

EPID 7xxx: Grant Writing and Scientific Communications

1. Background and Learning Objectives

This course is a two-part training course providing students with (a) guidance and hands-on experience with grant writing; and (b) writing and reviewing scientific papers and abstracts as well as core skills in scientific presentation. The first part of the course will provide a comprehensive overview of and experience with the grant writing process. By the end of the first part of the course, students will have rough drafts of an F30/31 grant, which with additional input and editing from primary mentor(s), will be suitable for submission to the NIH for the early December deadline. The second part of the course will expose students to the key elements of scientific writing in epidemiology, with an emphasis on constructing each component of a scientific paper (introduction, methods, results, discussion); adhering to widely-used reporting standards; elements of the peer review process; and selection of appropriate journals for reporting their work.

After completing this course, students will:

- Understand the basic principles of grant writing
- Be familiar with the structure, content, and timeline for preparing an F30/31 grant
- Have received guidance on administrative details of grant submission
- Have prepared template documents for mentors to complete
- Have read, wrote, and critiqued the sections of an F30/31 grant
- Understand the structure of scientific papers, including different types (novel research, reviews, meta-analyses, etc.)
- Be familiar with best practices for writing and preparing each component of a scientific paper, including the introduction, methods, results, and discussion sections, as well as figures and tables
- Have reviewed reporting standards for different study designs (SAMPL, CORE, etc.)
- Have an understanding of and practice with the literature peer review process
- Be able to identify potential predatory publishers and ‘gray literature’ producers

2. General Course Information

Director: Sean Hennessy, PharmD, PhD (hennessy@pennmedicine.upenn.edu)

Lecturers: Michael Harhay, PhD, MPH (mharhay@pennmedicine.upenn.edu)
Ellen Caniglia, ScD (ellen.caniglia@pennmedicine.upenn.edu)
TBD

Location: Blockley Hall **TBD** and/or online via Zoom (lecture information posted on Canvas)

Credits: 1.0 course unit

Prerequisites: This course is intended for students who have completed their first year of training in the epidemiology program. Students must have identified a doctoral dissertation topic and mentor prior to participating in this course. Non-epidemiology students and students still developing dissertation topics may take this course with permission of the instructor(s).

Note: Although international students are encouraged to participate in order to learn and practice general grant writing principles, only US citizens and permanent residents

are eligible for F awards. All interested students are encouraged to attend the lecture portion of the workshop but only students planning to submit an F grant in 2023 or 2024 will be permitted to participate in the hands-on portion of the workshop in which we work on writing and receive feedback on work in progress.

Materials: Except for textbooks, all materials will be posted on [Canvas](#).

Texts

- Hollenbach, Andrew: *A Practical Guide to Writing a Ruth L. Kirschstein NRSA Grant*, 2nd Edition. ([Amazon](#))
- Schimel, Joshua. *Writing Science: How to Write Papers That Get Cited and Proposals That Get Funded*, Illustrated Edition. ([Amazon](#))
- *Recommended:* Russell, Stephen W. and David C. Morrison. *The Grant Application Writer's Workbook: National Institutes of Health Version*. Los Olivos, CA: Grant Writers' Seminars and Workshops, LLC. ([Grantcentral.com](#))
- *Optional:* Yang, Otto O. *Guide to Effective Grant Writing: How to Write a Successful NIH Grant Application*, 2nd Edition. ([Amazon](#))
- *Optional:* Saramäki, Jari. *How to Write a Scientific Paper: An Academic Self-Help Guide for PhD Students*. ([Amazon](#))

Course Lectures and Example Materials

- Lecture slide decks are located in the *Files | Lectures* folder on Canvas
- Example materials and suggested readings are located in the *Files | Example Materials* folder.

Format: The class will meet weekly on Mondays and Wednesdays 1:45-3:15p ET.

- **Lecture (Monday):** Class sessions will generally consist of a lecture of approximately 60-90 minutes in length. A brief discussion/question-and-answer session will generally follow each lecture. Required and recommended readings will be finalized and posted one week prior to each session. Lecture slides will be posted the morning of each session yet will remain available for the duration of the semester.

- **Workshop (Wednesday):** This session will consist of grant preparation and presentation activities for the first part of the course and will include varying student-led activities including in-class presentations for the second part of the course (presentations may include sharing of text write-ups on screen and not necessarily require separate slide presentations). Preparation for workshops will include completion of grant-related tasks as described in the timeline presented in the first course lecture.

Assignments: Several types of assignments will be given for work in and out of class.

Homework: This will include completion of grant components and preparation of reference materials for the grant preparation process. In the second part of the course, this will include sample peer reviews and short presentations that will be presented in class. Some of these be limited to sharing text documents with the class; some will include sharing of slide decks, however due to concurrent revision of F31s written in the first part, these will be largely low-burden assignments.

Hands-on work: This will include within class activities such as reviewing grant materials and providing feedback in one-on-one or group student interactions. Materials will be completed in class for these activities.

- Evaluation:** 1) Homework (20%);
2) Hands-on Work/Discussion Participation (30%); and
3) Completion of grant packet [even if not submitting] (50%).

3. Course Outline (*Monday date of each week listed except weeks 1-2*)

(1) Introduction to the F Grant

8/30, Lecture: Introduction to structure of NIH grants, the grant submission and review process,
9/6 and the F grant; Sections of the F grant: Specific aims

Homework: Draft specific aims

Background Reading/Materials:

NIAID. *Draft Specific Aims*: <https://www.niaid.nih.gov/grants-contracts/draft-specific-aims>

Pre-class videos on Canvas: Introduction ([link](#)), NIH Grant Submission ([link](#)), NIH Grant Review ([link](#))

(2) Sections of the F Grant (I): Significance

9/11 Lecture: Writing the Significance section

Hands-on Work: With writing partners, students will review each other's specific aims and provide feedback

Homework: Draft a 2-page Significance section

Background Reading/Materials:

Pre-class videos on Canvas: Specific Aims ([link](#)), Specific Aims Tips ([link](#))

(3) Sections of the F Grant (II): Approach

9/18 Lecture: Writing the Approach section

Hands-on Work: With writing partners, students will review Significance and provide feedback

Homework: Draft a 3-4 page Approach section

Background Reading/Materials:

Pre-class videos on Canvas: Research Strategy ([link](#)), Writing Tips ([link](#))

(4) Sections of the F Grant (III): Scientific Support Materials

9/25 Lecture: Sections of the F grant: Goals for fellowship, biosketch, letters of reference, sponsor statement, human subjects

Hands-on Work: With writing partners, students will review Approach and provide feedback

Homework: Draft goals for fellowship and biosketches; discuss sponsor statement with mentor and provide template; identify 3-5 people who can write letters of reference

Background Reading/Materials:

Pre-class videos on Canvas: Personnel ([link](#)), Advice on Biostatistics ([link](#))

(5) Sections of the F Grant (IV): Administrative Support Materials/Grant Review

9/27 Lecture: Sections of the F grant: Facilities, institutional environment, RCR, sponsor and institution, respective contributions, project summary, project narrative; Review and wrap-up

Hands-on Work: With writing partners, students will review biosketch and provide feedback

Homework: *To be completed for class on 11/20-* students will share a draft of their scientific sections, teaching sections, and any completed administrative sections with instructor who

will assign the grants to three students each to prepare for mock study sections to be held on 11/27, 12/4, 12/6,.

Background Reading/Materials:

Pre-class videos on Canvas: Remaining F Documents ([link](#)), Structure of NIH Grant Reviews and Study Sections ([link](#))

1. CSR Insider's Guide to NIH Peer Review for Reviewers: <https://public.csr.nih.gov/ForReviewers/MeetingOverview/InsidersGuideReviewers>
2. How to Be a Member of an R01 NIH Study Section: https://www.hhmi.org/sites/default/files/Educational%20Materials/Lab%20Management/study_section.pdf
3. Peer Review at NIH: <https://www.cancer.gov/about-nci/organization/dcb/funding/resources/webinar-csr>

(6) The PICO (Population, Intervention, Comparator, and Outcomes) Model

10/9 Lecture: Introduction to the PICO statement and guidance on construction.

Homework: Draft a PICO statement for one of your current research projects using the appropriate framework from the lecture

Hands-on Work: In-class review of PICO statements in presentation format (15 minutes each per presentation; 8 minutes presenting/7 minutes discussion)

Background Reading/Materials:

1. Speckman RA, Friedly JL. Asking Structured, Answerable Clinical Questions Using the Population, Intervention/Comparator, Outcome (PICO) framework. *PM R* 2019; 11(5): 548-553.
2. Davies KS. Formulating the evidence-based practice question: a review of the frameworks. *Evid Based Libr Inf Pract* 2011; 6: 75-80.

(7) Anatomy of a Good Scientific Abstract

10/16 Lecture: Work through key elements of a structured abstract; integrating PICO statements into your abstract.

Homework: Write an abstract of your current research project in two formats, e.g., structured like in *Annals of Internal Medicine* and semi-structured for *Lancet* or as is common for SER and other conferences.

Hands-on Work: In-class review of abstracts in presentation format (15 minutes each per presentation; 8 minutes presenting/7 minutes discussion)

Background Reading/Materials:

1. Andrade C. How to write a good abstract for a scientific paper or conference presentation. *Indian J Psychiatry* 2011; 53: 172-5.
2. Nagda S. How to Write a Scientific Abstract. *J Indian Prosthodont Soc* 2013; 13: 382–383.

(8) Anatomy of a Good Scientific Paper

10/23 Lecture: Work through key components of a structured paper, as well as different publication types (commentaries, editorials, letters to the editor, etc.); Briefly introduce EQUATOR network; How to avoid submitting to a predatory journal.

Homework: Students will each be assigned a different article and should work through an outline reviewing if the paper has well-structured elements as discussed in lecture

Hands-on Work: In-class review of each article in presentation format, focusing on core elements and how it can guide writing a manuscript (10-15 minutes)

Background Reading/Materials:

1. Vigiante EM, Admon AJ, Carlton EF, Hensley MK, Prescott HC, Iwashyna TJ, et al. Publishing a clinical research manuscript: guidance for early-career researchers with a focus on pulmonary and critical care medicine. *Chest* 2019; 156: 1054–1061.
2. Harhay MO, Donaldson GC. Guidance on Statistical Reporting to Help Improve Your Chances of a Favorable Statistical Review. *Am J Respir Crit Care Med* 2020; 201(9): 1035-1038.
3. Think-Check-Submit- Identify trusted publishers for your research:
<https://thinkchecksubmit.org/>

(9) Reporting Checklists and Guidelines

10/30 Lecture: Provide a detailed look at the EQUATOR network and walk through STROBE guidelines; Show how following STROBE also provides a structure for a manuscript.

Homework: Each student should choose and review a reporting guideline/checklist

Hands-on Work: In-class review of key elements of each checklist in presentation format (15 minutes each per presentation; 8 minutes presenting/7 minutes discussion)

Background Reading/Materials:

1. von Elm E, Altman DG, Egger M, Pocock SJ, Gøtzsche PC, Vandenbroucke JP; STROBE Initiative. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: guidelines for reporting observational studies. *Ann Intern Med* 2007; 147: 573-577.

(10) Mock Study Section for F31s (Part I/II)

11/6 Hands-on Work: Study section review of grants to be discussed.

(11) Mock Study Section for F31s (Part III/IV)

11/13 Hands-on Work: Study section review of grants to be discussed.

(12) Focus on Reporting: Target trials and Propensity Score Methods (Caniglia)

11/20 Lecture: Focus on the reporting and presentation of complex epidemiologic results including DAGs, visual summaries of target trials, target estimands, confirming assumptions (e.g., positivity), etc.

Homework: Students will each be assigned a different article and should work through an outline reviewing if the paper has well-structured elements as discussed in lecture

Hands-on Work: In-class review of key elements of articles comparing against CONSORT or STROBE checklists in presentation format (15 minutes each per presentation; 8 minutes presenting/7 minutes discussion)

Background Reading/Materials:

1. Lederer DJ, Bell SC, Branson RD, Chalmers JD, Marshall R, Maslove DM, et al. Control of Confounding and Reporting of Results in Causal Inference Studies: Guidance for Authors from Editors of Respiratory, Sleep, and Critical Care Journals. *Ann Am Thorac Soc* 2019; 16(1): 22-28.

(13) Statistical Reporting (Harhay)

11/27 Lecture: Review guidelines for statistical reporting in papers; Introduce the SAMPL guidelines.

Homework: Students will each be assigned a different article and should work through an outline reviewing if the paper fulfills SAMPL reporting guidelines as discussed in lecture

Hands-on Work: In-class review of statistical reporting using the SAMPL checklists in presentation format (~10 minutes each per presentation)

Background Reading/Materials:

1. Lang TA, Altman DG. Basic statistical reporting for articles published in biomedical journals: the “Statistical Analyses and Methods in the Published Literature” or the SAMPL Guidelines. *Int J Nurs Stud* 2015; 52(1): 5-9.
2. Smart P, Maisonneuve H, Polderman A. *The EASE Science Editors’ Handbook*, 2nd ed. West Clandon, UK: European Association of Science Editors; 2013. Available from: <https://www.equator-network.org/2013/02/11/sampl-guidelines-for-statistical-reporting/>
3. Assel M, Sjoberg D, Elders A, Wang X, Huo D, Botchway A, et al. Guidelines for reporting of statistics for clinical research in urology. *BJU Int* 2019; 123: 401-410.
4. American College of Physicians. Information for authors – general statistical guidance. *Ann Intern Med* [accessed 2020 Feb 27]. Available from: <https://annals.org/aim/pages/author-information-statistics-only>

(14) Peer Review of Scientific Manuscripts

12/4 Lecture: Discuss how to be a good peer reviewer; review basic structure of grant review and study sections

Homework: Example pre-peer review article will be provided; students will perform short peer review and present critiques in class.

Hands-on Work: In-class peer review of article in presentation format (~10 minutes each per presentation)

Background Reading:

1. Spigt M, Arts ICW. How to review a manuscript. *J Clin Epidemiol* 2010; 63: 1385-90.
2. Cambridge University Press. A Guide to Peer Reviewing Journal Articles. <https://www.cambridge.org/core/services/peer-review/how-to-peer-review-journal-articles>

12/8 NIH F31 Submission Deadline

12/11 Share completed grant materials for review and grading