



Impact of a Resident Research Grant on Scholarly Output During Pediatric Residency

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WHAT'S NEW?

Lack of research funding is a known barrier to performing research during residency. Receipt of an institution-based resident research grant was associated with increased scholarly output. Programs should consider creating funding mechanisms to promote scholarship during residency.

RESEARCH PARTICIPATION DURING residency contributes to professional development by promoting and preparing trainees for research careers.^{1–5} The Accreditation Council for Graduate Medical Education requires residents to participate in scholarly activity and requires programs to allocate adequate resources to support this activity. Only a minority of pediatric program directors and residents report being satisfied with resident research participation,^{6,7} and numerous barriers, including a lack of funding, have been identified.^{4,6–8}

Although research funding improves academic productivity,^{2,3,9} the number of pediatric residents receiving grants is small, and a consistent association between resident funding and individual scholarly output has not been demonstrated.⁵ Our aim was to explore the impact of a residency research grant on residency productivity by determining whether grant receipt was associated with increased scholarly output.

EDUCATIONAL APPROACH AND INNOVATION

RESIDENCY RESEARCH GRANT

In 2003, Boston Children's Hospital established an endowed fund to support resident research, the Fred Lovejoy Resident Research and Education Grant. Residents apply for the grant with an identified mentor. A 15-member committee reviews applications using standardized

criteria, including significance and relevance, methodological rigor, innovation, and feasibility. From 2003 to 2018, 248 applications were received and 162 grants awarded (funding rate of 65%). The median award per grant was \$4000 (range, \$300–\$6620).

STUDY DESIGN AND ANALYSIS

We performed a retrospective cohort study of pediatric residents. The study protocol was deemed exempt by the Institutional Review Board. We used the Electronic Residency Application System to identify residents who matriculated between 2005 and 2012. We excluded residents with substantially more or less time than the typical resident to pursue research during pediatric residency, including those in the Integrated Research Pathway, combined integrated programs with a duration of training of ≥ 4 years, and those in our residency program for only 1 year. For each resident, we recorded demographic variables including gender, residency track, advanced degrees, and whether a Lovejoy Grant was awarded.

Our primary outcome was any scholarly output, defined as either a first-authored published original research manuscript or accepted abstract to the Pediatric Academic Societies (PAS) annual meeting, from the beginning of the second year of residency through the end of the first year after pediatric residency program completion or leaving for other reasons. We selected the PAS meeting because this was the most commonly attended meeting and our follow-up period to most accurately reflect research initiated and performed during residency.

Bivariate associations between scholarly output and potential predictors were assessed using chi-square and Fisher's exact tests. Multivariable logistic regression models were created to evaluate the association between grant receipt and scholarly output after adjustment for potential

confounders (residents' gender, prior research degrees, and residency track).

RESULTS

Three hundred residents met eligibility criteria, 71 (24%) of whom received the grant. Overall, 95 residents (32%) had at least 1 scholarly product, of which 36 (38%) published at least 1 first-authored original research manuscript (median = 1; range, 1–6) and 74 (78%) had at least 1 PAS abstract accepted (median = 1; range, 1–5). Residency research grant recipients had more scholarly output than non-recipients due to the greater number of PAS abstracts, despite a similar number of published papers (Table). After adjustment for residents' gender, prior research degrees, and residency track, receipt of the residency grant was associated with more than a 3-fold increase in scholarly output (adjusted odds ratio, 3.25; 95% confidence interval, 1.87–5.68).

Of the 71 grant recipients, 9 (13%) published a first-authored original research manuscript during the study period, with 5 publishing manuscripts related to the funded grant. As of March 2018, an additional 18 grant recipients (25% of recipients) published a related first-authored research manuscript more than 1 year after program completion, for a total of 23 (32%) grant recipients with a related publication. The median time from grant receipt to publication was 43 months (range, 10–63 months).

DISCUSSION AND NEXT STEPS

We found that receipt of an institution-based resident research grant was associated with increased scholarly output by pediatric residents. Previous studies have documented that faculty⁶ and residents^{4,7,8} perceive a lack of funding to be a barrier to research participation. Additionally, there is a high publication rate from trainee-related grants,³ and reimbursement for costs associated with meeting presentations^{9,10} and assistance with research-

related tasks¹⁰ (eg, data collection, biostatistics) increase research productivity. However, our study was the first to examine the impact of a research grant on individual resident scholarly output.

The association between receipt of a research grant and increased scholarly output was driven by increases in abstract acceptance but not manuscript publication. Our selected time window favored earlier stages of scholarship. When we expanded our search time period, we identified additional manuscripts published more than 1 year after program completion.

There are other known barriers to research participation, including a lack of protected time,^{2,4,6–8,11} access to mentors,^{2,3,7,8} limited research training,^{6,7} and resident interest.^{4,8,11} There are benefits to infrastructure such as protected research time.² Residency programs also should facilitate meaningful interactions between residents and mentors.

Our study has several limitations. First, although we demonstrated an association between receipt of the grant and scholarly output, additional factors may have played a role. Trainees receiving the grant likely had both a stronger research interest and a superior study proposal than those who did not apply or applied but did not receive the grant. These factors could have influenced the likelihood of scholarly output. To account for prior research experience, we adjusted for advanced degrees prior to residency. Second, we did not capture abstracts presented at conferences other than PAS or include second-authored scholarship. Third, we did not capture resident research support from other sources. Finally, the grant was implemented at a single site with strong research infrastructure and mentorship, a 3-month research block in postgraduate year 3, and residents who may be more interested in research; therefore, our findings may not be generalizable to other institutions. Additionally, the grant was created by charitable donations from program graduates, a mechanism

Table. Comparison Between Residents Who Did and Did Not Receive a Lovejoy Resident Research Grant

	Grant Recipients, n (%)	Non-recipients, n (%)	P Value
Demographics			
N	71	229	...
Gender			.59
Male	19 (26.8)	69 (30.1)	
Female	52 (73.2)	160 (69.9)	
Residency track			.68
Categorical	53 (74.7)	157 (68.6)	
Urban health and advocacy	15 (21.1)	59 (25.8)	
Neurology	3 (4.2)	13 (5.7)	
Advanced degree			.27
Doctor of Philosophy	14 (19.7)	43 (18.8)	
Master of Public Health	8 (11.3)	19 (8.3)	
Other master's degree	5 (7.0)	10 (4.4)	
Accelerated research pathway	2 (2.8)	11 (4.8)	.74
Scholarly Output			
Successful scholarly output*	37 (52.1)	58 (25.3)	<.01
Pediatric Academic Societies abstracts	33 (46.5)	41 (17.9)	<.01
Published manuscript	9 (12.7)	27 (11.8)	.84

*The number of abstracts and manuscripts do not sum to total successful scholarly output, as Pediatric Academic Societies abstracts and published manuscripts are not mutually exclusive.

potentially not feasible for all programs. However, other features critical to its success that can be more easily replicated include commitment of administrative support, a robust faculty review committee, and engagement from research mentors.

We demonstrated that receipt of a resident research grant was associated with increased scholarly output for pediatric residents. Residency programs should explore ways to provide funding for research to facilitate productivity and encourage trainee participation. Additional studies are needed to evaluate the impact of research during residency on later professional outcomes, including scholarly output as a faculty member.

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