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Dmitry Tumin, Jennifer Crotty, Inga Aikman and Sarah Leonard

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## Cost and effectiveness in fostering resident physician scholarly activity Coût et efficacité de la promotion de erudition des médecins résidents

Dmitry Tumin,<sup>1</sup> Jennifer Crotty,<sup>1</sup> Inga Aikman,<sup>1</sup> Sarah Leonard<sup>1</sup>

<sup>1</sup>Department of Pediatrics, Brody School of Medicine, East Carolina University, North Carolina, USA

Correspondence to: Dmitry Tumin, PhD. Department of Pediatrics, Brody School of Medicine at East Carolina University, 600 Moye Blvd, Greenville, NC 27834; phone: +1 (252) 744-3221; fax: +1 (252) 744-1376; email: [tumind18@ecu.edu](mailto:tumind18@ecu.edu)

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Resident physicians' participation in scholarly activity, including but not limited to traditional biomedical research, can enhance biomedical innovation, and strengthen the practice of evidence-based medicine. As such, resident scholarship has been increasingly encouraged by accreditation bodies, with growing interest in outcomes-based assessment of completed scholarly work. Yet, obstacles to resident scholarly activity are many, with two commonly self-reported barriers being lack of time and lack of research training.<sup>1</sup> Consequently, a wide variety of programs to foster resident scholarly activity have been developed, with common interventions including appointing research mentors, implementing research curricula, and introducing research requirements.<sup>2</sup> In this commentary, we discuss the need to move beyond descriptions of intervention design and scholarly outcomes to recognize the costs of fostering resident scholarly activity. In turn, accounting for costs can help residency programs choose strategies that are both cost-effective and concordant with their priorities for resident scholarship.

Evaluations of interventions intended to foster residents' scholarly activity have generally demonstrated increased scholarship among "treated" as compared to "control" groups.<sup>2</sup> Nevertheless, residency programs may find it difficult to choose among previously described interventions due to heterogeneity in definitions of scholarly outcomes, lack of head-to-head comparisons of alternative interventions, and different institutional

priorities. Because individual departments can bear a significant share of direct costs for supporting resident participation in scholarly activity, strategies for increasing resident scholarly productivity may be driven primarily by availability of department resources, programs' expectations of which types of scholarly activity are most feasible for their trainees, and perception of different interventions' likely effectiveness. The lack of a systematic approach for choosing interventions can contribute to disagreement between residents and residency program leadership about what support is needed, and can result in inefficient use of resources, including resources provided by government agencies.

Examining the cost of scholarly activity is especially important at resource-limited institutions, where adoption of one intervention may preclude investment in other approaches. Yet, the necessary data to evaluate cost are usually incomplete or not reported, because supporting resident scholarly activity encompasses a wide range of resources, including support for faculty time, coverage of clinical duties, direct research expenses, and indirect costs of research infrastructure. While many studies have described interventions implemented to support resident scholarly activity, few have attempted to place a price tag on the resources deployed to achieve this goal. One study described awarding grants that averaged \$4,000 to support resident research projects,<sup>3</sup> while another study estimated the total costs of supporting research among anesthesiology residents as \$27,467 per capita, including

clinical coverage for times residents were working on scholarly activity.<sup>4</sup> When scholarly activity is supported by extramural funding, costs may also be estimated based on amounts charged to the sponsor. For example, the R38 program of the National Institutes of Health provided \$3,861,000 in direct funding to eleven training programs in its inaugural year, while enrolling 57 residents,<sup>5</sup> implying a per-resident cost of \$67,737. Although this cost is infeasible for most residency programs to self-fund, it is unclear what lower cost should be budgeted for effectively supporting resident scholarly activity, and how such funds should be spent.

To help overcome barriers to resident scholarly activity, we call for greater attention to defining outcomes and costs of specific interventions. A consensus definition of primary outcomes of scholarly activity is needed to compare interventions on efficacy. This might be a weighted composite of grants, publications, quality improvement projects, novel curricula creation, and presentations, although a single easily tracked measure (such as number of publications) could substitute in the interim. The next step requires comparative effectiveness studies of the various interventions described to date, followed by a cost-effectiveness analysis of which interventions produce the most “units” of scholarly activity given the same level of funding.

For individual residency programs, identifying the most cost-effective approaches would help inform development of new initiatives to support resident scholarship, or guide expansion of existing strategies. For health systems and extramural sponsors (including public agencies funding resident training), cost-effectiveness analysis could also help identify opportunities for supporting scholarly activity among a wider range of programs and residents. In turn, pivoting to interventions that serve a greater number of residents could help improve equity in academic medicine, by making scholarly activity and scientific productivity accessible to more physicians in training. At each level, systematically determining the costs and benefits of interventions intended to foster scholarly activity can both spur greater resident participation in scholarly projects, as well as level the playing field for all trainees.

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