TRAINEE SECTION

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Fostering mentorship for clinician-investigator trainees: overview and recommendations

Abstract

Purpose: The Clinician Investigator Trainee Association of Canada/ Association des cliniciens-chercheurs en formation du Canada (CITAC/ACCFC) recently published the first survey to assess factors contributing to trainee satisfaction. One key finding is that increased level of mentorship strongly correlates with overall satisfaction; however, while 98% of respondents reported mentorship as important to success, more than 60% expressed some dissatisfaction with the mentorship received. To help address this discrepancy, we reviewed mentorship in academic medicine, focusing on clinician-investigator trainees, and distilled a set of recommendations for mentors, mentees and institutions.

Source: OVID and manual curation based on the search terms 'mentorship' AND 'education, medical and research' identified 198 articles. Two authors independently reviewed both titles and abstracts and narrowed them down to 75 articles, based on relevance to mentorship in academic medicine. Consensus resulted in the selection of 19 articles for detailed review.

Principal findings and Conclusion: Mentorship is beneficial at each training stage and is associated with greater research productivity, career retention and promotion. Nevertheless, more rigorous studies are needed, especially regarding cost-effectiveness. Studies have identified the characteristics of good mentors, including the ability to ensure open communication, ability to maintain confidentiality and ability to ensure that there is no mentor-mentee competition. Similarly, the characteristics of good mentees have been identified as the ability to take ownership of a project and the ability to build a network or team of mentors. The literature has also identified the actions that institutions can take to facilitate mentorship, which include mentor training and recognizing mentorship through awards.

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Mentorship can be beneficial; this has been seen across a number of different disciplines. In law, business and nursing, mentorship has been associated with higher levels of career satisfaction and a higher rate of promotion, especially when begun early in one's career [1]. In a broad meta-analysis of mentorship in different ages and areas (youth, academic or workplace mentoring), effects of mentoring were clearly positive in all domains examined. Statistically significant, positive effects were noted in behavioural, attitudinal, health-related, interpersonal, motivational and career outcomes [2].

The clinician-investigator^{1A} (CI) path is a unique one, offering exceptional trainees an opportunity to explore a career in both academic research and clinical medicine. The clinician-investigator path does, however, require the investment of an extensive amount of time and effort, typically increasing the training commitment by two to seven years (relative to training in only research or clinical medicine). With this associated increase in program length and uncertain future at the end of this training, effective guidance through a mentoring relationship can be critical to clinician-investigator trainee success [3].

The Clinician Investigator Trainee Association of Canada/ Association des cliniciens-chercheurs en formation du Canada (CITAC/ACCFC) advocates for the welfare of clinician-investigator trainees. Efforts in the past have included tracking of trainee demographics, leading to the first publication of this nature in Canada [4]. More recently, CITAC conducted an online nominal scale-based psychometric survey to assess factors that contribute to trainee satisfaction. One of the conclusions based on the survey data is that increased level of mentorship was strongly correlated with overall satisfaction. Herein also lies a major challenge, as 62% of respondents expressed some dissatisfaction with the level of mentorship received. One encouraging finding is that the overall satisfaction among trainees increased for each and every category for the level of mentorship received; from "none" to "abundant". This suggests that any intervention aimed at increasing mentorship support would lead to improved trainee satisfaction [5]. To address this discrepancy, we conducted a literature review to assess mentorship in the academic setting, with a focus on clinician-investigator trainees. Are there benefits of mentorship for clinician-investigator trainees? If there are benefits, how can they be maximized and made more widely available? The aim of this review is to develop strategies to increase the level of mentorship among clinician-investigator trainees. While excellent reviews exist on mentorship in academic medicine [6, 7],

this paper is unique in that it focuses on the perspective of the clinician-investigator trainees and provides not just a review of the literature but practical recommendations for mentors and mentees as well as institutions.

Methods

OVID and manual curation based on the search term 'mentorship' AND 'education, medical and research' provided 198 articles of interest. Two of the authors independently reviewed these titles and abstracts and narrowed them down to 75 articles, based on relevance to mentorship in academic medicine and the clinician-investigator trainee path. Reviews and empirical studies, whether of a quantitative or qualitative nature, were included. Articles that were primarily opinions or commentaries without a basis in empirical evidence or existing literature were excluded. Consensus of decision resulted in the selection of 19 articles for complete review. A list of the studies reviewed, methods used in those studies, major findings and recommendations can be found in Table 1.

Importance and benefits of mentorship

In a systematic review of mentorship in academic medicine, Sambunjak *et al.* found a consensus among studies on the positive effects of being mentored: benefits included increased confidence, increased support and more resources allocated to research activities [6]. Those trainees receiving mentorship tended to allocate more time to research, be more productive in their research (as assessed by number of publications and grants), were more likely to complete their theses and were more likely to be appointed professors [6, 7]. Mentored students have rated their overall well-being higher than their non-mentored counterparts [8]. On the other hand, those providing mentorship can also benefit [8]; for example, mentors of undergraduate medical students found mentoring invigorated their interests and their personal and professional growth [8]. While we were unable to find a meta-analysis that focused specifically on clinician-investigator trainees, the trends observed in academic medicine, as well as other disciplines, may be extrapolated to mentorship for clinician-investigator trainees. Indeed, findings from smaller studies of clinician-investigator trainees are suggestive of benefits of mentorship for clinician-investigator trainees [5, 10, 11].

Moreover, the benefits of mentorship are likely to span the different stages of a clinician-investigator trainee's development

^{1A} Here we use the term 'clinician-investigator' to broadly refer to physicians who are trained to be 'bilingual' in clinical medicine and scientific research or knowledge translation, regardless of the percentage of their time devoted to either.

TABLE 1. Summaries of articles reviewed in alphabetical order by first author

Source	Ref. no.	Study type description	Major findings	Recommendations
Abedin <i>et al.</i> , 2012	[26]	Qualitative: expert consensus and literature review were used to compile competencies for mentors of clinical/translational scholars	19 actionable and measurable competencies falling into six themes: 1) communication; 2) psychosocial support; 3) career and professional development; 4) professional enculturation; 5) research development; and, 6) clinical translational investigator development	Validate and develop competency measures for mentors
Cho <i>et al.</i> , 2011	[3]	Qualitative: grounded theory analysis of recommendation letters for a prestigious mentorship award at UCSF was used to derive qualities of good mentors	Outstanding mentors: 1) exhibit admirable personal qualities; 2) act as a career guide; 3) make strong time commitments; 4) support personal/professional balance; and, 5) and leave a legacy of mentoring	These qualities can guide mentor training programs and be used to develop evaluations
Cohen <i>et al.</i> , 2012	[32]	Case-control: institutions were placed into case or control groups based on number of presentations at an annual society meeting, then surveyed regarding their mentoring programs	Case institutions were more likely to 1) have an added year of protected research training, 2) have a program to connect mentors and mentees of similar interests, 3) require mentee progress reports, and 4) report ease of identifying a mentor	Research productivity can be enhanced requiring progress reports, facilitating the identification of a mentor and providing more protected research time
DeCastro <i>et al.</i> , 2013	[31]	Qualitative: semi-structured phone interviews of former recipients of NIH mentored career development awards and their mentors	Three themes emerged: 1) numerous roles of mentors in academic medicine; 2) low probability of finding one person who will meet all of one's mentorship needs; and, 3) importance of mentor networks	Focus on developing a network of mentors geared toward a mentee's unique needs rather than only developing hierarchical mentoring dyads
Donovan & Donovan, 2009	[35]	Qualitative: survey of Canadian postgraduate training directors for views on mentorship and mentorship programs	65% reported the existence of an active mentorship program at their institution; 40% felt a need for more structured mentorship; directors' experience of being mentored was associated with having a mentorship program	
Eby <i>et al.</i> , 2008	[2]	Meta-analysis of mentoring outcomes for mentees in three areas: youth, academic, and workplace	Mentoring is associated with many benefits in the realms of behavior, attitudes, health, relationships, motivation and career; effect sizes are general small	Beware of overestimating the effects of mentoring; stronger outcomes will likely be seen in attitudes, interpersonal relations and motivation than in career outcomes
Feldman <i>et al.</i> , 2012	[27]	Evaluation of the long-term impact of a mentor training program for clinical translational science faculty at UCSF; evaluations were conducted in 2010 for program graduates from 2007-2009	2/3 reported frequently applying what they learned from the training program; 97% reported being a mentor as important for their career satisfaction; 95% agreed the training program helped them become a better mentor	Mentor training programs, annual mentoring retreats, online mentor profiles, and a mentoring consultation service are some ways an institution can facilitate mentorship

TABLE 1. Summaries of articles reviewed in alphabetical order by first author (cont.)

Source	Ref. no.	Study type description	Major findings	Recommendations
Frei <i>et al.</i> , 2010	[8]	Literature review of mentoring programs for medical students found on PubMed for 2000-2008	Large varieties of mentorship programs from dyads to groups; benefits of mentorship include higher ratings of well-being and improved research productivity	Mentoring programs need to be developed and rigorously evaluated for their impacts on mentors and mentees
Hauer <i>et al.</i> , 2005	[33]	Focus-group analysis of 4 th year medical students at UCSF on their perceptions on mentorship; grounded theory analysis	Students emphasized the interpersonal connection and advocacy found in a mentor; short course durations and abrupt transitions were perceived barriers to mentorship; students recommended early education about finding mentors	More research is needed on ways to empower students to seek the mentorship they need and ways to educate faculty on students' perceived needs
Jackson <i>et al.</i> , 2003	[22]	In-depth individual telephone interviews of 16 faculty members about their experiences with mentoring	98% identified lack of mentoring as the first or second greatest barrier to career progress in academic medicine; finding an appropriate mentor requires effort and persistence and a certain match in "chemistry"	Institutions should publicly recognize mentorship efforts, provide opportunity for assigned mentoring but also allow for mentees to find another one if needed, and offer women and minority mentors without assuming that mentees would prefer a mentor of the same gender or race
Kashiwagi <i>et al.</i> , 2013	[21]	Literature review: MEDLINE, EMBASE and Scopus databases were searched from Jan 2000 – May 2011; 16 articles were reviewed for characteristics of successful mentoring programs for academic physicians	While seven mentoring models were identified, the dyad model was the most common; seven components of a formal mentoring program were identified, and the formation of mentor-mentee pairs was the focus of the most publications; mentees favour choosing their own mentors; written agreements are important	Standardized metrics need to be developed for evaluations for mentoring programs; long-term outcomes need to be studied
Sambunjak, Straus & Marusic, 2010	[24]	Systematic review of qualitative research on mentoring in academic medicine from earliest available to 2008; nine articles were reviewed	Mentoring involves mutual interests on both a professional and/or personal level; mentees should take an active role; mentors should be sincere, active listeners, and be established in the academic community; the main barriers to mentorship are personal inadequacies and relational problems	Institutions need to respect the complex nature of mentoring relationships which can span professional, career-related and personal interests
Sambunjak, Straus & Marusic, 2006	[6]	Systematic review of quantitative studies on the effect of mentoring on career choices and academic advancement in medical students and physicians from the earliest available date to May 2006; 42 articles were reviewed	Mentorship is perceived as important but less than 50% of medical students and in certain fields less than 20% of faculty mentors had a mentor; 87% of studies were cross-sectional self-report surveys with small sample size; women perceived greater difficulty in finding mentors	More rigorous studies are required to build an evidence base for mentoring in medicine

TABLE 1. Summaries of articles reviewed in alphabetical order by first author (cont.)

Source	Ref. no.	Study type description	Major findings	Recommendations
Shea <i>et al.</i> , 2011	[10]	Survey of chairs of departments of internal medicine and directors of Clinical and Translational Science Award centers; nominal group exercise at a meeting	76% indicate that >75% of junior physician-scientists at their institution have a designated mentor; <1/3 of institutions have criteria for who can be a mentor; mentoring is valued but rarely assessed	Programs can be enhanced by rewarding good mentoring and providing training for mentoring
Straus <i>et al.</i> , 2009	[28]	Qualitative study looking at 21 population health or clinician investigator mentees and seven mentors	Themes identified include the roles and characteristics of good mentoring, barriers to mentorship, and possible mentorship strategies. Barriers include significant difficulty with finding mentors and establish productive relationships	Development of formal mentorship initiatives: workshops organized by funding agencies in partnership with universities, and a mentorship training initiatives for mentors and mentees.
Straus <i>et al.</i> , 2011	[11]	Opinion column, evidence on benefits of mentorship	Academic clinicians who received mentorship obtained more research grants, publish more papers in refereed journals, get faster academic promotion and more likely to stay at their academic institutions, report greater belief in their own ability to accomplish specific academic goals and report greater career satisfaction	
Straus <i>et al.</i> , 2013	[25]	Two institution semi-structured interview conducted on 54 faculty members on characteristics of successful mentorship relationships	Traits of successful mentoring relationships: reciprocity, mutual respect, clear expectations, personal connection, and shared values. Traits of failed mentoring relationships: poor communication, lack of commitment, personality differences, perceived (or real) competition, conflicts of interest, and the mentor's lack of experience	Training programs should be in place for mentors to improve their mentorship skills. Identified lack of literature on consequences of failed mentoring relationships as well as strategies for effective mentorship
Zerzan <i>et al.</i> , 2009	[29]	"Managing up," a concept from corporate business is applied to academic medicine	Mentees should take the lead in guiding and facilitating the mentorship relationship; a prerequisite to this involves having a good understanding of his or her own needs and values	

[6, 10]. At the stage of undergraduate medical training, mentors provide personal support and career advice, with 90% of respondents in one study reporting that mentors assisted with specialty choice [12]. Indeed, of special relevance to clinician-investigator trainees, medical school graduates working in academic settings gave higher ratings to the importance of men-

torship on career choice than those working in nonacademic settings [13]. Similarly, mentors play influential roles at the post-graduate stage for those contemplating sub-specialization. In a national survey in America, 85% of general internists reported availability of a mentor as an "important" or "very important" factor when selecting a fellowship [14]. Exposure to

role models and mentors was also identified as important in determining Canadian internal medicine residents' choice of fellowship [15, 16]. Mentorship is also critical when starting off as a young faculty member [10]. Junior faculty with mentors are more likely to receive grant support [17, 18], can allocate more time to research [19] and have significantly higher retention rates and academic success in leadership and professional activities [20]. The percentage of clinical junior faculty members working with mentors varies widely (19-84%), and opportunities to receive mentorship can become scarce as trainees move along their careers, especially once formal training has been finished [21]. Not having a mentor, perhaps at any stage, can make it more challenging to navigate the system [22] and has been identified as a specific barrier to completing scholarly projects and publications [6, 11].

Unfortunately, the literature is lacking when it comes to more rigorous examinations of the benefits of mentorship. The study that most closely resembles a randomized trial is the study of two University of California, Los Angeles medical classes, comparing pre- and post-intervention, where the intervention involved a formal program providing extensive career mentoring [23]. Another important void in the literature is a lack of research on cost-effectiveness. This absence was first noted in a literature review by Frei *et al.* based on their 2000-2008 search [8], and it is again seen in this review, extending into 2013. This open question of cost-effectiveness of mentoring is also noted in other fields, including nursing and business [6]. Indeed, mentorship can impose certain costs to mentors, mentees and institutions. For mentees, qualitative studies have noted the possibilities of exploitation, including sexual harassment, mentors taking credit for mentee's work and mentors competing against mentees [24]. For mentors, there is the cost of their time and attention. For institutions considering formal mentorship programs, there can be personnel and financial costs associated with developing resources and holding workshops and networking events. Considering the potentially extensive costs to all parties involved, more research into potential cost and time savings associated with mentorship, for example, savings due to lower attrition rates in clinician-investigator trainee programs, may provide added incentive for all parties to invest in mentorship. It would also be worthwhile to find out at which stage of training different types of mentorship interventions exert the greatest benefit, so that institutions can allocate resources appropriately.

Qualities of a good mentor

While mentorship is important at nearly every stage of clinician-investigator training and the lack of mentorship is

identified as among the top two factors hindering career progress in academic medicine [22], the characteristics of effective guidance are poorly defined. There are only two research studies that identify exactly which qualities make a good mentor [25, 26]. Straus *et al.* conducted interviews with faculty members from the University of Toronto Faculty of Medicine and the University of California, San Francisco (UCSF), School of Medicine about characteristics of successful and failed mentoring relationships [25]. The authors found that successful mentoring relationships displayed reciprocity, mutual respect, clear expectations, personal connection and shared values. Abedin *et al.*, using focus groups, as well as reviewing literature, mentor training curricula and mentor evaluations, derived a list of competencies expected of mentors of clinical and translational scholars [26]. These competencies can be divided into six themes: 1) communication and relationship management; 2) psychosocial support; 3) career and professional development; 4) advocacy and maintenance of scientific integrity; 5) research opportunity development; and, 6) clinical and translational investigator development [26]. Mentors who exhibit these characteristics were deemed to be the most effective in providing guidance to junior faculty or clinician-investigator trainees during the early stages of their careers.

Finding a suitable mentor requires effort and persistence because a certain chemistry is needed to create an appropriate match between the mentor and mentee [22]. The difficulty of finding the right match can be compounded by a lack of faculty willing to become mentors due to perceived lack of experience or fear of ineffectiveness. In 2007, the UCSF, Clinical and Translational Science Institute launched a Mentor Development Program for faculty [27]. Within three years, it was reported that two-thirds of Mentor Development Program graduates often apply the knowledge, attitudes or skills obtained in the Mentor Development Program to their mentoring, and that nearly all graduates considered being a mentor important to their career satisfaction. Programs like the Mentor Development Program provide an interesting framework to increase the population of effective and suitable mentors by helping faculty members to become better mentors and to focus their mentoring goals.

There are many challenges that exist within the framework of academic medicine and the clinician-investigator training programs that make it difficult for clinician-investigators to receive appropriate mentorship. The shortage of readily available mentors jeopardizes the ability of clinician-investigator trainees to have successful careers; fortunately, initiatives like UCSF's Mentor Development Program provide a framework for training faculty members in the skills and characteristics

required to become effective mentors to clinician-investigator trainees [28].

The role of a mentee in establishing a positive mentor-mentee relationship

Having established the importance of mentorship in the context of clinician-investigator training, some aspects on how to establish a positive mentor-mentee relationship need to be mentioned. Despite the ever-increasing role of mentorship in academic medicine, very little research has been conducted on how to establish a healthy and productive mentor-mentee relationship. Several publications have identified limited resources and relational problems as the main structural constraints hindering the establishment of functional mentoring relationships [21, 24]. In two articles by Straus *et al.*, the authors conducted interviews with clinician-investigators to identify characteristics of a good mentoring relationship [25, 28]. These articles concluded that open communication and confidentiality are important and a clear expectation of the relationship needs to be established to ensure no conflict of interest arises. Failed relationships often exhibit poor communication, lack of commitment, perceived or real competition and lack of mentor experience. The lack of established mechanisms for matching mentors and mentees has also been identified as a barrier. These barriers may be easily addressed by institutional or cross-national programming efforts. Strauss *et al.* recommended mentorship training in the areas of setting benchmarks and communication strategies.

What role can mentees play to establish and maintain open communication and clear expectations? A guide for mentees was developed by Zerzan and colleagues that stresses the need for mentees to “manage up” or to take ownership of and direct the relationship [29]. The excellent mentorship guide from the Rackham Graduate School at the University of Michigan makes similar recommendations [30]. Taking responsibility for the relationship involves at four aspects.

First, even before the initiation of a relationship, mentees need to self-reflect and clarify their values, working and learning style, specific mentorship needs and goals; for example, is the mentee primarily looking for skill development and career guidance, or specifically for help with grant writing or presentation preparation? Such clarification will guide a trainee’s search for a suitable mentor.

Second, the mentee needs to search for a mentor by meeting with people they already know and soliciting recommendations. During the search period, mentees need to be open to finding multiple mentors since one mentor may not meet all a trainee’s needs [31]. Mentees also need to be able to empathize

with the challenges facing faculty members and the many demands faculty members need to balance, and to approach them with these in mind [30].

Third, at the first meeting, it is important for the mentee to clearly articulate their background, values, specific mentorship needs and expectations [29]. Together with the mentor, the objectives of the relationship should be set, as well as the frequency of meetings and the method(s) of communication between meetings.

Fourth, at each meeting, the mentee should plan and bring a meeting agenda, follow up on previous recommendations or tasks and schedule the next meeting.

Attending to these four aspects will help the mentor support the mentee and will ensure that the relationship is satisfying for both parties.

How institutions can facilitate mentorship

Despite the need for more rigorous research, the consensus for the importance of mentorship suggests that institutions should strive to create a culture of mentorship. What practical support can an institution provide to mentees and mentors? How can institutions intentionally promote a culture that values mentorship?

To support mentees, institutions often provide formalized mentor matching programs but should go beyond such interventions. Perhaps the first thing that comes to mind is to facilitate a match with a mentor with similar research interests. Indeed the majority of junior faculty members at academic health science centres are matched to a mentor. In a nationwide survey of Chairs of Departments of Internal Medicine in America and Clinical Translational Science Award Center Directors, the majority of respondents indicated that 76-100% of junior scientists are assigned a mentor prior to applying for funding [10]. In a case-control study, oncology training programs with greater research productivity were more likely to have formal processes in place to form dyads with similar interests [32]. Despite its widespread use and clear benefits, it is important for institutions to think beyond the formalized dyadic models of mentorship: in a qualitative study of previous recipients of NIH mentored career development awards and some mentors, a theme that emerged was the importance of building mentoring networks or teams [31]. Participants consistently mentioned the improbability of one mentor meeting all of a trainee’s mentorship needs. Rather, mentees need to identify their needs and actively seek to build a network or team of mentors, each with unique abilities to meet the trainee’s needs. A trainee may have a diverse group of mentors that include peers, junior and senior faculty and clinicians, and the compo-

TABLE 2. Actionable items to facilitate mentorship

Recommendations for mentors	Maintain open communication Maintain strict confidentiality Ensure there is no perceived or real competition with mentee Seek out mentorship training
Recommendations for mentees	Take ownership and initiative Self-reflect, then set goals and expectations accordingly Seek out a team of mentors to fulfill different mentorship roles Follow a structured, regular meeting schedule
Recommendations for institutions	Match mentees with mentors of similar research interests Train students with skills to build mentoring networks or teams Provide training and support for mentors Foster a culture of mentorship (e.g., awards for mentorship)

sition of this group would change over a trainee's training and career.

In order to empower students to build mentoring networks, institutions can provide early educational interventions and mentoring toolkits [33]. These workshops can discuss the four aspects of taking responsibility for one's mentorship relationships as described in the previous section: 1) self-reflection; 2) searching for a network of mentors; 3) setting clear expectations; and, 4) setting agendas and following up on each meeting. In addition to interactive workshops, institutions could publish mentorship handbooks with useful checklists that could be posted on the web [29, 30].

In addition to providing supports for mentees, institutions can provide training and support for mentors. While mentoring is widely provided at academic health science centers, few mentors receive training for mentorship and their mentoring skills are rarely assessed. In the 2011 survey of American departments of internal medicine by Shea *et al.*, less than a third of the institutions even have criteria for who can be a mentor [10]. To facilitate quality mentorship relationships, institutions can educate faculty on how to mentor [27, 33, 34]. An excellent example is the UCSF Mentor Development Program (mentioned previously) for clinical and translational researchers [27]. Their mentor development program involves 10 case-based seminars conducted on monthly half-days over five months. Most (95%) of the participants agreed that the program improved their mentorship skills and two-thirds reported that they applied what they learned from their program to their mentorship. Other supports could include a consultation services for challenging mentorship issues.

In addition to educational interventions for trainees and mentors, interventions can be made at the institutional level to foster a culture of mentorship. A simple way for an institution to show it values mentorship is to provide awards that recog-

nize mentorship or that support mentor development [27, 33]. Funding institutions can also provide more mentored awards, where funding comes contingent upon a continued mentorship relationships with identified leaders in the field [34]. Other ways mentorship can be built into the fabric of the institution at each level is the identification of mentorship facilitators or champions within every department [34]. Mentees could go to these facilitators to find out who may be a good match for their mentorship needs within the department. Moreover, mentors could consult these facilitators in cases of challenging mentorship issues.

Summary and future directions

While there is little to no research focused on clinician-investigator trainees *per se*, the literature within academic medicine consistently finds mentorship to be important and beneficial. Mentorship can be beneficial at all stages of clinician-investigator trainee journey, from advice on residency choice during medical training, to enhanced productivity during research training. Even as a junior faculty member, mentorship can be critical to successfully navigating the system, competing for grants and getting promoted. Nevertheless, more rigorous randomized studies are required regarding the benefits of mentorship, especially among clinician-investigator trainees. Studies are also needed to address the question of cost-effectiveness.

Given the importance of mentorship, studies have recently focused on describing the ingredients for good mentorship relationships. For mentors, Abedin *et al.* have developed a list of measurable competencies in areas such as psychosocial support, professional enculturation and scientific integrity [26]. These competencies will be useful for equipping and training mentors of clinician-investigator trainees. For mentees, Zerzan

et al. stress the need to take ownership of the relationship by setting mentorship goals and meeting agendas [29]. A commitment to open communication is critical for both sides, especially in establishing clear expectations regarding the relationship.

Institutions can play an important role in facilitating mentorship. In addition to formalized mentor-mentee matching programs, institutions can provide training. Early on in their training, students can be educated on specific skills in finding and building a team of mentors throughout their careers. Seminars for developing mentoring skills in faculty, as well as establishing awards or grants that are linked to mentorship, would also go a long way towards creating a culture that values mentorship.

Training to be a clinician-investigator is a long journey. Having a supportive network of mentors along the way is not just a perceived need by trainees (e.g., recent CITAC/ACCFC survey) but, as reviewed above, can play a critical role in successfully navigating the world of academic medicine. To support more and higher quality mentorship for clinician-investigator trainees, actionable items from this review are summarized for mentors, mentees and institutions in Table 2. A video series, to empower trainees to get the mentorship they need, is under development and links to these videos will be available on our webpage (www.citac-accfc.org).

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