

Participant perspectives on a seminar-based research career development program and its role in career independence

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Accepted 3 February 2021
Published Online First
18 February 2021



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To cite: Llewellyn NM, Adachi JJ, Nehl EJ, et al. *J Investig Med* 2021;**69**:775–780.

ABSTRACT

Health science researchers need training and support to effectively pursue independence in their research careers. Little data exist regarding the specific resources that faculty researchers have found or would find useful. In this study, we aimed to better understand the needs of health science researchers to develop recommendations for effective career development programming. The authors conducted a multi-method evaluation of early-career researcher faculty needs beginning by using post-session satisfaction surveys to assess the value of a long-standing “K-Club” seminar, which educates and supports those pursuing NIH Career Development (K) awards or similar. The authors then collected in-depth views on career development needs through a series of focus groups conducted with health science researchers at three career stages: early career, award-seeking junior faculty; mid-career faculty who have obtained some extramural funding; senior faculty who serve as mentors for early/mid-career faculty. Participants who attended the existing K-Club strongly endorse the program in supporting their career goals. Focus group participants described specific areas for program expansion that would add value across career stages: more flexible training options, conducted in smaller group settings with immediate feedback provided; more formalized training and resources for senior research mentors; in-depth guidance on individualized grantsmanship. The authors propose program development guidelines for helping researchers achieve research independence and success. Findings indicate that a broad-reaching K-Club style educational seminar can serve as a valuable foundation supporting professional development. The addition of tailored programs delivered across diverse platforms are predicted to heighten career development success.

INTRODUCTION

The development of a skilled health science research workforce is essential to the maintenance and expansion of high-quality clinical, translational, and basic science research.¹ Today's rapidly evolving research environment presents new professional challenges, including an increased need to establish strong collaborative interpersonal competencies, and clear,

concise, and compelling communication skills.^{2,3} Competition for research grants often means that those without a track record of success are at a significant disadvantage, making the barrier to reaching independence even steeper. Among biomedical scientists, formal training and experience in securing independent research funding is scarce, mechanisms are complex, and one result is a loss of workforce along the pipeline from early career to independently productive researchers.^{4,5}

Past research has demonstrated the utility of education and support programs, as well as peer and faculty mentorship to the success of emerging health science researchers.^{6,7} Semi-structured interviews conducted with K-series grant recipients broadly named mentorship and institutional resources as important for success,⁸ and retention and academic success are higher among faculty who actively participate in junior faculty development programs.⁹ However, little data exist regarding the specific resources that faculty researchers have found or would find useful. In this evaluation, we used a qualitative research approach to define the career development needs of health science research faculty across the career spectrum to understand what researchers embarking on their careers perceive as their most important needs, what mid-career faculty believed was instrumental in their recent successes, and what senior faculty observe is most helpful for their mentees. To accomplish this, we listened to early-career and mid-career faculty to assess their own perspectives on this topic, and we sought the insights of seasoned faculty research mentors to understand how to maximize formal career development training outside of the direct mentor–mentee relationship.

Emory University and Children's Healthcare of Atlanta offer resources to help internal faculty and trainees develop stable research careers. One such program is the K-Club, conceived in 2009 as an educational support forum assisting fellows and faculty with successful career development award applications. This program consists of monthly, interactive seminars covering topics related to professional development and grant application processes.

Using data collected during a 2016 to 2019 timeframe, we evaluated the long-term value of the K-Club, gaps in existing offerings, and interest in and requests for expanded programming. We reviewed ongoing K-Club registration information, post-session satisfaction surveys, and reported grant success of attendees, and conducted a focus group evaluation with past participants at three career stages to assess needs and interest in future potential offerings. We describe the results of this multi-method assessment and exploration of career development needs and provide strategic recommendations for targeted program growth that would address the needs of early-career health science research faculty.

Approach

Participant satisfaction and impact assessment

The K-Club meets for monthly seminars during the academic year and provides education on a broad array of topics related to the conception, development, submission, and post-award process of career development awards (emphasizing, but not limited to NIH K series awards), as well as general career development topics, such as collaborative team building and publication management. Although the program is generally intended to serve early-career faculty and fellows, attendees also include mentors and research/administrative staff who work with award-seeking faculty, or faculty interested in that session's topic who may have meaningful input for the discussion. Sessions typically consist of an introductory lecture by one or more expert guest speakers, followed by an interactive panel discussion. One-on-one interactions and mentorship are not part of the K-Club, but participation is conducive to valuable networking opportunities. Participation in the program is voluntary but encouraged for both attendees and invited guests/speakers. Faculty at different ranks are asked to serve as speakers and panelists based on their experiences and areas of expertise. Since the discussion outline and flow are typically staged and facilitated by the K-Club organizers, very little effort is required of the invited speakers and panelists outside of the 1-hour seminar. Boxed lunches are provided, and recordings are available for remote/future viewing. Immediately following each session, a brief satisfaction survey is emailed to all registrants (including attendees, panelists, mentors, and guest speakers) to solicit feedback on each session. Respondents have the option to remain anonymous, but participation in the survey is incentivized with a small gift raffled at the beginning of the next session among those who include their email address (responses are confidential among program staff). Participants have also been periodically solicited to report on specific grant application success associated with K-Club participation.

Focus group needs assessment

We employed a focus group discussion format with the goal of eliciting in-depth perspectives on career development needs and K-Club expansion, probing both the cognitive and emotional responses of participants while observing the underlying group dynamic.¹⁰ In 2017, we conducted a series of three 2-hour focus group sessions with participants stratified by stage of career: group A—early career, award-seeking junior faculty at the new assistant professor level,

not yet extramurally funded; group B—mid-career faculty at the assistant professor level, who have obtained one to three extramural awards; group C—senior faculty at the associate or full professor level, with a history of independent funding who serve as mentors for early/mid-career faculty. Senior faculty in group C mentor junior faculty as part of their ongoing departmental service and educational responsibilities which, along with patient care, are embedded in the faculty roles. Participants were recruited via requests made through email and during K-Club sessions with the aim of engaging a diverse and representative group. Of the 26 individuals who ultimately took part in the focus groups, 22 completed a demographic/background survey prior to their focus group session. Results of the survey indicated a reasonable distribution of participants across demographic indices, research areas, experiences, education, and institutional affiliations (table 1).

Interview guides were pre-formulated by the research team, including an independent evaluator not previously involved in the K-Club or K-Club leadership, and were designed to elicit conversation on K-Club value and to inform potential expanded support offerings. Focus group conversations facilitated by the independent evaluator extended into related topics based on the questions and comments that arose during each session. Sessions were audio/video-recorded and transcribed verbatim by two graduate students, who then conducted thematic qualitative analysis of the transcripts using MAXQDA V.12 Standard software.¹¹ They reviewed the transcripts, field notes, and interview guides to develop a code book with deductive themes derived from the interviews and inductive themes that emerged from the transcripts, for a total of seven codes, most with sub-codes. They coded transcripts independently, compared their analyses, discussed discrepancies, and reconciled differences until reaching agreement. Frequency analysis was conducted to determine the relative prevalence of each theme in each discussion. Although prevalence in the discussions is not necessarily the same as importance of the topic to participants, we took frequency information into account, along with subjective evaluation of contextual intensity, when forming recommendations.

Findings

Participant satisfaction and impact assessment

We evaluated K-Club records and satisfaction surveys collected during the 2016–2019 academic years. Registration records documented an average of 70 attendees per session, and post-session surveys show that the program has been well received by participants, with 73% of survey respondents indicating that the sessions were “Very likely” or “Extremely likely” to help them meet their research goals, and 84% indicating that it was “Very likely” or “Extremely likely” that they would recommend the sessions to others. Some participants have voluntarily reported a number of successfully funded grants attributed in part to K-Club participation, including 24 NIH grants (13 K-series, 5 R-series, 6 other) and 16 institutional, foundation, and other agency grants. Since this was based on voluntary reporting, this is most likely not an exhaustive list.

Table 1 Focus group participant demographic and background information

	Group A junior faculty n=6	Group B mid-career faculty n=8	Group C senior faculty n=8	Total	Total percent
Age					
25 to 35 years old	5	0	0	5	23%
36 to 45 years old	1	8	1	10	45%
51 years old and older	0	0	7	7	32%
Sex					
Female	3	6	2	11	50%
Male	3	2	6	11	50%
Ethnicity (checked all that applied)					
White	4	5	6	16	70%
Black/African American	0	2	1	3	13%
Native American or Alaska Native	1	0	0	1	4%
Asian	1	1	1	3	13%
Affiliation					
Emory School of Medicine	3	4	7	14	72%
Emory School of Medicine and Children's Healthcare of Atlanta	3	3	1	7	24%
Emory School of Medicine and VA Hospital	0	1	0	1	3%
Degree					
MD	2	5	5	12	55%
PhD	3	3	2	8	36%
MD/PhD	1		1	2	9%
Research classification (checked all that applied)					
Outcomes research	1	1	0	2	5%
Basic science	6	6	6	18	41%
Clinical science	3	3	4	10	23%
Translational science	4	4	6	14	32%
Mentoring experience (group C, senior mentors only, over entire career)					
Number of pre-doctoral mentees				Sum=50 Mean=6	
Number of post-doctoral mentees				Sum=91 Mean=11	
No of junior faculty mentees				Sum=63 Mean=8	

Four focus group participants, 2 from Group A, 1 from Group B, and from Group C, did not complete the pre-focus group demographic and background information survey.

Focus group needs assessment

In-depth thematic analyses of focus group transcripts indicated several major themes. Although the three focus group discussions differed in emphasis, the following major themes were discussed by all three groups: (1) session format/structure, including meeting times, locations, frequency, desire for breakout groups, individualized feedback, and invited experts; (2) mentorship, including resources for mentors, matching mentees with co-mentors, and support to help mentees better work with their mentors; (3) individualized pathways to independence, including locating and navigating appropriate grant resources, finding relevant grants, individual support in grant writing, compelling storytelling, and revising for resubmission.

First, participants were especially interested in opportunities to engage with material through smaller group formats with individualized feedback. They indicated that small breakout groups and/or more targeted and intense educational offerings would serve to accommodate diverse and specific career development needs. One mid-career focus group participant said: "It would be helpful, then you could group people applying for a K99 vs K23 vs K08. I think

you could have people that are in at least more thematically aligned areas as opposed to the large group."

Second, mentors acknowledged a need and interest in receiving more structured training on effective mentoring, and junior-level participants believe that it is key for their mentors to be more aware of and promote NIH and institutional resources to strengthen their mentoring efforts. One senior mentor participant explained: "Maybe come up with a creative way to engage mentors. Maybe a structured way of mentoring effectively. I think most of us mentor, that we just do it because we have to do it. There was somebody before us that mentored us. I've never received any mentorship training. So, some forum creating an opportunity to get some structured training on how to be an effective mentor would be something that the K-Club can do."

Third, participants highlighted a need for individualized resources and training that would guide mentees along pathways to independent research careers via formal direction on grant writing and effective career growth. According to one mid-career participant: "Really teaching somebody how to write and tell a story and to put together an argument is so foundational. It's almost like an 'aha moment'

Table 2 Frequencies of comments by theme and subtheme across focus groups

Major themes and definitions	Group A early-career faculty n=8	Group B mid-career faculty n=9	Group C senior faculty n=9	Total
Session structure/format:				
1.0 Operations and program logistics such as meeting times, locations, length, and frequency	25	24	13	62
1.1 Small groups to foster collaborative learning	10	11	2	23
1.2 Individualized feedback from a grant writing expert	4	9	7	20
1.3 Networking with colleagues	7	3	2	12
1.4 Include individuals that could provide more insight into the grant reviewing perspective and tips and tricks to grant writing	3	2	0	5
Total	49	49	24	122
Mentorship:				
2.0 Resources for mentors	15	18	9	42
2.1 Being a good mentor—resources to support mentors to improve their mentoring	8	12	4	24
2.2 The importance of mentors being more engaged in their mentee's career development	3	0	11	14
2.3 Being a good mentee—qualities/actions that make a good mentee	2	4	7	13
2.4 Incentivizing mentoring	1	0	1	2
Total	29	34	32	95
Individualized pathways to independence:				
3.1 Finding appropriate grants that match career interests	17	7	10	34
3.2 Best practices in grant writing	9	1	8	13
3.3 Compelling storytelling through refined grant writing to secure more funding	0	8	1	9
3.4 Simulate review process to help research investigators write successful grants	1	0	1	2
3.5 Navigating NIH/institutional resources	1	0	1	2
3.6 Revising for resubmitting grants after feedback	0	0	2	2
Total	28	16	23	67

that goes off and now I understand how to make this argument and get the funding.” Participants further identified a need for mentees to develop the ability to better drive the mentor–mentee relationship toward cultivating autonomous research careers and finding appropriate grants that match career interests.

Table 2 details frequency information for each major theme and sub-theme, delineated by group. Additional minor themes that arose included operational suggestions for the K-Club, such as improved branding to extend the understanding that K-Club is more than just about NIH K grants, enhanced use of technology, additional promotional efforts, and ongoing program evaluation. In addition to eliciting perspectives on what worked or would work for award-seeking faculty at different career stages, we also found that mid-career researchers feel somewhat neglected/forgotten even though they still have needs and senior mentors also still yearn for more training/mentor-specific resources.

Insights

This study expands on previous research examining factors that foster retention and success in the health science research workforce.^{8,9} According to multiple indicators, the structure and scope of the K-Club program at this institution has been beneficial and impactful for local health science researchers. Looking back, the program has a long record of excellent attendance, high reported attendee satisfaction, and documented success in helping participants develop their careers through the attainment of independent research funding. Looking forward, the results of our focus groups exposed

personalized perspectives that illuminated gaps to be filled and opportunities for program expansion toward maximal impact. Although the existing K-Club was originally envisioned to primarily support junior faculty, focus groups further revealed that both mid-career and senior mentors also recognize that they have much to gain from targeted career-development and training resources.

The results of the three focus groups shed light on key career development resources that emerged as important to and needed by participants. Delineating focus groups by career stage allowed us to learn what junior faculty thought they needed, what mid-career faculty believed worked for them, and what senior faculty think is valuable and feasible. Findings indicated that more flexible and individualized resources would help meet the growing needs of early-career faculty. Since participants noted their desire for more personalized resources, small group topics could vary based on interest, and include options such as mock grant reviews, informal grant review workshops, and/or provision of expert advice. Indeed, past research has shown that small-group formats can improve knowledge, skills, and attitudes around career development, as well as interconnectedness among faculty.¹² Thus, small groups could also serve as networking opportunities and with the added benefit of promoting future multidisciplinary and collaborative grant applications. We recommend engaging specialized professionals and institutional leaders to address these needs in break-out groups where a mix of junior and senior participants exchange personalized feedback.

In addition, focus group results indicated that mentors need more training, resources, and support to effectively

engage and support their mentees. Past research has shown that mentorship training is needed and effective,^{7 13 14} but that there are challenges to forming effective mentee-mentor relationships, such as managing time, expectations, and goals.¹⁵ We therefore recommend creating mentor toolkits that include resources for managing junior mentees and training workshops designed specifically for educating mentors. Indeed, past research shows that mentorship training can be beneficial for both the mentee's and the mentor's effectiveness, productivity and enthusiasm.¹⁶

Finally, mentees, along with their mentors, expressed the need for more support positioning themselves for career success via improved grantsmanship and skills navigating their pathways to independence, which has been shown to increase grant success rates.⁵ We recommend developing systematic roadmaps, including comprehensive career development plan templates that would guide researchers through their career trajectories, enhancing awareness of relevant resources and participation in applicable programming at each stage of the process. An emphasis on seamless continuity in support would be of benefit, in addition to guidance in getting the most from the mentor-mentee relationship as junior investigators work toward developing autonomous careers.

Taken together, our evaluation suggests that small-group educational offerings targeting carefully selected cohorts from different career stages would provide tremendous benefit to meet the breadth of health researcher needs. A similar concept has demonstrated success in improving successful career development over a period of years in the psychiatry field.¹⁷ We recommend offering a tailored approach, identifying researchers that would derive the most benefit from targeted and intense experiential education efforts. For example, researchers who are preparing their first grant application may benefit most from a grant writing laboratory that provides comprehensive grant writing curriculum. Once researchers secure their first award, they may benefit from a management course that offers insights and training on how to best organize and operationalize their own research program, develop talent, and manage research funds. Finally, researchers who are ready for the K to R transition or who are working to develop their local and national reputation may benefit most from curricula that helps them polish their communication, leadership, and mentorship skills. More intensive faculty development curricula such as this would require departmental commitment and support due to the demands on junior faculty members' time, and outcome measures should be taken to evaluate the benefits of this investment. Our study reveals new insight by specifically soliciting perceived needs of junior investigators and mid-career investigators and areas of proven strategies as articulated by mid-career and senior investigators, thus supporting this conclusion that a carefully tailored, individualized, and timed approach of career development resource offerings will successfully facilitate researcher career development towards independence.

A limitation of this investigation is that both the surveys and focus groups were self-reported assessments, and respondents self-selected to participate. We chose this design because we were interested in understanding the perceived needs, interests, and attributions of success of local health science researchers, at all levels of career stage, in their own

words. However, future researchers could conduct a more systematic and objective review of funding successes and researcher needs, including collecting data from authoritative sources on grant applications and funded grants for program participants, as well as feedback from all participants, at the end of each academic year.

CONCLUSION

Our K-Club program is an important initial resource for health science researchers that provides much more than support for successful K-series funding and can serve as a model for other institutions hoping to implement such a resource. Focus group participants noted high levels of appreciation for the existing program, with one junior-level focus group participant stating that *"it [does a] nice job keeping me on task. I think I go to a meeting and it [is] kind of a repetition, application of something I already heard. It kind of made me remember that this is something I really want to do and to prioritize."* Even though researchers are extremely busy, focus group participants indicated that they consistently protect time in their schedules for the seminars, a testament to the value it offers. Considering the findings of our evaluation, we endorse a multipronged approach to supporting career development that serves researchers in different stages of their careers. First, we assert that a regularly held seminar-style educational resource open to all (in the style of our K-Club) forms a foundation of support that reaches a broad audience and garners a high return on investment. Enhanced resources, including individualized educational formats, emphasis on independent grant writing, and mentorship/leadership training, could take a program to the next level, empowering researchers to achieve their full career-development potential.

Acknowledgements The authors wish to thank Barbara Kilbourne, RN, MPH, from Children's Healthcare of Atlanta, for her invaluable assistance with data collection and communications, and Andi L. Shane, MD, MPH, MSc, from Emory University and Children's Healthcare of Atlanta, for her leadership and direction in the K-Club from the beginning. In addition, the authors would like to thank Hannah D. Eisen, from Emory University's Rollins School of Public Health, for her efforts in transcribing and coding focus group data, and Dawn Comeau, PhD, MPH, from Rollins School of Public Health, for her much appreciated feedback on this study. Finally, we would like to acknowledge ongoing financial support for K-Club from Children's Healthcare of Atlanta, Emory Department of Pediatrics, Emory Department of Medicine, the Georgia CTSA, and the NIAID-sponsored Center for AIDS Research at Emory University.

Collaborators Barbara Kilbourne, Andrea L Shane, Hannah D Eisen, Dawn Comeau.

Contributors All four authors worked together collaboratively on this manuscript and meet all four authorship criteria as described below. 1. NML and SSH initially conceived of the project and sought meaningful input from EJM and JJA to refine the goals and the resulting study design. NML and JJA led the interviews, data acquisition, and analysis process. NML, EJM, SSH, and JJA worked collaboratively to interpret the data for the discussion and conclusions sections. This data interpretation occurred over multiple emails, phone calls, and two in-person meetings that included all four coauthors. 2. NML used input and feedback from the group conversations that occurred via email, phone, and in-person meetings to draft the initial manuscript. EJM, SSH, and JJA reviewed the initial draft and several other drafts thereafter offering critical feedback. During this iterative process, the four authors communicated primarily via email but also met two additional times to discuss final revisions to ensure the final draft included the entire group's collective intellectual contributions. 3. NML shared the final manuscript draft that had incorporated the feedback and revisions from the other three coauthors with the entire group, and EJM, SSH, and JJA all approved the final version that was submitted and published. 4. NML, EJM, SSH, and JJA were all integrally involved in this work from inception to submission and agree to be

accountable for all aspects of the work. All four coauthors agree that we will be accountable for any questions raised to the accuracy or integrity of the work and will work to appropriately investigate and resolve any questions raised.

Funding This research was supported by the National Center for Advancing Translational Sciences of the National Institutes of Health under Award Numbers UL1 TR002378 and KL2 TR002381, and the NIAID-sponsored Center for AIDS Research at Emory University under Award Number P30AI050409.

Disclaimer The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

Competing interests None declared.

Patient consent for publication Not required.

Provenance and peer review Not commissioned; internally peer reviewed.

Data availability statement Data are available upon reasonable request.

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REFERENCES

- 1 Comeau DL, Escoffery C, Freedman A, et al. Improving clinical and translational research training: a qualitative evaluation of the Atlanta Clinical and Translational Science Institute KL2-mentored research scholars program. *J Investig Med* 2017;65:23–31.
- 2 Alberts B, Kirschner MW, Tilghman S, et al. Rescuing US biomedical research from its systemic flaws. *Proc Natl Acad Sci U S A* 2014;111:5773–7.
- 3 Wuchty S, Jones BF, Uzzi B. The increasing dominance of teams in production of knowledge. *Science* 2007;316:1036–9.
- 4 Hall AK, Mills SL, Lund PK. Clinician-investigator training and the need to pilot new approaches to recruiting and retaining this workforce. *Acad Med* 2017;92:1382–9.
- 5 Yin HL, Gabrilove J, Jackson R, et al. Sustaining the clinical and translational research workforce: training and empowering the next generation of investigators. *Acad Med* 2015;90:861–5.
- 6 Freel SA, Smith PC, Burns EN, et al. Multidisciplinary mentoring programs to enhance junior faculty research grant success. *Acad Med* 2017;92:1410–5.
- 7 Chen MM, Sandborg CI, Hudgins L, et al. A multifaceted mentoring program for junior faculty in academic pediatrics. *Teach Learn Med* 2016;28:320–8.
- 8 Robinson GF, Schwartz LS, DiMeglio LA, et al. Understanding career success and its contributing factors for clinical and translational investigators. *Acad Med* 2016;91:570–82.
- 9 Ries A, Wingard D, Gamst A, et al. Measuring faculty retention and success in academic medicine. *Acad Med* 2012;87:1046–51.
- 10 Heary CM, Hennessy E. The use of focus group interviews in pediatric health care research. *J Pediatr Psychol* 2002;27:47–57.
- 11 VERBI software MAXQDA 12 2015.
- 12 Fleming ES, Perkins J, Easa D, et al. The role of translational research in addressing health disparities: a conceptual framework. *Ethn Dis* 2008;18:152–155–160.
- 13 Sood A, Tigges B, Helitzer D. Mentoring early-career faculty researchers is important—but first “train the trainer”. *Acad Med* 2016;91:1598–600.
- 14 Tsen LC, Borus JF, Nadelson CC, et al. The development, implementation, and assessment of an innovative faculty mentoring leadership program. *Acad Med* 2012;87:1757–61.
- 15 Keller TE, Collier PJ, Blakeslee JE, et al. Early career mentoring for translational researchers: mentee perspectives on challenges and issues. *Teach Learn Med* 2014;26:211–6.
- 16 Sheri K, Too JYJ, Chuah SEL, et al. A scoping review of mentor training programs in medicine between 1990 and 2017. *Med Educ Online* 2019;24:1555435.
- 17 Kupfer DJ, Schatzberg AF, Dunn LO, et al. Career development institute with enhanced mentoring: a revisit. *Acad Psychiatry* 2016;40:424–8.