Yesterday a Learner, Today a Teacher Too: Residents as Teachers in 2000

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Abstract. Resident physicians spend numerous hours every week teaching medical students and fellow residents, and only rarely are they taught how to teach. They can, however, be taught to teach more effectively. Teaching skills improvement initiatives for residents are taking a more prominent place in the educational literature. Limited evidence now suggests that better resident teachers mean better academic performance by learners. A small but important body of research supports selected interventions designed to improve residents’ teaching skills, but not all studies have demonstrated significant educational benefits for learners. An increasing number of valid and reliable instruments are available to assess residents’ clinical teaching, including objective structured teaching examinations and rating scales. In all specialties, rigorous research in evidence-based teacher training for residents will help prepare academic medical centers to meet the diverse and changing learning needs of today’s physicians-in-training. Pediatrics 2000;105:238–241; resident physicians, medical students, fellow residents, teaching, graduate medical education.

ABBREVIATION. OSTE, objective structured teaching examination.

Resident physicians spend many hours every week teaching medical students and fellow residents.1 As early as 1970, Brown2 reported that at one medical school, two-thirds of residents surveyed stated that they received >40% of their teaching from fellow housestaff, and the trend continues today.3 Residents also teach junior learners an important “informal curriculum” primarily at night and on weekends when attending physicians are not present.4 Residents are important teachers for generalist physicians-in-training: interns from different family medicine residencies reported spending nearly 25% of their educational contact time with residents as teachers.5 Yet resident physicians are only rarely taught how to teach. In a 1993 national survey, only 20% of internal medicine residency programs featured teaching skills improvement programs, despite the fact that residents provided 62% of inpatient teaching for medical students according to the residency directors’ estimates.6 Data are lacking on how many residents-as-teachers programs exist in pediatrics residencies.

Evidence suggests that many residents teach ineffectively. When Wilkerson, Lesky, and Medio7 observed 14 internal medicine residents during hospital work rounds, residents modeled patient care at the bedside, verified examination skills, and gave brief lectures, but they rarely cited literature, asked questions, or gave feedback to their learners—all teaching behaviors found to be highly effective in the faculty development literature.8 Another observational study9 found that inpatient work rounds run by senior residents are often insufficiently thorough. Residents generally do not teach problem-solving skills or psychosocial topics as often as do attending physicians.10

In other studies, physicians-in-training themselves have identified teaching as an important—but undervalued—part of their responsibilities and education.11–13 In a qualitative study at New York University,14 internal medicine residents expressed intense conflicts about their teaching roles. Educators began to record these phenomena as early as 3 decades ago when Barrow15 found that medical students reported they wanted to have definite teaching responsibilities as residents. Bing-You’s more recent review16 also found this to be true.

TEACHING SKILLS IMPROVEMENT PROGRAMS FOR RESIDENTS

Residents-as-teachers programs can be traced back to the early 1960s.17 Programs have since become both more specialized and more common, in areas that include pediatrics,18–21 surgery,22,23 internal medicine,24 psychiatry,12 family medicine,25 and others.26,27 Some programs take the form of brief, one-time teaching workshops, but other novel approaches have also been reported: resident-managed programs,28 learning styles workshops,29 month-long elective rotations to develop teaching abilities,30 and targeted training in ambulatory teaching skills.31 Most studies have not assessed the validity or reliability of the evaluation instruments32 used to assess their programs.

On the whole, resident development programs have yet to evolve to the current level of faculty development programs. It is not known how well faculty development concepts apply to residents’
teaching skills. Outcome-based research is now beginning to identify residents’ specific learning needs for becoming better teachers, and to clarify whether better resident teachers help students become better learners.

RESIDENTS AS TEACHERS: EVIDENCE-BASED EDUCATION

Outcome-Based Studies

Teaching skills improvement initiatives for residents are taking a more prominent place in the educational literature. Limited evidence suggests that better resident teachers mean better academic performance from learners. Griffith and colleagues\(^\text{33}\) from the University of Kentucky correlated students’ evaluations of their residents’ teaching skills with the students’ own clinical evaluations (gathered after the students had already rated their resident teachers to limit bias). Students who had better resident teachers demonstrated consistently higher academic performance, an effect independent of the attending physicians’ influence. We still do not know whether improving residents’ teaching skills improves learners’ clinical skills.

Do residents-as-teachers programs even improve residents’ teaching skills, knowledge and attitudes toward teaching? A limited but important body of evidence supports particular interventions. The faculty development literature demonstrates that several techniques can help faculty improve their teaching: among them, peer review (more than student feedback), educational consultants, concept-based training, various seminars and workshops, and videotape review.\(^\text{34}\)

Similar techniques appear effective for residents. Studies of clinical teaching workshops, the form most often chosen, have produced solid evidence suggesting that these workshops can improve residents’ attitudes toward teaching, and that these attitudinal changes may persist for as long as 18 months after even a brief teaching skills intervention.\(^\text{35}\) It should be noted, however, that improving attitudes is not the same as improving learning, or even improving teaching. We need to know whether teaching improvement programs also improve learning.

Teacher training for residents has been found to elevate medical students’ ratings of their residents’ teaching abilities.\(^\text{36,37}\) Irby\(^\text{38}\) concluded that well designed learner ratings are valid, consistent, and reliable. Litzelman, Stratos, and Skeff\(^\text{39}\) found that a weekend teaching skills retreat based on the Stanford Faculty Development Program produced statistically significant improvements in medical students’ ratings of residents’ clinical teaching skills, using a validated Likert scale.

Edwards and colleagues\(^\text{40}\) found that a teaching program for residents modestly improved teaching skills ratings. As part of that study, researchers randomly assigned 22 residents in family medicine, internal medicine, and obstetrics/gynecology to experimental and control groups in a longitudinal teaching skills program. A graduate student trained in evaluation rated both resident groups for 8 specific teaching skills before, during, and 6 months after the program. The experimental group showed modest improvements in some teaching skills, with a statistically significant improvement in overall teaching scores during the training, which apparently did not persist afterwards.

Little evidence sheds light on why such teacher improvement programs appear to work, or which program components are most important to fostering success. One exception for which we do have evidence is videotape review. When residents critically review their own microteaching videotapes with a trained consultant, their teaching skills appear to improve. Such results are not achieved, however, if residents review the tapes alone.\(^\text{40}\) Skeff’s review of the literature on clinical teaching improvement programs supports these findings,\(^\text{34}\) although we do not know how many videotapes must be reviewed to maximize learning.

Not all residents-as-teachers interventions have succeeded. Bing-You\(^\text{41}\) reported that a weekend teaching skills retreat did not improve most teaching skills for a group of internal medicine residents, as measured by a trained rater. Dunnington and DaRosa’s recent randomized trial\(^\text{42}\) reported similar disappointing findings. The authors randomized 62 surgical residents at 2 medical centers to a residents-as-teachers weekend retreat versus a control group. Despite follow-up boosters, the intervention group demonstrated few statistically significant differences on an OSTE given 6 months after the intervention. It is unclear whether a greater effect would have been realized with a longitudinal intervention, with a shorter interval between intervention and evaluation, or with a study design less subject to contamination biases. We find similar uncertainty throughout the literature on residents’ teaching skills. In many studies, we do not know whether it is the interventions themselves, or the research methods, that most affect outcomes.

Those involved with resident teaching often assume that a program will help the resident teachers as well as their learners. There is some evidence that resident teaching improves residents’ clinical skills. Weiss and Needleman\(^\text{43}\) conducted a recent study randomizing 43 pediatrics residents at a university-based program either to give a lecture on oral rehydration or to listen to a lecture on the same topic. All of the residents took a pretest on the topic and a posttest 6 to 8 weeks after the intervention. The results showed that the residents who had given the lectures performed nearly twice as well as those who had merely listened to the lectures.

Evaluation Methods

Evaluation issues have consistently plagued research on residents’ teaching skills. Although some evidence elucidates how residents’ teaching should be evaluated, the best methods remain to be determined. The OSTE\(^\text{44}\) is widely believed to be the most objective means available for assessing clinical teaching skills. In an OSTE, examinees typically
rotate through 8 to 10 stations that use standardized students and other structured methods to test teaching skills under direct or videotaped observation. Researchers have formally assessed the validity and reliability of certain OSTE formats. The main impediments to using OSTEs outside of research settings are the significant time and expense they require.

Rating scales for clinical teaching skills are used extensively in research on residents. The greatest challenges with using rating scales are determining which instruments to use and how to complete them most objectively. Various validated instruments are available to measure residents’ teaching skills, as well as attitudes toward teaching. We must use caution even with faculty raters, because untrained faculty were found in 1 study to rate learners more on their personal characteristics than on the skills they were instructed to measure. Yet another study found faculty evaluations highly reliable with good criterion-related validity.

Learner ratings, although not without bias, can be very helpful when used carefully. If learners are taught to use rating scales that reflect characteristics known to represent good teachers (including instructor knowledge; organization and clarity of presentation; enthusiasm and stimulation of interest; group instructional skills; clinical competence; clinical supervision; and professional characteristics), learner ratings are both reliable and valid. Medical students’ global evaluations of their preceptors’ teaching skills correlate reliably with scores on more detailed rating scales. As an objective measure of teaching skills, self-evaluations generally lack adequate validity and reliability, although they may serve as useful adjunct interventions in themselves.

CONCLUSIONS

In medical education research, many methodologic discussions have focused on how we should evaluate the quality of teaching and of teaching programs. Experts have called for medical education research to rely on more powerful research designs, to use reliable and valid instruments, and to incorporate theory into interpreting results. More research is needed in ambulatory education, and as primary care training moves ever more into the ambulatory setting, teaching programs will need to impart effective ambulatory teaching skills to faculty and resident physicians alike. Effective ambulatory teacher training models like Wilkerson’s “Arrows in the Quiver” workshop, which improved faculty teaching behaviors in a 1998 study, need to be tested with resident teachers.

Research on residents’ teaching skills has many specific needs. Although many educators believe that better resident teachers become more effective learners and better physicians, few data support this assertion. We need to explore further the interaction between residents’ teaching and learning abilities. Medical educators also need to examine how residents’ teaching skills may interact with their skills in patient communication. As stated in the draft objectives of the Graduate Medical Education Core Curriculum Project of the Association of American Medical Colleges: “Patient care and the education of patients, peers, and students require the blending of a variety of skills [for] the physician and communicator and teacher, [including] . . . effective communication, leadership, collaboration, team participation, and teaching.”

We also need to know how residents’ teaching abilities affect the performance of their junior learners. If research determines that better learners are associated with better resident teachers, we must demonstrate whether improving residents’ teaching skills also improves their learners’ clinical performance.

Future research needs to address which general types—and which specific aspects—of residents-as-teachers curricula effectively improve educational outcomes. Many educators believe that longitudinal residents-as-teachers curricula will be most effective, yet this assertion requires data to support it, especially from randomized, controlled trials with large sample sizes. We need to learn how best to help residents acquire specific teaching skills that experts have identified as important to ambulatory teaching, such as imparting generalizable knowledge while balancing depth and breadth of knowledge. Research also needs to address important questions about which evaluation instruments will best allow us to assess residents’ clinical teaching behaviors and skills.

Economic and sociopolitical changes are likely to affect medical education over the next decade, perhaps profoundly. Attending physicians, particularly in primary care, will be called on to shoulder increasing clinical burdens that will lessen their availability as teachers. Medical students and other junior medical learners will tend to suffer the most unless a cadre of capable and motivated resident physicians steps in to fill the breach. Teaching may in fact become residents’ main leadership training now that their role in clinical decision-making is becoming increasingly limited.

Although such issues are important to all specialties, they may be most important to pediatrics and other primary care specialties. Future research needs to examine where, when, and how generalist residents teach, as well as how residents from sister specialties can best learn how to teach future generalists. Collaborative interdisciplinary studies are also needed, especially among the primary care specialties. In all specialties, rigorous research in evidence-based teacher training for residents will help prepare academic medical centers to meet the diverse and changing learning needs of today’s physicians-in-training.

REFERENCES


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