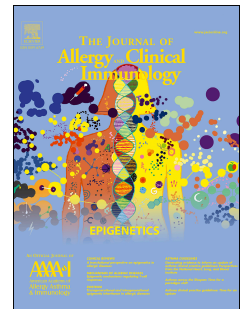


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Time to Develop More Clinician Educators in Allergy and Immunology

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Title: Time to Develop More Clinician Educators in Allergy and Immunology

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Abbreviations:

AAAAI: American Academy of Allergy, Asthma, and Immunology

AAMC: Association of American Medical Colleges

ACAAI: American College of Allergy, Asthma and Immunology

ACGME: Accreditation Council of Graduate Medical Education

A/I: Allergy and Immunology

CIS: Clinical Immunology Society

Abstract

Clinician educators in the field of allergy and immunology (A/I) in the U.S. teach and assess trainees (medical students, residents, fellows), provide professional development to primary care physicians and advance practice providers, and are essential in developing a pipeline of academic A/I specialists. The U.S. appears to be facing a shortage of clinician educators and academic allergists in A/I, based upon data from Doximity and the Association of American Medical Colleges. Without adequate numbers of A/I specialists focused on medical education, institutions will find it difficult to train fellows and introduce the field of A/I to medical students and residents. It is now imperative that the field focus on empowering more A/I specialists to become *clinical teachers* and *clinician educators*. There are specific strategies which individuals, as active agents in their own development, can take in planning for this rewarding and fulfilling career. Individuals can pursue professional development opportunities, join medical education communities of practice, seek education mentors, and join in scholarship activities. It is also essential that systems-level support be provided for clinician educators, given the increasing business pressures in medicine. Academic institutions, national organizations, and professional societies can provide resources, including structured programs in medical education, protected time, and grants. This article outlines strategies for individuals, institutions and professional organizations that will promote the development of the next generation of A/I clinician educators.

Introduction

Clinician educators in the field of allergy and immunology (A/I) in the U.S. teach and assess trainees (medical students, residents, fellows), provide professional development to primary care physicians and advance practice providers, and are essential in developing a pipeline of academic A/I specialists. While the role of clinician educators is vital, the U.S. appears to be facing a shortage. In 2014, Doximity reported that the number of A/I specialists in academic health centers was less than 10% of the estimated workforce (507/5454), and likely to include a mix of roles, such as clinicians, educators and researchers.¹ In 2017, the Association of American Medical Colleges (AAMC) reported results of a survey study where 1% (55/4774) of A/I specialists identified teaching as a major professional activity.² Recognizing that collection methodologies and role definitions vary, these numbers are low, and the A/I specialty is late to the call to action to develop more educators. Specialties such as internal medicine began addressing this gap in the early 1990's.^{3,4} Without adequate numbers of A/I specialists focused on medical education, institutions will find it difficult to train fellows and introduce the field of A/I to medical students and residents. This may also lead to a further decline in fellowship applications.⁵ With the goal of increasing A/I fellowship applicants, the academic priority should include the empowerment of clinicians to become *clinical teachers* and *clinician educators*. In this Rostrum article, we explore *clinical teacher* and *clinician educator* roles within the field of A/I, outline benefits and challenges associated with these roles, and provide strategies to enhance development and recruitment.

Defining the roles

The roles of *clinical teacher* and *clinician educator* are often sources of confusion. Throw in faculty preceptor, academic faculty/member, core residency teaching faculty, master

teacher, and master educator and you have a true nomenclature potpourri. For the purposes of this article, we distinguish between the roles of *clinical teacher* and *clinician educator* (see Table 1). The *clinical teacher* is a physician whose primary responsibility is patient care. Teaching involvement is variable and includes infrequent lecturing to healthcare professions trainees, precepting trainees in ambulatory clinics, and informal teaching on inpatient wards. *Clinician educators* are more extensively involved in medical education. They typically spend less time on patient care and more time on teaching and advising trainees, developing and designing curricula, assessing learners, and/or evaluating programs. Clinician educators also devote time and effort to scholarship and/or research in medical education, and may be involved in medical education forums at the regional, national, and international level. While the term *medical educator* is sometimes used synonymously with *clinician educator*, we maintain these are distinct roles, as *medical educators* typically include education specialists who have advanced degrees in education (e.g., MEd/MA or PhD/EdD.) (Table 1). These individuals also have specialized roles in medical education, including academic administrative roles (e.g., supporting services in medical schools, graduate medical education, or continuing medical education offices), leadership roles, teaching, and/or research roles.

Background

Physician educators' roles have evolved within academic medical centers since Flexner's time, when the missions and roles of academic healthcare centers were examined and a greater focus on clinical teaching was emphasized.^{6, 7} Today, support for physician educators (clinical teachers and clinician educators) can be seen in the work of national organizations such as the AAMC and the Accreditation Council for Graduate Medical Education (ACGME). The AAMC has identified five specific educator domains (i.e., curriculum development, teaching, learner

assessment, advising and mentoring, and educational leadership and administration) for consideration in the promotion of all academic faculty, both MDs and PhDs, as medical educators in the United States and Canada.⁸ In addition, ACGME residency milestones have highlighted the importance of teaching skills in several specialties, such as internal medicine, surgery, and pediatrics.⁹⁻¹¹ The AAMC, while noting differences between academic advancement in medical research versus medical education, indicated that both research and education are necessary for the continuation of academic medicine in the United States.⁸

Professional identity. Given the importance of educational training to the future of academic medicine in the United States, the field of A/I needs to support the development of more clinical teachers and clinician educators. An awareness of professional identity is a critical first step. The formation of a physician's professional identity includes the process of acquiring and habitualizing the skills, attitudes and practice habits one needs as a physician.¹² Undergraduate and graduate medical education trainees should see A/I specialists as clinicians, clinical teachers and clinician educators. Exposure to role models will allow for early formation of a professional identity as both an A/I specialist, as well as an educator. When A/I fellowship applicants are asked the question, "Where do you see yourself in 5-10 years after your fellowship?" many will reply, "As a clinician educator at an academic healthcare center." But this is only possible if trainees are somewhat familiar with the skills, roles, and competencies needed to advance through the various stages of skill development to become clinician educators. Exposure to good educators and positive role models is known to influence medical students in their career choices.¹³ However, if physicians do not self-identify as clinician educators and are not explicit about their roles, it makes it difficult for trainees to form their own professional

identities. We need practicing A/I specialists to self-identify clearly as clinician educators to provide these needed role models.

Competencies. A competency-based framework can provide another lens for viewing the clinician educator role. Depending upon one's specific educational role, one will need to meet competencies in the following educational domains: knowledge of and skills in curriculum development, assessment of learners, learner-centered teaching skills, and administration of learning systems and programs.¹⁴ Evidence-based teaching practices, educational research and scholarship, and educational leadership (at both regional and national levels) are emphasized by other competency frameworks.¹⁵

Roles for clinician educators. According to Harden and Lilley, there are at least eight roles which clinician educators typically occupy: information provider and coach, facilitator and mentor, developer and implementer of curricula, assessor and diagnostician of learners, role model, manager and leader, scholar and researcher, and lastly, expert professional teacher.¹⁶ A Canadian mixed-methods study identified four key roles of the clinician-educator: clinician, educational scholar, practitioner of educational theory, and consultant on educational issues.¹⁵ Anticipating future trends, additional roles may include: an adopter of innovative technology, an analytic and diagnostic assessor of big data, and curator of pre-existing and contemporary educational materials.¹⁷

Challenges

Challenges for clinical teachers and clinician educators include balancing clinical practice with teaching and administrative responsibilities. Clinical teachers must find equilibrium between the work of a physician providing optimal patient care and that of a teacher. Measures of productivity for physicians at academic healthcare centers continue to change, increasing the

pressure to see more patients and complete electronic health records, resulting in stress and even burnout.^{18, 19} Rising new academic faculty at academic institutions are frequently caught unaware, unfamiliar with the culture and general expectations, both as a clinician, teacher, and an educator, and administrative duties may be added quickly. Those individuals wishing to develop competence as clinician educators will need to find additional time to learn the specialized knowledge associated with this educational role. Indeed, maintaining dual professional identities is challenging. Stoddard and Brownfield have called for extensive collaborations with non-clinical medical educators.²⁰ Educational research and scholarship are other activities that need development and prioritization for clinician educators, and may require not just a master's degree, but a PhD or EdD. Institutional rules for promotion as clinician educators may not be clear and recognition for teaching, be it financial or otherwise, may be absent or under-valued. Physicians may also have family roles, and can struggle – both physically and emotionally – with leaving their workplaces in a timely fashion or protecting family time while at home.

Benefits

The noun “doctor” comes from the verb *docere* (Latin, ‘to teach’). Physicians have a deep professional commitment to teaching: not only to patients, but to other learners within the healthcare system (e.g., allied healthcare providers, medical students, other trainees). The most common factors motivating physicians to teach are personal and intrinsic satisfaction; the ability and responsibility to teach and influence future healthcare providers, who will then impact and manage patients; and the desire to keep up-to-date in one's profession.²¹⁻²⁴ Another factor identified in two studies of teaching physicians was the ability to showcase their medical specialty, which could assist with student and resident recruitment to the field of A/I.^{23, 25}

Strategies to increase development of clinician educators

To ensure that the pressures of clinical productivity and research priorities do not deter institutions from supporting clinical teachers and clinician educators, a multi-level approach is recommended. Change will need to occur at the individual level (Figure 1), institutional level, and professional society/national healthcare organization level (Table 2).

Strategies for individuals. Individuals must be single-minded and passionate about pursuing the field of medical education. There are several strategies which individuals can use to develop and enhance skills and knowledge related to their roles as clinician educators (Figure 1). If one is already determined to pursue a career as a clinician educator, clinician educator tracks are now more readily available during residency.^{26,27} During post graduate training, one can pursue residency tracks and/or institutional professional educator development longitudinal programs, where available. If no programs exist locally, fellows and junior faculty can seek out programs at professional society meetings. Identification of role models and mentors in medical education are also strategies for individuals' intent on becoming clinician educators. These relationships can help deepen one's commitment to the field of medical education, and assist in professional identity formation. It can also open up opportunities for sponsorship and individual promotion in new educational opportunities, locally and beyond, focusing on teaching, scholarship, or research. Obviously, these offers should be readily accepted by the individual. If unable to identify local role models or mentors, one can participate in medical education learning communities. Independent study and gathering information informally are tried and true approaches to learning. There is an abundance of online learning resources, from curated reading lists to massive open online courses (MOOCs) and free open access medical education (FOAM) that make informal learning in medical education accessible to all.²⁸⁻³² For others, formal learning may be preferred, or even required for academic advancement. Formal learning

opportunities include local institutional professional development programs, workshops at regional and national meetings, and master's or doctoral programs in education or health professions education.³³

A community of practice, defined as a group of individuals with a common interest or passion (e.g., medical education), can offer individuals opportunities to share and learn from each other. At the same time, individuals develop relationships which further both practice in and knowledge of education (Figure 1).³⁴ Other benefits of participating in a community of practice include engaging in collaborative work, finding supportive colleagues, and acquiring information about new practices and innovations.³⁵ Communities of practice can be organized formally (i.e., organized by institutions or professional societies) or can develop organically.

Development of skills in educational scholarship is another strategy for clinician educators to consider. Educational scholarship is similar to scholarship in medicine in that products include peer-reviewed articles, textbook chapters, and publications regarding research. Educational scholarship also includes the dissemination of curricula and evaluation project results, innovative teaching strategies, learner assessment projects, advising and mentoring programs, and educational leadership and administration.⁸ Recent examples of educational scholarship in A/I are the development and dissemination of educational programs in drug allergy evaluations and the development and dissemination of A/I fellowship milestones.^{36,37}

Systems-Level Support: Local and National Sponsorship and Resources

As academic healthcare centers typically have related goals of providing excellent patient care, educating trainees, and retaining faculty, they need to support the development and promotion of clinician educators.⁸ If A/I specialists are unable to attain faculty appointments and seek academic promotion, learners at all levels will lack role models in teaching, research, and

leadership. When learners lack teachers, mentors, coaches, and role models they can identify with, they are less likely to pursue a given career.¹³ Taking a systems-level view of support for clinician educators, clinical and academic healthcare institutions can do much more to foster the professional development and academic advancement of junior clinician educators (Table 2). Clinician educators, like basic and clinical science researchers, need protected time to develop specialized skills in teaching, to adopt new educational technologies, and to engage in educational research and scholarship.

Professional development opportunities for clinician educators range from clinician-educator tracks within A/I fellowships to institutional faculty development programs,³⁸ and medical education fellowships for faculty. For junior faculty already in practice at academic centers, as well as private practitioners wishing to start or return to teaching, several options exist (Table 2). While some programs and fellowships emphasize teaching and assessment skills, others are directed toward educational research and scholarship.³⁹

Professional society support. Those clinicians in private practice seeking educator development can look into primary specialty organizations' certificate programs, such as the Society of General Internal Medicine's "Teaching Educators Across the Continuum of Healthcare" (TEACH) program and the American Academy of Pediatrics' Advancing Pediatric Educator Excellence (APEX) Teaching Program.^{40,41}

In addition to offering courses and certificate programs in teaching, there are other ways professional societies can support clinician educators. A/I societies already offer workshops on fundamentals of teaching skills, highlighting problem-based learning, team-based learning, and interactive teaching methods. Offering these sessions on an annual basis and listing sessions within 'clinician educator tracks' are useful for meeting attendees; these activities emphasize the

importance of medical education to fellows and society members. Developing and scheduling new topic sessions, such as technology in education, learner assessment, program evaluation, educational research and scholarship, will further assist with the goal of developing more clinician educators in A/I. Our societies already support fellowship program directors, one community of practice, with regular meetings outside the annual society meetings and boot camp sessions. Professional identity formation can also be enhanced by developing a *clinician educator interest section*, *clinician educator working group*, and mentorship or coaching programs. In addition, society awards and grants focused on development of clinician educators will further engage those motivated to pursue a career in medical education. Announcements of the awardees and gatherings of these individuals at the annual society meetings will allow additional communities of practice to develop on a regular basis. The inaugural 2020 AAAAI Educators Development Award is an exciting opportunity for individuals who have self-identified as clinician educators.

To promote publication opportunities for clinician educators, A/I specialty journals can develop specific sections/categories for medical education manuscripts, thereby increasing awareness and showcasing educational research and scholarship. Further awareness of medical education literature can be promoted by offering regular education-themed issues, following the example of JAMA's December issue.⁴² Recent articles in the Journal of Allergy and Clinical Immunology are examples that can be included in a dedicated education section or thematic issue.^{36,43, 44}

Summary

The development of and support for *clinical teachers* and *clinician educators* in A/I should be a primary concern for institutions, professional societies, and the A/I specialty, given

287 the changing landscape of healthcare. While individuals must develop specialized skills within
288 medical education domains and be active agents in their own careers, they will need support to
289 be successful. Leaders in the field of A/I should advance opportunities and programs for junior
290 clinician educators, creating spaces for those seeking careers as educators. Fellowship tracks in
291 medical education can engage those individuals already motivated to pursue further training.
292 Programs at professional society meetings can engage individuals seeking additional guidance
293 for their careers. Taking a systems-level approach to career development can lead to much-
294 needed growth in the overall population of A/I faculty. This support will amplify the passion of
295 the next generation of clinician educators. More than ever, the time is now for the field of A/I to
296 sponsor and cultivate clinical teachers and clinician educators, advancing their professional
297 development in education, and ensuring the future of the specialty.

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Figure 1. Key strategies for Development as a Clinician Educator after Medical School

- Seek out residency and fellowship programs that have clinician educator tracks
- Seek out leadership roles during residency, such as chief resident
- Develop knowledge in the following educational domains: Learning theories, learner-centered teaching, learner assessment, curriculum development, program evaluation
- Professional Development: Depending upon specific interests, cultivate skills in the following areas: interactive teaching methods and/or teaching within the following domains: clinical reasoning, assessment, technology innovations, interprofessional education
 - Skill development can occur with professional faculty development programs locally, regionally or nationally.
 - Obtain advanced degree in medical education (MEd, MHPE, PhD, EdD, etc.)
- Volunteer, seek out, and accept teaching opportunities when offered (local, regional and national)
- Identify role models and seek out mentors
- Community of Practice: Participate in learning communities of clinician educators at the local, regional, or national levels
 - These communities can be at found within institutions or at regional, national and international meetings and courses. This strategy opens the door to collaboration in scholarship, research, and teaching.
- Scholarship: Identify scholarship opportunities, specifically focused on medical education
 - This strategy involves identifying key medical education journals or specialty journals with categories for medical education articles. Reading medical education articles will assist with familiarity and confidence in this domain and enhance motivation in writing and publication
 - Work with other educational scholars at the local, regional and national levels
- Accept offers to be involved in educational research
- Seek an educational research mentor
- Seek out fellowships, grants and awards in medical education (available at local institutions and professional societies)

452 **Table 1. Definitions: Clinical Teachers, Clinician Educators, Medical Educators**

Features/Attributes/Characteristics	Clinical Teachers	Clinician Educators	Medical Educators
Degree(s)	MD/DO, Clinical PhD	MD/DO, Clinical PhD, some with secondary degree such as MEd/MHPE/MA/MS	PhD/EdD, MA/MS/MEd
Audience	Medical students, residents, fellows, allied healthcare students and professionals	Same as clinical teachers -- <i>plus</i> academic health science center faculty, allied healthcare faculty	Same as <i>clinician educators</i> -- <i>plus</i> academic health science center faculty, allied healthcare faculty, nursing, research and other IPE faculty/instructors
Teaching settings/venues	Private practice, academic healthcare institution (ambulatory clinics, inpatient services, emergency departments), occasional clinical lectures in undergraduate medical education (UME), and graduate medical education (GME)	Same as clinical teachers, but also more formal settings such as faculty development meetings/retreats, regional, national and international medical education meetings	Same as <i>clinician educators</i> , but generally not in clinical settings
Clinical time spent seeing patients	Typically >60% up to 100%	Typically 5% to <60%	0%
Scholarship	None to little involvement in publishing; and/or few presentations at the local, regional or national level	Publishing; presentations at the local/regional/national level; reviews for journals/textbooks and conferences; editorial positions	<i>For PhDs/EdDs:</i> Same as clinician educators, but typically more dedicated time <i>MA/MS/MEd:</i> variable involvement

Research	None to limited involvement	None to principal- and/or co-investigator and/or research mentor-investigator	<i>For PhDs/EdDs:</i> Same as clinician educators, but typically more dedicated time <i>MA/MS/MEd:</i> variable involvement
Type of academic appointment	No appointment to clinical, adjunct or assistant professor	Assistant, associate or full professor at academic institution	<i>For PhD/EdDs:</i> Same as <i>clinician educators</i>
Types of administrative positions/roles available in UME/GME	Possible committee membership and/or associate roles in UME/GME	Directors and associate clerkship directors at the clerkship level; Program directors/ associate program directors, and designated institutional officials for GME; Assistant/associate dean or dean at the medical school level.	<i>For PhDs, EdDs:</i> Director/Associate director (UME and GME levels), Vice Chair for Education (GME level); Assistant/associate dean and potentially dean at the medical school level.
Other teaching/learning responsibilities	May be local coach/advisor for trainees	Same as clinical teacher and also mentors for trainees and faculty locally and nationally	<i>At PhD/EdD level:</i> Mentors in scholarship and research for trainees and faculty locally and nationally <i>MA/MS/Med:</i> variable involvement

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459 **Table 2. Systems-Level Supports: Local and National Sponsorship and Resources for**
 460 **professional development of Clinician Educators**

Type of support/resource	Local clinical institutions (e.g., teaching hospitals)	Local academic institutions (e.g., medical schools)	National organizations (e.g., AAMC, ACGME)	National and international professional societies (e.g., AAAAI, ACAAI, CIS)
Structural (e.g. protected time, hardwired administrative support, departmental funding for educational research)	Protected time for educational activities (teaching, assessment, etc.), participation in professional development activities (e.g., conferences/courses to enhance skills in teaching, assessment, research, etc.), and sabbaticals. Administrative support in the form of coordinators or program managers (GME) and possibly specialized medical educators (PhDs/EdDs or master-level educators (MA/MS/MEHPE)	Same as local clinical institutions --- <i>plus</i> budgeted departmental funding to support educational researchers	Well-defined standards for medical education research and scholarship	Tracks for clinician educators and medical educators at annual meetings; creation of interest sections and/or workgroups
Educational opportunities and awards	Local clinician educator tracks during residency, Medical Education fellowships , local coaching and mentorship programs	Same as local clinical institutions --- <i>plus</i> Faculty development programs/courses offered by the medical school and courses related to teaching and research offered at local colleges/universities	Educator and scholarship programs offered at annual meetings; national coaching and mentorship programs	Same as national organizations --- <i>plus</i> stand-alone programs, medical society journal articles/issues on medical education; national and international coaching and mentorship programs

Educational and research resources/support	Grants and fellowships to support educational research and other types of scholarship. Social media for communication and to support dissemination of research/educational innovations.	Same as local clinical institutions --- <i>plus</i> administrative coordinators for UME programs	Same as local clinical institutions --- <i>plus</i> committees on enhancement/promotion of medical education; identified leaders in organizations; ambassadors of the field	Same as national organizations
Recognition and rewards	Educator/researcher awards and honors,	Same as <i>local institutions</i> --- Plus awards and recognition via educational academies, collaboratives, societies	Same as local institutions	Same as local institutions
Academic promotion (i.e., faculty appointments)		Faculty appointments offered through degree-granting bodies such as medical schools or colleges and universities		

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Figure 1. Key strategies for Development as a Clinician Educator after Medical School

- Seek out residency and fellowship programs that have clinician educator tracks
 - Seek out leadership roles during residency, such as chief resident
 - Develop knowledge in the following educational domains: Learning theories, learner centered teaching, learner assessment, curriculum development, program evaluation
- Professional Development: Depending upon specific interests, cultivate skills in the following areas: interactive teaching methods and/or teaching within the following domains: clinical reasoning, assessment, technology innovations, interprofessional education
 - Skill development can occur with professional faculty development programs locally, regionally or nationally.
 - Obtain advanced degree in medical education (MEd, MHPE, PhD, EdD, etc.)
- Volunteer, seek, and accept teaching opportunities when offered (local, regional and national)
 - Identify role models and seek out mentors
- Community of Practice: Participate in learning communities of clinician educators at the local, regional, or national levels
 - These communities can be found at local institutions, at regional, national and international meetings. This strategy opens the door to collaboration in scholarship, research, and teaching.
- Scholarship: Identify scholarship opportunities, specifically focused on medical education
 - This strategy involves identifying key medical education journals, or specialty journals with medical education categories/articles. Reading medical education articles will assist with familiarity and confidence in this domain and further motivation in writing and publication (reference Sullivan GM)
 - Work with other educational scholars at the local, regional and national levels
- Accept offers to be involved in educational research
 - Seek an educational research mentor
 - Seek out fellowship, grants and awards in medical education (available at local institutions and professional societies)