NIH Policy and Grant Application Changes
SUMMARY
January 2016

During 2016, NIH is implementing multiple policy changes that will affect grant application structure and content. The changes are being implemented in two phases.

Phase 1: Changes effective for applications submitted on or after January 25, 2016.

Phase 2: Changes effective for applications submitted on or after May 25, 2016.

For grant application due during **Phase 1**, NIH published a new SF424 (R&R) Application Guide on November 25, 2015 (NOT-OD-16-029) and will continue to use expired Forms Version C application forms (NOT-OD-15-146).

Although not pertinent to grant applications, several policies and forms relevant to interim and final progress reports and other post-award documents are changing in the first quarter of 2016 (NOT-OD-16-005).

For grant applications due during **Phase 2**, NIH plans to publish in late March 2016 a new SF424 (R&R) Application Guide and new Forms Version D application forms.

NOT-OD-16-004 provides an overview of many of these changes.

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*for F & T applications; ^ for RPPRs

1. Relevant Notices (as of January 29, 2016)

NOT-OD-15-102	Sex as a Biological Variable
NOT-OD-15-103	Enhancing Reproducibility through Rigor & Transparency
NOT-OD-15-112	Anticipated Changes to Research Training Tables
NOT-OD-15-146	Form Changes Pending; Continue with Current Forms
NOT-OD-16-004	OVERVIEW of changes and implementation
NOT-OD-16-005	Post-Award Forms and Instructions
NOT-OD-16-006	Vertebrate Animals
NOT-OD-16-007	New Research Training Table Formats
NOT-OD-16-008	New Peer Review Requests Form (eff. 05/25/16)
NOT-OD-16-009	Font Guidelines (eff. 05/25/16)
NOT-OD-16-010	Change in Definition of Children (eff. 01/25/16)
NOT-OD-16-011	Implementing Rigor & Transparency (R&T)
NOT-OD-16-012	Implementing R&T in K Award Applications
NOT-OD-16-029	Revised SF424 Application Guides for Applications due 1/25/16 – 5/24/16 Download the Nov. 25, 2015 version at SF424 (R&R) Application Guides
NOT-OD-16-031	R&T in Research Performance Progress Reports
NOT-OD-16-034	Formal Instruction in Rigor & Transparency for F, T, and K awards

2. Web Resources – Discussions, Commentaries, FAQs

Rigor & Reproducibility Overview, Goals, Guidance, Timeline, References and Resources

Rigor & Reproducibility FAQs

Updates on Addressing Rigor in Your NIH Applications blog by Mike Lauer, Deputy Director for Extramural Research

January 2014 Francis Collins guest commentary on reproducibility in Nature
http://www.nature.com/news/policy-nih-plans-to-enhance-reproducibility-1.14586

S.C. Landis, et al., 2012. A call for transparent reporting to optimize the predictive value of preclinical research. Nature 490:7419
http://www.nature.com/nature/journal/v490/n7419/full/nature11556.html

June 2015 Larry Tabak blog
http://nexus.od.nih.gov/all/2015/06/09/enhancing-reproducibility-in-nih-supported-research-through-rigor-and-transparency/

Consideration of Sex as a Biological Variable in NIH-funded Research

Training in Rigor and Reproducibility
http://www.nih.gov/research-training/rigor-reproducibility/training

List of NIH FORMS-D Application Form Changes (for applications due on or after May 25, 2016)

Form Updates 2016 – FAQs

Do I Have the Right Electronic Forms for My Application?

Revised Vertebrate Animals Section (VAS) webpage or PDF version with a description, guidance, and a VAS checklist.

3. Rigor and Transparency in Research

Relevant Notice(s):

NOT-OD-15-102	Sex as a biological variable in research
NOT-OD-15-103	Enhancing Reproducibility through Rigor and Transparency (R&T)
NOT-OD-16-011	Address R&T in most research grant applications starting 1/25/16
NOT-OD-16-012	Address R&T in most individual K award applications starting 1/25/16
NOT-OD-16-031	Address R&T in RPPRs starting 1/25/16
NOT-OD-16-034	Training in R&T for institutional T awards, institutional K awards, and individual F awards – time line of implementation yet to be announced.

Policy:

The **Enhancing of Reproducibility through Rigor and Transparency (R&T)** applies to the full spectrum of research, from basic to clinical, and focuses in four areas deemed important for enhancing rigor and transparency:

1. the scientific premise forming the basis of the proposed research,
2. rigorous experimental design for robust and unbiased results,
3. consideration of relevant biological variables, including sex, and
4. authentication of key biological and/or chemical resources.

See NOT-OD-15-103 for a discussion on each of the four topics.

Implementation:

The R&T policy applies to grant applications, contract proposals, K proposals (except K02, K05, K24), and RPPRs as of January 25, 2016 (Phase 1). It does **not** apply to T and F applications at this time.

This policy applies to T and F series applications submitted on or after May 25, 2016 (Phase 2).

The Nov. 25, 2015 **SF424 (R&R) Application Guide** contains new instructions regarding R&T in NIH-sponsored research. The intent is that the rigor and transparency requirements will "1) clarify long-standing expectations to ensure that NIH is funding the best and most rigorous science, 2) highlight the need for applicants to describe details that may have been previously overlooked, 3) highlight the need for reviewers to consider such details in their reviews through updated review language, and 4) minimize additional burden."

There are three elements to implementation of R&T:

1. Revisions to the SF424 Application Guide instructions (Nov. 25, 2015 version) for preparing your Research Strategy attachment
2. Use of a new "Authentication of Key Biological and/or Chemical Resources" attachment

3. Additional rigor and transparency questions reviewers will be asked to consider when reviewing applications

Application Instruction Updates for R&T

Listed below are new, additional instructions (in purple font). See the indicated page of the SF424 Application Guide for full instructions for the corresponding proposal section.

Research Strategy (starting on p. I-133)

Significance. Describe the scientific premise for the proposed project, including consideration of the strengths and weaknesses of published research or preliminary data crucial to the support of your application.

Approach. Describe the experimental design and methods proposed and how they will achieve robust and unbiased results.

Explain how relevant biological variables, such as sex, are factored into research designs and analyses for studies in vertebrate animals and humans. For example, strong justification from the scientific literature, preliminary data, or other relevant considerations, must be provided for applications proposing to study only one sex.

Refer to NOT-OD-15-102 for further consideration of NIH expectations about sex as a biological variable.

Authentication of Key Biological and/or Chemical Resources (p. I-80)

Grant applications for the activity codes covered by the policy must include a new PDF attachment related to the authentication of key biological and/or chemical resources. In this attachment:

Briefly describe methods to ensure the identity and validity of key biological and/or chemical resources used in the proposed studies.

- Key biological and/or chemical resources may or may not be generated with NIH funds and: 1) may differ from laboratory to laboratory or over time; 2) may have qualities and/or qualifications that could influence the research data; and 3) are integral to the proposed research. These include, but are not limited to, cell lines, specialty chemicals, antibodies, and other biologics.
- Standard laboratory reagents that are not expected to vary do not need to be included in the plan. Examples are buffers and other common biologicals or chemicals.

Reviewers will assess the information provided in this Section. Any reviewer questions associated with key biological and/or chemical resource authentication will need to be addressed prior to award.

For applications submitted for *due dates between January 25, 2016 and May 24, 2016:*

Save this information in a single file named “Authentication of Key Resources Plan,” and attach it as Item 12, Other Attachments, on the Other Project Information form. Information in this section must focus only on authentication and/or validation of key resources to be used in the study; all other methods and preliminary data must be included within the page limits of the research strategy. Applications identified as non-compliant with this limitation will be withdrawn from the review process (see NOT-OD-15-095 and NOT-OD-16-011).

Applications submitted for *due dates on or after May 25, 2016*, will use updated FORMS-D forms. The PHS 398 Research Plan Forms-D version will include a new "Authentication of Key Biological and/or Chemical Resources" *attachment field*. FORMS-D application forms and instructions will be available for all active funding opportunity announcements at least 60 days prior to due dates that fall on or after May 25, 2016.

NOT-OD-15-102 NIH expects that **sex as a biological variable** will be factored into research designs, analyses, and reporting in vertebrate animal and human studies. Strong justification from the scientific literature, preliminary data, or other relevant considerations must be provided for applications proposing to study only one sex. Investigators are strongly encouraged to discuss these issues with NIH program staff prior to submission of applications. Further information regarding NIH expectations for the consideration of sex as a biological variable is provided at:
http://orwh.od.nih.gov/sexinscience/overview/pdf/NOT-OD-15-102_Guidance.pdf

Application Review Information

Reviewers will be asked to consider *additional review questions* in order to assess R&T. From the Nov. 25, 2015 SF424 (R&R) Application Guide:

Research Project Evaluation Criteria

Significance

- Is there a strong scientific premise for the project?

Approach

- Have the investigators presented strategies to ensure a robust and unbiased approach, as appropriate for the work proposed?
- Have the investigators presented adequate plans to address relevant biological variables, such as sex, for studies in vertebrate animals or human subjects?

Additional Review Considerations

Authentication of Key Biological and/or Chemical Resources

- For projects involving key biological and/or chemical resources, reviewers will comment on the brief plans proposed for identifying and ensuring the validity of those resources.

Proposal Writing Recommendations

Rigorous Experimental design (NOT-OD-15-103): Scientific rigor is the strict application of the scientific method to ensure robust and unbiased experimental design, methodology, analysis, interpretation and reporting of results. This includes full transparency in reporting experimental details so that others may reproduce and extend the findings.

NIH expects applicants to describe how they will achieve robust and unbiased results when describing the experimental design and proposed methods. Robust results are obtained using methods designed to avoid bias and can be reproduced under well-controlled and reported experimental conditions.

NIH expects that sex as a biological variable will be factored into research designs, analyses, and reporting in vertebrate animal and human studies. Strong justification from the scientific

literature, preliminary data, or other relevant considerations must be provided for applications proposing to study only one sex.

Significance. The new review question under the Significance review criterion asks, "Is there a strong scientific premise for the project?", and the Application Guide instructs the writer to, "Describe the scientific premise for the proposed project, including consideration of the strengths and weaknesses of *published research or preliminary data* crucial to the support of your application" [emphasis added]. Thus, address the rigor and transparency of the published literature that supports the critical need for and the experimental approach and methods for your proposed research, as well as the rigor and transparency of the preliminary data for each of the aims *in the Significance section*. *In writing your proposal, make it easy for reviewers to identify the information needed to assess the review criteria and questions.*

To guide the reviewers, consider having paragraphs within the **Significance** section with appropriate headers that address[1]:

- Scientific Premise
    - Overall Scientific Premise
    - Scientific Premise for Aim 1, Literature and Preliminary Results
    - Scientific Premise for Aim 2, Literature and Preliminary Results
- Significance of Expected Research Outcome

In the scientific premise sections, *when you identify the strengths and weaknesses of published research or preliminary data, label them as such.*

NOT-OD-15-103 suggests you consider whether the authors took a rigorous and transparent approach, incorporated relevant biological variables, used appropriate statistical power and blinded studies, and used authenticated key resources. For a more detailed discussion, see Landis, et al., 2012 (http://www.nature.com/nature/journal/v490/n7419/full/nature11556.html).

Approach. In the Approach section, you are to "describe the experimental design and methods proposed and how they will achieve robust and unbiased results", and reviewers will assess whether you "presented strategies to ensure a robust and unbiased approach, as appropriate for the work proposed" and "presented adequate plans to address relevant biological variables, such as sex, for studies in vertebrate animals or human subjects". Notice NOT-OD-15-103 provides links to guidelines published by three NIH ICs (NINDS, NIMH, and NIDA) for improved rigor in experimental design and reporting.

Again, to help reviewers recognize the material essential for their assessment, consider including under **Experimental Design**, relevant subsections or highlighted statements:

- **Strategies to ensure a robust and unbiased approach.** Explanation of how experimental approach is rigorous
- **Sex and Other Biological Variables.** Include both sexes when feasible (humans and vertebrate animals) and consider other biological variables (age, weight, underlying conditions). If not including or not feasible, explain.

"Authentication of Key Biological and/or Chemical Resources" attachment. In this new attachment:

[1] Grant Writers' Seminars and Workshops, *The Grant Application Writer's Workbook,* Supplement – 2016 Changes

- focus only on authentication and/or validation of key resources
- confine other methods and preliminary data to the Research Strategy
- do not use this attachment to circumvent page limits

Training in rigor and transparency

Requirements for training in R&T will be extended to **institutional training, institutional career development, and individual fellowship applications**. A new "Plan for the Instruction in Methods for Enhancing Reproducibility" attachment was scheduled to be added to the PHS 398 Research Training Program Plan form in FORMS-D application packages (NOT-OD-16-004). However, recognizing "that the development of substantive and effective instructional plans and curricula to ensure in-depth, transformative education and training in rigorous experimental design across the many different fields and disciplines…would require time and resources on the applicant's part…the timeline for implementing this requirement has been extended. Applicants should anticipate the requirement becoming effective during FY2017. For guidance on expectations and links to resources for training programs, see NOT-OD-16-034.

4. Vertebrate Animals

Relevant Notice(s): NOT-OD-16-006

Implementation: Proposals due on or after January 25, 2016, except on May 25, 2016 for F and institutional training applications. Changes do not apply to AHRQ applications.

Requirements of the Vertebrate Animal Section (VAS) have been simplified by the following changes:

- A description of veterinary care is no longer required.
- Justification for the number of animals has been eliminated.
- A description of the method of euthanasia is required only if the method is not consistent with AVMA guidelines.

Review Criteria: Reviewers will assess:

1. description of procedures involving animals including species, strains, ages, sex and total number to be used;
2. justifications for the use of animals versus alternative models and for the appropriateness of the species proposed;
3. interventions to minimize discomfort, distress, pain and injury; and
4. justification for the euthanasia method if not consistent with the AVMA Guidelines for the Euthanasia of Animals. Reviewers will assess the use of chimpanzees as they would any other application proposing the use of vertebrate animals.

See the Vertebrate Animals Section webpage (PDF version) for a description and a checklist of what applicants proposing the use of vertebrate animals should include in the VAS.

5. Definition of Child

Relevant Notice(s): NOT-OD-16-010

Implementation: NIH Proposals due on or after January 25, 2016. Changes do not apply to AHRQ applications.

Starting with applications submitted for due dates on or after January 25, 2016, for the purposes of inclusion policy, *the age of a child will be defined as individuals under 18 years old* instead of under 21 years old, the current NIH definition of a child. Applicants conducting human subjects research must include a description of plans for including children. If children (or a subset of children) will be excluded from the research, the application or proposal must present an acceptable justification (see NOT98-024).

6. Research Training Program Plan Attachments

Relevant Notice(s): NOT-OD-16-004

Implementation: Proposals due on or after January 25, 2016

Requirements and instructions for several attachments to the PHS 398 Research Training Program Plan form are implemented. Changes effect Recruitment and Retention Plan to Enhance Diversity, Human Subjects research, Vertebrate Animals research, and the Progress Report. See NOT-OD-16-004 for details.

7. Inclusion Reporting

Relevant Notice(s): NOT-OD-16-004

Implementation: Proposals due on or after May 25, 2016

FORMS-D application packages will include an optional PHS Inclusion Enrollment Report form.

The new form will replace the optional Planned Enrollment Report and the Cumulative Inclusion Enrollment Report forms in the FORMS-C application packages.

Look for more details in spring 2016.

8. Data Safety Monitoring Plans

Relevant Notice(s): NOT-OD-16-004

Implementation: Proposals due on or after May 25, 2016

Applications involving **clinical trials** will need to include a Data Safety Monitoring Plan as a new attachment in the FORMS-D application packages.

Although inclusion of a data safety monitoring plan is not new, use of a separate attachment is.

9. Research Training Tables

Relevant Notice(s): NOT-OD-16-007 (see also NOT-OD-15-112)

Implementation: Proposals due on or after May 25, 2016

- Format of the research training data tables is changed
- The number of required tables is reduced from 12 to 8

- Individual-level information is minimized
- Tracking of trainee outcomes is extended from 10 to 15 years
- NIH's xTRACT system to help prepare the new tables and to store the information provided in the tables was available on Oct. 16, 2105
- Use of xTRACT is optional for FY2016 and not yet ready for all training grant mechanisms
- Example data tables are available at http://grants.nih.gov/grants/funding/424/datatables.htm
- Required for RPPRs due Dec. 1, 2015 or later

10. Appendices

Relevant Notice(s): NOT-OD-16-004

Implementation: Proposals due on or after May 25, 2016

The appendix policy is under review. A notice will be issued in spring 2016 describing specific policy changes.

11. Assignment Request Form

Relevant Notice(s): NOT-OD-16-008

Implementation: Proposals due on or after May 25, 2016

To make requests relevant to Institute or Center assignment and initial peer review, applicants must use a new **PHS Assignment Request Form.** The new form will include these fields:

- PHS Awarding Component, both positive ("assign to") and negative ("do not assign to")
- Study Section or Special Emphasis Panel requests, both positive and negative
- List of potential reviewers in conflict, and why
- List of scientific expertise needed to review the application

Making requests is optional, but using the form to do so will be required. Applicants need not use all fields on the form.

Inclusion of a Cover Letter is still allowed to address other issues (e.g., reason for submitting a late application, submitting a Changed/Corrected application after the due date, statement if the proposed studies will generate large-scale human or non-human genomic data)

12. Font Requirements

Relevant Notice(s): NOT-OD-16-009

Implementation: Proposals due on or after May 25, 2016

Additional flexibility in fonts will be allowed in grant applications.

Text in PDF attachments must follow these minimum requirements:

- **Font size:** must be 11 points or larger (smaller text in figures, graphs, diagrams and charts is acceptable as long as it is legible when the page is viewed at 100%)
- **Type density:** must be no more than 15 characters per linear inch (including characters and spaces)
- **Line spacing:** must be no more than six lines per vertical inch
- **Text Color:** must be black (color text in figures, graphs, diagrams, charts, tables, footnotes and headings is acceptable as long as it is legible)

The *following fonts are recommended*, although other fonts (both serif and non-serif) are acceptable if they meet the above requirements:

- Arial
- Garamond
- Georgia
- Helvetica
- Palatino Linotype
- Times New Roman
- Verdana

Recommendation: *Use one of the recommended fonts.*

If you choose to use another font, be sure it adheres to the minimum requirements.

Because some PDF converters reduce font size, be sure the text in the PDF complies with the font requirements.

13. Biographical Sketch Clarification

Relevant Notice(s): NOT-OD-16-004

Implementation: Proposals due on or after May 25, 2016

- A URL for a publication list is optional and, if provided, *must be to a government website* (.gov) like My Bibliography (https://www.ncbi.nlm.nih.gov/account/)
- Publications (peer-reviewed and non-peer-reviewed) and research products may be cited in both the personal statement and the contributions to science sections
- Graphics, figures and tables *are not allowed*

Recommendation: SciENcv (Science Experts Network) Curriculum Vitae (see www.ncbi.nlm.nih.gov/sciencv) allows you to populate your NIH or NSF biographical sketch and data can be imported from eRA Commons. My Bibliography can be used to create your .gov publication list.

Biosketch FAQs	http://grants.nih.gov/grants/policy/faq_biosketches.htm
Creating SciENcv Profiles	https://www.nlm.nih.gov/pubs/techbull/jf15/jf15_biosketch.html
My Bibliography FAQs	http://publicaccess.nih.gov/my-bibliography-faq.htm
My NCBI Help	http://www.ncbi.nlm.nih.gov/books/NBK3842/
My NCBI video overview	https://www.youtube.com/watch?v=ks46w3mNAQE