GRANT EDITING BASICS: 
Appealing to Reviewers

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Overview

- Grants / NIH Overview
- NIH Peer Review Process
- Pieces of NIH Research Grants
- Common Mistakes
- Grant Editing Strategies
- Best Practices & Logistics
Need for Grant Editing

• Funding limited and extremely competitive

• Grant reviewers
  • Not always experts in grant area
  • Human

• Investigators
  • Don’t always think about reviewers
  • Aren’t always good writers

Biomedical Funding Agencies

• National Institutes of Health (NIH)
• Agency for Healthcare Research and Quality (AHRO)
• Centers for Disease Control and Prevention (CDC)
• Food and Drug Administration (FDA)
• Department of Defense (DoD)
• National Science Foundation (NSF)
• American Heart Association (AHA)
• Patient-Centered Outcomes Research Institute (PCORI)
NIH Overview

- **Mission:** To... *enhance health, lengthen life, and reduce illness and disability.*

- 27 Institutes/Centers
  - 24 give funding
  - Each has own mission and priorities

- 182 regular standing study sections
  - Determine scientific merit

NIH Institutes & Centers

- **NCI** National Cancer Institute
- **NEI** National Eye Institute
- **NHLBI** National Heart, Lung, & Blood Institute
- **NHGRI** National Human Genome Research Institute
- **NIA** National Institute on Aging
- **NIAAA** National Institute on Alcohol Abuse & Alcoholism
- **NIAID** National Institute of Allergy & Infectious Diseases
- **NIAMS** National Institute of Arthritis, Musculoskeletal, Skin Dis
- **NIBIB** National Institute of Biomedical Imaging & Bioeng
- **NICHHD** National Institute of Child Health & Human Dev
- **NIDCD** National Institute on Deafness & Comm Disorders
- **NIDCR** National Institute of Dental & Craniofacial Res
- **NIDDK** National Institute of Diabetes, Digestive & Kidney Diseases
- **NIDA** National Institute on Drug Abuse
- **NIEHS** National Institute of Environmental Health Sciences
- **NIGMS** National Institute of General Medical Sciences
- **NIMH** National Institute of Mental Health
- **NIMHD** National Institute on Minority Health & Health Disparities
- **NINDS** National Institute of Neurological Disorders & Stroke
- **NINR** National Institute of Nursing Research
- **NLIN** National Library of Medicine
- **CC** NIH Clinical Center
- **CIT** Center for Information Technology
- **CSR** Center for Scientific Review
- **FIC** Fogarty International Center
- **NCATS** National Center for Advancing Translational Sciences
- **NCCIH** National Center for Complementary & Integrative Health
Study Section Assignment

Application

Center for Scientific Review (CSR)

Institute / Center

Study Section

Special Emphasis Panel

Scientific Review Group (SRG)

Often focus on Project Summary + Aims page to make assignment decisions

PHS Assignment Request Form

• Request specific Institute/Center
• Request specific study section (up to 3)
• Identify expertise needed to evaluate application (not people)
• List individuals who should not review application

• Optional

Editors: Ask investigators who reviewers will be
NIH Peer Review Process

Center for Scientific Review
Assigns to NIH Institute/Center and Review Group/Study Section

Study Section
Reviews for Scientific Merit

Institute/Center
Evaluates for Relevance to Research Priorities

Advisory Council or Board
Recommends Action

Institute/Center Director
Makes Final Funding Decisions

Before Study Section
Reviewed by 3 Primary Reviewers

During Study Section
Discussed & Scored by All Reviewers

Review Criteria

- Significance
  - Need, scientific premise, impact

- Innovation
  - New/unique aspects

- Approach
  - Methods and analyses appropriate, robust, feasible

- Investigator(s)
  - Qualified, complementary team members

- Environment
  - Needed space, equipment, support

Full Review Criteria
https://grants.nih.gov/grants/peer/critiques/rpg_D.htm#rpg_os
### Overall Impact Score Descriptor Examples

<table>
<thead>
<tr>
<th>Overall Impact</th>
<th>Score</th>
<th>Descriptor</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>1</td>
<td>Exceptional</td>
<td>• Address problem of high importance, no/some technical weaknesses</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Outstanding</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Excellent</td>
<td></td>
</tr>
<tr>
<td>Medium</td>
<td>4</td>
<td>Very Good</td>
<td>• Address important problem, but weaknesses bring impact to medium</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>Good</td>
<td>• No/some technical weakness, but address only moderately important problem</td>
</tr>
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<td></td>
<td>6</td>
<td>Satisfactory</td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>7</td>
<td>Fair</td>
<td>• Address moderate/important problem, but weaknesses bring impact to low</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>Marginal</td>
<td>• No/some technical weakness, but address problem with low/no importance</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>Poor</td>
<td></td>
</tr>
</tbody>
</table>

### How are Proposals Scored?

- **Overall Impact**
  - Likelihood to exert sustained, powerful influence on field
  - Scored from 1 – 9
  - Not average of the 5 scored review criteria!
  - Also considers other (unscored) issues
Before Study Section

- 3 Primary Reviewers
  - Read fully, provide written reviews, and score
  - Also reading ~10-15 other grants
  - Not always experts in exact area

- Three overall scores are averaged
- Top 50% of proposals go to study section

Implication: Need primary reviewers to like proposal better than others

During Study Section

- 1-2 day meeting
- Includes SRO, chair, 3 primary reviewers, ~20 other reviewers
- Dozens of applications discussed
- Reviewed in order of preliminary scores
  - Begin with best

Implication: Need high preliminary scores from primary reviewers
During Study Section

- Three primary reviewers give enthusiasm level and score
- First reviewer introduces app, brief synopsis, strengths/weaknesses
- Second and third reviewers add
- Other reviewers ask questions, raise concerns
- Primary reviewers announce final overall impact scores
- Chair briefly summarizes
- Rest of panel confidentially scores application

Must be written in way that primary reviewers will advocate for proposal
Must be easy for other reviewers to skim

After Study Section

- SRO writes summary of discussion
- Evaluated by Institute/Center
  - Advisory Council makes recommendations
  - Director makes funding decisions

Implication: Must be relevant to Institute/Center mission
NIH Grant Types

- Research Grants (R01, R21, R03)
  - Career Development Grants (Ks)
  - Individual Training Grants
  - Institutional Career Development/Training Grants
  - Large-Scale Program and Center Grants

NIH Research Grants

- Introduction (if resubmission – 1 page)
- Specific Aims (1 page)
- Research Strategy (6 or 12 pages)
- Other Files
  - Project Summary
  - Biosketches
  - Letters of Support
  - Facilities/Resources
  - Human Subjects & Clinical Trials Information
  - Budget & Justification
Introduction *(for resubmission)*

🌟 Ensure investigators:

- Respond to all major reviewer critiques
- Reiterate positive comments
- Organize page appropriately
- Use proper tone
- Don’t highlight changes with difficult-to-read formatting

Specific Aims Page

🌟 Does it provide clear snapshot of whole proposal?

- Attention-grabbing opening
- Introduce problem/critical gap
- Objective of proposal
- 2-4 specific aims
  - Feasible; related but not interdependent
  - Strong impact statement
Research Strategy: Significance

- Demonstrate need for study
  - What is problem and why important to solve?
- Provide strong scientific premise
  - Is prior research supporting project rigorous?
- Emphasize what impact of study will be

★ Ensure section is compelling & sets up proposed study

Research Strategy: Innovation

- Highlight new or unique aspects of grant

★ Can you easily identify the innovative points?
  - Bulleted list = useful

★ Is Innovation distinct from Significance section?
Research Strategy: Approach

- Methods and analyses appropriate?
- Strategies robust and unbiased?
- Plans to address weaknesses in rigor of prior research?
- Potential problems and alternative strategies considered?
- Is project feasible?
- Address relevant biological variables?

Ensure that:

- Wording of aims matches wording on aims page
- Preliminary data provided
- Methods/experimental plans are feasible, clear, complete
- Power analysis included for sample size
- Potential pitfalls & alternative strategies listed
- Rigor/reproducibility and sex as biological variable addressed
- Summary at end
Other Review Criteria: Investigator(s)

- Person/team qualified?
- Investigators complement one another?
  - Comes mostly from biosketches
  - Could include “Team Overview” in Research Strategy

Other Review Criteria: Environment

- Have needed space, equipment, support?
- Scientific environment contribute to success?
- Benefit from subject populations or collaborations?
  - Comes mostly from Facilities and Resources
Common Problems / Mistakes

Specific Aims
- Too ambitious
- Unfocused

Significance
- Not significant or exciting
- Lack compelling rationale
- Incremental and low impact

Innovation
- Not clearly addressed
- Not innovative

Approach
- Unnecessary experimental detail
- Not enough detail
- Not enough preliminary data
- Not directly testing hypothesis
- No discussion of potential pitfalls

Other
- Too dense
- Sloppy

Grant Editing Strategies

⭐ Ensure:
- All directions followed
- Grant tells compelling story and is persuasive
- All parts written clearly and concisely
- Consistency throughout grant
- Grant is organized and flows logically
- Grant is visually appealing and easy to read/skim
- Proper grammar, spelling, punctuation
Follow Directions

Read funding opportunity announcement (FOA)

Check:
- Font type and size
- Page margins
- Use of headers/footers
- Hyperlinks
- Word or page limits

Not all investigators know the rules or read FOA carefully!

NIH FOA Sections

<table>
<thead>
<tr>
<th>Part 1</th>
<th>Overview Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part 2</td>
<td>Full Text of Announcement</td>
</tr>
<tr>
<td>Section I</td>
<td>Funding Opportunity Description</td>
</tr>
<tr>
<td>Section II</td>
<td>Award Information</td>
</tr>
<tr>
<td>Section III</td>
<td>Eligibility Information</td>
</tr>
<tr>
<td>Section IV</td>
<td>Application and Submission Information</td>
</tr>
<tr>
<td>Section V</td>
<td>Application Review Information</td>
</tr>
<tr>
<td>Section VI</td>
<td>Award Administration Information</td>
</tr>
<tr>
<td>Section VII</td>
<td>Agency Contacts</td>
</tr>
<tr>
<td>Section VIII</td>
<td>Other Information</td>
</tr>
</tbody>
</table>
Compelling & Persuasive

- Must be very clear to reviewers:
  - What the problem is *(need)*
  - Why important to solve problem
  - How grant will solve the problem
  - Why grant is *rigorous* and likely to succeed
  - What ultimate *impact* of grant will be

Clear & Concise

- Condense or break up long sentences
- Define new terms/concepts on first use
- Eliminate jargon
- Limit use of acronyms
- Cut unnecessary details & redundancy
Consistency

Ensure consistent:

• Terminology

• Numbers

• Heading labels & style

• General formatting & style

Organization & Logical Flow

• Use descriptive headings with clear hierarchy

• Ensure logical flow

• Check reasoning

• Use appropriate transitions
Visually Appealing & Easy to Read

- White space!
- Spaces between paragraphs
- Indent paragraphs if no spacing

- Use underline or bold sparingly for emphasis

- Tables/figures must be legible
Tables & Figures

- Font big enough?
- Titles and captions?
- Numbered correctly?
- Described in text?
- In best location?
- Easy to interpret?
- Necessary?

<table>
<thead>
<tr>
<th>Measures</th>
<th>Times</th>
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<tbody>
<tr>
<td><strong>Patient Measures</strong></td>
<td></td>
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<tr>
<td>Primary outcome, medication adherence, measured 2 ways: patient self-report (past 7 days of behaviors), EMR query (prescription refill examination)</td>
<td>T0, T1, T2, T3</td>
</tr>
<tr>
<td>Self-efficacy – 11 questions measure patient self-efficacy in care</td>
<td>T0, T3</td>
</tr>
<tr>
<td>Satisfaction with care</td>
<td>T0, T3</td>
</tr>
<tr>
<td>Clinical/laboratory measures: blood pressure, weight, heart rate</td>
<td>T0, T1, T2, T3</td>
</tr>
<tr>
<td>Demographics: age, sex, race, ethnicity, income, education, marital status, employment status</td>
<td>T0</td>
</tr>
<tr>
<td><strong>Provider Measures</strong></td>
<td></td>
</tr>
<tr>
<td>Provider demographics: discipline, years in practice, sex, race</td>
<td>T0</td>
</tr>
<tr>
<td>Willingness to adopt intervention</td>
<td>T0</td>
</tr>
<tr>
<td>Fidelity to intervention</td>
<td>T3</td>
</tr>
<tr>
<td>Provider self-efficacy – 11 questions measure provider self-efficacy</td>
<td>T0, T3</td>
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Table X. Study Measures

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<th>T3</th>
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<tr>
<td><strong>Patient Measures</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medication adherence (self-report &amp; EMR query)</td>
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<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Self-efficacy in care</td>
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Properly Written

Check and correct:

- Grammar
  - Active voice
  - First person
- Punctuation
- Spelling and typos

Best Practices & Logistics

- Get draft early
- More than one round of editing ideal
- Build trusting relationships with investigators
- Track changes
- Provide rationale in comments – tie to reviewer
Final Considerations

• How to define “success” for grant editing services?
• May be difficult to get feedback from investigators
• Long time before know outcome of submission
• It is their grant and they may not listen

Scientific Editors Network (ScENe)

For people in academic and freelance settings who conduct substantive scientific editing for grants and manuscripts. This means you go beyond improving grammar and clarity to strengthen scientific arguments and highlight the significance of the work.
• Google Group for general discussion, asking questions, and sharing info.

• Email me to become a member: maramsey@umich.edu