

Strategies for Preparing a Grant Application

Kerim Munir, MD, MPH, DSc

kerim.munir@childrens.harvard.edu

Tel + 1617-355-7166; Fax: +1 617-730-0252

Boston Children's Hospital, Harvard Medical School

Objectives

- To describe a topography of grant writing process
- To describe its relevance for research ethics training
- To have time for discussion

Outline

- Main components of a grant proposal
- Strategies for selecting a topic
- Strategies for writing effectively
- Assembling the research team
- Establishing a timeline for grant writing
- Grant review process

Selecting a Topic

- What do I want to study?
 - Personal interests
 - Gaps in the scientific literature
 - Issues/problems identified through interactions with colleagues
 - Societal issues or trends
 - Impact of legislative initiatives
 - Public documents and reports by government agencies (i.e., Healthy People 2010)
 - Funding agency goals and priorities
- How does this project fit into my overall research agenda?

General Advice

- Search thoroughly to find the best match between what you want to do and a funding source
- Find out everything you can about the funding source
- Number of applications in a typical cycle, percent applications funded
- Reviewers' interests and credentials

General Advice

- Contact and talk to staff at the funding agency to clarify details of the announcement
- Understand the mission of the agency
- Talk to previous successful applicants to the funding agency
- Study the announcement thoroughly and frequently, not miss critical aspects

General Advice

- Choose experienced collaborators as co-investigators
- Seek mentoring
- Test ideas on colleagues
- Allow at least twice the time you think it will take to write the proposal.
- Especially time to refine the final version

General Advice

- Multi-disciplinary and inter-institutional groups often have a better chance with many funding agencies
- Especially related to public health and global health projects

Research Team Caveats

- Identify people inside and outside of your institution who have relevant expertise to serve as co-investigators or project staff.
- If the PI is a new investigator, identify senior faculty who have relevant research expertise and a history of external funding to serve as mentors to the PI.
- Ask leaders in the field to serve as consultants.

Assembling the Research Team

- **Principal Investigator (PI)**: Oversees the entire project and takes responsibility for scientific integrity.
- **Co-Investigators/Collaborators**: Contributes a particular area of expertise to the project.
- **Project coordinator**: Manages the day-to-day details of the project.
- **Raters/RAs**: Collects data from participants; implements an experimental protocol in intervention studies.
- **Data base manager**: Establishes and maintains data files.
- **Statistician**: Determines and conducts appropriate statistical analysis.
- **Advisory Board/Expert Consultants**: Provides guidance, recommendations to PI and core research team

Timeline for Writing the Grant

- Estimate how long each task will take.
- Subtract the total time needed from the date the grant is due to estimate when you need to start writing.
- You will experience unexpected delays so plan accordingly!!!

General Advice

- Review the literature to identify the gaps and needs
- Plan to propose good science to address an important need that is appropriate to the announcement
- Address why you are the most qualified to do this
- Be enthusiastic
- Give your 100% effort

General Advice

- Write clearly
- Explain preliminary data
- Don't assume the reviewers know your field
- Proofread and have someone else proofread
- Minor mistakes as well as major ones are are inexcusable

NIH Grant Announcements

- **RFA** = Request for Application (one time)
- **PA** = Program Announcement (recurring)
- **Cooperative Agreement** = NIH staff has a prominent and on-going role in all aspects of the work throughout the life of the grant

General Advice

- Be creative, but honest, about cost-sharing
- All agencies like to see their money multiplied by in-kind and other contributions from applicant institutions

Review Criteria

Impact Score

- Significance
- Approach
- Innovation
- Investigators
- Environment
- Capacity Development

Significance

- What is the importance of the work?
- What is the relevance?
- If you are successful, so what?
- What is the rationale?
- Why this work at this time?
- What is the usefulness?
- How will this work fit into future work?

Problems with Significance and Innovation

- Not significant, not exciting, not new
- Lack of compelling rationale
- Incremental and low impact research
- Lack of biomedical relevance

Problems with Specific Aims

- Too ambitious, too much work proposed
- Unfocused aims, unclear goals
- Limited aims and uncertain future directions

Approach

- Is there a hypothesis?
- Is it too ambitious? Is it feasible?
- Is it focused?
- Is it clear? Can the reader understand it?
- Are there alternative approaches?
- Are the statistical analyses appropriate?

More on the Approach

- Is there need for preliminary data?
- How does the proposed work build on the preliminary data?
- Are the pitfalls and limitations addressed?
- What will you do if the first part fails? Does everything else depend on it?
- What will you do if it all succeeds?
- Are you challenging what is already known?

Problems with Approach

- Too much unnecessary experimental detail
- Not enough preliminary data to establish feasibility
- Feasibility of each aim not shown
- Little or no expertise with approach
- Lack of appropriate controls
- Not directly testing hypothesis
- Correlative or descriptive data
- Experiments not directed towards mechanisms
- No discussion of alternative models or hypotheses
- No discussion of potential pitfalls
- No discussion of interpretation of data

Investigator

- Is the investigator trained and able?
- Investigator background and expertise, as indicated in publications
- Collaborators and “*whose project is it anyway?*”
- Letters of agreement from collaborators and consultants?

Problems with Investigators

- No demonstration of expertise (peer reviewed publications)
- Low productivity, few recent papers
- No collaborators or no letters from collaborators
- Make no assumptions that reviewers will lead between the lines or give the benefit of the doubt

Environment

- Institutional support: show the institution is behind you:
 - Laboratory space (resources)
 - Personnel
 - Start up funds, if relevant
- Basis on which to build the work:
 - Adequate equipment and resources
 - Access to qualified personnel

Problems with Environment

- Little demonstration of institutional support
- Little or no start up package or necessary equipment
- Registration with funding agency
- Availability of an Office of Sponsored Programs
- Research finance oversight
- Human subjects oversight

Human Subject Concerns

- Federal Wide Assurance (FWA)
- Federal Policy (Common Rule) for the protection of Human Subjects at Section 103(a) requires that each institution engaged in Federally-sponsored human subject research to file an "Assurance" of protection for human subjects – that formalizes the institution's commitment to protect human subjects.
- Both for awardee and collaborating performance sites
- Institutional Review Board (IRB) – for both awardee and performance sites

Specific Issues Related to Global Health Funding Agency

- Why is the research being done in the specific foreign country or set of countries?
- What is the benefit to the funding agency or government?

Typical Time Line

- Announcement published
- Deadlines
- Letter of Intent (LOI)
- Application received
- Review decision
- Internal center decision
- Advisory Council meeting
- Award is made

What good is the Review to you if you do not get funded?

- Not the kiss of death!
- Most do not get funded the first time: but many get funded at some time
- Critique of your work is a basis of a revision and resubmission – see it as an opportunity
- Resubmission allowed

Letter of Intent (LOI)

- Some funding agencies request this
- Helps the agency to understand the proposed work
- Helps the agency to identify reviewers
- Program Officer may ask questions and give advice

Primary Components of a Grant Proposal

- Title
- Abstract
- Specific aims and hypotheses
- Background and significance
- Literature review and theoretical framework
- Methods
- Dissemination plan/plan to build upon the work.
- Preliminary studies/research team credentials
- Institutional qualifications
- Budget
- References
- Appendix

Primary Components of a Grant Proposal

- **Title**
- Abstract
- Specific aims and hypotheses
- Background and significance
- Literature review and theoretical framework
- Methods
- Dissemination plan/plan to build upon the work.
- Preliminary studies/research team credentials
- Institutional qualifications
- Budget
- References
- Appendix

Primary Components of a Grant Proposal

- **Title**

- A short descriptive phrase that captures the main idea of a proposal

- Avoid titles that are too brief to orient the reader to your proposal.

- “A program to help adolescents stop smoking.”*

- Avoid titles that are too long and confusing.

- “QUIT: A four week multi-media program to help adolescents to stop smoking that will rely on a partnership of schools, health care providers, community groups and families.”*

Primary Components of a Grant Proposal

- Title
- **Abstract**
- Specific aims and hypotheses
- Background and significance
- Literature review and theoretical framework
- Methods
- Dissemination plan/plan to build upon the work.
- Preliminary studies/research team credentials
- Institutional qualifications
- Budget
- References
- Appendix

Primary Components of a Grant Proposal

- **Abstract**

- A brief summary of the proposal.
- Provides information about the research goals, significance, and the research design and methods.
- Should be clear and concise.
- Goal: Leave the reader with a favorable impression of your proposed research.

Primary Components of Grant Proposal

- Title
- Abstract
- **Introduction**
- Specific aims and hypotheses
- Background and significance
- Literature review and theoretical framework
- Methods
- Dissemination plan/plan to build upon the work.
- Preliminary studies/research team credentials
- Institutional qualifications
- Budget
- References
- Appendix



Primary Components of a Grant Proposal

- **Introduction**

- Provide an overview of what your project is about and why it is important.
- Provide a context for your specific aims and research questions.

Primary Components of a Grant Proposal

- Title
- Abstract
- **Specific aims and hypotheses**
- Background and significance
- Literature review and theoretical framework
- Methods
- Dissemination plan/plan to build upon the work.
- Preliminary studies/research team credentials
- Institutional qualifications
- Budget
- References
- Appendix

Primary Components of a Grant Proposal

- **Specific aims**
 - Concise statements about what your research proposal will accomplish.
 - Goals: clearly define study goals, explain/define key concepts and constructs.

Primary Components of a Grant Proposal

- **Hypotheses**

- Definition: A proposed explanation for natural phenomena that can be tested through empirical research.
- Goal: Hypothesis testing provides answers to the research questions implied by the specific aims.

Primary Components of a Grant Proposal

- Title
- Abstract
- Specific aims and hypotheses
- **Background and significance**
- Literature review and theoretical framework
- Methods
- Dissemination plan/plan to build upon the work.
- Preliminary studies/research team credentials
- Institutional qualifications
- Budget
- References
- Appendix

Primary Components of a Grant Proposal

- **Background and Significance**

- Justify why the proposed research is important.
- Provide a review of the literature that is germane to the project.
- Argue how the proposed project will address an important gap in the scientific literature.
- Describe how the specific aims are supported by a theoretical framework.
- Literature review should be thorough and up to date.

Primary Components of a Grant Proposal

- Title
- Abstract
- Specific aims and hypotheses
- Background and significance
- Literature review and theoretical framework
- **Approach (methods)**
- Dissemination plan/plan to build upon the work.
- Preliminary studies/research team credentials
- Institutional qualifications
- Budget
- References
- Appendix



Primary Components of a Grant Proposal

- **Approach (Methods)**
 - Overview of the study design (i.e., cross-sectional, longitudinal, observational, experimental)
 - Sample description and selection/recruitment plan
 - Description of measures and their validity for the study sample
 - Data collection procedures
 - Strategies for human subjects protection
 - Statistical analysis plan
 - Timeline for conducting the proposed research
 - Assumptions and study limitations

Primary Components of a Grant Proposal

- Title
- Abstract
- Specific aims and hypotheses
- Background and significance
- Literature review and theoretical framework
- Methods
- **Dissemination plan**
- Preliminary studies/research team credentials
- Institutional qualifications
- Budget
- References
- Appendix



Primary Components of a Grant Proposal

- **Dissemination plan/plan to build upon the proposed work.**
 - Explain how the proposed project will have a broad impact.
 - Provide strategies for disseminating study results (i.e., publications, presentations at professional meetings, presentations to relevant community groups, etc.).
 - For pilot projects, describe how the proposed research will lead to a larger and more comprehensive study.

Primary Components of a Grant Proposal

- Title
- Abstract
- Specific aims and hypotheses
- Background and significance
- Literature review and theoretical framework
- Methods
- Dissemination plan
- **Preliminary studies**
- Institutional qualifications
- Budget
- References
- Appendix

Primary Components of a Grant Proposal

- **Preliminary studies/research team credentials**
 - Present pilot data that supports the importance of the proposed project.
 - Describe studies conducted by the principal investigator and other members of the research team that are relevant to the goals of the proposed project.
 - Describe the qualifications of each investigator and explain how their particular skill set is critical to carrying out the proposed research.

Primary Components of a Grant Proposal

- Title
- Abstract
- Specific aims and hypotheses
- Background and significance
- Literature review and theoretical framework
- Methods
- Dissemination plan/plan to build upon the work.
- Preliminary studies/research team credentials
- **Institutional qualifications**
- Budget
- References
- Appendix

Preliminary studies/research team credentials

- **Institutional Qualifications**
 - Describe the resources available to support the principal investigator and the proposed research project.

Primary Components of a Grant Proposal

- Title
- Abstract
- Specific aims and hypotheses
- Background and significance
- Literature review and theoretical framework
- Methods
- Dissemination plan/plan to build upon the work.
- Preliminary studies/research team credentials
- Institutional qualifications
- **Budget / Budget Justification**
- References
- Appendix

Preliminary Studies/Research Team Credentials

- **Budget**

- Itemize the types of expenses that you will incur.

- Personnel
 - Equipment
 - Supplies
 - Travel

- Estimate how much money you will need for personnel, equipment, supplies, etc. to complete project activities.

Preliminary Studies/Research Team Credentials

- **Budget Justification**

- Provide a short explanation for why you need the money you are asking for.

- *Example: Researcher A will provide 25% effort in year one of the project to develop intervention materials and to train study interviewers.*

Primary Components of a Grant Proposal

- Title
- Abstract
- Specific aims and hypotheses
- Background and significance
- Literature review and theoretical framework
- Methods
- Dissemination plan/plan to build upon the work.
- Preliminary studies/research team credentials
- Institutional qualifications
- Budget
- **References**
- Appendix

Preliminary Studies/Research Team Credentials

- **References**

- List the sources of the information presented in the proposal.
- Use a consistent reference style.

Primary Components of a Grant Proposal

- Title
- Abstract
- Specific aims and hypotheses
- Background and significance
- Literature review and theoretical framework
- Methods
- Dissemination plan/plan to build upon the work.
- Preliminary studies/research team credentials
- Institutional qualifications
- Budget
- References
- **Appendix**

Preliminary Studies/Research Team Credentials

- **Appendix**

- Information that supplements the main proposal (i.e., relevant papers published by the research team not in press, questionnaires, letters of support, etc.).
Restrictions apply!
- DO NOT put anything in the appendix that is needed for someone to understand your research aims, the significance of your project, or the study design and methods.

Sources of Funding

- NIH
- Grand Challenges Canada
- Bill and Melinda Gates Foundation
- EU / Frameworks
- Wellcome Trust
- National Science Foundation
- U.S. Civilian Research & Development Foundation (CRDF)
 - www.crdf.org
- Listing of possible grant opportunities
 - <http://www.proposalwriter.com/intprocure.html>

Thank you!



Boston Children's Hospital
Until every child is well™



HARVARD MEDICAL SCHOOL
TEACHING HOSPITAL