

Near-Peer Supervision in Primary Care: Bringing Teaching Teams From the Wards to the Clinic

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ABSTRACT

Background Teaching near-peers yields numerous benefits to residents. Opportunities for near-peer teaching are typically restricted to hospital settings. Little is known about the educational potential of outpatient near-peer teaching.

Objective To describe Primary Care Teaching (PC Teach), a novel outpatient near-peer teaching experience for residents in a large, urban, internal medicine residency program; characterize its feasibility and acceptability; and evaluate changes in residents' self-reported confidence in outpatient teaching and attitudes toward teaching and primary care/outpatient medicine.

Methods In 2020-2021, following a didactic workshop, 43 postgraduate year 3 (PGY-3) residents at continuity clinics assigned to PC Teach completed a series of half-day sessions acting as preceptor to interns under attending supervision. Worksheets facilitated post-session feedback for residents and interns. Eighteen PGY-3s at nonparticipating clinics, who also completed the workshop, served as controls. We assessed process measures for feasibility and acceptability and analyzed resident attitudes using pre-post surveys.

Results Participating residents completed 2 to 8 sessions each. Post-intervention scores for confidence in outpatient teaching and attitudes toward teaching were greater, relative to pre-intervention group means, for intervention residents (median pre-post changes +0.60 [IQR 0.26, 1.26] and +0.46 [-0.04, 0.46], respectively) vs controls (-0.15 [-0.48, 0.85] and -0.36 [-0.86, 0.39]; between-group differences +0.75 [$P=.03$] and +0.82 [$P=.02$]). Changes in attitudes toward primary care/outpatient medicine did not differ significantly between intervention and control groups (+0.43 [-0.07, 0.68] and 0.04 [-0.58, 0.42]; between-group difference +0.39 [$P=.12$]). In multivariable analyses, odds of gains in confidence in outpatient teaching remained significantly larger for intervention residents vs controls.

Conclusions Implementing PC Teach with existing resources was feasible and acceptable, with program flexibility highlighted as a strength. Resident participation was associated with greater confidence in outpatient teaching.

Introduction

Residency programs are tasked with preparing residents not only to practice medicine, but also to teach.¹ However, in internal medicine, despite the fact that residents train for both hospital-based and outpatient careers, opportunities to practice clinical teaching are often concentrated in inpatient settings.²⁻⁵ Applying key principles from inpatient teaching teams to the primary care context could help ensure that internal medicine training meets its clinical and pedagogical objectives for all practice settings.⁶

Two features of inpatient wards teams are key to preparing residents as teachers: near-peer teaching and experiential learning. Near-peer teaching, defined as teaching between trainees at different stages, benefits teachers and learners.⁷⁻⁹ Residents who teach near-peers consolidate their own knowledge, gain

confidence and motivation, improve their clinical and teaching skills, and report greater work satisfaction.⁷⁻⁹ Receiving feedback on inpatient near-peer teaching may also increase residents' interest in teaching careers.¹⁰ In hospital team settings, these advantages are compounded by experiential learning—that is, learning to teach via experiences that authentically simulate the role of inpatient clinician educator, rather than through classroom teaching removed from the clinical context. *In situ* experiences supervising interns and medical students via inpatient teaching may help senior residents visualize future careers as inpatient educators⁷ and develop their own teaching style through experimentation, reflection, and synthesis.¹¹

In contrast, residents in primary care continuity clinics typically work directly with an attending,¹²⁻¹⁴ with no structured opportunities to practice outpatient precepting. Teaching strategies that are effective on the wards may not apply to the clinic, where the pace, resources, and patient needs create unique teaching challenges. Instead, direct outpatient near-peer precepting practice could help to prepare and encourage

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Editor's Note: The online version of this article contains the worksheets and surveys used in the study, details of factor analysis, and details about the indices generated via factor analysis.

future outpatient clinical teachers. Rewarding primary care teaching experiences could also increase residents' interest in academic primary care careers.⁷ Although several studies have evaluated programs in which residents teach medical students in clinic,^{15,16} only 2 studies, focused on family medicine and internal medicine residents, have described an outpatient model in which residents precept interns.^{17,18} However, these early studies have been limited by a very small sample size,¹⁷ uncontrolled pre-post design,^{17,18} or implementation in a single clinic,^{17,18} with little or no emphasis on incorporating near-peer teaching into longitudinal curricular activities across diverse clinic settings. Better understanding of the feasibility and impact of outpatient near-peer teaching is of particular importance in internal medicine, where residents have reported being dissuaded from primary care careers in part due to a perceived gap in emphasis on their inpatient and outpatient training.¹⁹ Insights gained from implementing outpatient near-peer teaching in internal medicine could also inform efforts to enhance academic career pathways for other specialties that involve outpatient practice.

We developed the Primary Care Teaching (PC Teach) experience to translate the near-peer, experiential learning teaching model of inpatient wards to the continuity clinic setting via a longitudinal resident-as-preceptor program. This article describes an evaluation of the pilot program's feasibility, acceptability, and associations with residents' confidence as teachers and outpatient providers and interest in medical education and primary care careers.

Methods

Setting and Participants

PC Teach began in 2017 with 5 postgraduate year 3 (PGY-3) residents at one clinic within the internal medicine residency program at the University of California, Los Angeles. Our large, urban, academic program trains approximately 180 residents per year across a variety of inpatient and outpatient settings. This article focuses on the 2020-2021 academic year, by which time we had expanded PC Teach to all PGY-3 residents at 5 of 8 continuity clinics based on clinic directors' readiness to implement the program. Participation in PC Teach was required for PGY-3 residents whose continuity clinics were assigned to the intervention. PC Teach clinics included 3 academic hospital-affiliated clinics and 2 Veteran's Health Administration (VHA) clinics. An additional VHA clinic implemented PC Teach only for the 33% of PGY-3 residents who had previously opted into a 2-year medical education pathway. Nonparticipating

KEY POINTS

What Is Known

Near-peer teaching, where a more senior resident precepts a junior resident, is common in inpatient settings but sparsely reported in outpatient settings, representing a potential missed opportunity for growth in both sets of learners.

What Is New

An internal medicine residency program found implementation of a program called PC Teach, a longitudinal educational experience in which senior residents precept interns in continuity clinic under attending supervision, to be feasible and acceptable to participants, increasing confidence in teaching.

Bottom Line

Graduate medical education programs interested in expanding the opportunities for residents-as-teachers may be interested in this novel longitudinal, clinic-based intervention.

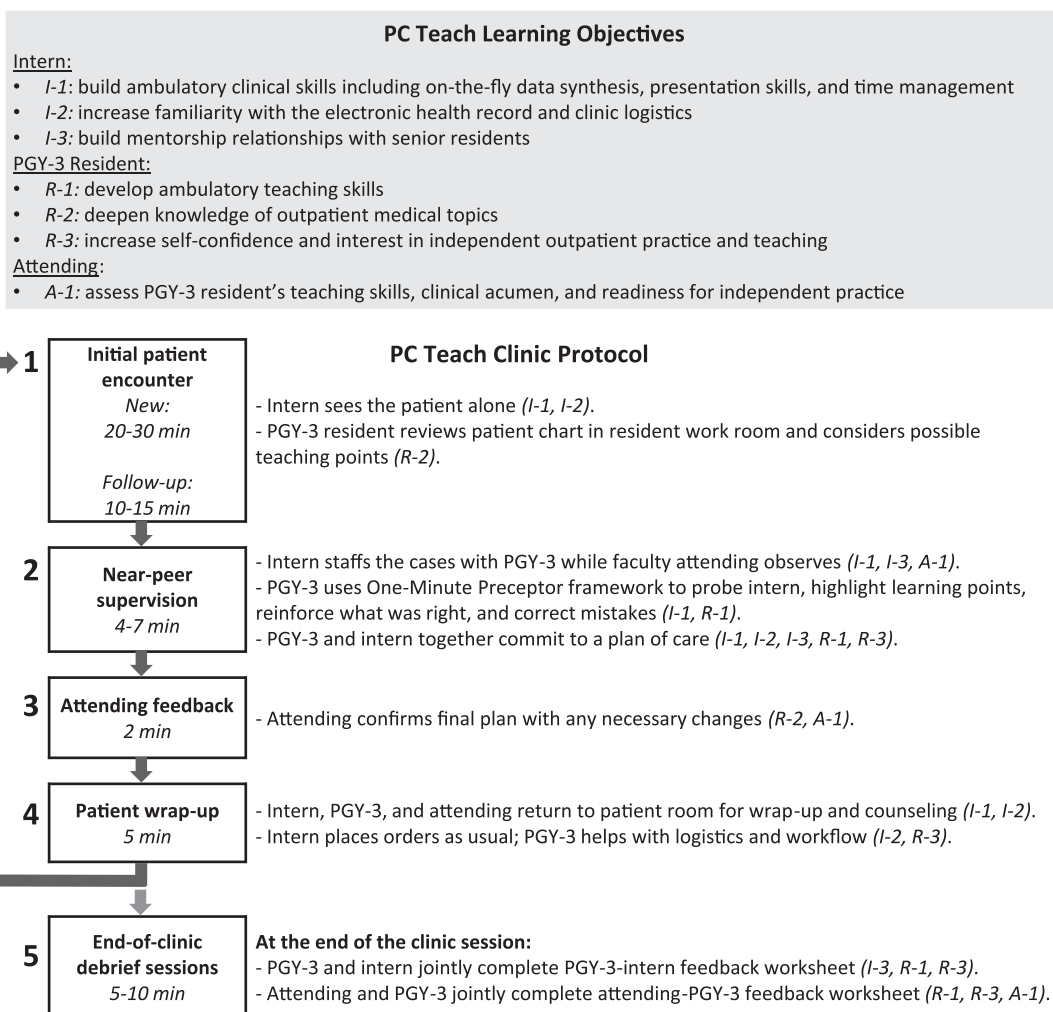
clinics included a federally qualified health center and a county clinic. Residents were assigned to continuity clinics based on their preferences before starting internship. In total, 43 PGY-3 residents spanning the categorical (n=31) and primary care (n=12) tracks of our program participated in PC Teach, while 18 categorical PGY-3 residents served as controls.

Intervention

PC Teach is a longitudinal educational experience in which senior residents precept interns in continuity clinic under attending supervision.

Early in the academic year, all PGY-3 residents participated in a one-hour, role-play-based workshop on applying the One-Minute Preceptor model in outpatient settings.⁸ Attendings at PC Teach clinics were briefed on program objectives and procedures during faculty meetings. Learning objectives, shown in the *FIGURE*, were shared with residents, interns, and attendings participating in PC Teach.

The *FIGURE* summarizes the PC Teach workflow. Intervention residents were excused from up to 8 half-days of direct outpatient care to participate. During each session, a resident was assigned to an intern, who was scheduled to see up to 3 patients per half-day (standard in our program). The resident had no patient care obligations besides supporting the intern in a role akin to clinic preceptor. The intern evaluated a patient independently before presenting to the resident in a common work area. The attending supervised and provided feedback on the resident's precepting, then finalized the plan before the intern saw the next patient. We provided worksheets to guide self-assessment and resident-intern and resident-attending feedback after each session

**FIGURE**

Learning Objectives and Half-Day Clinic Protocol for PC Teach, a Novel Near-Peer Supervision Model for Residency Continuity Clinics

Abbreviations: PC, primary care; PGY-3, postgraduate year 3; min, minutes.

Notes: One PGY-3 resident is paired with one intern in each half-day PC Teach session. Residents have no assigned patients of their own during PC Teach. Visits are supervised by the attending assigned to oversee the residency clinic session. Trainees not assigned to PC Teach see patients on their own with attending supervision as usual. Italics indicate intern, PGY-3 resident, and attending learning objectives as they map to each aspect of the clinic protocol.

(provided as online supplementary data). Control residents completed routine clinic activities with no near-peer precepting.

Feasibility and Acceptability Assessment

To evaluate feasibility, we reviewed the number of sessions scheduled and elicited email feedback from administrators responsible for scheduling. To explore acceptability and opportunities for improvement, coauthors involved in implementing and overseeing PC Teach (former chief residents K.L.C. and E.K.A., former resident S.E.Y., and clinic directors G.M.J.N. and M.W.A.) reflected on lessons learned from informal participant feedback and our own experiences.

Assessing Associations With Resident Attitudes

To assess whether PC Teach met its goals of influencing PGY-3 residents' confidence and attitudes toward outpatient teaching and practice, we invited residents in both study arms to complete an anonymous, online pre-post survey (provided as online supplementary data), which the authors developed without testing. Nine Likert scale items assessed outcomes relevant to Level 2A of Kirkpatrick's evaluation model (modification of attitudes/perceptions).²⁰ Respondents self-identified their clinic and study arm; we excluded one survey with discrepant responses. Because survey items were correlated and thus likely not measuring 9 distinct concepts, we used exploratory factor analysis

with principal component analysis to reduce the number of variables analyzed and combine them into meaningful indices²¹ (see details in online supplementary data). The 3 resulting indices served as study outcomes: confidence in outpatient teaching (confidence index), positive attitudes toward teaching (teaching attitudes index), and positive attitudes toward primary care and outpatient medicine (PC/outpatient index; online supplementary data). We then compared pre-post changes in outcomes between study arms. Using Wilcoxon rank sum tests, we first compared pre-intervention scores between groups. Next, we assessed within-group pre-post change scores by subtracting the pre-intervention group mean from each post-intervention score. Finally, we compared pre-post change scores between groups. Additionally, to account for treatment assignment by clinic and differences between primary care and categorical residents, we used logistic regression to compare odds that a post-intervention score was greater than the pre-intervention group mean, controlling for track (primary care vs categorical) and adjusting for clustering by clinic. Analyses used a significance threshold of $P < .05$ and were conducted in Stata BE17 (StataCorp LLC, College Station, TX).

The University of California, Los Angeles Institutional Review Board certified this analysis as exempt (#21-001474).

Results

Feasibility and Acceptability

Forty-three residents were scheduled for 177 PC Teach sessions in 2020-2021. Sessions per resident ranged from 2 to 8 (mean=4). Although we strove for consistent resident-intern pairings, most residents had the opportunity to precept multiple interns. Scheduling PC Teach required no additional funding or personnel. Program administrators incorporated PC Teach into routine scheduling procedures with support from chief residents. We estimate that the hours worked by residents remained roughly equivalent, as PC Teach substituted one outpatient session for another. PC Teach sessions were counted toward residents' ambulatory training time but not their longitudinal continuity experience.¹ With the additional resident in clinic, attending-to-resident ratios were maintained at less than 4:1, as our program schedules 2:1, 3:1, or 4:2 outpatient ratios at baseline. Given robust support from leadership and trainees, PC Teach has been continued beyond 2021, and our program is currently working to expand this experience to all third-year residents.

In informal feedback, participants told us that they appreciated the flexibility built into the PC

Teach structure: in hectic situations, the intern could bypass the resident and present directly to the attending, and the resident could help other trainees while the intern saw a patient. Although participants found the feedback worksheets helpful, they sometimes forgot or ran out of time to use them. Interns valued the opportunity to build mentoring relationships with residents. Attendings observed that residents sometimes struggled at first with the pace of outpatient precepting but gained confidence and efficiency once they began to preview interns' schedules before subsequent sessions. Some attendings reported that supervising PC Teach encouraged reflection on their own practice and revealed gaps in residents' knowledge. Support from clinic directors helped facilitate faculty buy-in. Clinic directors noted that designating certain attendings as consistent PC Teach supervisors helped increase attendings' familiarity, efficiency, and engagement with the program.

Associations With Resident Attitudes

Response rates in the intervention group were 98% (42 of 43) pre-intervention and 58% (25 of 43) post-intervention. Control group response rates were 50% (9 of 18) pre-intervention and 44% (8 of 18) post-intervention. The TABLE summarizes survey outcomes. Pre-intervention, mean outcomes were not significantly different between groups (confidence index: 3.40 and 3.15; teaching attitudes index: 4.54 and 4.61; primary care/outpatient index: 3.57 and 3.33 for PC Teach and controls, respectively; $P > .05$ for group differences in pre-intervention outcomes). Positive median pre-post change scores in the PC Teach group (+0.60, +0.46, and +0.43 for confidence, teaching attitudes, and primary care/outpatient indices) indicated that for all outcomes, most post-intervention scores were greater than the group pre-intervention mean. In contrast, for most controls, scores for confidence and teaching attitudes were lower than the group pre-intervention mean (-0.15 and -0.36, respectively), while PC/outpatient index scores were marginally greater (+0.04). Comparisons of median pre-post change scores between groups showed that the intervention group's increases in confidence and teaching attitudes were significantly greater than those of controls (between-group differences +0.75 [$P = .03$] and +0.82 [$P = .02$], respectively), while PC/outpatient index pre-post change scores did not differ significantly between groups (between-group difference +0.39 [$P = .12$]).

After adjusting for clinic clustering and track, the odds that post-intervention confidence scores exceeded the pre-intervention group mean were 6.25 times greater (95% CI 2.46-15.89) for the intervention

TABLE

Results From a Controlled Pre-Post Survey of Residents in the PC Teach Study, 2020-2021

Variables	Confidence Index	Teaching Attitudes Index	Primary Care/ Outpatient Index
PC Teach			
Pre (n=42), mean (SD)	3.40 (0.54)	4.54 (0.55)	3.57 (0.75)
Post (n=25), mean (SD)	4.12 (0.74)	4.60 (0.52)	3.86 (0.68)
Pre-post change, median [IQR]	0.60 [0.26, 1.26]	0.46 [-0.04, 0.46]	0.43 [-0.07, 0.68]
Control			
Pre (n=9), mean (SD)	3.15 (0.97)	4.61 (0.42)	3.33 (0.63)
Post (n=8), mean (SD)	3.21 (0.83)	4.31 (0.65)	3.28 (0.80)
Pre-post change, median [IQR]	-0.15 [-0.48, 0.85]	-0.36 [-0.86, 0.39]	0.04 [-0.58, 0.42]
Difference in mean pre scores, PC Teach minus control	0.25	-0.07	0.24
P value for difference in pre scores	.73	.84	.44
Difference in median pre-post change, PC Teach minus control	0.75	0.82	0.39
P value for difference in pre-post change	.03 ^a	.02 ^a	.12
aOR (95% CI) for increased score			
PC Teach	6.25 ^b (2.46-15.89)	1.11 (0.35-3.49)	1.21 (0.03-43.68)
Control	[ref]	[ref]	[ref]

^a $P < .05$.^b $P < .001$.

Abbreviations: PC, primary care; UCLA, University of California, Los Angeles; IQR, interquartile range; aOR, odds ratio for increase in score, controlling for program track (primary care vs categorical) and adjusting for clustering by clinic site; CI, confidence interval; ref, reference group.

Note: Because surveys were anonymous and no individual identifiers were collected, we were unable to match individuals' pre- and post-intervention responses. As a result, the composition of individuals in the "pre" and "post" samples for a given study arm may differ. Pre-post change was calculated for individuals in each study arm as post-intervention score minus the group mean pre-intervention score. All P values were estimated from Wilcoxon rank sum test comparing outcome distributions between study arms.

group. The intervention group was also more likely to have larger post-intervention scores, relative to pre-intervention group means, for the teaching attitudes index (OR 1.11, 95% CI 0.35-3.49) and PC/outpatient index (OR 1.21, 95% CI 0.03-43.68), but these differences were not statistically significant (TABLE).

Discussion

Our pilot evaluation suggests that implementing near-peer teaching in internal medicine resident continuity clinics presents a feasible and acceptable opportunity to improve residents' confidence as outpatient teachers and possibly to boost their attitudes toward teaching in general.

The absence of a significant association with interest in primary care and outpatient careers suggests that while it might promote positive attitudes toward teaching careers, PC Teach alone is insufficient to increase interest in primary care. Additionally, residents may have already made career decisions by the time they begin their final year of training. However, since most subspecialists spend some of their time in clinic, PC Teach may be beneficial even for residents

who wish to incorporate teaching into careers outside of primary care.

Our findings largely align with those of a qualitative study by Ince-Cushman et al, in which family medicine residents who precepted interns after observing videos of interns' patient visits reported that teaching interns not only boosted their confidence but also promoted self-reflection¹⁷—a key element of experiential learning.¹¹ Our results also echo findings from Hilburg and Coyle, who reported that internal medicine PGY-3s felt, on average, more confident and prepared to precept in clinic following a didactic workshop and one-time near-peer precepting session.¹⁸ Our study extends these earlier findings by exploring associations with self-reported career interests and by showing that near-peer, resident-intern teaching can work outside the context of video-observed patient visits, across multiple clinic settings, and longitudinally throughout the academic year, via a precepting experience that closely approximates the practice of academic outpatient medicine. Furthermore, PC Teach protects residents' time for teaching while leaving work hours unchanged, thus helping to address concerns raised in other studies about the tension between teaching and clinical efficiency.^{6,16}

Our pilot study has several limitations. We rely on data from a single institution, albeit a large program with numerous and diverse clinic sites. Generalizability may be limited due to the COVID-19 pandemic; future evaluations should explore the role of telemedicine and/or provider burnout on program experiences. Survey analyses should be considered exploratory: survey items were not assessed for validity evidence, and varying pre-post response rates and nonrandom assignment of residents to clinics and clinics to the intervention might have introduced selection bias. We were unable to link individuals' pre- and post-intervention surveys or prevent the same respondent from submitting duplicate surveys. Finally, although our authorship team contributes perspectives from various roles, our feasibility and acceptability assessments reflect anecdotal experience, and informal feedback and may be biased.

With PC Teach now in its sixth year, designating additional program champions—such as faculty, chief residents, or residents interested in medical education—could further strengthen participant engagement and help identify opportunities to ensure ongoing sustainability and improvement. Future iterations of PC Teach may benefit from more robust faculty orientations, greater attending-resident-intern continuity, and efforts to increase use of the feedback worksheets (eg, shortening the worksheets or providing reminders or incentives while collecting data on worksheet completion). Future evaluations can be strengthened by linking individuals' pre-post surveys, gathering validity evidence for survey items, assessing feasibility and acceptability with more formal measures and in other primary care specialties and institutions, and exploring effects on: (1) senior residents' knowledge, teaching skills, and career outcomes; (2) interns' learning and mentorship; (3) attendings' self-reflection, efficiency, and efficacy as supervisors; and (4) patients' experiences.

Conclusions

This pilot study demonstrated that outpatient near-peer supervision can be incorporated into routine residency activities. Among senior internal medicine residents, precepting interns in continuity clinic was associated with increased confidence in outpatient teaching. We also observed a positive but inconsistently significant association between program participation and favorable attitudes toward teaching, while there was no significant association with attitudes toward primary care and outpatient medicine.

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