

A Novel Survey Tool to Assess Pulmonary and Critical Care Fellows' Attitudes Regarding Acquiring Teaching Skills During Fellowship Training

JEREMY B. RICHARDS, MD, MA
EMER KELLY, MD
HENRY FESSLER, MD
DAVID H. ROBERTS, MD

Abstract

Background Important components of fellowship training include learning teaching skills and career development. Pulmonary and critical care medicine (PCCM) fellows' opinions of the importance of developing teaching skills and interest in careers in medical education have not been previously described, and there are no tools to assess interest in acquiring teaching skills.

Objective We describe the development and initial psychometric validation of a survey tool to assess trainees' attitudes toward and interest in acquiring teaching skills.

Methods A survey tool to assess attitudes toward teaching and medical education skills was designed and psychometrically characterized. We then anonymously surveyed fellows in 1 PCCM program to assess their perceptions of and attitudes regarding acquiring teaching skills.

Results The survey tool demonstrated acceptable psychometric properties. The survey showed that most fellows felt that acquiring teaching skills was "very important," and nearly half reported being "interested" or "very interested" in pursuing careers as medical educators. However, fellows disagreed with the feedback they received from attending physicians with regard to their teaching abilities (10% disagreed with feedback at the beginning of the year, 36% disagreed at the end of the year; $P = .03$).

Conclusions Our survey demonstrates acceptable psychometric properties and performance characteristics in a single-site study of PCCM fellows during 1 academic year. Fellows are interested in improving their teaching skills but do not know how to become better teachers. Added research in multiple settings should explore the generalizability of our findings.

Editor's Note: The online version of this article contains finalized fellow survey questions after development, independent review, and pilot testing; a revised version of fellow survey questions for use in subsequent studies; and a loading plot demonstrating correlations between first 2 survey components and Likert-based survey questions.

Jeremy B. Richards, MD, MA, is Instructor in Medicine, Carl J. Shapiro Institute for Education & Research, Beth Israel Deaconess Medical Center; **Emer Kelly, MD**, is Research Fellow, Harvard Combined Pulmonary Fellowship Program, Massachusetts General Hospital; **Henry Fessler, MD**, is Associate Professor of Medicine, Division of Pulmonary and Critical Care Medicine, Johns Hopkins; and **David H. Roberts, MD**, is Associate Professor of Medicine, Carl J. Shapiro Institute for Education & Research, Beth Israel Deaconess Medical Center.

Funding: The authors report no external funding source for this study.

The authors would like to thank Richard M. Schwartzstein, MD, and Amy M. Sullivan, PhD, for providing expert review of the survey tools described in this study.

Corresponding author: Jeremy B. Richards, MD, MA, 330 Brookline Avenue, KSB-23, Boston, MA 02215, 617.667.5864, jbrichar@bidmc.harvard.edu

Received June 13, 2012; revision received January 7, 2013; accepted February 23, 2013.

DOI: <http://dx.doi.org/10.4300/JGME-D-12-00153.1>

Introduction

Teaching is a core component of academic medical practice and is embodied in the etymology of the word *doctor* from the Latin *doctorem*, or "teacher."¹ The Accreditation Council for Graduate Medical Education's (ACGME's) practice-based learning and improvement competency requires trainees to "participate in the education of patients, families, students, residents, and other health care professionals."²

The literature indicates that residents consider teaching an important component of their training,^{3,4} and that attending physicians and residency programs encourage resident teaching to improve residents' knowledge, communication skills, time management, and clinical reasoning.^{5,6}

Fellows' attitudes toward teaching skills have rarely been examined,⁷⁻¹¹ and there is only 1 prior study focused on pulmonary and critical care medicine (PCCM) fellows' perspectives.¹² The importance that PCCM fellows place on acquiring and improving teaching skills during fellowship has not been previously measured. We developed and psychometrically characterized a survey tool to assess

fellows' attitudes regarding the acquisition of teaching skills. Using this survey tool, we performed a prospective, observational cohort study to evaluate the survey tool's ability to assess the attitudes regarding and perceptions of the importance of acquiring teaching skills. We studied first-year through fourth-year fellows at the Harvard Combined PCCM Fellowship Program during 1 academic year.

Methods

Fellows' Survey

As our literature review did not identify existing survey tools for assessing fellows' perspectives and attitudes regarding teaching skills, we developed questions to measure these domains. We designed questions to assess the domains of "interest in medical education" and "perception of support [in the acquisition of teaching skills]." Candidate questions were designed to minimize bias, redundancy, and confusion,¹³ and were edited by the authors in an iterative fashion to optimize content, length, and relevance to survey goals.¹⁴ We then asked 3 faculty members at our institution with medical education experience and familiarity with survey design to review the survey and edited the survey on the basis of this feedback. The final draft was piloted with 4 PCCM fellows to assess clarity, survey length, and identify redundant questions.¹⁵ The final version of the survey was administered to PCCM fellows at the 4-year Harvard Combined PCCM Fellowship Program (the survey instrument is provided as online supplemental material).

The anonymous survey was first administered online in August 2010, and the second administration occurred in June 2011. A self-generated identification was used to match both surveys for each participant.

The study protocol was reviewed by the Beth Israel Deaconess Medical Center Institutional Review Board and determined to be exempt.

Statistical Analyses

Statistical analyses were performed with JMP Pro version 9.0 (SAS Institute Inc, Cary, NC). Cronbach α was calculated to assess for internal reliability of the survey items. We performed principal component analysis on correlations of responses from the beginning and end of the year (collapsed and decoupled from subject identification) to assess for variance per component and weighted correlations between questions. We also performed 2-tailed *t* tests to compare fellows' answers from the beginning of the year to those from the end of the year.

Results

Fellows' Survey

Twenty-seven of 34 fellows (78%) completed the survey at the beginning of the academic year, compared to 31 of 34 (91%) at the end of the year (TABLE 1).

TABLE 1 FELLOWS' SURVEY RESPONSE RATES^a

Year of Training ^b	Response Rate No., %
Beginning of year	
1	8 (89)
2	6 (75)
3	6 (67)
4	7 (88)
Total	27 (78)
End of year	
1	9 (100)
2	7 (88)
3	8 (100)
4	7 (88)
Total	31 (91)

^a Characteristics of the fellows surveyed.

^b Years 1 and 2 are primarily clinical; years 3 and 4 are primarily devoted to research.

Principal component analysis demonstrated clustering of questions into components and graphically displayed between-question correlations (principal component analysis data are provided as online supplemental material). Cronbach α for the entire set was 0.648.

Responses on the 10-point Likert scales were collapsed into subgroups for ease of interpretation and generalizability of the results (TABLE 2). Changes from the beginning to the end of the year were determined by comparing results from all fellows for a given question. Most felt that acquiring teaching skills was "important" or "very important" at the beginning of year (89%) compared to the end of year (84%, $P = .15$). Approximately half the fellows indicated they were "interested" or "very interested" in pursuing careers as medical educators (beginning of year = 55%, end of year = 46%; $P = .30$).

Despite positive attitudes toward teaching skills and interest in pursuing careers in medical education, most fellows were uncertain as to what skills they needed to become better teachers, with a minority indicating it was "very clear" what skills they needed (beginning of year = 26%, end of year = 16%; $P = .92$).

Our questions relating to fellows' attitudes about the feedback they received from faculty regarding their teaching skills revealed that the frequency with which fellows disagreed with faculty feedback showed a statistically significant increase during the academic year (beginning of year = 11% disagreed with feedback, end of year = 36% disagreed; $P = .02$). There were no across-group (by

TABLE 2 FELLOWS' SURVEY RESPONSES FROM THE BEGINNING AND END OF THE YEAR^a

Survey Question	Beginning of the Year Results	End of the Year Results	<i>P</i> Value for Difference for All Fellows From Beginning to the End of the Year
1. On ICU rotation(s), how frequently were you observed teaching medical students and/or residents by an attending physician?	Daily or weekly: 70%	Daily or weekly: 52%	.03
	Less than weekly: 33%	Less than weekly: 48%	
2. On pulmonary consult rotation(s), how frequently were you observed teaching medical students and/or residents by an attending physician?	Daily or weekly: 35%	Daily or weekly: 26%	.28
	Less than weekly: 65%	Less than weekly: 74%	
3. How frequently do you receive any feedback from an attending physician about your teaching?	Rare (1–3): 26%	Rare (1–3): 36%	.90
	Occasional (4–6): 60%	Occasional (4–6): 55%	
	Often (7–10): 15%	Often (7–10): 10%	
4. How often do you receive useful feedback about your teaching?	Rare (1–3): 22%	Rare (1–3): 32%	.59
	Occasional (4–6): 63%	Occasional (4–6): 48%	
	Often (7–10): 15%	Often (7–10): 19%	
5. Do you often disagree with your attending physicians' feedback about your teaching skills?	Rare (1–3): 89%	Rare (1–3): 64%	.02
	Occasional (4–6): 11%	Occasional (4–6): 36%	
	Often (7–10): 0%	Often (7–10): 0%	
6. Do you feel more or less comfortable as a teacher since having started fellowship?	More comfortable: 90%	More comfortable: 86%	.56
	No change: 10%	No change: 14%	
	Less comfortable: 0%	Less comfortable: 0%	
7. How important are teaching skills to your future career?	Minimal/moderate (1–6): 11%	Minimal/moderate (1–6): 15%	.30
	Important (7–9): 33%	Important (7–9): 48%	
	Very important (10): 56%	Very important (10): 36%	
8. Is it clear what skills you need to learn or to improve to become a better teacher?	Not at all (1–3): 19%	Not at all (1–3): 16%	.92
	Moderate (4–6): 56%	Moderate (4–6): 68%	
	Very clear (7–10): 26%	Very clear (7–10): 16%	
9. Would you be interested in a 2-week elective rotation dedicated to improving your teaching skills?	Not at all (1–3): 11%	Not at all (1–3): 26%	.29
	Moderate (4–6): 33%	Moderate (4–6): 29%	
	Very interested (7–10): 56%	Very interested (7–10): 45%	
10. How interested are you in pursuing a career as a medical educator?	Minimal/moderate (1–6): 44%	Minimal/moderate (1–6): 54%	.30
	Interested (7–10): 33%	Interested (7–10): 36%	
	Very interested (10): 22%	Very interested (10): 10%	

Abbreviation: ICU, intensive care unit.

^a Fellow survey questions with answers from the beginning and end of the academic year. The 10-point Likert scales are collapsed into subgroups; the percentages associated with each subgroup represent the total number of fellows answering within the specified range of responses. The *P* values reflect comparisons of all responses (and not for the frequency of specific categories of answers) between the entire cohort (all subgroups) at the beginning and the end of the year. Bolded *P* values indicate a statistically significant difference between the answers at the end as compared to the beginning of the year.

year) or within-group differences for a specific fellowship class when comparing beginning of year versus end of year.

Discussion

We describe the development and preliminary psychometric properties of a survey tool to assess fellows' attitudes

about teaching and present results from a single-center cohort study of PCCM fellows.

Despite a somewhat low Cronbach α , our fellow survey tool meets criteria for content validity, as participants' answers indicate consistency with both pretesting expert validation and pilot testing.

The strongest indication of construct validity we offer is the clustering of similar questions on principal component analysis (provided as online supplemental material). Limited added evidence of construct validity is found in the consistency of the results of our study and prior studies of residents^{3,4} and fellows.⁷ Our survey found that most fellows were interested in improving their teaching skills and a sizeable percentage were interested in pursuing careers in medical education. During a year of fellowship training, fellows maintained positive attitudes toward teaching skills, yet most fellows reported they did not know what specific skills they needed, and this did not change after a year of fellowship training.

Fellows' increasing disagreement with faculty feedback as the year progressed may reflect fellows' increased clinical knowledge and increased experience as teachers from the beginning to the end of the year. However, the specific reasons for this attitudinal shift were not determined in this study. Our findings are consistent with prior studies of residents and their perceptions of obstacles to acquiring teaching skills.^{3,4}

Our study has limitations. This initial survey was conducted at a single fellowship program, which focuses on training academic physicians, and likely attracts and selects applicants with attitudes toward teaching skills that may differ from other programs.

In addition, the range of the Likert scales used in the survey tool may have been too wide, and future iterations of the tool will use scales ranging from 1 to 5 rather than 1 to 10 (provided as online supplementary material). This will obviate the need to cluster responses in future studies, increasing the utility and ease of interpretation of the survey results.

Conclusion

Our survey tool to assess PCCM fellows' attitudes toward learning teaching skills and interest in careers in medical education demonstrated moderate performance. Most fellows supported the importance of learning teaching skills, but most were unclear as to how to acquire these skills. Half of the fellows were interested in medical education careers and this interest persisted during fellowship. Our finding

that most fellows did not know what would improve their teaching skills suggests that increased attention to explicitly developing fellows' teaching skills may fill an unfilled educational need.

Further studies of more heterogeneous populations of PCCM fellows and other trainees are necessary to draw definitive conclusions regarding fellows' attitudes toward acquiring teaching skills. Future research also is needed to assess construct validity in different populations of learners, generalizable to PCCM fellows in other settings and potentially other trainees.

References

- 1 Simpson J, Weiner ESC, eds. *The Oxford English Dictionary*. 2nd ed. Oxford, England: Clarendon Press; 1989.
- 2 Accreditation Council for Graduate Medical Education. ACGME practice-based learning and improvement core competency. https://www.acgme.org/acgmeweb/Portals/0/PDFs/commonguide/IVA5c_EducationalProgram_ACGMECompetencies_PBLI_Explanation.pdf. Accessed April 10, 2013.
- 3 Apter A, Metzger R, Glassroth J. Residents' perceptions of their role as teachers. *J Med Educ*. 1988;63(12):900–905.
- 4 Busari JO, Prince KJ, Scherpbier AJ, Van Der Vleuten CP, Essed GG. How residents perceive their teaching role in the clinical setting: a qualitative study. *Med Teach*. 2002;24(1):57–61.
- 5 Bordley DR, Litzelman DK. Preparing residents to become more effective teachers: a priority for internal medicine. *Am J Med*. 2000;109(8):693–696.
- 6 Busari JO, Scherpbier AJ, van der Vleuten CP, Essed GG. The perceptions of attending doctors of the role of residents as teachers of undergraduate clinical students. *Med Educ*. 2003;37(3):241–247.
- 7 Thompson BM, Searle NS, Gruppen LD, Hatem CJ, Nelson EA. A national survey of medical education fellowships. *Med Educ Online*. 2011;16.
- 8 Wilson S, Denison AR, McKenzie H. A survey of clinical teaching fellowships in UK medical schools. *Med Educ*. 2008;42(2):170–175.
- 9 Warshaw GA, Bragg EJ, Shaull RW, Goldenhar LM, Lindsell CJ. Geriatric medicine fellowship programs: a national study from the Association of Directors of Geriatric Academic Programs' Longitudinal Study of Training and Practice in Geriatric Medicine. *J Am Geriatr Soc*. 2003;51(7):1023–1030.
- 10 Backes CH, Reber KM, Trittmann JK, Huang H, Tomblin J, Moorehead PA, et al. Fellows as teachers: a model to enhance pediatric resident education. *Med Educ Online*. 2011;16.
- 11 Carmody S, Meier D, Billings JA, Weissman DE, Arnold RM. Training of palliative medicine fellows: a report from the field. *J Palliat Med*. 2005;8(5):1005–1015.
- 12 Kempainen RR, Hallstrand TS, Culver BH, Tonelli MR. Fellows as teachers: the teacher-assistant experience during pulmonary subspecialty training. *Chest*. 2005;128(1):401–406.
- 13 Fowler F. *Improving Survey Questions: Design and Evaluation*. Thousand Oaks, CA: SAGE; 1995.
- 14 Gehlback H, Artino AR, Durning S. AM last page: survey development guidance for medical education researchers. *Acad Med*. 2010;85(5):925.
- 15 Karabenick SA, Woolley ME, Friedel JM, Ammon BV, Flazevski J, Bonney CR, et al. Cognitive processing of self-report items in educational research: do they think what we mean? *Educ Psychol*. 2007;42(3):139–151.