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Career Development Awards in Emergency Medicine: Resources and Challenges

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Abstract

Objectives: In the United States, emergency medicine (EM) researchers hold proportionately fewer federal career development awards than researchers in other specialties. Others hypothesize that this deficit may partly be attributed to lack of mentors, departmental resources, and qualified applicants. Our objectives were to examine the association between departmental and institutional resources and career development awards and to describe the barriers to conducting research and btaining grants in EM.

Methods: We conducted an online, cross-sectional survey study of vice chairs for research and research directors at academic emergency departments in the United States in January and February 2016. Participants provided quantitative information regarding their department's demographics, available research resources, number of funded independent investigators, and number of career development awards. They were also asked about the perceived adequacy of departmental and institutional resources and perceived barriers to research and grant success. Data were analyzed using descriptive statistics and multivariable linear regression, as appropriate.

Results: Of 178 eligible participants, 103 (58%) completed the survey. Most departments reported some infrastructure for research and grant submission, including research coordinator(s) (n = 75/99; 76%, 95% confidence interval [CI] = 66%−84%), research associates (69/99; 70%, 95% CI = 60%−79%), and administrative/secretarial research support (79/101; 78%, 95% CI = 69%−86%). The majority of departments (56/103; 49%, 95% CI = 44%−64%) had no R01-funded researchers, and only 15 (15%, 95% CI = 8%−23%) had three or more R01-funded researchers. The most frequently reported challenge to junior faculty applying for grants was low motivation

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for applying (62/103; 60%, 95% CI = 50%−70%), followed closely by insufficient mentorship (50/103; 49%, 95% CI = 39%−59%) and discouragement from low funding rates (50/103; 49%, 95% CI = 39%−59%). In the multivariable model, only the number of departmental R-level-funded researchers was associated with the number of departmental career development awards (coefficient = 0.75, 95% CI = 0.39-1.11; R^2 = 0.57).

Conclusions: While more multiple departmental and institutional resources correlated with a greater number of funded career development awards, the single greatest predictor was the number of R-level-funded researchers in the department. Low motivation and insufficient mentorship were the most frequently reported barriers to junior faculty applying for career development awards. Further studies are needed to describe junior faculty perspectives on these issues and to explore strategies for overcoming these barriers.

Biomedical research is necessary to advance science, clinical care, and population health. The National Institutes of Health (NIH) is the largest single funder of biomedical research in the United States[1]. Emergency medicine (EM) has proportionately fewer independent NIH-funded investigators than other medical specialties and receives less than 1% of all NIH funding.[2,3] The Institute of Medicine has highlighted shortages of adequately trained investigators and research training programs as barriers to emergency care research.[4] Career development awards are an important mechanism for training EM researchers to conduct independent research. Although the success rate of EM applications to the NIH is similar to that of other specialties,[3] EM investigators submit fewer research project and career development award applications to the NIH than investigators from other specialties.[3,5]

Potential explanations for this dearth of applications include lack of mentorship, lack of departmental resources, and lack of qualified applicants.[6] The decline in NIH funding may also deter potential applicants. To address these potential barriers, the NIH has taken steps to encourage emergency care research. Most notable have been the creation of the NIH Office of Emergency Care Research; the development of the National Heart, Lung, and Blood Institute Research Career Development Programs in EM (K12); and the development of the Trans-NIH K12 Program in Emergency Care Research funded by the National Institute of Nursing Research, the National Heart, Lung, and Blood Institute, and the National Institute of Mental Health. The Society for Academic Emergency Medicine developed a credentialing program for EM research fellowship programs to improve and standardize the quality of research training for young investigators. The Institute of Medicine also called for academic medical institutions to provide “research time and adequate facilities for promising emergency care and trauma investigators.”[4] Emergency physicians are, anecdotally, increasingly involved in multidisciplinary and multi-institutional research networks, including Clinical and Translational Science Award programs. However, the objective correlation between departmental and institutional resources and successful career development awards by EM junior researchers is unknown. Our primary goal was to examine the association between departmental and institutional resources and EM career development awards. We also sought to describe the prevalence of resources available to researchers and barriers to conducting research and obtaining grants.

METHODS

Study Design

We conducted a cross-sectional survey study of academic emergency departments (EDs) in the United States. This project was deemed exempt from review by our institutional review board.

Study Setting and Population

We invited the vice chair for research or research director in academic EDs in the United States to participate. These individuals were targeted because they are likely to have an overall knowledge of the research-related resources and activities in their departments. Eligible participants were identified using the Society for Academic Emergency Medicine Research Directors' Interest Group database and internet searches for contact information.

Study Protocol

Eligible participants received up to three e-mail invitations to complete the online survey. Participants were asked to provide information regarding their department's demographics, available resources, and grant applications and funding.

Based on literature review and expert feedback, the authors developed and refined a survey assessing departmental research resources and perceived facilitators and barriers to junior EM researchers' career development award funding. [6-9] Based on others' work showing that most EM career development awards have non-EM primary mentors,[5] the survey also included questions about adequacy of institutional support. Survey domains included department demographics, current research funding, departmental research support, institutional research support, adequacy of departmental and institutional resources, and junior faculty challenges. A free-text field was also included at the end of the survey for additional comments from participants. The survey was administered using Research Electronic Data Capture (REDCap).[10]

Participants were blinded to the study hypothesis. They were not compensated for their participation.

Measurements or Key Outcome Measures

Our primary outcome was the number of career development award applications and awards at each institution. Career development awards included NIH K-series funding and other comparable career development awards such as NIH F-series awards and foundation awards. Our secondary outcome was the number of extramural grant applications submitted by junior clinician-researchers in the past year. Junior clinician-researchers were defined as those at or below the assistant professor level. Theoretical correlates of career development award success, based on existing literature, included departmental research funding, department resources, and institutional resources.[6-9] For the purposes of analysis, "total number of adequate resources" was defined as the number of the following resources deemed adequate by the respondent: departmental research funds, institutional (school/hospital) research funds, secretarial support, research coordinator support, protected time for

faculty, office space for faculty, office space for research staff, institutional grant development support, departmental grant development support, statistical consultation within institution, research motivation of faculty by chair/chief, and support from other faculty for research. Thus, the maximum possible count was 12. Presence of a clinical and translational science center/institute was defined as the presence of an NIH-funded clinical and translational science center/institute. R01-level funding was defined as R01, R25, U01, PCORI, and equivalent grants. R-level funding was defined as R01, R25, R01, U01, PCORI, R21, R34, and equivalent NIH grants. Industry funding was defined as industry funding for research, excluding NIH and foundation funding.

Data Analysis

Given 178 eligible participants and an estimated response rate of 40%, we estimated a sample size of 71 responses. While this sample size would be adequate for performing descriptive statistics and developing the multivariable linear regression models, we aimed for a sample size of 100 participants to achieve narrower 95% confidence intervals (CIs) around the estimates for the prevalence of resources available to researchers and barriers to conducting research and obtaining grants. Data were initially analyzed using descriptive statistics. The total number of resources deemed adequate by the respondent were calculated. Univariable followed by multivariable linear regression was used to examine the association between the measured factors and the number of career development award awardees in each department (primary outcome) and the number of extramural grant applications submitted by junior clinician-researchers (secondary outcomes). Independent variables for the multivariable analysis were selected a priori, based on expert judgment. Presence of a clinical and translational science center/institute and adequacy of institutional and departmental resources were chosen to reflect the research environment. Number of R-level—funded researchers and number of industry-funded researchers were selected to reflect availability of research mentorship and experience. The multivariable linear regression models were built using a direct approach.[11] Robust standard errors were used for inferences about regression coefficients, to protect against model mis-specification, including omitted covariates as well as heteroscedasticity in residuals. Verification of basic assumptions included an assessment of outlying residuals and high-leverage observations due to outlying independent variables, as well as visual examinations of the distribution of histograms. In preliminary analyses, the joint distribution of predictors was examined using scatterplot matrices and correlation coefficients, to assess the potential impact of collinearity among the terms in the model. Nevertheless, all covariates judged to be important were retained in models, because the standard errors reflected the impact of correlations among predictors. In secondary analysis, values greater than the 95th percentile in number of R-level—funded and industry-funded researchers were trimmed to the 95th percentile and the model was refit. In addition, final models were refit with additional interaction terms among select predictors, to assess effect modification that could arise from synergies or antagonisms between these predictors. Analyses were performed using Stata (Version 14.1, StataCorp).

RESULTS

Of the 178 eligible participants, 103 (58%) completed the survey. The majority of participants (61/103; 59%) were research directors with a median of 4.5 years in their position. Most (67/103; 65%) were at the primary teaching site of a medical school. The majority of departments reported that they had no R01-funded researchers (56/103; 54%; Table 1).

Resources Available to Researchers

Overall, most participants reported having research coordinator(s), research associates, research administrative and secretarial support, and adequate research motivation from their department chair (Table 1). While research in progress meetings were held by most departments (73/101; 72%, 95% CI = 62%—81%), formal systems for reviewing research ideas (43/101; 43%, 95% CI = 33%−53%) and grant proposals (37/100; 37%, 95% CI = 28%—47%) were less common. Three participants (3/103; 3%, 95% CI = 0.6%—8%) reported that their departments had none of 12 resources in the survey.

The resources most frequently felt to be “inadequate” were research funds and grant development support, at both the departmental (65/103; 63%, 95% CI = 53%—72% for both) and the institutional levels (75/103; 73%, 95% CI = 63%−81%; and 68/ 103; 66%, 95% CI = 56%—75%, respectively). Five participants (5/103; 5%, 95% CI = 2%−11%) reported that none of the research resources were adequate in their settings, and three (3/103; 3%, 95% CI = 0.6%−8%) reported that all 12 were adequate.

Approximately half of participants (53/103; 51%, 95% CI = 41 %—61%) reported at least one researcher with R-level funding in their department (e.g., R01, R25, U01, PCORI, R21, R34). Of these, almost half (22/53; 42%, 95% CI = 28%−56%) reported that all of their R-level-funded researchers were mentoring junior faculty while five (5/53; 9%, 95% CI = 3% −21%) reported that none of their R-level-lunded researchers were mentoring junior faculty.

Barriers to Conducting Research and Obtaining Grants

The most commonly identified barriers to junior faculty conducting research were insufficient protected time (65/103; 63%, 95% CI = 53%−72%) and lack of research peers (61/103; 59%, 95% CI = 49%- 69%; Table 2). The most common challenge to junior faculty applying for grants was low motivation for applying (62/103; 60%, 95% CI = 50%−70%), followed closely by insufficient mentorship (50/103; 49%, 95% CI = 39%−59%) and discouragement from low funding rates (50/103; 49%, 95% CI = 39%−59%). The least commonly reported barrier (16/103; 15%, 95% CI = 9%−24%) was a department chair’s unwillingness to provide the protected time required by the grant (Table 2). Respondents also commented that teaching responsibilities and “competing interests” were barriers to junior faculty conducting research and applying for grants. One respondent described the situation at his/her institution as a “catch 22” in which the institution will provide resources if funding is obtained but funders want to see established resources to guarantee project completion.

Factors Associated With Career Development Awards

In univariable regression analyses, all of the following were associated with a department's number of career development awards: number of R-level-funded researchers (coefficient = 0.77; 95% CI = 0.63-0.91), having a clinical and translational science center/institute (coefficient = 1.60; 95% CI = 0.74-2.5), and adequacy of institutional and departmental resources (coefficient = 0.27; 95% CI = 0.13-0.40). Number of industry-funded researchers in a department was not associated with the number of career development awards (coefficient = 0.18; 95% CI = −0.04 to 0.40). In multivariable analysis, only the number of R-level- funded researchers was associated with number of career development awards (coefficient = 0.75; 95% CI = 0.39-1.11; $R^2 = 0.57$). In the secondary analysis with outlying values for number of R-level-funded researchers and number of industry-funded researchers trimmed to the 95th percentile, the coefficient for R-level-funded researchers was attenuated (coefficient = 0.67; 95% CI = 0.25-1.09; $R^2 = 0.37$) and the coefficient for adequacy of institutional and departmental resources increased, reaching statistical significance (coefficient = 0.13; 95% CI = 0.008-0.26).

Factors Associated With Extramural Grant Applications by Junior Clinician-researchers

In univariable regression analyses, all of the following were associated with a department's number of extramural grant applications submitted by junior clini-cian-researchers: number of R-level-funded researchers (coefficient = 1.29; 95% CI = 1.02-1.57), number of industry-funded researchers (coefficient = 0.42, 95% CI = 0.015-0.83), having a clinical and translational science center/institute (coefficient = 3.60; 95% CI = 2.09-5.11), and adequacy of institutional and departmental resources (coefficient = 0.52; 95% CI = 0.29-0.76). In multivariable analysis, only the number of R-level-funded researchers was associated with number of extramural grant applications submitted by junior clinician-researchers (coefficient = 1.08, 95% CI = 0.52-1.64; $R^2 = 0.52$). In the secondary analysis with outlying values for number of R-level-funded researchers and number of industry-funded researchers trimmed to the 95th percentile, the coefficient for R-level-funded researchers was attenuated (coefficient = 0.93; 95% CI = 0.24-1.63; $R^2 = 0.38$) and the coefficient for adequacy of institutional and departmental resources increased, reaching statistical significance (coefficient = 1.52; 95% CI = 0.21-2.83).

DISCUSSION

Prior work has described current rates of NIH funding for EM research and suggested reasons for the low career development award application rates. The NIH, EM societies, individual medical schools, and department chairs are increasingly discussing how to best advance EM research. To assist in these efforts, it is essential to quantify the correlates of career development award applications and awarded grants. Our study helps to fill this knowledge gap by describing the spectrum of research resources available to EM faculty at the departmental and institutional levels, describing departmental research leaders' perceptions of potential barriers to grant success, and quantifying which departmental measures correlate most strongly with career development award grant success. To our knowledge, this is the first attempt to quantify these factors in EM. Our results may inform leadership efforts to grow a research portfolio or may inform junior faculty's ability to

choose a center that is most likely to facilitate career success. A conceptual model of the relationship between contributors and barriers to EM junior clinician-researchers obtaining career development awards, based on this study's results, is shown in Figure 1.

Most importantly, we found that although multiple departmental and institutional resources correlated with career development award success, the single greatest predictor was the presence of senior EM researchers in the department. The latter likely exists because of, or in concert with, the former. Institutions and departments with more resources are more likely to attract EM researchers, and EM researchers are more likely to obtain funding when they have adequate resources and support to conduct studies. Importantly, ongoing research and funding from senior EM researchers may contribute to the development of research infrastructure and provide opportunities for junior researchers, with a net effect of catalyzing research within the department. Our data suggest that for every R-level-funded researcher, a department can be expected to produce one more extramural grant from a junior clinician-researcher and add almost one career development award. For department leaders wishing to build a research program, our findings suggest that recruiting funded senior EM researchers may be a better strategy than recruiting junior researchers to build a program "from the ground up."

For junior researchers pursuing a career development award, strong mentorship is paramount. Junior faculty planning to apply for career development awards should carefully consider the availability of mentors, specifically those with R01 funding, when selecting an institution. Importantly, mentorship from outside the department or division of EM should be considered, as many EM researchers have non-EM mentors due to the relative paucity of R01-funded EM researchers.[5] Over the longer term, EM as a specialty should consider strategies for retaining midcareer EM researchers to increase the mentorship pool for future career development award applicants.

In our secondary multivariable analysis, we also found adequacy of institutional and departmental resources—but not presence of a clinical and translational science center/ institute—to be significantly associated with number of career development awards and number of extramural grant applications. Thus, the presence of a clinical and translational science center/ institute alone is not sufficient to stimulate grant applications or funding success. A culture that fosters research through intramural funding, administrative assistance, grant development services, and faculty motivation is more important for junior clinician-researchers' success. While many of these resources may exist within a clinical and translational science center/institute, leadership and junior faculty should ensure that they are adequate and available to EM researchers. Department leadership should consider providing those resources not available from a clinical and translational science center/ institute.

Departments with and without career development awards reported substantial barriers to conducting research and obtaining grants. Some barriers, such as research coordinators and grant administrators, may need to be addressed within the department or institution. However, others might be overcome by collaboration with an organization such as the Society for Academic Emergency Medicine. For example, a database of senior researchers

willing to mentor junior investigators might allow junior researchers to identify mentors with relevant expertise outside their own institutions. Similarly, online communities might provide grant development support and peer-to-peer mentoring for researchers without these resources at their own institution. Smaller departments might also consider partnering with larger departments on grant submissions and research studies to gain experience and build their research portfolio. The Society for Academic Emergency Medicine interest groups, committees, and academies might serve as a way for individuals and departments to connect and collaborate on topics of shared interest.

The most commonly perceived barrier to applying for career development awards was junior investigators' low motivation for obtaining funding. This finding aligns with prior data showing that EM investigators apply for NIH funding at lower rates than investigators from other specialties.[3] However, the reasons for this low motivation remain unknown. One possibility is the lack of a pipeline for EM research. Fewer MD-PhD program graduates enter EM than any other specialty except physical medicine and rehabilitation,[12] suggesting that graduating medical students interested in research may not pursue careers in EM. Similarly, many EM residency programs do not require completion of a research study. Another possibility is generational values. Many junior investigators are of the millennial generation, which is characterized as results-oriented and desiring instant gratification. Given the low funding rates of many grants, millennials may see the time and effort spent preparing an unfunded application as a waste. They may also be discouraged by the length of the peer review process and its critical nature. In a similar study of factors leading to NIH K awards for surgeon-scientists, persistence and resilience were two factors identified as critical for academic success.[13] Highlighting successes and encouraging junior EM researchers may be one strategy for increasing motivation. Departmental compensation plans might consider grant applications in their evaluation metrics, even if the applications were ultimately unfunded. Yet another possibility is the financial burden associated with research training. Financial support from the department or institution may enable a junior researcher to have a salary similar to clinically oriented colleagues while establishing his/her research career.[13] Loan repayment programs, such as the one offered by the NIH, may also ease the financial burden on junior investigators by repaying educational debt. Future research should investigate junior faculty perspectives on the barriers to applying for and obtaining career development awards.

LIMITATIONS

While our survey was based on published literature[6-9] and expert feedback, it was not pilot tested. Our response rate is higher than average for survey studies, but the possibility of selection bias remains. Our cross-sectional results do not reflect grants and funding over time and include departments with National Heart, Lung, and Blood Institute Research Career Development Programs in EM (K12). We show association, but not causation, between departmental factors and career development awards. We invited faculty in research leadership positions to participate because we hoped they could provide information that would reflect experiences of several junior researchers. Future studies should focus on the perspectives of junior researchers. We allowed respondents to classify whether they felt

resources were “adequate” rather than use quantitative cutpoints to define adequate funding and resources, introducing some subjectivity into the data.

CONCLUSION

Overall, presence of R-level-funded independent investigators was the most important predictor of funded career development awards among academic EDs in the United States. Nearly all emergency medicine leaders report substantial departmental and institutional barriers to conducting research and obtaining grant funding. Future research should seek to characterize junior faculty perspectives on these issues and to explore strategies at the departmental, institutional, and national levels for overcoming these barriers.

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This project was approved by the Society for Academic Emergency Medicine (SAEM) Board of Directors. The work presented does not represent the official views of SAEM.

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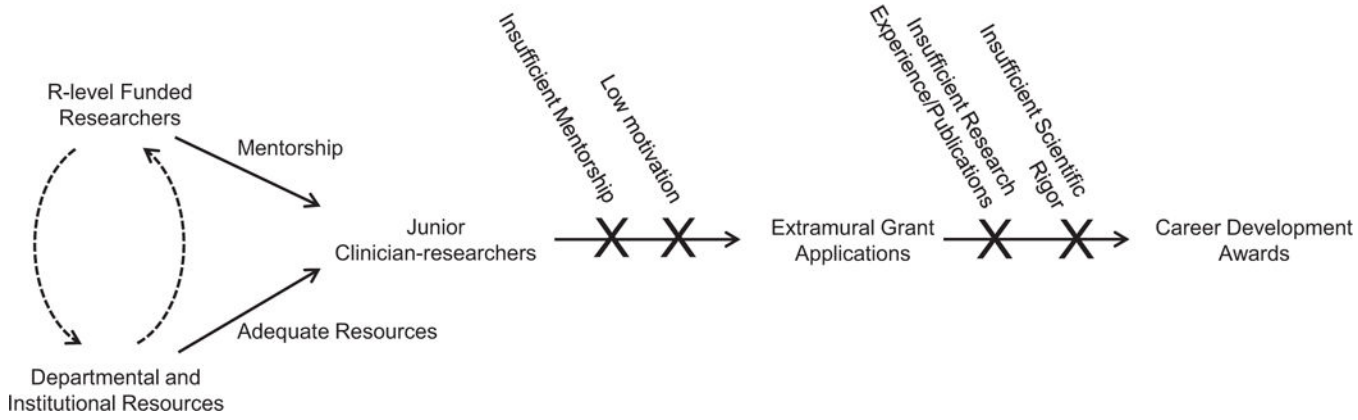

Figure 1.

Conceptual model of the relationship between contributors and barriers to EM junior clinician-researchers obtaining career development awards.

Table 1:

Department Characteristics and Resources

	No R01-funded* Researchers (*n* = 56)	1–2 R01-funded* Researchers (*n* = 32)	3+ R01-funded* Researchers (*n* = 15)
Program setting			
Primary teaching site of a medical school	28nn (50)	26 (81)	13(87)
Secondary teaching site of a medical school	17 (30)	4(13)	1(7)
Not affiliated with a medical school	6(11)	1 (3)	0(0)
Not provided	5(9)	1 (3)	1(7)
Institutional CTSI/CTSC	12 (21)	20 (63)	13(87)
Faculty			
Total faculty members			
Fewer than 30	39 (70)	8 (25)	1(7)
30–49	9(16)	16 (50)	6(40)
50 or more	6(11)	7(22)	8(53)
Not provided	2(4)	1 (3)	0(0)
Junior physician researchers			
None	22 (39)	3 (9)	0(0)
1–2	18 (32)	14 (44)	3(20)
3 or more	14 (25)	15 (47)	12(80)
Not provided	2 (4)	0 (0)	0(0)
NIH K-funded researchers			
None	51 (91)	25 (78)	5(33)
1–2	3 (5)	6(19)	3(20)
3 or more	0 (0)	1 (3)	6(40)
Not provided	2 (4)	0 (0)	1(7)
Researchers with other CDA funding			
None	47 (84)	17 (53)	5(33)
1–2	6(11)	14 (44)	7(47)
3 or more	1 (2)	1 (3)	2(13)
Not provided	2 (4)	0 (0)	1(7)
Clinical hours without grant funding or buy-down (h/month)			
<80	19 (34)	7(22)	3(20)
80–99	10 (18)	8 (25)	3(20)
100–119	11 (20)	11 (34)	4(27)
120+	7(13)	5(16)	3(20)
Departmental resources available			
Research coordinator(s)	33 (59)	28 (88)	14(93)
Research nurse(s)	15 (27)	17 (53)	5(33)
Research associates	32 (57)	25 (78)	12(80)
Administrative support	24 (43)	27 (84)	14(93)
Grant writer(s)	13 (23)	5(16)	2(13)

	No R01-funded* Researchers (*n* = 56)	1–2 R01-funded* Researchers (*n* = 32)	3+ R01-funded* Researchers (*n* = 15)
Grant administrator(s)	21 (38)	24 (75)	13(87)
Secretarial support	26 (46)	25 (78)	15(100)
Statistician(s)	30 (54)	16 (50)	10(67)
Research in progress meetings	37 (66)	24 (75)	12(80)
Formal idea review process	17 (30)	15 (47)	11(73)
Formal grant review process (presubmission)	14 (25)	14 (44)	9(60)
Departmental research funds	28 (50)	21 (66)	9(60)
Adequate resources available			
Departmental research funds	14 (25)	13 (41)	11(73)
Institutional (school/hospital) research funds	9(16)	11 (34)	8(53)
Secretarial support	18 (32)	18 (56)	10(67)
Research coordinator support	24 (43)	23 (72)	10(67)
Protected time for faculty	19 (34)	17 (53)	9(60)
Office space for faculty	42 (75)	24 (75)	7(47)
Office space for research staff	31 (55)	22 (69)	7(47)
Institutional grant development support	14 (25)	13 (41)	8(53)
Departmental grant development support	9(16)	17 (53)	12(80)
Statistical consultation within institution	28 (50)	19 (59)	11(73)
Research motivation of faculty by chair/chief	31 (55)	24 (75)	12(80)
Support from other faculty for research	25 (45)	20 (63)	11(73)

Data are reported as number (%). Those who did not enter a value for the number of R01-funded researchers (*n* = 2) were included with the "no R01-funded researchers" group.

*R01 or R01-equivalent

CDA = career development award; CTSI/CTSC = Clinical and Translational Science Institute/Center

Table 2

Barriers to Conducting Grant-funded Research

	Departments Without CDAs (*n* = 64)	Departments with 1 or More CDAs(*n* = 36)
Number of junior research faculty		
None	22(34)	3(8)
1–5	34(53)	24(67)
6+	8(13)	9(25)
Number of intramural or departmental grant applications submitted by junior faculty in past year		
None	27(42)	9(25)
1–3	22(34)	8(22)
4+	12(19)	17(47)
One or more R01-funded * researchers	17(27)	29(81)
One or more other R-level NIH-funded researchers	21(33)	31(86)
One or more industry-funded researchers	42(66)	29(81)
Clinical hours without grant funding or buy-down (h/month)		
<80	19(30)	10(28)
80–99	17(27)	4(11)
100–119	13(20)	13(36)
120–139	8(13)	6(17)
CTSI/CTSC	20(31)	24(67)
CTSC resources available to junior faculty		
Statistical support	13(20)	20(56)
Grant writing	9(14)	13(36)
Informatics and database management	11(17)	21(58)
Intramural grant support	11(17)	20(56)
None	2(3)	0(0)
Other	0(0)	2(6)
Challenges to *conducting research*		
Insuficient protected time	45(70)	20(56)
Insuficient research mentorship	31(48)	14(39)
Few research peers	42(66)	19(53)
Insuficient research administrative support	30(47)	6(17)
Research not valued within the department	18(28)	4(11)
Other	11(17)	1(3)
Challenges to *applying for grants*		
Insuficient mentorship	36(56)	14(39)
Insuficient administrative support	31(48)	8(22)
Chair unwilling to provide protected time required by grant	13(20)	3(8)
Insuficient guidance in grant writing (overall approach, budget development, etc.)	37(58)	10(28)
Low motivation for obtaining funding	45(70)	17(47)

	Departments Without CDAs (*n* = 64)	Departments with 1 or More CDAs(*n* = 36)
Discouraged by low funding rates	34(53)	15(42)
Dificulty inding appropriate funding opportunities	28(44)	15(42)
Other	2(3)	3(8)
Challenges to *obtaining grants*		
Insuficient mentorship	32(50)	9(25)
Insuficient research experience or publication record	48(75)	21(58)
Insuficient scientiic rigor in research proposal	29(45)	14(39)
Insuficient departmental support/resources/environment	25(39)	4(11)
Insufficient institutional support/resources/environment	26(41)	7(19)
Insufficient reviewer expertise	21(33)	6(17)
Other	4(6)	5(14)

Data are reported as *n* (%).

* R01 or R01-equivalent