Internal Medicine Training in the Inpatient Setting

A Review of Published Educational Interventions

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PURPOSE: Although the inpatient setting has served as the predominant educational site of internal medicine training programs, many changes and factors are currently affecting education in this setting. As a result, many educational organizations are calling for reforms in inpatient training. This report reviews the available literature on specific internal medicine inpatient educational interventions and proposes recommendations for improving internal medicine training in this setting.

METHOD: We searched Medline for articles published between 1966 and August 2004 which focused on internal medicine training interventions in the inpatient setting; bibliographies of Medline-identified articles, as well as articles suggested by experts in the field provided additional citations. We then reviewed, classified, and abstracted only articles where an assessment of learner outcomes was included.

RESULTS: Thirteen studies of inpatient internal medicine educational interventions were found that included an outcome assessment. All were single institution studies. The majority of these studies was of poor methodological quality and focused on specific content areas of internal medicine. None assessed the effectiveness or impact of internal medicine core inpatient experiences or curriculum.

CONCLUSION: This review identifies significant gaps in our understanding of what constitutes effective inpatient education. The paucity of high quality research in the internal medicine inpatient setting highlights the urgent need to formally define and study what constitutes an effective "core" inpatient curriculum.

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Traditionally most internists have learned how to practice medicine by taking care of sick, hospitalized patients, but training for the internist of the future is rapidly being reshaped by a number of changes in the health care and medical education system. Over the last decade the acuity of hospitalized patients has risen substantially. Cost pressure on hospitals, physician groups and managed care has contributed to a continuous drop in the average length of stay by nearly 20% since 1990. The result is that residents training in the inpatient setting have less patient contact time to observe, diagnose, manage and learn from their often very ill and complex patients than in the past. There is also concern that traditional

bedside teaching is increasingly been traded for teaching in the classroom.²

Compounding these changes, there has been a growing

Compounding these changes, there has been a growing push to shift more of the educational experience away from a heavy reliance on the traditional model of the inpatient "resident ward team," toward more balance with ambulatory-based education. This shift will be further tested with the growing interest in "hospitalism." While there is no need to diminish the historical success of the inpatient training experience, a more balanced internal medicine educational experience will force programs to identify the most important core inpatient experiences. Concern over the detrimental effects of excessive work hours on residents' health, patient care, and safety resulted in the Accreditation Council for Graduate Medical Education (ACGME) strict enforcement in July 2003 of resident work limits that has taxed many training programs' ability to meet both their educational mission as well as their hospital service needs.^{3,4} In addition, the model of care for hospitalized patients is being pressured to move away from the traditional "physician-centric" approach to an interdisciplinary team approach that emphasizes patient centered care to improve outcomes and reduce health care costs.⁵ Finally, residents are and will be continuously confronted with an overwhelming explosion in medical knowledge, research and diagnostic medical technology.

While there is significant heterogeneity in the structure and process of educating residents among internal medicine residencies in the United States, all programs share the primary goal to produce excellent general internists. Internal medicine residency education is an apprentice-like experience that is supplemented by the many different educational efforts that overlap with outpatient and inpatient care opportunities. Even with the comprehensive work of the Federated Council on Internal Medicine (FCIM)⁶ to characterize the breadth of the knowledge, skills, and attitudes of the ideal internal medicine resident, most programs struggle with implementing effective educational curriculum that meet all FCIM competencies in an ACGME outcomes based education.⁷

Given the shifting educational experience of today's internal medicine resident, what do we truly know about effective internal medicine educational interventions in the inpatient setting? The purpose of the present article is to review the published literature specifically for internal medicine educational interventions in the inpatient setting, identify potential educational gaps, propose recommendations to improve the current

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structure and process of internal medicine residency training and thereby identify key areas for future educational research.

METHODS

Our search strategies can be reviewed at the Society for General Internal Medicine website.⁸ Separate Medline searches were conducted by 2 investigators (L.D.F. and E.S.H.). The first search was conducted on the Medline database from 1966 to August 2004 by combining medical subject headings and text words pointing to the hospital setting and inpatients with medical subject headings and text words associated with teaching, curriculum, and evaluation. This search was then specifically narrowed to internal medicine. The result of this first search resulted in 102 articles. A parallel Medline search was conducted utilizing a different search strategy combining medical subject headings and text words pointing to curriculum, teaching and hospitals with medical subject headings and text words associated with internship and residency and internal medicine. This second independent search revealed 973 articles. We then reviewed all 1,075 articles by title and abstract and included only articles pertaining to internal medicine residency that were educational interventions in the inpatient setting and excluded all publications that were opinions, reviews, commentaries, or educational studies that did not perform an outcome assessment of their intervention. We also searched bibliographies of relevant articles to identify other potential interventional studies.

All candidate articles were then reviewed and assessed using a modified version of the Best Evidence Medical Education (BEME) coding framework before final inclusion. Articles were categorized by what ACGME general competency was targeted by the intervention with emphasis on study design, number and nature of participants, intervention, learning outcome(s), results, and strengths and weaknesses of each study. Each study was first independently categorized by 2 authors (L.D.F. and E.S.H.) with disagreements resolved by consensus.

The final results of the literature review were shared with the inpatient subcommittee of the Society of General Internal Medicine (SGIM) Reforming Residency Task Force to develop recommendations. Recommendations were then discussed with members of the core task force and outside reviewers to develop panel recommendations for improving internal medicine training in the inpatient setting.

EDUCATIONAL INTERVENTIONS

Thirteen studies met criteria for inclusion in this review (Tables 1–5). All were single institution studies and 3 used a rigorous randomized design. Five studies directly assessed knowledge or skills of the residents and 5 assessed resident satisfaction or self-assessment of competence only. Twelve of the 13 articles reported a positive impact on trainees. Importantly, we found no educational intervention that attempted to evaluate the effects of a "core" inpatient curriculum or the daily experiences of inpatient training.

Several educational interventions reported positive results that might translate into improved patient care outcomes. Issenberg et al. 10 showed that implementing a focused cardiology review course with deliberate practice using a cardiac simulator ("Harvey") on residents during a general ward month could objectively improve their bedside

cardiology skills. Sulmasy et al. 11 showed in a quasi-randomized controlled trial that a formal ethics educational intervention taught to residents caring for terminally ill inpatients can improve care of "do not resuscitate" patients by primarily enhancing focus on important concurrent care concerns (e.g. pain control, nutrition, antibiotics, discharge planning). Landefeld and Anderson¹² studied the effect of guideline-based consultation to prevent anticoagulant-related bleeding among hospitalized inpatients that were at increased risk for major inhospital bleeding. They noted a significant reduction in major and minor bleeding rates among the patients that received guideline based consultation versus usual care (13% guideline vs 31% usual care), and lower rates of follow-up venous thromboembolism in the subsequent 90 days after discharge. However, the authors did not provide a specific description of the educational intervention and the only learner outcome assessed was resident satisfaction and self-assessment of anticoagulation management skills. Kulaga et al. 13 evaluated the impact of hospitalist clinician educators hired specifically to cover the inpatient medical service. This change was effective in reducing both the patients' length of stay as well as cost of treatment. Their resident satisfaction survey data revealed significantly higher ratings of the quality of teaching rounds, bedside rounds and the overall resident experience with essentially no effect on the resident's role as team teacher or leader.

We found 3 articles that focused on educational interventions to improve resident medical knowledge during rotations in the inpatient setting. A study of a palliative care intervention failed to show that four 1 hour case-based discussions of how to communicate bad news/goals of care, withhold/withdraw life-prolonging care, discuss advance directives and care in the last hours of living objectively improved residents' knowledge and attitudes surrounding end of life issues during a monthly general medicine rotation. 14 Lindberg and Sullivan 15 showed that a geriatrics education intervention that involved interdisciplinary team meetings, geriatrics-based noon conferences, interaction with geriatrics-trained nurse practitioners, and a dedicated geriatrics reading syllabus during a 4-week internal medicine ward rotation could improve residents' knowledge of geriatric medicine. In addition, a study of internal medicine residents on a 2 months inpatient psychiatry ward service found improved self-reported confidence among the residents in managing common psychiatric problems, conducting appropriate counseling, and discussing emotionally difficult issues with patients. 16

There were 2 articles that focused on developing competency in practice-based learning and improvement. Bravata et al. 17 conducted a small pilot study of the implementation of a 4 week educational intervention to improve residents' self-directed learning skills during their inpatient ward rotations. They were able to show self-reported increases in short- and long-term learning behaviors after 1 year but their intervention had no effect on the quantity or quality of clinical question asking or medical reading. This study, however, suffers from several methodological flaws, most notably a very high rate of subject drop-out. Another study sought to evaluate the impact of an educational program on cost-effectiveness for residents during a general ward month on the quality and cost of patient care. 18 Methods included utilization of a cost containment booklet (listing the costs of laboratory and radiology tests), review of daily patient charts, periodic distribution of patients'

Table 1. Summary of Inpatient Educational Studies by Competency: Patient Care

Study	Issenberg ⁸	Sulmasy ⁹	Landefeld ¹⁰	Kulaga ¹¹
Design	Single group, before and after	Quasiexperimental trial (4 groups=1 extensive intervention (EI), 1 limited intervention (LI), 2 control)	Randomized trial (patients randomized/learners not randomized)	Single group, before and after
Participants	67 IM Residents (single institution)	88 IM Residents (single institution)	46 IM Residents (single Institution)	36 IM Residents (single institution)
Intervention	Use of a review course in cardiology bedside skills using UMedic multimedia computer curriculum linked to "Harvey" the cardiology patient simulator	Use of a limited ethics (LI) educational intervention consisting of 6 lectures addressing ethical vocabulary, principles, landmark court decisions and local law versus an extensive ethics intervention that included the 6 lectures plus participation in an additional 6 ethical case conferences	Use of guideline-based consultation to manage patients at high risk for bleeding while initiating long term anticoagulation that included review of risks and benefits of anticoagulation as well as recommendations for daily management) versus usual care	Use of 2 full time hospitalist clinician educators (HCE) at an academic community hospital
Learning outcomes	To improve residents' skills in bedside cardiology	To improve residents' knowledge in "Do Not Resuscitate" (DNR) orders and attention to patients' concurrent care concerns (CCC)	To improve resident skills in the management of anticoagulation therapy and assess the patient benefit in rates of bleeding	To improve residents' attitudes toward inpatient education as well as assess the patient benefits (length of stay, cost of care) of HECs as compared with community physician controls
Results	There was a statistically significant positive improvement in residents' bedside cardiology skills was noted among residents after the review course (pre 45.3 to post 71.7 <i>P</i> =.0001)	While there was no difference in CCCs addressed per DNR order among the groups at baseline. There was a statistically significant positive improvement in the EI (0.9 to $3.8\ P<.05$) with no significant change in the LI group (0.5 to 1.4) and drop in the control group (1.9 to $1.0\ P<.05$)	There was a statistically significant improvement occurred in the guideline-based consultation patients with major or minor bleeding rates of 13% guideline versus 31% usual care patients (P =.03). Guideline-based patients had lower rates of thromboembolism in the 90 d after discharge (5% vs 17% P =.06). 91% of resident and attending reported consultation improved resident learning	Resident survey data (response rate of 78%) revealed a positive impact on residents' perception of their educational experience. 97% reported "improved" or "greatly improved" teaching which included bedside rounds, attending rounds and didactic lecturing with 90% stating that the HCE encouraged their own use of evidence-based medicine. 75% reported that their role as team leader was increased or unchanged with 100% of residents stating a preference for the new system. HECs were able to reduce length of stay by 20.8% with cost per case reductions of 18.4% compared with community-based physicians
Strengths/ weaknesses	Costly but clearly replicable intervention. Unclear if these cardiology skills will be retained over a longer period of time	Intervention is labor intensive, but well defined. Unclear if these results are sustainable over longer period of time	Effect on patient care is highly significant and a clinically important patient safety improvement. Details of "educational" intervention not described. Only educational outcome was subjective trainee satisfaction	Impact on patient outcomes is financially valuable. Single institution study of 2 HCE limits its generalizability. Use of subjective resident survey might not be strong enough evidence

itemized bills, emphasis on residents performing routine urinalysis, Gram stains and hemoglobin results over the laboratories, elimination of routine admission tests or standing test ordering, and employment of a "why" instead of a "why not" philosophy for lab and radiology test ordering. Results after 5 months of implementation on 1 out of the 4 resident general

ward services found marked reductions in the number and cost of laboratory and radiology tests, in charges for medications and overall cost of patient hospitalization compared with the services without this education. However, this "intervention" was primarily orchestrated by a single attending on the ward team.

Table 2. Summary of Inpatient Educational Studies by Competency: Medical Knowledge

Study	Fischer ¹²	Lindberg ¹³	Juergens ¹⁴
Design	Single group, before and after	Quasiexperimental trial (3 groups = 1 control, 1 IM, 1 Geriatric attending based)	Single group, before and after
Participants	70 IM Residents (40 control and 30 intervention) (single institution)	93 IM Residents (24 control, 25 IM, 44 Geriatrics based) (single institution)	47 IM Residents (single institution)
Intervention	Use of 4 weekly 1 hour case based, small group discussions derived from the Education for Physicians on End of Life Care (EPEC) teaching materials in addition to usually educational training during a month long medicine ward rotation	Use of a 4 week intensive, inpatient geriatrics educational experience that included care of acutely ill geriatric patients with interdisciplinary team meetings, geriatric-based noon conferences, interaction with a geriatrics trained nurse practitioner and a syllabus of geriatric reading material with or without a geriatric trained attending physician versus a control group with no formal exposure to geriatric training	Use of a 2 month inpatient psychiatric rotation that included a multidisciplinary approach to patient care, utilizing individual and group psychotherapy, pharmacotherapy and other somatic treatments, behavioral therapy, psychiatric social services and activity recreational therapies with formal lectures in psychiatry
Learning outcomes	To improve residents' knowledge in palliative care as assessed by a 16 question test (4 multiple choice casebased questions and 12 True False questions) and attitudes toward death and palliative care issues by the Collett-Lester Death Anxiety Scale (C-LDAS) and Semantic Differential Scale (SDS)	To improve residents' knowledge in geriatrics and attitudes toward older patients and the field of geriatrics as assessed by a 24 item and 35 item test	To assess residents' attitudes toward psychiatry and mental disorders as assessed by a customized survey
Results	There were no significant improvements noted on the knowledge test, SDS or C-LDAS after implementation of the intervention versus controls	There were no significant differences in residents' pretest attitudes and knowledge based on 24 item/35 item tests. Both intervention groups (Geriatrics/IM) showed significant improvement in knowledge (P=.011) and the presence of a Geriatrician did not change this effect. Resident attitudes were overall positive and were not significantly changed by the intervention	Their survey revealed that as a group the residents become more confident in their ability to diagnose and manage psychiatric and personality problems better, $(P <.01)$ as well gained more comfort conducting supportive counseling $(P <.01)$. Additional improvements in resident attitudes occurred in their conviction that inpatient psychiatry is valuable, confidence in making effective psychiatric referral, perception that psychotherapy is useful, comfort in discussing emotionally difficult subjects with patients and their overall enjoyment of the rotation $(P <.01)$. Attitudes that were found to be relatively positive but were not affected by the experience included the consensus that knowledge of psychiatry is important in practicing medicine, respect for psychiatric practitioners, willingness of residents to seek or accept psychiatry referral if they themselves have psychiatric problems and the conviction that use of psychiatric consultation would not compromise the residents' relationship with their patients
Strengths/ weaknesses	Use of a brief, well-defined educational intervention derived from the EPEC teaching materials and validated tests to assess end of life attitudes	The use of a well-defined geriatric educational curriculum can improve residents' knowledge of basic geriatrics without use of "certified" Geriatricians should be appealing to IM programs. Depth of the geriatric education and any long-term effect of the intervention remains unknown	Practicality of a 2 month inpatient psychiatry rotation may be an issue in today's IM programs

We identified 2 educational interventions that had the potential to improve resident's teaching skills. Wipf et al. 19 showed that a 6 hour workshop on resident teaching and leadership skills given to residents resulted in continuous and sta-

tistically significant improvements in their teaching skills as measured by their mean ratings on the clinical teaching assessment form after implementation of the workshop into their residency program over a 3 year period. Likewise, Furney

Table 3. Summary of Inpatient Educational Studies by Competency: Systems-based learning

Study	Bravata ¹⁵	Hamburger ¹⁶
Design	Prospective Cohort Study	Nonrandomized trial
Participants	37 IM residents with 6 attendings (single institution)	21 versus 72 IM residents (3 residents \times 1 team \times 7 months vs 3 residents \times 3 teams \times 7 months) (single institution)
Intervention	Use of an educational and administrative curriculum to teach physicians (attendings and residents) the skills necessary to learn and engage in self directed learning during a typical 1 month general medicine inpatient ward rotation. The curriculum included performing a learning needs assessment, using appropriate learning resources, developing efficiency in reading medical journals, developing and supporting a learning plan, asking clinical questions and maintaining a clinical question diary	Use of a single attendings' cost effectiveness curriculum among residents that included a cost containment booklet that displayed the price of laboratory and radiology tests, daily patient chart reviews, occasional distribution of itemized patient bills, performance of urinalysis, gram stains and hemoglobin results by residents instead of the hospital laboratory, elimination of routine admission tests and daily or standing test orders with use of a "why" philosophy instead of a "why not" philosophy for test ordering and continued hospitalization
Learning outcomes	To improve physicians' skills with respect to self reported learning behavior, capacity for asking and answering well constructed clinical questions and their self-efficacy for performing essential self directed learning behaviors	To improve residents' skills with respect to containing hospital costs by facilitating simple laboratory tests (urinalysis, gram stains and hemoglobin measurements) with critical lab and radiology test ordering and assess the patient benefits in terms of cost of care
Results	There was no change in the quantity or quality of clinical question asking postintervention. Immediately after the intervention there was an increase in the number of physicians defining short- and long-term learning goals and reports of self-efficacy improved for their ability to plan to keep up with the literature. (52/100 vs 72/100 pts, P =.04) The positive effect on short- and long-term learning behaviors was maintained from the postintervention period for upwards of 1 y (short-term results pre 5% to 1 y 50% P =.0075, long-term results 10% to 1 y 70%, P =.0013)	There were statistically significant reductions in the number and cost of laboratory and radiology examinations (P <.01), period of hospitalization (average length of stay 6.43 days which was 24% lower) and overall costs of hospitalization among the intervention resident teams versus control teams
Strengths/ Weaknesses	Attending and resident data was combined with a substantial drop-out rate of participants between pre- and posttests (only 22 of 43 completed posttest) with an even fewer number (10) at 1 y follow-up. As a result of significantly small numbers to analyze, the validity of their final conclusions is suspect	Well-defined cost effectiveness intervention. Both the nonrandomized study design of a single attending teacher as the educational intervention and the cumbersome shifting of the hospital lab workload onto residents will limit its generalizability and practicality

et al.²⁰ showed that a 1 hour intervention that incorporated lecture, small group discussion, and role play to teach residents the "1 minute preceptor" was associated with improvements in resident teaching skills.

Finally, there were 2 studies that showed promising impact on residents' ability to participate in systems-based learning. Sivaram et al. 21 studied the effect of case management on general medicine ward teams at an academic VA medical center. Seven months after implementation they documented that use of case management on resident ward teams led to significant reductions in patient length of stay with no effect on readmission rates. This model has important implications for all residents who are likely to be exposed to the managed care environment and can strengthen their understanding of utilization review, teamwork and disease management. Likewise, the novel use of a postdischarge clinic in 1 institutional study where residents could follow-up on the patients that they cared for during their general ward rotation promptly after discharge, led to marked reductions in patients' postdischarge emergency room utilization.²²

DISCUSSION

This review of published literature demonstrates that we have little data on what constitutes effective internal medicine educational interventions in the inpatient setting. Most of the articles focused on specific areas such as palliative or end of life care, inpatient psychiatry, inpatient geriatrics, cardiovascular physical examination skills improvement, resident teaching skills, and cost effective inpatient care strategies. The good news is that several studies showed that interventions can involve both education and improved patient care. However, there were no studies evaluating any internal medicine program "core" inpatient curriculum. Furthermore, very few of the present studies performed direct assessment of resident competencies, preferring instead to use satisfaction and self-assessment.

Internal medicine programs have been training internists primarily in the hospital inpatient setting for over 100 years. Despite significant pressure to shift more training to the ambulatory setting over the last 25 years, internal medicine residents at the end of their training still say they feel more prepared to care for inpatients than outpatients. ^{23–25} Changes in future inpatient education will need to consider the effects of shifting more training to the ambulatory setting, the impact of resident work hour limitations, and the need to develop more interdisciplinary team approaches to inpatient care.

Why are there so few studies in internal medicine? One reason is the nature of internal medicine training. Internal medicine residency has traditionally been a complex conglomeration of learning occurring over a 3-year period that inter-

Study	Sivaram ¹⁸	Diem ¹⁹
Design	Single Group Study, before and after	Randomized trial
Participants	Unclear the exact number of IM residents. Five teams (10 to 15 residents) prior, 4 teams (8 to 12) that were noncase management and 1 team (2 to 3) case management. Study period January to July 94 (prestudy), January to July 95 (study period). Residents did rotate on both teams during the study period (single institution)	18 IM teams in intervention vs. 24 IM teams in control (single institution)
Intervention	Use of a case management program that employed 1 case manager (RN) working with 1 traditional general medicine ward team who assessed patients at admission to identify potential problems with the discharge process and coordinate appropriate services as necessary	Use of a postdischarge clinic that allowed residents to see the patients that they cared for in the hospital soon after discharge
Learning outcomes	To assess residents' attitudes toward case management and assess its patient benefits in terms of length of stay, and readmission rates	To assess residents' attitudes toward use of a posthospitalization discharge clinic and assess its patient benefits in terms of patient utilization of later hospital services
Results	While the median length of stay was not statistically different at 5 days, the cumulative distribution of lengths of stay for case management patients was significantly lower with more patients discharged by day 7 (precase management 68.7%, noncase management 70.7%, and with case management 76.1%). Readmission rates were not statistically different between the teams with and without case management. Only informal poll data conducted a weekly resident meetings was described to suggest a positive perception that case management improved patient care and team functioning among residents	Residents did not feel that the clinic was time consuming and 70% felt that it was a good experience. Intervention patients had fewer emergency room visits than controls (28% vs 20% P =.03) in the 30 d after discharge. Length of stay, readmission rates and overall mortality were similar among the groups
Strengths/ weaknesses	Intervention helpful in getting patients discharged faster despite obvious contamination across study period. Data on case managements' impact on resident attitudes was qualitative at best	Strong clinical impact on residents with a modest improvement in patient outcomes despite poor follow-up at the discharge clinic in the intervention group (45.5%). May be time consuming and more costly to staff

twines multiple educational interventions and different patient experiences. Experiential education by caring for patients with the right combination and timing of autonomy, supervision and feedback remains essential. Determining what is the right kind of supervisory teaching also necessitates that a clearly defined curriculum that includes the core knowledge, skills, and attitudes unique to the inpatient setting be developed and that effective internal medicine inpatient rotation structures can be created. Studies over 20 years ago had already noted the changing demographics of the hospitalized patient. 26,27 Despite a recent study of internal medicine training residents at 1 institution that showed that over 3 years, residents on average covered 76% of FCIM priority 1 competencies (those optimally learned through direct responsibility of patients), no resident was able to cover all FCIM competencies.^{6,28} While promising, educators must avoid equating clinical exposure with clinical competence and advocate for the identification and implementation of more effective educational models in the inpatient setting.

It is apparent that the lack of a universally accepted core inpatient curriculum has hampered the study of teaching in the inpatient setting. Without a formal inpatient curriculum further study of teaching in the inpatient setting will be hindered. To accomplish this feat in an evidenced based manner, it is important to build a curriculum around the common inpatient medical conditions (problems, diseases, and disorders) encountered by today's practicing internist.

Our review supports the need for defining an inpatient curriculum and the need for more study of effective inpatient educational interventions and experiences. While a trainee must always learn from their medical errors, the inpatient educational system must be designed to maximize patient safety and education concomitantly. As Ludmerer points out, the central moral paradox of graduate medical education is that the best situation is for the individual patient to be cared for by the most experienced clinician. But, for society, trainees have to be given the graduated autonomy necessary to join the next generation of independently practicing physicians. ²⁹ Innovative approaches to teaching and supervising in the inpatient setting are urgently needed that allow residents to learn, make decisions, exercise responsibility, and autonomy to the point of a potential error without actually committing errors.

Our review has a number of limitations. First, our search strategies could have missed other important studies not included in Medline, Embase, or bibliographies. However, we used 2 different search strategies for identifying educational intervention articles. Second, by limiting our analysis to only educational interventions in internal medicine residency training and the inpatient setting eliminated many studies of medical students and residents in other fields. We also did not target other broad-based competency interventions that may have some applicability in the inpatient setting because the inpatient setting was not the subject of that research. The goal of this study was to specifically define the "state-of-the-art" for internal medicine training to help identify important gaps in our understanding of the inpatient training experience. Third, our restrictive criteria for outcomes data eliminated several descriptive studies. Finally, many internal medicine programs

Table 5. Summary of Inpatient Educational Studies by Competency: Interpersonal and Communication Skills

Study	Wipf ¹⁷	Furney ¹⁸
Design	Time Series (3 years before and 3 years after intervention)	Randomized trial
Participants	446 IM residents (single institution)	57 IM residents (29 control and 28 intervention groups) (single institution)
Intervention	Use of a teaching improvement program focused on second and third year residents that consisted of three 2 hour sessions covering topics such as leadership skills, conducting work rounds, interacting with attendings, practicing teaching skills, teaching medical students, using feedback and evaluation and dealing with problem behaviors and other morale issues	Use of a 1 hour teaching session focused on the One-Minute-Preceptor (OMP) model which consisted of a 15 min lecture on the OMP model, followed by a 20 min role play session and debriefing which allows the residents to practice. The facilitator then led a 15 minute discussion about the use of the OMP in residents teaching. Pocket cards were given to intervention residents and they were asked to state their goals for teaching using the model
Learning outcomes	To improve residents' skills in teaching as assessed by the Clinical Teaching Effectiveness Form (CTAF)	To improve residents' skills in teaching as assessed by student and intern ratings at the end of their rotations with a 14 item questionnaire that addressed the 5 microskill domains in the OMP model. Secondary outcomes looked at resident self-report of pre- and postintervention teaching skills and usefulness of the OMP model at the end of the rotation
Results	Results of 3,946 evaluations of 235 postgraduate year (PGY) 2 and 211 PGY 3 revealed continuous and statistically significant improvements in mean CTAF ratings each year after introduction of the teaching workshop (P <.001)	Residents assigned to the intervention group showed improvements in all domains except the "teaching general rules" category. Intervention residents reported statistically significant changes in all behaviors (<i>P</i> <.05). 87% of residents reported the intervention as "very useful" or "useful" on a scale of 1 to 5 with a mean score of 4.28. However, the ratings of overall resident teaching effectiveness were not statistically different between the 2 groups of residents
Strengths/ weaknesses	Intervention is replicable and impact on teaching skills based on CTAF scores is statistically robust. Unclear if these differences have real life educational significance	Easy to administer intervention which has quick and focused impact on resident teaching. Unclear of intervention is durable over time without continuing education

implement successful curricular as well as evaluation programs that have not been formally published but may have been presented at educational meetings in abstract format without widespread dissemination.

CONCLUSIONS AND RECOMMENDATIONS

There is a pressing need for the entire education community to perform a comprehensive and rigorous assessment of the current structure of inpatient education. New approaches to supervision, teaching and evaluation will be required if inpatient training is to be truly patient-centered. All stakeholders should work to define the "core" inpatient curriculum for internal medicine. For example, the Society of Hospital Medicine (SHM) is developing a core curriculum of inpatient medicine(M. Pistoria, Personal communication.) by using data from the National Hospital Discharge Survey³⁰ that focuses on the most common inpatient medical conditions, a core set of necessary inpatient procedures and the systems based practice skills relevant to the inpatient setting. The ongoing work of both SHM and that already achieved by the FCIM could potentially serve as the basis for this new "core" inpatient curriculum. We believe that new inpatient team structures and skills will be required to enhance the link and training in both the inpatient and outpatient settings. Experiential educational activities should take precedence over passive educational methods in the inpatient setting as shown in the small number of studies reviewed. Finally, research is urgently needed to study the effects of curriculum on resident learning and patient care which utilize more rigorous research design and multiinstitutional collaborations.

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