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Promoting addiction medicine teaching through functional mentoring by co-training generalist chief residents with faculty mentors

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Abstract

Background: Generalist physicians should play a vital role in identifying and managing individuals with substance use but are inadequately trained to do so.

Methods: This 5 year (2008–2012) controlled educational study assessed whether internal medicine and family medicine chief residents' (CRs) addiction medicine teaching increased by co-training with faculty mentors at a Chief Resident Immersion Training (CRIT) program in addiction medicine. All CRIT CR attendees identified a residency program faculty mentor to support addiction medicine teaching after CRIT through functional mentoring with a focus on developing and implementing an Addiction Medicine Teaching Project ("Teaching Project"). Approximately half of the CRs attended CRIT with their mentor (*co-trained*) and half without their mentor (*solo-trained*). Addiction medicine teaching outcomes were compared between groups using 6- and 11-month questionnaires and 4 bi-monthly teaching logs. Of *co-trained* CRs, mentor characteristics that positively influenced addiction medicine teaching outcomes were identified.

Results: 100 CRs from 74 residency programs attended CRIT from 2008–2012; 47 *co-trained* with their mentors and 53 *solo-trained* without their mentors. At 6-month follow-up, the *co-trained* CRs were more likely to meet at least monthly with their mentor (22.7% v. 9.6%, $p < 0.01$), and more likely to identify their mentor as a facilitator for Teaching Project implementation (82.2% v. 38.5%, $p < 0.01$). At 11-month follow-up a higher percentage of *co-trained* CRs had completed

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their Teaching Project (34.0% v 15.1% $p < 0.05$). Both CR groups had similarly large increases in other addiction medicine teaching outcomes. Mentors with more experience, including years of teaching, was associated with better CR Teaching Project outcomes.

Conclusions: Co-training generalist chief residents with a faculty mentor appeared to facilitate functional mentoring driven Teaching Project implementation but did not further increase already high levels of other addiction medicine teaching. Faculty mentors with more years of teaching experience were more effective in facilitating Teaching Project implementation.

Keywords

mentoring; addiction medicine; teaching; program evaluation

Introduction

In the US, unhealthy substance use including risky use (e.g., binge alcohol) and substance use disorders are prevalent. According to the 2016 US National Survey on Drug Use and Health, of US adults, 24.2% reported past month binge alcohol use, 10.6% reported past month illicit drug use, 5.6% met criteria for an alcohol use disorder and 2.7% met criteria for a drug use disorder.¹ Despite availability of evidence-based pharmacologic and non-pharmacologic treatments for substance use disorders² only 10.6% of US adults with a substance use disorder receive treatment.¹

Many individuals with substance use present for care in generalist outpatient and inpatient practice settings with undiagnosed substance use disorders, poorly treated chronic medical³ and psychiatric co-morbidities⁴ and substance-related complications (e.g., withdrawal).² It has also been shown that patients with active substance use are less likely to receive routine health care maintenance (e.g., cancer screening, vaccinations)⁵, and are more likely to have recurrent acute care hospital utilization.⁶ Along with the entire healthcare team it is important for generalist providers to be competent in identifying and managing individuals with unhealthy alcohol and other drug use. This role is supported by the recommendation over a decade ago by the US Preventive Services Task Force that clinicians should screen adults for unhealthy alcohol use and provide brief behavioral counseling to reduce alcohol misuse.⁷ In addition, generalist physician training in addiction medicine is an important element in multipronged efforts to mitigate the current opioid morbidity and mortality crisis.⁸

Because of the high prevalence and relevance of substance use and addiction in generalist physician practices, addiction medicine core competencies in generalist residency training have been defined.^{9,10} Although addiction medicine training in Graduate Medical Education remains inadequate,^{11,12} successes in incorporating addiction medicine into Undergraduate¹³ and Graduate Medical Education have occurred.^{14–18} One example is the Chief Resident Immersion Training (CRIT) program in addiction medicine, which targeted internal medicine and family medicine chief residents (CRs) to successfully increase addiction medicine teaching to other residents and medical students.¹⁹ CRs were targeted because they play a key role in training future physicians²⁰ and often become change agents in future leadership roles.²¹

In the initial evaluation of the CRIT program¹⁹, CR attendees reported that faculty mentor support was one of the top facilitators to successfully completing an Addiction Medicine Teaching Project following the immersion training.¹⁹ To capitalize on the mentor role, in 2008 the CRIT program adopted a “functional mentoring” model²² which pairs a CR attendee with a residency program faculty mentor to accomplish a specific project, in this case increasing the CRs’ addiction medicine teaching including implementation of an Addiction Medicine Teaching Project. The purpose of this study is to evaluate how CRs’ addiction medicine teaching and Teaching Project implementation are influenced through functional mentoring when CRs were *co-trained* with their mentor compared to CRs who were *solo-trained* without their mentor at the CRIT program in addiction medicine.

Methods

Study Design

A five-year (2008–2012) evaluation of co-training incoming generalist (internal medicine, family medicine) chief residents (CRs) with faculty mentors (“mentor”) at a four-day Chief Resident Immersion Training (CRIT) program in addiction medicine. The CRIT program, funded by the National Institute on Drug Abuse (NIDA), supported full scholarships for approximately 20 CR attendees per year. All CR attendees were required to identify a faculty mentor at their residency program to support their addiction medicine teaching, including the implementation of an Addiction Medicine Teaching Project (“Teaching Project”). It was recommended that the CR preferentially select a mentor who was actively engaged in residency program teaching. All mentors wrote a letter of support for their CR to attend CRIT, detailing how they would support the CR’s addiction medicine teaching and Teaching Project implementation. Mentors had the option to apply to be co-trained with their CR; however, mentors needed to pay for their own travel and accommodations as there were no scholarships available for mentor attendees. Mentor attendees received free Continuing Medical Education credits. Based on space limitations a maximum of 10 mentor slots were available each year.

Acceptance of CR applicants was determined by the CRIT program directors (DPA, JHS) based on CR educational achievement, amount of time dedicated to CR teaching at their institution, number of residents in their training program and quality of their personal statement and letters of support. If there were more than 10 faculty mentors applying to be co-trained with their CRs in a given year, the CRIT program directors prioritized mentor acceptance based on a subjective assessment of which mentors had the most potential to benefit from attending CRIT. This study compares addiction medicine teaching and Teaching Project implementation outcomes between CRs *co-trained* with their mentor and CRs *solo-trained* without their mentor at the CRIT program.

Chief Resident Immersion Training (CRIT) in Addiction Medicine Program Description

The four-day CRIT program occurred at conference center on Cape Cod, Massachusetts and was intended to improve addiction medicine teaching by incoming generalist (i.e., internal medicine, family medicine) CRs.²³ The CRIT program provided an in-depth evidence-based synthesis of major advances in the field of addiction medicine through case-based lectures,

small group interactive sessions, journal club, skills practice sessions, visits to mutual support meetings (e.g., Narcotics Anonymous), and small group semi-structured interviews with individuals in recovery.

The CRIT core faculty, all general internists with expertise in addiction medicine and medical education, role modeled teaching methods throughout the program. To help facilitate addiction medicine teaching after CRIT, attendees received addiction medicine teaching resources, including PowerPoint presentations, case studies for small group work, instructions and role descriptions for skill practice exercises, up-to-date medical literature, and important addiction medicine websites and online resources including enrollment in an online newsletter “Alcohol, Other Drugs, and Health: Current Evidence” (www.aodhealth.org). CRIT also covered advanced teaching skills (e.g., adult learning principles, small group teaching methods, teaching the reluctant learner) and ways to integrate addiction medicine issues into different teaching venues (e.g., morning report, work rounds, morbidity and mortality rounds, preclinical and noon conferences).

During CRIT all CRs developed an Addiction Medicine Teaching Project (“Teaching Project”) intended to enhance transfer of knowledge and skills learned at CRIT to the CRs’ residency program trainees. Before attending CRIT, approximately six weeks prior to their assuming CR duties, CRs were instructed to discuss possible Teaching Projects with their residency program faculty mentors, giving consideration to residency program curricular needs and CRs’ interests. Using a Teaching Project worksheet during CRIT all CRs created Teaching Project goals, objectives, project description (content/focus, audience, setting, timing, and teaching methods), action steps, evaluation plan, potential facilitators and challenges. Examples of prior successful CR Teaching Projects include a resident workshop on mutual help recovery programs (e.g., Alcoholics Anonymous), including visiting a meeting,²⁴ and intensive resident workshops in addiction medicine.^{25,26} During CRIT all CRs met one-on-one with CRIT core faculty at least three times to develop their Teaching Project plan. CRs who *co-trained* with a mentor were instructed to attend all Teaching Project CRIT core faculty meetings with their mentor and meet with their mentor during unscheduled times to facilitate Teaching Project development. To encourage residency program support for Teaching Project implementation, a copy of the CR’s Teaching Project was sent to all CR attendee’s residency program directors and mentor (for those CRs *solo-trained*) after CRIT.

Faculty Mentors Experience at CRIT

Faculty Mentors (mentors) who were *co-trained* with their CRs participated in all CRIT educational activities described above. In addition, mentors attended an orientation run by CRIT core faculty to review their functional mentoring role both during CRIT (e.g., helping their CR with Teaching Project development) and post-CRIT (e.g., helping their CR with Teaching Project implementation and other addiction medicine teaching). Mentors also participated in a 60-minute workshop led by the CRIT core faculty education expert (AHJ) entitled “Mentoring for Mentors”. This session included helping the mentor anticipate functional mentoring challenges (e.g., time constraints) of supporting their CR Teaching Project implementation and addiction medicine teaching. Mentors identified qualities and

responsibilities of a good mentor and mentee via a brainstorming exercise. Mentors subsequently identified their own mentoring strengths and weaknesses. Mentors completed a worksheet, outlining the specific steps needed to facilitate their CRs Teaching Project implementation, such as scheduling the first CR meeting, developing a timeline and deliverables, and identifying potential challenges and solutions.

Program Evaluation

The outcome evaluation comparing the *co-trained* and *solo-trained* CRs consisted of self-assessment online questionnaires rating their specific addiction medicine teaching practices completed at the time of the CRIT application (pre-CRIT [baseline]) and 6-months post-CRIT program (follow-up). CRs also completed four bi-monthly teaching logs that focused on addiction medicine teaching (topics, frequency, methods and venues). In addition, the CRs completed an 11-month post-CRIT questionnaire about Teaching Project implementation, including challenges and facilitators to Teaching Project completion. At 11-months, each CR identified the “level of impact” of their Teaching Project to their residency program curriculum by a “check all that apply” response to the following question: “*as a result of your Teaching Project, what programmatic changes, if any, have occurred at your institution, (Response options: expanded addiction medicine curriculum, lecture or teaching event, addiction medicine screening materials, addiction medicine treatment materials, links to addiction treatment organizations, other, or nothing).*” Responses were then reviewed and coded by the program director (DPA) and manager (BLC) to create an overall Teaching Project impact variable from 1–4: (1-Nothing, 2-Minimal (e.g., single lecture), 3-Moderate (e.g., multi-day educational series) and 4-Extensive (e.g., expanded sustainable addiction medicine curriculum).

CRs were assigned a unique ID across assessments to assure confidentiality. CRs received a \$20 gift card after completing all of the follow-up questionnaires. The CRIT independent evaluator (BB) prepared baseline, 6-month and 11-month survey data in an Excel file for the statistician (MW) and aggregated and summarized all teaching-log data before sending it to CRIT program directors (DPA, JHS). The Boston University Medical Campus Institutional Review Board (IRB) determined this evaluation to be exempt from further IRB review.

Statistical Analysis

Baseline and Follow-up Surveys—Baseline characteristics of the *solo-trained* and *co-trained* CR groups were described through means and standard deviations for continuous variables, and counts and proportions for categorical variables, and analyzed using chi-square and t-tests, as appropriate. Differences between the two groups on outcomes at 6- and 11-month follow-ups were analyzed using chi-square tests for categorical outcomes and the Wilcoxon rank sum test for continuous variables. Summary characteristics of the *solo-trained* and *co-trained* groups 4 bi-monthly teaching log outcomes across 8-months were described through means and standard deviations for continuous variables, and analyzed using t-tests. Of the total possible 400 teaching logs (100 participants X 4 logs per year), there were 6 logs not completed. Logs not completed were treated as though the CR had not taught in that given time frame.

Baseline characteristics of *co-trained* mentors in comparison with CRs' Teaching Project impact were also described through means and standard deviations for continuous variables and counts and proportions for categorical variables, and analyzed using chi-square and t-tests, as appropriate. A two-sided p-value of 0.05 was considered statistically significant. Analysis of bi-monthly teaching logs was conducted using SPSS version 20 of SPSS for Microsoft Windows (IBM Corporation, Pittsburgh, PA.) All other analysis was conducted using SAS/STAT version 9.3 of the SAS System for Microsoft Windows (SAS Institute, Inc., Cary, NC, USA).

Results

Over five years (2008–2012), 100 CRs from 74 residency programs in 29 states completed the CRIT Program. All CRs attendees identified a faculty mentor in their residency program prior to attending the CRIT program. All 100 mentors wrote letters of support that verified their willingness and ability to serve as a functional mentor to assist the CR with incorporating addiction medicine into the residency program teaching and the development and implementation of an Addiction Medicine Teaching Project. Fifty-three faculty mentors applied to be co-trained with their CR of which 47 were ultimately co-trained. The other 6 mentor applicants were not co-trained for the following reasons: one was accepted but dropped out, two were not accepted due to preexisting addiction medicine expertise, and three were not accepted because there were more than 10 mentor applicants and they appeared to have comparatively less of an active teaching role in their residency program. In summary, over the 5 year study, 47 CRs were *co-trained* with their mentor and 53 CRs were *solo-trained* without their mentor.

All 100 CRs completed the baseline survey and 11-month follow-up questionnaire, and 97/100 CRs completed the 6-month follow-up questionnaire. Teaching log completion rates were as follows: Log #1 100%, Log #2 100%, Log #3 97%, Log #4 97%. CRs were similar at baseline (Table 1), with the exception of the *co-trained* group, who were more likely to be family medicine trained (16/47 (34%) v. 5/53 (9%), $p<0.01$), had fewer total number of CRs in their residency programs (3 v. 5, $p=0.01$) and self-described less time dedicated to teaching during their chief year (35% v. 44%, $p=0.01$).

Addiction Medicine Teaching Project (Teaching Project) Outcomes (Table 2)

At 6-month follow-up, the *co-trained* CRs were more likely to meet at least monthly with their mentor (22.7% v. 9.6%, $p<0.01$), and more likely to identify their mentor as a facilitator for their Teaching Project implementation (82.2% v. 38.5%, $p<0.01$). At 11-month follow-up more *co-trained* CRs had completed their Teaching Project (34.0% v. 15.1% $p<0.01$), and a nonsignificant higher self-reported "impact rating" of their Teaching Project.

Co-Trained Mentor Characteristics that Improved Teaching Project Impact Outcomes

The co-trained baseline mentor characteristics associated with improved Teaching Project completion and impact (Table 3) were more years teaching about addiction medicine (mean: 9.6 v. 2.6 years, $p<0.01$), more years as faculty when teaching was a major focus (greater

than 20% effort) (mean: 8.8 v. 3.4 years $p<0.01$), and more years since graduating from medical school (mean: 20.1 v. 10.7 years, $p<0.01$).

Addiction Medicine Teaching Practices

The four teaching logs over 8-months demonstrated high levels of teaching in both CR groups with no significant difference in number of addiction medicine topics taught or number of teaching venues. The *co-trained* CRs did use significantly more addiction medicine teaching methods (e.g., skills-based practice sessions, visits to mutual help meetings) than *solo-trained* CRs (2.9 [SD: 2.2] v 2.1 [SD: 1.6] ($p=0.03$) (Table 2)).

Discussion

The Chief Resident Immersion Training (CRIT) in Addiction Medicine effectively enhanced addiction medicine teaching by internal medicine and family medicine chief residents (CRs). Co-training CRs with faculty mentors increased CRs implementation of an Addiction Medicine Teaching Project (“Teaching Project”) during their chief residency through “functional” (i.e., project-specific) mentoring. Compared to *solo-trained* CRs, *co-trained* CRs reported more frequent post-CRIT meetings with their mentor, that their mentor was a facilitator in their Teaching Project implementation and that their Teaching Project had greater curricular impact. *Co-trained* mentors with more years of teaching experience, especially addiction medicine teaching, were more effective in facilitating the CRs Teaching Project implementation. These findings build on the previously reported success of the CRIT program¹⁹ and importantly provide evidence supporting the use of co-training CRs and their faculty mentors to facilitate functional mentoring to successfully implement a Teaching Project. This study also provides a specific example of the use of functional mentoring²² to advance medical education goals in residency training.

Functional mentoring has been used in a variety of training settings including faculty development.^{27,28} In this study, functional mentoring was used to pair and co-train the CR attendee with a faculty mentor to facilitate addiction medicine teaching and the implementation of a Teaching Project, a project that translates their newly acquired addiction medicine knowledge and skills into residency program curricular change. While both CR groups (*solo-* and *co-trained*) were encouraged to participate in functional mentoring post-CRIT the *co-trained* CRs had the advantage of a shared learning experience with their mentors, which focused on developing a realistic Teaching Project and strategies for addiction medicine teaching during their chief residency. Although all CRs met with CRIT core faculty to develop the Teaching Project, it is likely that the *co-trained* CRs with their mentors were able to benefit from their mentor knowledge and expertise regarding residency program curricular needs and potential challenges and facilitators specific to their residency programs. This model of co-training mentor and mentee to enhance successful functional mentoring may be applicable to other curricular development and implementation. Recently faculty and resident “co-learning” showed improved Quality Improvement project completion.²⁹

This educational study evaluation has several limitations worth exploring. The non-randomized nature of this controlled educational study could have led to confounding. *Co-*

trained CRs had a mentor who was willing and able (e.g., self-pay, take time away from work) to co-train with them at a 4-day immersion training program. This could indicate that the mentor was more invested in helping the CR succeed in implementing addiction medicine teaching and Teaching Project completion. However, it is also possible that the mentors who did not attend CRIT had already felt capable to mentor the CR in addiction medicine teaching without attending CRIT. It is also possible that the three mentors who applied and were not accepted due to space limitations and assessed to having comparatively less of a teaching role in the residency program compared to mentor attendees, may have further biased the results. However the assessment of mentor applicants' "perceived teaching role" was subjective and based on limited information. The CR groups were different in that *co-trained* CRs were more family medicine trained, had fewer CRs in their programs and less time dedicated to teaching. It is possible that family medicine programs may be more open to addiction medicine curricular changes. Fewer CRs per program may facilitate greater interaction between CR and core residency program faculty including the faculty mentor. However, less dedicated teaching time should have led to decreased Teaching Project completion, which we did not observe. This study relied on self-reported data that may have resulted in social desirability bias. However, all data were collected by an independent evaluator, and this bias should be equally present in both groups. Additionally, the overall small sample size makes identifying differences between groups more difficult. Despite these limitations, CRs who *co-trained* with a mentor showed significant improvement in the completion of their Teaching Projects. Also, among the sample of mentors that *co-trained* with their CRs, more experienced mentors led to better Teaching Project outcomes. Unfortunately the characteristics of the mentors who supported the *solo-trained* CRs are unknown and thus cannot be described or compared to the characteristics of the *co-trained* mentor group.

While *co-trained* CRs had greater Teaching Project implementation compared to *solo-trained* CRs, it is unclear whether these findings are due to the shared training experience or the importance of having a mentor willing and able to attend the training or a combination of both. The pragmatic approach of functional mentoring may have unique utility in medical education, in that a focused objective can be served by the efforts of a paired more senior and junior physician educator. Future educational initiatives and research should consider how this model may be adapted to other residency program curricular change.

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Table 1.

Baseline Characteristics of Chief Residents Participants Comparing those *Solo-Trained* and those *Co-Trained with Faculty Mentors*

	Overall N=100	Solo-Trained N=53	Co-Trained N=47	
Baseline Chief Resident Characteristics	N (%)	N (%)	N (%)	p-value
Gender Female	62 (62.6)	30 (57.7)	32 (68.1)	0.29
Race/ethnicity	57 (57.0)	30 (56.6)	27 (57.4)	
White	16 (16.0)	9 (17.0)	7 (14.9)	
Asian	12 (12.0)	5 (9.4)	7 (14.9)	
Hispanic	8 (8.0)	5 (9.4)	3 (6.4)	
Black/African American	1 (1.0)	0	1 (2.1)	
Native American	3 (3.0)	2 (3.8)	1 (2.1)	
Other	3 (3.0)	2 (3.8)	1 (2.1)	
More than one race				0.92
Medical Specialty	79 (79.0)	48 (90.6)	31 (66.0)	
Internal medicine	21 (21.0)	5 (9.4)	16 (34.0)	
Family medicine				<0.01
Attended a non-U.S. (or foreign) medical school	19 (19.0)	9 (17.0)	10 (21.3)	0.58
	Mean (SD)	Mean (SD)	Mean (SD)	p-value
Years between graduation from medical school and attending CRIT	3.5 (1.4)	3.4 (1.3)	3.5 (1.5)	0.73
Approximate number of residents in residency program	74.5 (47.7)	82.5 (48.7)	65.2 (45.3)	0.07
Total number of chief residents in residency program	4.0 (2.2)	4.5 (2.4)	3.4 (1.7)	0.01
Percentage of time chief resident expected to teach	39.6 (15.8)	43.7 (16.1)	35.0 (14.4)	0.01
Number who worked or volunteered in an addiction treatment setting for a month or more	20 (20.0)	9 (17.0)	11 (23.4)	0.42
Extent that substance use is included in residency program training [<i>1=not included at all, 5= included a great deal</i>]	2.7 (0.9)	2.8 (0.9)	2.7 (0.8)	0.39
Confidence in teaching related to substance use [<i>1=not at all confident, 5=very confident</i>]	2.6 (0.9)	2.6 (0.7)	2.6 (1.0)	0.97

Table 2:

Chief Resident Addiction Medicine Teaching Project Completion and Other Addiction Teaching Comparing those *Solo-Trained* versus those *Co-Trained with Faculty Mentors*

	Outcome Time	Variable	Solo-Trained N=53	Co-Trained N=47	p-value
			N (%)	N (%)	
Addiction Medicine Teaching Project	6-Month [*]	Since attending CRIT, how often did you meet with your Faculty mentor about your Teaching Project	13 (25.0) 34 (65.4) 5 (9.6) 0 1	2 (4.6) 32 (72.7) 10 (22.7) 1 2	0.01
		Never Once, twice, or a few times At least monthly or weekly Did not answer this question Did not complete entire survey			
	11-Month	Faculty mentor was a facilitator to Teaching Project implementation	20 (38.5)	37 (82.2)	<0.01
		100% Teaching Project completion	8 (15.1)	16 (34.0)	0.03
		"Impact" of Teaching Project on Curriculum Nothing/minimal Moderate/extensive	22 (41.5) 31 (58.5)	13 (27.7) 34 (72.3)	0.15
Addiction Medicine Teaching			Mean (SD)	Mean (SD)	p-value
	Across 8-Months (4 logs) ^{**}	Total Different Topics Taught [Maximum topics taught= 36]	11.8 (4.9)	12.1 (5.9)	0.74
		Total Teaching Methods Used [Maximum teaching methods = 20]	2.1 (1.6)	2.9 (2.2)	0.03
		Total Number of Teaching Venues [Maximum venue=28]	9.7 (3.6)	9.9 (4.2)	0.88

* Three CRs did not complete the 6 month follow-up survey (1 solo-trained, 2 co-trained)

** Overall Log Completion Rates were 99%, Log #1– 100/100; Log #2– 100/100; Log #3– 97/100; Log #4– 97/100

Table 3.*Co-Trained* Faculty Mentor Characteristics and Addiction Medicine Teaching Project Outcomes

Co-Trained Faculty Mentor Characteristics	Impact of Co-Trained CR's Teaching Project on Curriculum		p-value
	Nothing/minimal n=13	Moderate/extensive n=34	
	N (%)	N (%)	
Previously worked or volunteered in an addiction treatment setting for a month or more?	6 (23.1)	20 (76.9)	0.37
Previously been an investigator on addiction research?	4 (20.0)	16 (80.0)	0.28
	Mean (SD)	Mean (SD)	p-value
How many years have you been teaching about addiction?	2.6 (1.6)	9.6 (8.1)	<0.01
Overall, how confident are you about teaching related to addiction? [1=not at all confident, 5=very confident]	3.4 (0.8)	3.6 (1.0)	0.51
Number of years as a faculty member when teaching was a major focus (i.e., greater than 20% of your job)	3.4 (4.9)	8.8 (7.2)	<0.01
Years between graduation from medical school and attending CRIT	10.7 (7.5)	20.1 (10.3)	<0.01