COMMENT

Commentary on “Limited achievement of NIH research independence by K award recipients”

Alan H. Jobe¹*Pediatric Research* (2018) 84:481–482; <https://doi.org/10.1038/s41390-018-0100-2>

The fragile state of funding for pediatric research by the National Institutes of Health (NIH) over many years has been well documented.^{1,2} The aggregate of all NIH support for pediatrics has not kept pace with overall spending as a percent of yearly budgets. A recent, more granular analysis by Good et al.,³ demonstrated that only 15 academic institutions in the United States received and supported 63% of all pediatric-related R01—equivalent awards, with just three institutions receiving 32% of all awards. Further, only 57% of grants were identified with physician scientists with MD or related degrees. The age of first receipt of an R01 or equivalent funding has been increasing despite efforts by the NIH to support early stage investigations. In the Good et al. analysis, 58% of R01 or equivalent grants were held by investigators with a professor rank and 24% were service chiefs, chairs, or deans. Thus, the independent investigator R series grants that were traditionally viewed as the stepping stone to an established research career and tenure in academic pediatrics are highly concentrated to senior investigators in just a few academic pediatric programs in the United States.

Traditionally, success in academic medicine meant successfully staying on the narrowing pyramid from early medical training to clinical training and on up the academic ranks with inevitable losses of investigators to other academic activities such as teaching, clinical care, or administration. Such career tracks that were dependent on R01 or equivalent external funding only apply now to a very few academic pediatric institutions. Further, the distribution of those grants primary to senior faculty suggests that the early career R grant is seldom an achievable goal for an academic pediatrician. The R grant pyramid has become inverted with the funding concentrated at the top without a large number of R grants for younger investigators to develop independent research careers.

The first stage on the ladder to academic success has often been the receipt of K08 or K23 awards from NIH for young physician scientists who have had initial successful fellowship training. However, the success rate for applications of K series training grants (K08, K23) has decreased from about 45% in 2010 to less than 15% in 2015.² The numbers are small with about 100K series awards in pediatrics per year, clearly insufficient to support a robust pipeline of pediatric scientists. But how effective are K awards to achieve the primary goal of providing the further training sufficient to compete for an R series award? In the Journal this month, Good and colleagues⁴ use government data to explore the transition for pediatricians from K to R grants for 2012–2017. Of the 86 career development awards that

were followed by an R01 or equivalent award, 52% were received by women, 52% had an additional degree beyond an MD, and 48% were already associate professors. The R awards were funded within about 5 months of the end of the K Award. Only 10 institutions supported 56% of the K08 and K23 awards. These institutions overlapped almost exactly with the institutions with the most R awards for pediatric research, again demonstrating the striking concentrations of NIH supported research to a few institutions. About 56% of K08 or K23 awardees had not transitioned to an R award within the time frame of this study.

Viewed from the perspective of the ragged edges of the academic pyramid, a 44% success rate for an R award shortly after completion of the K award may be a success given the difficulty in getting R series awards in this time of restricted budgets. A number of K grant young investigators are certainly being lost. However, some K award investigators will get R series funding after a delay or will succeed in research with funding from other sources.

The Pediatric Academic Society and many departments of pediatrics promote research in pediatrics beginning with summer programs for high school, college, and medical students through subspecialty training. These efforts are valuable to engage trainees at all levels to pediatrics and pediatric research. The K award is the first recognition that a trainee has real potential for success in pediatric research. The critical questions are what happens to the K award applicants who choose to continue NIH level research and the K award recipients who seek but do not receive R01 funding? Are we losing exceptional talent from pediatric research? We need academic pediatricians with multiple different skills in our progressively more complex medical centers, and the “failed K” investigators may be providing exceptional skills for other activities. In my experience, pediatricians with a sound research background generally are very successful as clinicians and teachers, so all is not lost. But, there are two choke points for research success— inadequate numbers of K awards and subsequent R01 grants to build research careers in pediatrics.

While NIH funding is limiting the pediatric research endeavor, the community of pediatric academic centers must recognize their contributions to the problem. Why is NIH funding for training programs and pediatric research so concentrated in just a few centers? Trainees for pediatric research must have superior research training to compete as independent investigators. The three-legged stool of academic medicine for clinical care, teaching, and research seems to have an atrophied research leg in many institutions where preference is given to clinical care and

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RVU's of faculty.⁵ Successful pediatric research training is an expensive endeavor that requires an institutional commitment to training, modern research infrastructure, and exceptional trainees who are likely to succeed with training from supporting mentors. As American Pediatric Society President in 1996, Dr. Richard Johnston requested a group of us to assess the departmental commitments required to promote academic success. The results published in this journal estimated that the average cost for the 3 years of support needed to transition an aspiring young investigator from fellowship to a research faculty position was about \$650,000.⁶ That number, which included salary support and start-up funds would be much higher today. Not all young investigators will succeed to achieve at least partial funding within 3 years, further raising the costs. The K08 or K23 grants can subsidize that transition in part, but the funding level is insufficient to fully support the required research time or cost of the research. The development of pediatric investigators is inefficient, expensive, and inadequately funded to exploit the exceptional research opportunities resulting from the application of the new biology to pediatric problems. The traditional academic pyramid to a successful career in pediatric research is in tatters.

ADDITIONAL INFORMATION

Competing interests: The authors declare no competing interests.

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