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EDITORIAL

Building an ARC to Grant Success: The Aims Review Committee

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Grant writing is an acquired skill. There is nothing intrinsically obvious about how to put together a proposal that will convince a panel of reviewers that one particular project, among all those submitted by a host of bright and talented investigators, should rise to the top of the stack. Yet that is what academics have to do, over and over again, to build a career in research. The difficulty of accomplishing this task is reflected in the fact that funding represents the single greatest hurdle to the pursuit of an academic career in rheumatology (1,2). Teaching grant writing is therefore one of the key missions of any training program seeking to develop successful physician-scientists.

Over the last 5 years, our group at the Brigham and Women's Hospital and Boston Children's Hospital has tried a new approach toward this goal, something we term the Aims Review Committee (ARC). Here we explain the rationale underlying ARC, outline the approach, and share some lessons learned along the way.

Specific aims page

Every part of a grant proposal is important, but some parts carry more impact than others. Pound for pound, nothing beats the specific aims page. In the space of a single side of text, the investigator introduces the project in all its glory: the problem to be addressed, the hypothesis and supporting preliminary data, and the proposed path forward. It is the "elevator talk" that persuades the reviewer that the subject matter is important, the approach promising, and the investigator qualified.

The specific aims page also sets the reviewer's expectations for the rest of the proposal. Is the discussion well-informed, thoughtful, and bold without hyperbole? Does the presentation reflect the attention to detail that we associate with good science? Has the writer taken the time to consider how to make the topic accessible to a reviewer whose expertise lies elsewhere? The specific aims page typically makes a powerful first impression, positively or negatively, and this impression flavors the remainder of the review. For this reason, the specific aims page merits the most meticulous attention from the grant writer, and from those who seek to support the grant writer's success.

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Aims Review Committee (ARC)

Perhaps the most common piece of advice given to grant writers is to have colleagues critique a proposal before submission. However, in reality this suggestion fails in 2 ways. First, providing feedback on a whole grant is hard. Really digesting a proposal is time-consuming and cognitively strenuous, especially if outside of the reader's direct area of expertise. We may have a few people from whom we can ask such a big favor, but even of these we cannot ask it often. Second, and more importantly, critical problems in a grant, i.e., the kind that will sink a proposal and are therefore most important to remedy, are usually deep. For example, the grant may be poorly tailored to the request for applications; it may present the topic in a way that is overly complex or technical, or that fails to convey its significance; or its aims may be too big, too small, or too interdependent. The understandable wish to show a valued colleague only one's best work tends to result in the appearance in our e-mail inboxes of proposals that are obsessively polished yet still hopelessly flawed, way too close to deadline for the real problems to be addressed. This represents a very unfortunate waste of everyone's precious time—grant writer, friendly colleague, and study section member alike.

We have therefore taken a different approach. Every 1–2 months, we convene the ARC. This committee is a small operation: a chair to organize and moderate the session, together with 3 to 10 other participants, depending on interest and availability. Grant writers submit a 1-page specific aims page, ideally targeting a grant deadline a few months away, and these are circulated a day before ARC convenes to allow members the chance to read them through briefly. The review process is then simple. One by one, members respond to the written page, identifying strengths and weaknesses. Comments focus on both the science and the presentation, including detailed attention to elements of grantsmanship such as

length of paragraphs and use of jargon, font, spacing, figures, and color. The submitting investigator may respond to comments, but should mostly just listen to the reactions of others, like a fly on the wall at study section. Each aims page is discussed for 20–30 minutes, allowing consideration of 2 or occasionally 3 proposals in a 1-hour, brown-bag lunch session.

The communal aspect of ARC review turns out to be surprisingly important. Review by committee is very different from review by several individuals separately. Discussion amplifies and refines specific concerns, helping weaknesses to emerge more clearly into view. This process mimics what happens in a real grant review panel, where a loose thread noted by one reviewer may be seized upon by another, and then another, leading potentially to the unraveling of the whole proposal. Sometimes the opposite happens, and ARC members can reassure a grant writer that a concern voiced by one member is not widely shared. Unlike a real review panel, however, ARC members seek to offer solutions as well, with the goal of helping grant writers to optimize their proposals before submission.

Interestingly, the methodologic expertise of ARC members has proven not all that important. ARC began with a basic science focus, but now the committee reviews both basic and clinical proposals, and we regularly find that members provide fruitful insights even where the topic and methods are entirely foreign. After all, the aims page has to make sense to a reviewer for whom the material may also be unfamiliar. Similarly, the seniority of ARC participants is of modest importance. Experienced faculty provide helpful perspective, but most of the benefit of ARC comes from seeing how an aims page resonates with a diverse panel of smart but critical readers, providing a window into how a specific idea or presentation will fly at grant review.

Does ARC make a difference? So far, the outcome seems encouraging. Of 53 aims pages that have undergone ARC review since 2011, 40 have been submitted to granting agencies, with a funding rate of 58% (19 funded, 14 not funded, and 7 pending). Two aims pages resulted in more than 1 award, for an overall yield of 10 foundation grants, 3 industry grants, 3 K08 and K23 awards, 3 R01s, an R21, and a P30. We do not know how these grants would have fared had they not undergone ARC review, and we have no "comparator arm" of non-ARC grants submitted by the same investigators in the same funding climate. However, no aims page has yet made it through ARC without changes, and typically these are quite substantial. Further, 5 years into ARC, investigators seem more motivated than ever to submit aims for ARC review. In view of the modest commitment required of ARC members, i.e., typically 15 minutes to read the aims in advance, and then the lunch hour for the meeting itself, the investment in time and effort appears more than worthwhile.

Lessons from ARC

Having seen multiple sets of aims passage through ARC, it is clear that there is no one right way to write a specific aims page, and that there are exceptions to every rule. However, 4 simple principles of good aims writing have emerged.

1. The specific aims page presents the whole grant, not just the science. A dictum often cited in ARC is that a grant gathers almost all its positive points by the end of the specific aims page. After that, you just lose, as reviewers pick at the specific plan to find hidden flaws. The National Institutes of Health (NIH) review encompasses 5 criteria: significance, investigator, innovation, approach, and environment. A good aims page hits all of these, laying out not only what will be done and why, but also why by this investigator, why here, and why now. Timing is particularly important for career development grants, since these are targeted to specific phases in the ascent up the academic ladder, but is also relevant for proposals that address time-sensitive needs or opportunities.

2. Get to the point. Making room for elements of the grant beyond the approach inevitably translates into a need to trim elsewhere. The introductory paragraph is usually an excellent place to find sacrificial words. Waxing poetic about the health impact of a disease familiar to reviewers is more often than not a waste of space. A good rule of thumb is that the reviewer should know what the grant is about within the first few sentences. Wherever possible, focus not on the knowledge gap ("little is known about…" is pretty thin gruel) but on the harm, need, or problem that the research will address. Keep it short, punchy, and clear! (What would Hemmingway write?)

3. Be empathetic with your reviewer. Reviewing grants is rarely the highlight of anyone's day. How can one make it easier on the reviewer, and thereby help the proposal to stand out? Turning to the specific aims page, does the reviewer encounter a wall of margin-to-margin gray text, or instead something more inviting; for example, friendly spaces between paragraphs, (sparsely-applied) bolded text signposting key points, or an illustrative figure? Does the reviewer have to wrestle with unfamiliar acronyms and long paragraphs, or are concepts translated into crisp, plain, straightforward language? Are hypotheses and expected outcomes stated explicitly, or does the reviewer have to deduce them? In ARC we remind junior investigators who have not themselves served on a grant review panel that the formal evaluation begins with a short presentation of the proposal by the primary reviewer to the other committee members. How does the specific aims page help the reviewer to formulate this summary in a way that enables the grant (and the reviewer!) to shine?

4. Write the aims page first. As noted above, flaws that sink grants are typically fundamental ones. These problems are usually evident in the specific aims page. The corollary is that if the aims page fails to make a compelling case, then hacking away at the rest of the grant is likely a waste of time. I ask my mentees to draft a complete aims page (not just the aims themselves) early in the grant writing process. We iterate this page in detail before we submit our best effort to ARC for review, whereupon we revise again. In this way, by the time we sit down to write the grant, the "storyline" is clear. Not a few grant ideas return to the drawing board after aims page review, saving considerable time, effort, and heartache, while those that pass muster typically become competitive proposals.

In the end, of course, the specific aims page can do no more than put the best shine on the science. It cannot

make up for a weak project, an inexpert investigator, overwhelming competition, a microscopic payline, or a reviewer who just has it in for the hypothesis. To handle these, there is resilience, persistence, hard work, and a little luck. We can model (most of) these for our mentees too, as we draft our own specific aims and ourselves face the trials and tribulations of grant review.

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REFERENCES

1. Ogdie A, Shah AA, Makris UE, Jiang Y, Nelson AE, Kim AH, et al. Barriers to and facilitators of a career as a physician-scientist among rheumatologists in the US. Arthritis Care Res (Hoboken) 2015;67:1191–201.
2. Davidson A, Polsky D. Sustaining the rheumatology research enterprise. Arthritis Care Res (Hoboken) 2015;67:1187–90.