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Feature Articles

Big Bad Application Blunders

Even though we know that haste makes waste, when we’re busy we may move that maxim to our cerebral trash bin.

Trouble is, when you’re preparing a grant application, rushing often leads to, well, trouble.

NIH gives you only one chance to address your reviewers’ criticisms before you will need to scrap the application and start over with a new one, so you want to make each submission count.
But happily, the most common serious mistakes are preventable with careful planning.

Here we take on what we at NIAID—including our review staff—see as the ten biggest bloopers: your application "must avoid."

1. Bad presentation.

Are you surprised that we list presentation as number one? Although this list isn’t in order of seriousness, we want to highlight appearances first.

Read this comment from Dr. Colin Parrish, who wrote one of our sample applications:

My advice after reviewing grants and being at study section is that more people would benefit from a clearer presentation of their experiments and plans. At least half the applications I saw were noncompetitive because they were badly organized...before anyone even looked at the science.

Presentation problems can spell the end of your application. Under this umbrella fall poor formatting, grammatical errors and typos, and an unappealing appearance.

You can avoid falling into those traps by creating a solid and obvious organization.

That means a structure based on the application sections (e.g., Significance, Innovation, and Approach), and in the Approach section, organizing your experiments by your Specific Aims.

Include headers, bolding, and other features that guide your readers to the information they seek.

Poor proofing can affect factual accuracy, e.g., if you refer to a nonexistent figure or to the wrong item in the reference list.

If English is not your native tongue, be especially careful; grammatical errors can make your application hard to understand or even change the meaning. If English is not your forte, get help.

2. Wrong study section.

The repercussions of not having the right reviewers are huge. They may see your field as having other priorities (you chose the wrong project) or believe that the research you proposed is too far out of the mainstream (the project is too risky).

Be sure to request a study section in your cover letter and get advice on your choice so your application ends up in a study section that would be amenable to, even excited about, the research you propose. That quest will take you time but is well worth it.

3. Insufficient preliminary data.

Having insufficient preliminary data—or preliminary data that do not support your project’s feasibility—is a dealbreaker for an R01.

You will need preliminary data that are directly relevant to the project you propose. If you’re not sure how much is enough, look at our sample applications and get help from your advisors and mentors.

4. Insignificant question.

This fatal flaw harks back to your topic choice. When reviewers judge an application to be short on significance to the field or public health, they move on to the next application.

To avoid this flaw, don’t jump into writing an application before you seriously research which project to choose.

Your reviewers will judge your application’s impact—its ability to move the field forward—and whether it addresses an important public health problem.
5. Lack of innovation or new ideas.

Avoid being accused of "me-too" research by proposing an innovative way to tackle the research problem at hand.

What to do if you're in a well-studied area that has few knowledge gaps or one that many others are studying? Propose new ideas and new approaches, and unearth a research question they have not asked.

To be innovative, you don't need a new paradigm, but you do need to create new knowledge.

6. Insufficient expertise.

Whereas the previous two points relate to the importance of the topic, this one is about feasibility: do you and your collaborators have the expertise to complete the research?

Though expectations are lower for new investigators, you still need to show experience in and knowledge of the field.

Much of today's research is multidisciplinary, and no one person could possibly have all the expertise needed to complete all the experiments. For this reason, you need to carefully consider whom to bring into your team and provide evidence that these people have made a commitment to participate.

7. Weak hypothesis and Specific Aims.

A solid hypothesis (or hypotheses) and well thought out objectives—Specific Aims—lay a solid foundation for your entire plan, so you avoid a fishing expedition. For most types of research, reviewers expect to see a hypothesis, so include either one overall hypothesis or one for each aim.

As you assess your hypothesis, return to the significance question and ask whether your reviewers would find it important enough to have an impact on your field. Then check that your aims and experimental design will be able to test your hypothesis.

You can create a hypothesis and then design your Specific Aims and experiments to test it, or you can do the reverse.

8. Insufficient knowledge of the field.

Not everyone will share your perspective so it is important to show that you have considered alternative viewpoints. It's one thing if you aren't comprehensive; it's another if you neglect to cite papers that provide an alternative view and omit them from the context of your study.

For example, HIV has a negative effect on HCV disease progression, but it's less clear on whether HCV has a negative effect on HIV disease.

If that's your topic, you'll need to cite papers that support both viewpoints. Then discuss the limitations of previous findings and how your study will try to get a definitive answer.

9. Overly ambitious.

Most people propose three Specific Aims and around two or three sets of experiments for each aim.

While that's a rough guideline, keep in mind that biting off more than one can chew is a very common mistake. Be sure to avoid proposing too much work.

Plan your research design with the understanding that research often takes more time than people think it will.

Even if you are a new investigator, it's okay to ask for the maximum number of years (five for an R01) as long as you can fill the time productively.

If you have never made these assessments before, get help.

10. Failure to identify alternatives.

Do you know what you would do if you got negative results? What if you got surprising results that beckon you down a new path?
You’ll need to anticipate potential swerves and lay out plans in your application that state what strategies you will pursue should they occur. That step shows that you have planned for different eventualities, making your plan more solid.

You should also anticipate some of the questions reviewers may raise and answer them while you have the opportunity.

Read more in our Strategy for NIH Funding.

Part 2

- Pick a Research Project
- Design a Project
  - Be Innovative, But Be Wary
- Team Science

Part 3

- Investigate Committees and Members
- Highlight Significance and Innovation

Part 5

- How Reviewers Score Applications

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Step One to a Winning Application: Conduct a Self Evaluation

Summary

- Assess your qualifications to work in a field.
- Do you have significant experience and a publication record in the field?
- If moving to a new area, consider a smaller grant type or getting more training, depending on your career stage.

In our October 26 issue, we gave you Ten Steps to a Winning Application, outlining the essential "must haves" for funding success if you’re applying for an R01.

This article expands on the first step: evaluating yourself to figure out what research you are qualified to conduct.

To apply for an independent research grant, you’ll need expertise in either a scientific field, an area of science like AIDS vaccines, or a technology, like x-ray crystallography.

Your qualifications lay the foundation for your grant-seeking efforts: whatever you write in your application is immaterial unless your reviewers deem you able to complete the work you propose.

They will scrutinize your application for your credentials whether you are a new investigator or an experienced one breaking into a new field.

Take Aim

When picking an area to study, most investigators stay in the field where they are already working.

A proven track record builds the confidence of your peer reviewers in your ability to conduct the research.

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Ten Steps to a Winning Application

1. Conduct a Self Evaluation
2. Find Your Niche
3. Draft Specific Aims
4. Identify a Study Section
5. Size Up Your Specific Aims
6. Outline Your Experiments
7. Nail Your Budget
8. Define Resources
9. Build Your Team
10. Write to Excite
To assess your qualifications to work in a field, we suggest following these steps.

- Evaluate your training, publications, and presentations at scientific meetings in the field.
- Be critical: look at yourself through the eyes of your future reviewers.
- Ask colleagues or advisors to make the same assessment of you.

If you are still developing your career, take the time to learn about different fields.

**Got the Creds?**
To get nods from reviewers, you'll need significant experience and a publication record (first or last author) in respected journals or a history of overseeing projects in your field.

Seasoned grantees wishing to enter a new field may want to start with a small grant type such as an exploratory/developmental research grant (R21) or a small grant (R03) before trying for an R01.

Anyone needing more experience or wanting to change fields should also consider getting more training in the new area.

You may want to look into our Career Development Awards (K) (linked below), which are especially helpful for postdocs.

For example, the NIAID Research Scholar Development Award (K22) lets you gain experience with support. For other institutes, look into the NIH Pathway to Independence Award (K99/R00). NIAID makes very few of these awards, but some other institutes fund a good number.

We also support mentored K awards:

- [Mentored Research Scientist Development Award (K01)]
- [Mentored Clinical Scientist Development Award (K08)]
- [Mentored Patient-Oriented Research Career Development Award (K23)]
- [Mentored Quantitative Research Development Award (K25)]

If you are trying for your first independent grant, your reviewers will also ask whether you will be able to lead a major research project in that area. Read more at [Ready for Independent Support?](http://www.niaid.nih.gov/researchfunding/newsletter/2011/pages/1123...)

In our next article, we'll tell you more about how to find a research niche in your field where you can make a difference.

**Related Links**
Find publications

- [NIH Databases and Electronic Resources](http://www.niaid.nih.gov/researchfunding/newsletter/2011/pages/1123...)

Find funded projects, experts in your field, their publications and grants, and study sections that reviewed their applications

- [NIH RePORTER](http://www.niaid.nih.gov/researchfunding/newsletter/2011/pages/1123...)

Find training opportunities

- [Career Development Awards (K)]

**Strategy for NIH Funding**

If you are new investigator, read about reviewer expectations at Ready for Independent Support?

Read more about eligibility at:
- How to Qualify for NIH Funding
- Steps to Determine Eligibility

- Pick a Research Project in Part 2. Pick and Design a Project, see how to Hatch a Plan for Your Career
- Part 3. Write Your Application—learn how to write about your qualifications in the application
- Sample R01 Applications and Summary Statements—find examples of outstanding funded applications
- Small and Exploratory/Developmental Research Grants SOP

Opportunities and Resources

New Resources Web Site in the Works: Comments, Please
If you build it, they will come.

That’s what we’re counting on as we develop a new site that links to all resources NIAID provides to the research community, like collaboration opportunities, animal models, and bioinformatics software and data.

We’re also depending on your feedback to get the project up and running. Staff in our Office of Communications and Government Relations give you some food for thought on the Resources for Researchers Blog.

To chime in on various aspects of the new site, go to the bottom of the blog posts and leave a comment.

AREA Applicants: Get to Know Your New Parent . . . PA
Who says parents never change? At NIH, they do every few years. Of course, we’re referring to parent program announcements (PAs), such as the one for Academic Research Enhancement Awards (R15), which was reissued three weeks ago.

Though you can’t listen to this parent, you should read it for changes from the previous version. For example, it clarifies budget language and multiple PI policy for R15s, has additional details on special submission requirements, and includes revised review criteria.

Reading the new PA is especially important if you missed last month’s receipt date and plan to submit for another deadline using information in the old announcement.

Be sure to check out the November 2, 2011, Guide notice. For more information on AREAs, read our Academic Research Enhancement Awards SOP, and go to NIH Academic Research Enhancement Award (AREA) Grants.

Other News

Watch Webinar on Financial Conflicts of Interest
Are you free next Wednesday afternoon from 2:00 p.m. to 3:30 p.m.? If so, tune into a Webinar and learn more about changes to the financial conflict of interest policy.

NIH staff will give an overview of the revised regulations, cover investigator and institutional responsibilities, and field questions.

For further details on the broadcast, go to What NIH Grantees Need to Know About the 2011 Revised Financial Conflict of Interest Regulation.

If you have a conflict and miss the Webinar, don’t worry. You can catch it a few days later by going to NIH VideoCasting and Podcasting: Most Recent VideoCasts.

Find more information about FCOI here:
Let's Recap "Bridging the Gap"

They came, they saw, they conferenced.

A host of graduates, postdocs, and junior faculty scientists supported by NIAID diversity supplements convened in Bethesda on October 6 and 7, 2011, for the biannual Bridging the Career Gap Conference.

Underrepresented minority investigators used this two-day workshop as an opportunity to network, seek mentoring relationships with established investigators, learn to write and manage grants, and absorb pearls of wisdom from distinguished scholars and senior NIAID staff.

Featured presentations this year included guidance for career development award candidates, tips on NIH grant writing, and analysis of the pros and cons of research collaborations for young scientists. We've incorporated these topics into our advice and tutorials:

- **Career Development Awards (K) portal**, your first source for all things K.
- **Training and Career portal**, with information on fellowships, career awards, training, and the NIH Loan Repayment Program.
- **Team Science** in the **Strategy for NIH Funding**, which gives you pointers for working on a team and how collaboration may affect your career.

You may want to check out NIAID's **List of Foundations and Other Funding Sources** for non-NIAID opportunities for students and others, and read more about **Diversity Programs Supported by NIAID**.

Help Write the Next Scene in the Radiation Exposure Countermeasures Saga

Lots of good movies revolve around a character who has to solve a problem, with dire consequences for failure—think *Indiana Jones: Raiders of the Lost Ark*.

Here's a chance to help us write our version of a thriller. Let's start with the dilemma:

- FDA has approved no medical countermeasures for the post-exposure treatment or mitigation of radiation injury.
- Medical practitioners have no good way to rapidly identify exposed individuals who require treatment.

To have your say in scripting the solution, reply to our request for information on mechanisms, detection, and countermeasures for mixed-field radiation exposure. Your comments will help us target our initiatives.

Read the **November 3, 2011, Guide notice** for directions and more information on the nine research areas for which we'd like community feedback. Comments are due by February 3, 2012.

News Briefs

Here's news from the NIH *Guide*.

**NIH Expands Transparency Act Requirements.** For awards issued after October 1, 2010, NIH now requires many grantee institutions to submit information about subawards and executive compensation for each noncompeting grant. Read the **November 10, 2011, Guide notice** for more information.

**Attend IACUC Conference.** Join the **2011 Winter Conference** "IACUC Responsibility and Compliance: New Guide Changes," on December 5 and 6 in San Antonio, Texas. Learn about advances in research animal welfare and get
Advice Corner

What's "New?"

Summary

- Think of a new application as one that asks a new scientific question and anticipates a new outcome.
- Find a new project that can capitalize on your data, resources, and expertise.
- As part of your search, read your reviewer critiques for possible ideas.
- Alternatively, see if you can repurpose your application.

When you've used up your one chance to resubmit, you may find yourself grappling with the question "what's new?" You have few choices (read more below) beyond submitting a new application. But you want to keep your research intact, so what to do?

While you can save some aspects of the unsuccessful application, just how much is difficult to gauge.

NIH's Center for Scientific Review makes a judgment call on degree of newness based on the science—there's no hard and fast rule we can give.

In the end, CSR either agrees that your application is sufficiently new or sends it back to you unreviewed.

The Answer Is the Question

For grant applications, "new" falls somewhere on the age continuum between brand new and a bit burnished. Despite numerous descriptions and examples posted online, people are often still confused about where that sweet spot lies.

Rather than counting new aims or calculating a percentage of your text, we suggest a more conceptual approach.

Think of a new application as one that asks a new scientific question and anticipates a new outcome.

That concept gives you some guidance on how to proceed. For example, you can still keep some, or even most, of your people, methods, animal models, and preliminary data as long as you tackle a new scientific problem.

What not to do is to make superficial changes and hope CSR staff won't notice. They will, and you'll only waste time.

Mine for Clues

When it comes to your research objectives, make a clean break from that old application. Find other projects that can capitalize on your data, resources, and expertise.

If you're not certain what they may be, explore your research niche to find the opportunities in your field. Read more in Pick a Research Project in Part 2 of the Strategy for NIH Funding, linked below.

Also read your reviewer critiques to see if you could build on the ideas your reviewers liked or other areas they mentioned that you could explore. Getting tips from your summary statement is fine, but be sure not to refer to the previous review in your new application.

If you do use some of the same ideas from your old application, include a cover letter explaining how the new application is different. That way, you make your case proactively rather than rely on someone who is unfamiliar with your work to
figure it out.

When you start planning your new application, compare your old and new aims side-by-side. If you can't tell what is different, it's unlikely CSR staff could either.

**Repurpose!**

We mentioned other choices at the beginning of this article, so here is one you might consider. NIH allows you to apply for support for the same research if you switch from an investigator-initiated application to a request for applications or vice versa.

We use the term "repurpose" because while you do not need to change the research, you do need to check the funding opportunity announcement to make sure you are meeting all its requirements.

Did you initially apply with an investigator-initiated R01? Check our opportunity list for any RFAs in your research area.

If you can, do both: repurpose the old application and write a new one that has a different scientific objective. Having multiple irons in the fire is an essential part of a strategy for staying funded. Read more in the links below from our Strategy for NIH Funding.

- Part 2
  - Plot Your Application Strategy in Pick a Research Project

- Part 6
  - Options if Your Application Isn't Funded
    - Option 2: Create a "New" Application
    - Option 3: Repurpose the Application

- Part 7
  - Strategy for Staying Funded
  - Approaches for Staying Funded