

BCH Postdoc Assn
Grant Writing
Thurs March 29, 2018
3:30 – 5PM
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Applying for a Grant

Major Types of Funding Resources: Private and Federal

Private:

Foundations
Professional Societies
Institution-based (including possible Industry-Institutional agreements)
Development-based

Federal:

NIH
Individual (F) fellowships and Institutional (T) training grants
Individual (K01, K07, K08, K23, K99...) and Institutional (K12) Career Development Awards
NSF (less so for biomedicine)
DOD – usually requests for applications in specific areas

When to apply and for what type of funding opportunity?

Trainees should always discuss their funding needs/priorities with their mentors, who will have experience guiding trainees to the most appropriate funding sources, including those sources that have previously funded other trainees in the lab/research group and/or in the division/department. Mentors may also have a specific schedule in mind re when their trainees should apply for funding – another reason to keep this dialogue open!

Other sources of funding information (and career-related matters) are the Office of Fellowship Training, the Office of Sponsored Programs, the Office of Research Administration, and the Office of Faculty Development at BCH and their equivalent offices at the DFCI (request to be put on their mailing lists); Harvard Foundation Funds (invitational: by internal nomination only); funding announcements posted on the DGN (make sure you receive this electronic newsletter, daily); the QuickLink to BCH/DFCI Funding Resources at the bottom of the DGN (which highlights those funding sources with which the Division has had the greatest success). More details, below.

Usually beginning trainees starting research are initially funded by a training grant (institutional: NIH T32) or by a mentor's grant.

Once a trainee has begun to gather sufficient preliminary data, and can begin to seek independent funding, it is usually best to explore first private sources of funding, as well as those offered by professional societies, and also by the institution as some of these types of funding opportunities require minimal preliminary data (the research group's record of

accomplishment often can serve as the basis for these proposals). Additionally, private foundation/professional society funding rarely have citizenship requirements whereas only US citizens/GreenCard holders are eligible to apply for most NIH career development awards (exception: K99/R00).

In contrast, successful competition for an individual NIH career development (K) award requires evidence of accomplishment - 'unofficially' at least 1 first author publication in a top tier journal based on research in the current mentor's lab/research group. Prior to 2014, an applicant only got 2 chances to submit a given NIH application (the original, so-called A0 application and 1 revised, so-called A1 application). However, in 2014 (see: grants.nih.gov/grants/guide/notice-files/NOT-OD-14-074.html) the NIH updated its resubmission policy to permit additional re-submissions. The announcement states: "... the NIH ... will accept a new (A0) application following an unsuccessful resubmission (A1) application. The subsequent new application need not demonstrate substantial changes in scientific direction compared to previously reviewed submissions, and must not contain an introduction to respond to the critiques from the previous review." (More specifics are provided in the announcement.)

Although theoretically applications ought to improve with each new submission, and although the new policy gives applicants a chance to try again, in our limited experience we are not so sure this new policy makes a difference. Some of our concerns are that (i.) there is no place in the new 'A0' to address/explain reviewers' critiques, and (ii.) if the same study section reviewers are reading the new 'A0', they may recall the initial submissions and that may have a negative impact. In the one instance where one of our fellows did submit a 3rd time, for whatever reason, the 3rd score was the worst of the three.

Thus we continue to recommend that one apply from a position of strength. K funding remains one of the 'gold standards' in that it carries a lot of weight when transitioning to independence/is transferable upon obtaining an independent position, and obviously viewed as a 'plum' when being considered for an independent position. **However, there are other prestigious funding opportunities from private foundations and professional societies that are also especially sought after** (see below).

Note:

- (i.) If one has already sought/obtained funding from private foundation sources but is perhaps not quite ready to apply for an individual K (or is awaiting more data to re-submit an already reviewed revised K application), an alternative is to seek funding on an Institutional K. These institution-based K12s are excellent sources of funding and can act as a 'bridge' between training grant/private sources of funding and individual K grants. They may not have quite the prestige of an individual K. Perhaps of more concern is that K12 funding is not transferable, and may not be considered as strong evidence (as an individual K) of having obtained independent funding. It also may 'count' toward total no. of years one can be funded by a K (5 yrs). Details of these K12s (including PIs and thematic areas) are listed below.
- (ii.) There are some additional awards from private sources that carry the same prestige (and similar funding levels) as the NIH K awards – for example, the Burroughs Wellcome Fund Career Awards, and locally the Smith Family Awards Prgm in Medical Research (administered by the Medical Fndn/HRIA). But these are at least as competitive as K funding.

- (iii.) An alternative for PhD (as opposed to MD or MD/PhD) fellows is to begin the training period with institution- or mentor-based funding and then very early on apply for an F32 (the 'individual equiv' of being on a training grant). Following the period of F32 funding, and assuming at least top tier journal 1 first author publication, it makes good sense to apply for a K01 at that point.

Preparing any grant or fellowship application is a process that requires active participation of designated administrators - ***applicants never directly submit the application***; the institution does. Each institution has its own protocol for doing so and once it is decided to proceed, it's important for trainees to meet with (a) designated administrator(s) to outline the specific process necessary to submit the application and to set up a reasonable schedule to insure that the application is prepared in a timely manner. For example, when applying through BCH, the applicant will need to provide Word documents of the final files to a designated /research group administrator. That individual then forwards the final files to the Division's representative in the Office for Sponsored Programs. It is the latter who actually submits the application. BCH policy now requires files to reach OSP at least 7 days in advance of the submission deadline and obviously the files need to be submitted to the specified admin several days prior to that. The protocol is somewhat different on the DFCI side of the house/contact the appropriate admin for details!

NOTE: It is CRITICAL to leave SUFFICIENT TIME for ADMINISTRATIVE ISSUES. Grant specialists may uncover administrative deficits in the application that need to be addressed and this can take time. Likewise, there are only so many hours in a day and if a grant specialist is responsible for submitting multiple applications due at the same grant submission deadline, those that are submitted late in the process may not make the deadline.

Heme/Onc has a designated faculty member (Roz Orkin) who works one-on-one with trainees to 'demystify' and provide specific details regarding the grant writing process. Once trainees have begun the research component of their fellowship, set up an appointment to meet with a designated individual in one's Division to discuss strategies/timelines/specifics of funding opportunities. If there is not a specific designated faculty member for this purpose, then trainees should meet with their sponsors/advisors (they should do this anyway!) In addition, Harvard Catalyst, and institutional fellowship and/or career development offices offer specific programming to outline/guide new applicants through the various aspects of applying for grant support. Watch for announcements from these sources and register for the program.

How best to identify those entities which are most likely to fund specific areas of research.

Begin locally: mentors and more senior trainees in the research group/division/department will know which private funding sources have successfully funded research in the area of interest; likewise, which NIH Institutes are most likely supportive of the research in question.

Each institution has Offices of Sponsored Research, Research Administration, Research Training (for example, BCH Office of Fellowship Training), Postdoc Assns ... that announce funding opportunities as they become available. (They also post relevant programming such as seminars on grant writing, job talks, promotions etc.) ***Check out the websites for these offices/get on their list-serves.*** Here are some links:

At BCH: the Office of Fellowship Training (<http://www.childrenshospital.org/research-and-innovation/research-administration/office-of-fellowship-training>), Office of Faculty Development, (<http://www.childrenshospital.org/research-and-innovation/research/office-of-faculty-development>), Office of Sponsored Programs (<http://www.childrenshospital.org/research-and-innovation/research-administration/office-of-sponsored-programs>) and Office of Research Administration (<http://www.childrenshospital.org/research-and-innovation/research/research-administration>). The BCH Children's Trust (aka, the Foundation Relations Team) also announces funding opportunities/to contact, email: FoundationRelations@chtrust.org)

At the DFCI, 'equivalent/parallel offices': (<http://www.dana-farber.org/Education-and-Training/The-Office-for-Faculty-Development.aspx> and <http://www.dana-farber.org/Research/For-Postdocs.aspx> and <http://www.dana-farber.org/Research/Research-Administration.aspx>)

The Daily Group News (DGN) e-newsletter of the Div. of Heme/Onc is an additional source of funding announcements. This daily electronic newsletter is emailed to all members of Heme/Onc, tho most of the listings also appear in postings from the fellows' offices, sponsored programs, etc. Though nonmembers of the Division would not have emailed access to the daily postings, there is a link to funding resources toward the bottom of each DGN, under **Quick Links**, entitled: **BCH/DFCI Funding Resources**. This link – which is on the BCH intranet - (<http://web2.tch.harvard.edu/oncology/mainpageS2806P186.html>) opens to a funding resources page with links to the relevant BCH/DFCI offices, as well as external funding databases, a list of foundations that have funded our trainees in the past, a link to a list of funders whose area of interest is of relevance to the Division, and other useful contact information.

Harvard Catalyst also posts some funding opportunities as well as programming relevant for trainees and junior faculty. See: <https://grants.catalyst.harvard.edu/> (Note: Tho Harvard Catalyst Grand Central - funding opportunities database - no longer exists, there are many other useful links at this website.)

Harvard Foundation Funds offerings (<http://hms.harvard.edu/foundationfunds>) are another source of potential funding, but these are invitational through Harvard (and sometimes invitational by Institution): that is, individuals must be selected by a nomination process, through the nominating institution, to apply. (See details below under Open vs Invitational funding).

The BCH Office of Faculty Development with the joint sponsorship of the Basic/Translational Executive Committee (BTREC), and the Clinical and Translational Research Executive Committee (CTREC), sponsors an annual competition to fund Faculty Career Development Fellowships. The DFCI equivalent office (**DFCI Office for Faculty Development**) also sponsors a parallel program – the Gloria Spivak Faculty Advancement fund. As per the website, the purpose of this program is “to provide transitional funding for Instructors and Assistant Professors to enhance research productivity during the early critical years of an academic research career. The awards will support resources for research including supplies, salary (PI and/or research assistant), or other requests, upon review, that will contribute to the individual's academic career development.” Details are at: <http://www.childrenshospital.org/research-and-innovation/research/office-of-faculty-development/fellowships-and-opportunities> and through the DFCI at <http://www.dana-farber.org/Education-and-Training/The-Office-for-Faculty-Development.aspx>

NOTE: These awards are patterned after the Eleanor and Miles Shore Fellowships at HMS, some of which are also open to junior faculty at the hospitals. See: <https://fa.hms.harvard.edu/shor>

Online databases also provide updated funding information, but these can be somewhat difficult to navigate to focus on specific research areas.

SPIN (<https://spin.infoedglobal.com/Home/SOLRSearch>)

Harvard University's PIVOT COS (https://pivot.cos.com/funding_main)

Duke University Funding Database (<https://researchfunding.duke.edu/>)

Grants.Gov (<http://www.grants.gov/>)

The Foundation Center is a very large philanthropy database (<https://fconline.foundationcenter.org>)

It is also worth getting to know the Development Office representative for your research group. S/he can assist with identifying not only relevant foundation funding opportunities as well as other philanthropic sources. However, this somewhat sensitive relationship is best pursued through ones mentor.

Open vs. Invitational Funding

Application processes can be *open* (applicants are free to apply, pending mentor's approval) or *invitational* (institutions are invited to nominate applicants – these require internal selection processes; the institution does not determine the nominating entity/this is determined by the funder.)

A major invitational opportunity is through the Harvard Foundation Funds process (formerly the RedBook: <http://hms.harvard.edu/foundationfunds>). Note that some of these offerings are also offered through the hospitals, so it is important to determine the 'appropriate' institutional nominating entity. (As mentioned, the nominating institution is *determined by the funding agency*, not the institution. Requirements differ from agency to agency. For example, some may permit a potential applicant to be nominated by HMS and/or the primary hospital where the applicant is based. Other agencies may only allow an individual to be considered for nomination through the hospital.)

Additionally, the hospitals may offer invitational opportunities, from sources other than those 'sponsored' by the Harvard Foundation Funds. These opportunities may involve the respective hospital's 'development offices'. Check the announcements from the BCH Office of Sponsored Programs and the DFCI equivalent offices (often appear as 'Limited Applications' announcements).

Unexpected Facts about Funding: Direct vs Indirect Costs; Employee vs Stipendee

Direct vs Indirect

Direct costs are those paid by the funder directly to the applicant (more correctly to the applicant's institution and the latter then distributes funds to the applicant). These funds are used for salary, supplies, equipment, travel funds and the like. These funds do NOT cover institutional costs, aka, *indirect* costs. The latter include maintaining the physical plant: lights, heat, water, plumbing, trash collection, administrative costs, etc.

Primarily it is the R01 (and similar types of federal grants) that pay a majority of the indirect costs. The institution negotiates the level of indirect costs on a regular basis with the NIH. Indirect costs can range as high as 70 – 80% (or more!). That means, for example that for each \$100,000 in direct costs from an NIH R01, the NIH pays the institution another \$80,000. In contrast, private funding sources and some federal sources of funding (including individual career development (K) awards) pay no or relatively low indirect costs (for example, 8 – 10%). Thus although it is important for trainees to seek and successfully obtain funding (to independently support their projects and to begin to develop an ‘academic trajectory’ consistent with ultimate transition to independence), it comes at a cost to the institution and the mentor’s lab.

Employee vs Stipendee

Trainees who are funded on a mentor’s grant (for example, an R01) are by definition considered employees. Trainees who are funded on training grants or similar sources are by definition considered stipendees. Employees receive fringe benefits; stipendees do not. These designations are based in tax law (not on institution-based decision making) and may have tax consequences. Offices of Fellowship Training may have additional information (re benefits and tax consequences) or may be able to direct trainees to those offices that will.

When to begin writing (far in advance/at least 1 application cycle!)

Although funding opportunities (especially from private sources) sometimes appear with little notice (especially new offerings), this is generally not the case for most NIH awards which for most funding mechanisms, have 3 submission deadlines/year (see chart below). If possible, applicants should try to start the grant writing process at least 1 cycle in advance in order to avoid ‘photo finishes’ and to have sufficient time to prepare an application that can be critiqued by mentors/peers, edited, and polished. In addition to the preparation of the science component, there are numerous administrative details (for example, understanding the format of the award application; securing letters from ‘grant-associated personnel’, getting files to appropriate offices that actually submit the application, in timely fashion, etc) and applicants must set aside time to complete these requirements. If it is a mentored grant/fellowship application, there is also likely a candidate and career development section that needs to be written.

Although ‘private funders’ often provide specific application guidelines, instructions can sometimes lack details (other than page limits). In that case, our recommendation is to follow the format of the NIH Career Development Award (K) application as closely as possible as the current format is very focused and highlights the most important aspects of the proposed research.

NIH Mentored Research Career Development (so-called K) Awards

<https://researchtraining.nih.gov/programs/career-development>

K awards are one of the ‘gold standards’ for trainee funding.

With the exception of the K99/R00 award, *only US citizens/permanent residents (ie Green Card holders) are eligible for K funding.* Likewise, only US citizens/permanent residents are eligible for institutional training grant (T award) and postdoctoral fellowship (F award) funding from the

NIH. Additionally, some K awards also have time - sensitive eligibility (for example, for the K99: no more than 4 yrs of postdoctoral research training).

NOTE: **Not** all NIH Institutes support all types of K awards and individual Institutes periodically change their 'K portfolios' so it is important to keep current/determine these details in advance! For ex, in May 2017, the NCI announced it will no longer support the K23 (see: <https://www.cancer.gov/grants-training/training/funding/K23>). However, this does NOT mean the NCI will no longer support clinical/translational research. To the contrary, the NCI is trying to streamline the review process and as per the NCI K program officer, will consider both basic and clinical/translational applications/just that basic and clinical/translational applications will all be considered under the K08 program. The program officer indicated the NCI will continue to have appropriate reviewers for the different categories of research.

Major reasons to obtain K funding (in addition to obtaining \$\$\$):

- (i.) to preserve protected time;
- (ii.) to establish a record of independent funding (and in the case of individual K awards, prestigious independent funding);
- (iii.) as an educational opportunity to learn how to write an NIH grant (a mainstay of future research support if one is planning a career in academic medicine);
- (iv.) to help facilitate the 'transition to independence'. Despite their being considered mentored periods of training, K awards are transferrable (including 5 yr mentored K awards such as the K01, K08, and K23) and serve as an important 'milestone' when seeking an independent position. Usually, with these awards, the awardee is expected to spend ~ 2/2+ yrs doing the proposed research in the indicated mentor's lab/research group and then to seek an independent position/transfer the award as part of a total funding package to one's first independent position. This is true for the K01/K08/K23, not just for the K99. Indeed, whereas the K99 has an absolute requirement to transition to independence w/in 18-24 mos. (or not be eligible for R00 funding), these other Ks have no such constraints/allow more flexibility in securing an independent position.

A list of all K awards (there are currently 15!!! different categories) and a description of each can be found at <https://researchtraining.nih.gov/programs/career-development> (or Google NIH Research Career Development Awards). We routinely focus on 4-6 individual K programs and 1-2 institutional K programs. (NOTE: Those Ks we do not focus on are generally geared toward other 'cohorts' of investigators)

After you have identified a potential award mechanism and have read the program announcement (PA), it is a good idea to call the contact (the Program Officer) at the most likely funding Institute or Center to discuss your selection.

The most 'common' K awards that 'we' deal with are listed below.

Summary Individual K Awards:

NOTE: Check individual K funding announcements to confirm which Institutes support the specific K funding mechanism of interest. If you don't see the Institute listed you may still want to contact the Program Officer (for example, from another K offering) to clarify/confirm which funding mechanisms the specific Institute supports.

- **Basic science K08 'parent' announcement (and K01 for PhD only holders)**
 - **K08 Mentored Clinical Scientist Research Career Development Award** (This award is for those holding MD, MD/PhD and similar degrees. Note: the **K01 is the equivalent for PhD** applicants.)
 - K08 'parent announcement': <http://grants.nih.gov/grants/guide/pa-files/PA-14-046.html>
 - K01 'parent announcement': <http://grants.nih.gov/grants/guide/pa-files/PA-14-044.html>
 - To support the career development and research training of individuals with a health professional doctoral degree (e.g., M.D.'s, D.O.'s, D.V.M.'s, Pharm.D.'s, Ph.D.'s in nursing...) committed to a career in laboratory or field-based research. This award may also be used to support a laboratory focused career development and research training experience in translational research.
 - Evaluation based on project (merit, relevance, appropriateness), mentor (appropriateness, quality, history), location, resources
 - Up to 5 years, nonrenewable
 - Must be a US citizen or permanent resident

- **Clinical Science K23 Mentored Patient-Oriented Research Career Development Award**
 - K23 'parent announcement': <http://grants.nih.gov/grants/guide/pa-files/PA-14-049.html>
 - To support the training of clinically trained professionals who have made a commitment to focus on patient-oriented research. For the purpose of this award, patient-oriented is research conducted with human subjects (or on material of human origin such as tissues, specimens, and cognitive phenomena) for which an investigator interacts directly with human subjects. This award may also be used to support a patient-oriented research focused career development and research training experience in translational research.
 - M.D., D.O., D.D.S., D.M.D., O.D., D.C., Pharm.D., N.D. (Doctor of Naturopathy), as well as a doctoral degree in nursing research or practice. Candidates with Ph.D. degrees are eligible for this award if the degree is in a clinical field and they usually perform clinical duties.
 - Must be a US citizen or permanent resident
 - K23 'parent announcement': <http://grants.nih.gov/grants/guide/pa-files/PA-14-049.html>

[NOTE: As mentioned above, the NCI has phased out K23 awards, albeit not the program in that it will continue to support clinical/translational research but under the aegis of the K08. At this writing only the NCI has taken this step.](#)

- **K99/R00 NIH Pathway to Independence (PI) Award (Basic Science)**
 - K99/R00 'parent announcement': <http://grants.nih.gov/grants/guide/pa-files/PA-14-042.html>
 - The only K award for which non-US citizens may apply
 - Initial mentored phase of 1-2 yrs
 - Up to 3 additional years of independent support, contingent upon securing an independent research position.
 - MD, PhD, MD/PhD
 - Geared toward more senior Fellows/Instructors closer to transitioning to independence (must obtain an independent faculty level position within 2 yrs of initial award)
 - Must be applied for w/in 4 years of postdoctoral research experience at the time of the initial or the subsequent resubmission application, and must be in non-tenure-track or equivalent positions (i.e., eligible candidates include residents,

clinical fellows, instructors, and clinical assistant professors). Time spent in **clinical training** during residency or clinical specialty is not counted towards K99/R00 eligibility.

NOTE: We generally do not recommend this funding option to US citizens because of its severe restrictions: must be w/in 4 yrs of advanced degree and must arrange an independent faculty position w/in 18-24 mos. of the start of the grant. That said, this grant pays more in its R00 phase and thus is especially attractive to potential employers.

- **K22 NIH Career Transition Award**

- There does not appear to be a 'parent' announcement for the K22. Instead, each supporting Institute has its own announcement. For a brief description and links to the individual websites, see: <https://researchtraining.nih.gov/programs/career-development> and scroll down to the K22
- Like the K99/R00, the goal of the K22 program is to facilitate the transition of investigators to independent, productive research careers.).
- MD, PhD, MD/PhD
- Unlike the K99/R00, this award does not have a 4 yr from Advanced Degree requirement for eligibility; it is geared toward more senior postdocs
- Unlike the K99/R00 it does require US citizenship or Green Card Unlike the K99/R00 the mentored phase of this award is generally for intramural research (ie, w/in an NIH lab). There is (at least) one exception and that is the K22 sponsored by the NCI which does NOT have a mentored phase/it's essentially like the R00 component of the K99. For the latter, one applies during fellowship and if selected, the funds do not begin until the applicant is in a first faculty position.

- **Curriculum Development**

- **K07:** Academic Career Award supports 2 types of activities:
 - K07 Development Award** for more junior investigators to develop academic and research expertise in a particular health-related field, as a way to increase the overall pool of individuals capable of research or teaching in the identified area.
 - K07 Leadership Award** for more senior investigators to improve the curricula and enhance the health-related research capacity within an academic institution.
- K07 'parent announcement': <http://grants.nih.gov/grants/guide/pa-files/PA-11-192.html>
- Candidates for this award must have a clinical, research, or health-professional doctoral degree. Such degrees include but are not limited to the Ph.D., M.D., D.O O.D., D.C., D.S.W., D.P.H., Pharm.D., N.D. (Doctor of Naturopathy), as well as a doctoral degree in nursing research or practice.
- Must be a US citizen or permanent resident

NOTE: Always check the program announcement to confirm that the Institute for which your research is most suited supports the funding opportunity. Not all Institutes support all K offerings. However, if an institute is not listed in the so-called 'parent' (or general) announcement, that does not necessarily mean it does not support the K in question. If the institute is not listed in the so-called 'parent' (or general) announcement, Google the institute and K-type. Sometimes a specific NIH Institute that does not support the 'parent announcement' may sponsor a 'focused K' – for example, The NCI supports a K01 to promote diversity. The NIDDK (Diabetes/Digestive and Kidney Diseases) is not listed as one of the institutes supporting the 'parent K01', but it has its own K01 that funds research specific to the mission of said Institute and this includes research in the area of non-malignant hematology.

Institutional K Awards:

K12 Programs: Institutional Research and Academic Career Development Award Programs. These are *institution-based grants* for which only a senior PI would submit an application to the NIH. Funding on these grants is ear-marked for individual K-level training in the area for which the K12 was awarded. Once the program is awarded, then a Fellow may apply, internally. This is NOT a grant for which a fellow would apply directly to the NIH.

- The specific internal K12 program will announce the internal application requirements and internal competition deadlines (usually 1 or 2X per year).
- The Division of Hematology/Oncology (BCH) has overseen a K12 grant (actually it is Harvard-wide) with Ellis Neufeld as PI, on the topic of non-malignant heme. See: www.bloodscholars.org. However, this program may be ending and no additional fellows will be supported.
- The Department of Medicine (BCH) also has a K12 on which Gary Fleisher is the PI and Jordan Kreidberg is co-PI. To my knowledge, this K12 just received a favorable review at the NIH and will continue to offer funding through an internal selection process.
- Tracy Bachelor (MGH) is the PI on a K12 for the study of nervous system tumors.
- Bruce Chabner (MGH) is the PI on a K12 in oncology. For whatever reason, pediatric research applicants have not been successful obtaining funding through this mechanism.
- Jonathan Finkelstein (BCH) is the PI on a K12 for child and family centered outcomes research.

Harvard Catalyst has a K12-like program, the KL2 Catalyst Medical Research Investigator Training Program (see: <https://catalyst.harvard.edu/services/kl2/>). The faculty member who oversees this program is Anthony Hollenberg.

When to apply?

- When you have an appropriate research plan and preliminary data. More and more, having a first authored high profile publication will generally improve an applicant's chance of funding
- Applicants who are not funded initially usually only re-apply (with a revised application) one time. The one-time (to re-apply) restriction has been officially lifted. But we've not found it helpful to try to re-apply more than once. Therefore, important to maximize one's chances of funding/get an initial score that is close to the funding cut off so that one can more easily 'cross this threshold' upon submission of a revised application.
- After at least 1-2 years in research – but timing is dependent on 'experimental success'/need for publication. There are also 'economic' considerations, but best to seek non-NIH based funding first in order to obtain the necessary 'level of accomplishment' prior to applying for a K.
- Discuss timing of application with your mentor – are others in your lab/research group also submitting?
- Despite the need to show evidence of accomplishment (and thereby evidence of feasibility of the proposed research), waiting too long to apply can be as bad as not having sufficient evidence to apply... There is a definite 'balancing act' in play here. Though it can sometimes take years to acquire the necessary data for a first authored publication, keep in mind that if one waits too long to apply, applicants can be criticized by reviewers for requesting additional mentored training support when they already have had 3 or 4 years of mentored training. It is therefore critical to explain the new training that will be acquired (during the period of the K award) and why this is critical to be able to transition to independence.
- Once it is determined that you should be thinking about applying for a K, with your mentor's input, formulate at least a preliminary set of specific aims. Decide which Institute(s) will most likely fund the type of research you propose to do. Then contact NIH Program Officer (PO) to introduce yourself and to ask for advice. Is your topic w/in the 'mission' of the specific institute in question?

Are there specific aspects of the project of greater interest to the Institute in question? Do you have sufficient preliminary data to proceed?

- Due dates for K award submissions: Cycle 1 due Feb 12, Cycle 2 due June 12, Cycle 3 due Oct 12.

Note: resubmission deadlines are usually 1 mo. after first submission deadlines

<https://grants.nih.gov/grants/how-to-apply-application-guide/due-dates-and-submission-policies/standard-due-dates.htm>

Getting ready to start writing

- Prepare an NIH biosketch (there is a new format, see: <https://grants.nih.gov/grants/forms/biosketch.htm> - the latter in the Biosketches section) and obtain an eRA Commons no. (speak to your mentor's administrator to get one). The eRA Commons no. is the means by which the NIH communicates with you.
- Compile your figures (your data and other people's data; if the latter, cite appropriately)
- Make an outline and discuss with your mentor, and other advisors
- If your division has a designated individual who can help in the grant writing process, set up an appointment to discuss the application and set up a time-line to work through the process.
- Give yourself enough time to prepare. Starting at least an entire grant cycle in advance (4 mos.) is not too early. Completing the application early will give you time to refine/polish the original draft. Whereas the mentoring/research plans for a mentored (K) application only comprise 12 pages (plus a pg for Spec Aims), the entire finished product can be close to 100 pages so there is much to be done both administratively, and in terms of involving various individuals who will write letters on your behalf and also agree to serve as advisors, collaborators, consultants... This all takes considerable time to arrange. **START EARLY!**
- Ask other trainees who already have successfully obtained K funding if you can have a copy of their application to use as a guide. Also ask to read their review sheets, if they are willing to share them
- Refer to NIH SF 424: <https://grants.nih.gov/grants/how-to-apply-application-guide/forms-e/career-forms-e.pdf> for the **Career Development Award guidelines: Career Development Instructions for NIH and Other PHS Agencies.** The version released September 25, 2017 and Revised December 29, 2017 has guidelines for applications being submitted on and after January 24, 2018.

For links to grant applications for all types of NIH funding, see:

<http://grants2.nih.gov/grants/funding/424/> NOTE: Because guidelines/information are continuously being updated, web links also may change. Be sure to check with your grant administrators/advisors to make sure you are using the most updated versions

- **Determine the 'institutional application protocol'** (ie w/in BCH or the DFCI) – which admins to contact/when applications are due in the 'grants office' that will submit the application. If an 'invitational offering', determine the internal selection process by which interested potential applicants are selected as the institution's nominee(s). Make sure to give yourself sufficient time to submit the application. Grant offices have multiple applications to submit for any given submission deadline and there are only so many hours in the day.
- **In general, the applicant** will need to prepare the different components of the application as individual Word files, then work with a designated grant administrator who will submit these various parts of the application. On the BCH side of the house, the Division's contact person in the Office for Sponsored Programs (OSP) is the individual who ultimately uploads the grant application. On the DFCI side, work with your appointed admin to do this. **Applicants are NEVER to submit the application directly to the NIH.** Likewise **for private fndns, applicants must notify the appropriate offices, to determine the proper 'submission protocol' and notify all appropriate personnel of intent to submit.**

Specifics of the K application

- General outline:
 - Cover letter – can request consideration by a specific institute(s)
 - SF424 R&R Face Pages
 - Research and Related Project Information (Abstract, Public Hlth Relevance Statement, Facilities/Other resources, Equipment...)
 - Research and Related Senior/Key Personnel (Biosketches incl personal statements related to the proposal for ea, Res Support – current/pending for Sr/Key personnel: Applicant, Mentor(s), Advis Comm, possibly collaborators/consultants)
 - Confidential letter writers
 - Budget information
 - Letters from mentors/co-mentors; from collaborators/contributors /consultants, including those from Scientific Advis Comm Members
 - The 'meat' of the application: 12 pages: candidate section (3-4 pgs) + research strategy (8-9 pgs); plus 1 additional page for Specific Aims and 1 additional page for Responsible Conduct of Research.

NOTE: Although the mentoring plan/research plan total 14 pages, the entire application package can approach 100 pages. It is therefore critical to set aside sufficient time to be able to prepare/collect these additional components of the application

Candidate Section (Aim for 3.5- 4 pages for the 'Individual part' of the Candidate Section)

Individual part of the Candidate Section

Candidate's background

Career goals/objectives

Career development/Training Activities proposed for the award period (ie, Mentoring Plan). Routinely, a timeline chart for these activities is included at the end of this section.

Institutional part of the Candidate Section (ea has its own page limits which are not part of the 12 pages for the 'meat' of the application – see <http://grants.nih.gov/grants/how-to-apply-application-guide/format-and-write/table-of-page-limits.htm>)

Letters/statements from Mentors, Advisors, Collaborators...

Description of Institutional Environment

Letter of Institutional Commitment to candidate's res career dev

Training in the Responsible Conduct of Research

Research Section (8–8.5 pages, including prelim data)

- Specific Aims (not counted in the 12 pg limit)
- Significance
- Innovation
- Research Strategy - includes prelim data/figs, proposed res (as per Spec Aims), discussion of anticipated results/potential pitfalls/alternative approaches

NOTE: Significance and Innovation sections should immediately speak to two key issues:

- i.) Will the proposed research be a game-changer to the field/shift the paradigm/result in a clinically relevant product, for example? and
- ii.) Is the applicant/the applicant's environment (in the case of K awards) the best to make the proposal happen?

A Recent (2016) New Requirement for all NIH Applications: Rigor and Transparency.

'Rigor and Transparency' has become an especially hot issue in the NIH lexicon with the NIH releasing new guidelines for fellowship and grant applications - including Career Development Awards. For example, as discussed at <http://grants.nih.gov/reproducibility/index.htm> :

"Individual fellowship applications will be required to summarize in the research strategy section plans to ensure rigorous, well-controlled experiments that consider all relevant biological variables, use authenticated biological and chemical resources, and apply appropriate statistical tests for data analyses. In addition more detailed description of instruction in rigorous experimental design to ensure reproducibility will be required in the section on Institutional Environment and Commitment to Training."

This area will be addressed in more detail when each application is being developed.

- **Table of page limits** for the various components of the application, including the letters (see: <http://grants.nih.gov/grants/how-to-apply-application-guide/format-and-write/table-of-page-limits.htm>)
- **Categories of Letters:** Ask people to write letters for you – they will likely want to see your specific aims and biosketch. Depending on your relationship with these individuals, you may be asked to draft letters which they will embellish/complete. With the exception of the confidential letters which are submitted directly to the NIH by the letter writers, all other letters are included as part of the application.
 - your mentor/co-mentor (6 pg total)
 - letters of support from collaborators/consultants/contributors (6 pg total)
 - letters from your Scientific Advisory Committee (part of the mentoring component of the grant) – these appear to be part of the 6 pgs limited to collaborators/consultants/contributors.
 - letter of institutional support (1 page)
 - 3 – 5 **confidential** letters of reference – “These letters should be from individuals not directly involved in the application, but who are familiar with your qualifications, training, and interests. **The sponsor/mentor of this application cannot be counted as a reference.**”

More on the NIH Grant Process

- Assignment
 - Institutes (NCI, NHLBI, NIDDK...)
 - Be strategic! Research potential Institutes in terms of their track record for funding submissions similar to yours.
 - A valuable resource is **Research Portfolio Online Reporting Tools (RePORT)**
 - RePORTER database
 - Matchmaker identifies funded grants similar to your proposed project
 - Use NIH Data Book and Funding Facts section to compare success rates for different funding mechanisms by IC, type of CDA, etc
 - There is now also a Federal RePORTER for additional research funders, including NSF, NASA, EPA, DOD, AHRQ, FDA, CDC, VA, among others
 - Program officer (PO) – names for each participating Institute are listed in the grant announcement. This is the individual whom applicants should contact prior to preparing/submitting their application.
 - Scientific review administrator (SRA – formerly called the Executive Secretary of the Study Section). The SRA is the NIH's administrative representative to the Study Section and is responsible for collating the reviews/posting them online at eRA Commons.

- Addendum, critical changes – In the past it was possible to update applications with new data, manuscript accepted or published. This is generally no longer the case, but applicants, on an individual basis, can speak with their PO about trying to submit this information prior to the Study Section review.
- Scientific review (NIH Center for Scientific Review - CSR)
 - Study section meets 1-2 days to review ~75 grants
 - Reviewer guidelines: http://grants.nih.gov/grants/peer/reviewer_guidelines.htm
Also see: <http://enhancing-peer-review.nih.gov/process&changes.html>
 - Priority scores = averaged score. New scoring scale
 - point rating scale (10 = exceptional (10 is a perfect score); 90 = poor). Note: usually applications with scores of 50 or higher are triaged.
 - Review Sheets (formerly the Pink Sheets – when delivered as paper copy, the paper was pink.) Scores are issued on the Review Sheets, but currently not percentiles. Scores will be posted on individual eRA Commons sites almost immediately (w/in 5 days or less) following the Study Section review. Review sheets, however, are not made available for 6-8 weeks following the Study Section meeting.
 - Priority Scores and Paylines:
 - As indicated above, refer to the NIH Data Book and Funding Facts section of NIH RePORTer to compare success rates for different funding mechanisms by IC, type of CDA, etc.
 - Paylines are percentile-based funding cutoff points. Paylines are set after the budget is determined and are established by balancing the projected number of applications to an IC with the amount of funds available. They are not made for all mechanisms, may be adjusted during the year, and payline statistics are not always readily available (though some institutes may post some data)
 - Applicants are free to Google “NIH scores, percentiles, and paylines” and various links will appear. However, there is no apparent central statement from the NIH that summarizes this information.
- Council review
 - Funding decisions/payline
 - Fiscal year
 - Exceptions
- Submit “Just In Time” (JIT) info – budget, IACUC and human subjects approval
- K Awards Timeline <https://grants.nih.gov/grants/how-to-apply-application-guide/due-dates-and-submission-policies/due-dates.htm>
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	Submission date	Scientific review	Council review	Start funding	Resubmit
Cycle 1	Feb 12	June/July	Sept/Oct	Dec 1	Mar 12
Cycle 2	June 12	Oct/Nov	Jan/Feb	April 1	July 12
Cycle 3	Oct 12	Feb/Mar	May/June	July 1	Nov 12

- Resubmission
 - Paylines seem to be continuing to fall, so the aim is to try to get an initial score as close to the high teens as possible such that if necessary, one is w/in striking distance of a fundable score upon re-submission. (Note: 10 is a perfect score)

- Receipt dates: March 12, July 12, November 12 (note that re-submission deadlines differ from submission deadlines by 1 mo.)
- Response/rebuttal (to review) page is part of the revised application - to respond to comments directly, incorporate suggestions if appropriate, highlight changes. In the body of the application, highlight new text by using a different font, and if possible, including a vertical line in the page margins, alerting the reader where new text is located.

Other Pearls

- Ask **lots** of questions. If you think you got the wrong answer, **ask someone else**.
- Call the NIH Program Officer (listed by link – for ea NIH Institute - in ea K announcement) to make yourself/your research known/ask for advice/input. I recommend that this be done early in the process/as soon as Specific Aims have been formulated. Applicants will want to discuss their current level of training and degree of accomplishment (espec. no. of first authored papers in top tier journals from the current lab/research group), and how best to structure the research proposal to be of interest to the potential funding Institute.
- Check your grant status (when they want progress reports, etc.) at NIH eRA Commons <https://commons.era.nih.gov/commons/>
- Note: when the application says “principle investigator” that means YOU! Not your mentor/sponsor
- Use readable type, not too small – Arial 11 (or equivalent) is a usual standard size. NOTE: The font/size are mandated by the NIH. Use of smaller font size will disqualify the application administratively.
- **Color** figures are best
- Reviewers don’t read minds, make sure you write what you are thinking
- Grant application basics – what the NIH is looking for <https://nccih.nih.gov/grants/resources/grantwrite-advice.htm> and <https://www.niaid.nih.gov/GRANTS-CONTRACTS/SAMPLE-APPLICATIONS>
- BCH Library has purchased online ‘Whitepapers’ sold by the Principal Investigators’ Association, a for-profit group that charges for manuals and guidelines related to grant writing and other relevant topics. At least some may be of interest and can be accessed through the following link using a Children’s computer: <http://childrenshospital.libguides.com/content.php?pid=120987&sid=1048971#book3509757>
NOTE: The section on Research lists guides/tip sheets for various grant application processes.

NIH LOAN REPAYMENT PROGRAMS (LRPs) Link: <https://www.lrp.nih.gov/index>

This information pertains only to those MDs with medical school tuition debt (and possibly undergraduate tuition debt as part of the prgm). Speak to others in your Dept/Div who may have previously applied and ask for guidance from them. Additionally, the NIH has recently initiated an LRP Ambassador Program with the aim of forming a network of current and former awardees to promote and provide guidance wrt applying to the program. See: <https://www.lrp.nih.gov/sites/default/files/docs/pdfs/LRP-Ambassador-Overview-508c.pdf>

Disclaimer: Websites change periodically/it is possible that some of those listed are no longer active.