic murmur, had the lowest self-confidence scores through all groups. This raises concern that there is little improvement in self-confidence in particular physical examination skills despite continued training and experience.

We expected that M3 students would have less self-confidence in most individual skills compared to other levels.

Table 5. Differences Between Overall Mean Perceived Utility and Self-Confidence in Individual Physical Examination Skills

Physical examination skill	Difference	Perceived utility	Self-confidence
Distinguishing between a mole and melanoma	1.5	4.7 [0.6]*	3.2 [1.0]
Detecting a thyroid nodule	1.4	4.2 [0.8]	2.8 [0.9]
Interpreting a diastolic murmur	1.3	4.2 [0.8]	2.9 [0.9]
Detecting a breast mass in a female patient	1.2	4.6 [0.6]	3.4 [0.9]
Nondilated fundoscopic examination using an ophthalmoscope to assess retinal vasculature	1.2	3.7 [0.9]	2.5 [1.1]
Measuring jugular venous pressure	1.0	4.0 [0.9]	3.0 [1.0]
Detecting splenomegaly	0.9	4.1 [0.8]	3.2 [0.9]
Detecting a pleural effusion	0.8	4.3 [0.7]	3.5 [0.9]
Interpreting a systolic murmur	0.6	4.2 [0.6]	3.6 [0.8]
Detecting ascites	0.4	4.3 [0.8]	3.9 [0.8]
Measuring blood pressure	0.2	4.9 [0.3]	4.7 [0.6]
Determining vertical liver span	0.2	3.7 [0.9]	3.5 [1.0]
Detecting a positive straight-leg raise sign	−0.1	3.8 [0.9]	3.9 [1.0]
Detecting clubbing	−0.7	3.5 [1.1]	4.2 [0.9]

Perceived utility scale: 1 = "Not at all Useful"; 3 = "Neutral"; 5 = "Very Useful." Self-confidence scale: 1 = "Not at all Confident"; 3 = "Neutral"; 5 = "Very Confident"
**Standard deviation is in brackets*

However, we found that M3 students had less confidence than PGY-1 residents in only one skill, and a lack of significant difference in overall self-confidence in physical examination skills between these 2 groups. Overall self-confidence was generally higher at advanced training levels, but M4 students had more self-confidence than did PGY-1 residents. One explanation may be that M4 students have an artificially inflated self-confidence because, having completed the third year of medical school, they possess a new sense of accomplishment and mastery, whereas PGY-1 residents, confronted with newfound responsibility for patient care, realize their deficiencies in skill, thereby casting lower perceptions of their abilities. Alternatively, PGY-1 residents' lower self-confidence may be attributed to their having learned the physical exam at various different medical schools with different curricular experiences, whereas M3 and M4 students were from one institution, and PGY-2–4 residents had spent at least 1 year training in the same institution. A recent study of students in an inpatient medicine clerkship showed that students spent more time with interns than residents, and seemed more satisfied with physical examination instruction by interns compared to residents.[20] However, our study implies that, during a critical time in their education, medical students in clerkships may not be learning the physical examination from the most optimal teachers. Interestingly, a recent study by McMahon et al. showed that upper-level Internal Medicine residents rated their overall physical examination skills lower than those of medical students and PGY-1 residents.[21] In our study, we found that M3 students had lower self-confidence, and PGY-1 residents had similar self-confidence, when compared to upper-level residents.

Our results also show that even the faculty Internists, although having relatively higher confidence in their physical examination skills, nonetheless still have areas where they rate their skills as only slightly above "Neutral." It has been shown that faculty attending physicians' observations of housestaff physical examination skills can reveal a high incidence of errors.[22] However, our study raises the question of how faculty can be the "gold standard" of physical exami-

nation skills if their self-confidence is not much different than that of housestaff.

Our study demonstrates that there are also differences across levels of training in perceived utility regarding overall and individual physical examination skills, as we saw with self-confidence. It was reassuring that all groups reported greatest perceived utility in measuring blood pressure and reported perceived utility above "Neutral" for all skills. However, 2 commonly taught skills, detecting clubbing and determining vertical liver span, consistently had the lowest perceived utilities, raising concern that the clinical context of these skills may not be fully appreciated. Furthermore, our finding that housestaff have an overall decreased perceived utility of the physical examination compared to medical students is troublesome because this attitude could potentially negatively affect the students' perspective on clinical skills.

Overall, the physical examination skills with the largest numerical differences between self-confidence and perceived utility included distinguishing between a mole and melanoma, detecting a thyroid nodule, interpreting a diastolic murmur, detecting a breast mass in a female patient, and the nondilated fundoscopic examination using an ophthalmoscope to assess retinal vasculature. Although these numerical differences have no measurable units, they indicate, nonetheless, areas in which instruction and practice in these physical examination skills need improvement at all training levels.

Regarding specific physical examination skills, a previous study of Internal Medicine and family medicine residents found high importance attributed to cardiac auscultation and relatively lower self-confidence in this skill, but without comparison to other skills.[5] Although we have shown that, compared to other skills, interpretations of systolic and diastolic murmurs have a lower perceived utility, there still exists a gap between self-confidence and perceived utility, particularly with interpretation of a diastolic murmur. These findings combined demonstrate a continued need to improve the teaching of cardiac auscultation skills and emphasize the utility of these skills.

Interestingly, although having a relatively lower self-confidence score, the nondilated fundoscopic examination using an ophthalmoscope to assess retinal vasculature also had a relatively lower perceived utility score. In fact, among the faculty Internists, this skill had the lowest perceived utility score. Was this because it is a difficult exam to master, and so medical students and physicians are prone to de-emphasize its importance? Would our results have been different had we specified using the new technology of the PanOptic ophthalmoscope? It is also possible that respondents felt that this exam is better done by an ophthalmologist and could be accomplished by emergent consultation if necessary. This area could be further studied to see if there is a change in attitude toward this skill using this new technology.

Our study had several limitations. The study investigated a limited set of physical examination skills and was conducted at only one institution. The study was done during an academic training year, thereby including variation in skill level because of differing educational and training experiences within each medical student and resident class. The students were from one medical school, whereas the residents and faculty graduated from many different schools. The residents are also all former students who chose Internal Medicine, whereas the students may not necessarily be entering Internal Medicine. Our questions regarding self-confidence and perceived utility were inherently subjective. Furthermore, there was no objective assessment of participants' physical exam skills to validate the self-ratings. It is well-known that physicians' self-assessment do not correlate with actual skill when examined with external assessment, as recently summarized in a systematic review by Davis et al.[23] In addition, our use of a 5-point Likert-type scale in assessing self-confidence and perceived utility, even with "3 = Neutral," does not provide a clear minimum acceptable standard with which to compare respondents' ratings. Finally, it is unclear what the implication of confidence in and perceived utility of physical examination skills has on patient care and outcomes.

However, our study had strengths that should be noted. To the best of our knowledge, no study has been done investigating the attitudes toward a wide variety of physical examination skills over the spectrum of educational and training levels from medical student to faculty Internist at one institution. Furthermore, no other studies have shown a comparison of the relative perceived utilities of specific components of the physical examination. Those who view specific skills as having less utility may be less likely to be motivated to improve their competence in these skills, even if they have less self-confidence.

Knowledge and performance of the physical examination is essential to a physician. For most medical students, however, the learning of the physical examination during medical school is best described as variable. It has long been known that teaching of clinical skills requires time and patience, yet the most qualified physicians for this instruction are often unavailable because of other commitments, thereby leaving medical housestaff recruited to teach the physical examination to medical students.[24] Yet, few residency programs provide additional instruction in physical examination skills. Housestaff, when in doubt of a finding, typically turn to attending physicians for guidance, and it is assumed that they, given their experience, are more proficient in the physical exam. However, as we have shown, even if faculty Internists may potentially be competent in their skills, they do not have complete confidence, and this may contribute to the decline in teaching at the bedside, although they acknowledge that this will lead to decreased skills in medical students and residents.[25]

With easier access to and widespread use of technology, such as the echocardiogram, magnetic resonance imaging, and computed tomography, physicians may find themselves hesitant to rely on their own physical findings in diagnosing disease; rather, technologic diagnosis is viewed as the means to diagnostic confidence.[2] Still, being able to perform a physical examination confidently and competently may perhaps decrease the inappropriate use of more expensive diagnostic confirmatory tests. Indeed, it has been shown that physical examination, in conjunction with patient history, leads to the correct diagnosis much of the time.[26] A doctor's physical examination skills remain as critical tools in patient care, as well as in teaching students and residents about patient care. Faculty teaching physicians must continue to emphasize and exhibit confidence in the physical examination and undertake improvement in their skills to teach properly future generations of physicians.

Acknowledgments: *We appreciate the assistance of Dr. D. Michael Elnicki in the editing of this manuscript. This work was presented as a poster at the 2004 Society of General Internal Medicine Annual Meeting and as an oral abstract at the 2004 Rhode Island Regional*

Meeting of the American College of Physicians. At the time of the study, Dr. Wu was a resident in General Internal Medicine, and this work was supported by the Melvin D. Hoffman Award from the Division of General Internal Medicine at Rhode Island Hospital. We appreciate the participation of medical students from The Warren Alpert Medical School of Brown University and the medical housestaff and teaching faculty of Rhode Island Hospital.

Conflict of Interest: *None disclosed.*

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