**Title: Writing a good research grant proposal**

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**Abstract:** Research is becoming increasingly important in the delivery of paediatric care and in the training of healthcare professionals. Many young clinicians are now looking for some way of becoming involved in research during their training, and some will wish to develop a more formal academic component to their career and/or study for a higher degree in research. Research funding is essential to enable high quality research, but training in how to apply for such funding is relatively limited. This article aims to provide guidance for new researchers setting out to write a research grant proposal. It highlights the importance, at the outset, of selecting the correct research environment, ensuring adequate support and supervision and identifying the necessary knowledge and expertise needed to deliver the project efficiently and effectively. It also covers the important practical steps involved in developing the proposal, writing and submitting the application, and provides suggestions for maximising chances of success.

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**Writing a good research grant proposal (Max 4000 words)**

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**Introduction**

A career in research is not for everyone, but for paediatric trainees, some involvement in research is encouraged and increasingly, expected. In the UK, with introduction of the Royal College of Paediatrics and Child Health (RCPCH) Progress curriculum for paediatric training it is stated that “paediatricians at all levels need to demonstrate they can apply an evidence-based approach to their practice - and so need research skills”. For many, this will be limited to completing Good Clinical Practice in Research (GCP) training, recruiting to multicentre studies, or co-authoring a paper. For others, this activity might kindle a spark and lead them to explore research in more detail; some may always have fostered an interest in research as a long-term career goal. How to proceed at this point is not always clear. In the first instance, as a trainee, spending time in research will usually mean clarifying local procedures to apply to take time out of a training programme to pursue a research project or doctoral degree. Understanding this process in advance will make it easier to plan and obtain necessary approvals in a timely way. Assuming this knowledge, this article aims to provide guidance for junior researchers setting out to navigate the winding and sometimes challenging, but always exciting road to successful development of a research proposal and funding application. Although the author is a clinical academic, and so more familiar with these pathways, similar principles also apply for those wishing to pursue a career in other areas of research.

**Early Steps**

Preparation for this journey is all-important. While careful consideration and groundwork before setting out cannot guarantee success, failing to prepare adequately will almost certainly lead to disappointment. High quality research is costly, in both time and money, and the funding pot is not bottomless, so the process of applying for grants is extremely competitive. It therefore makes good sense to place yourself in the best possible position right at the start. There are a number of crucial things to have in place before putting pen to paper, or typing the first words into your online application.

*Choosing a topic for research*

How you choose the research topic for your application will depend on whether it is your own ‘de novo’ idea or based on an advertisement or suggestion from an established research group within an ongoing programme of work. Regardless of how your position arises, the key to successfully embarking on and completing a research project is to choose an important subject area that interests and inspires you, and for which you feel you can develop a ‘passion’. If successful in your funding application, you will spend months, years, or longer devoted to pursuing your goals in research, so it must be something that is important to you, as well as to others with whom you will work. For many researchers, their first project paves the way to a career furthering research in that same area.

*Identifying supervisors, mentors and collaborators*

This is arguably the most important step of all. Writing a grant proposal is not something to be undertaken alone. Even someone with prior experience in developing grant proposals will need advice, guidance and constructive criticism from trusted and experienced colleagues. For many junior researchers, a supervisor will be the appropriate person to provide this support. Your supervisor should be an experienced researcher in your chosen field, with a good track record in obtaining grant funding either as a lead or as an active member of an established and successful research team. They should be in a position to devote time and expertise to assist in working through your proposal, and to signpost others who will be able to help you develop your research ideas and plans. Do not underestimate the importance of choosing a supervisor with whom you believe you can develop a good working relationship, and who you feel will be able to recognise and respond to your learning and development needs. Completion of a higher degree, fellowship, or project over a number of years can be a valuable shared experience if the team is successful, but can be a miserable time if peppered with conflicts, misunderstandings and clashes of personalities.

Increasingly, mentorship is also recommended and can play an important part in the guidance and support of early career researchers. In contrast to supervision, the role of a mentor is less concerned with the specifics of the research being undertaken, than with the professional development of their mentee. Having a mentor can reduce the stress associated with taking on a new role and learning new skills; increase confidence, motivation and reflection; provide a “sounding board” at times of decision-making; and help identify options for the way forward at difficult junctures.

*Planning a route*

Depending on career intentions and aspirations, different routes into research are available, designed to achieve different ends. The many names for different types of funding can be confusing. Some titles will clearly specify that applications come from researchers at a certain point in their career, or with certain expertise, and others will be more generic. Essentially, the main types of grant of interest to new researchers are:

1. Project grants

Project grants are available from most funding bodies, and designed to support the delivery of a specific, defined piece of research. As the name implies, the project itself is the focus of these awards, and financial support is for the duration of this project. The success of these applications rests on the importance of the chosen area of research, the feasibility and likelihood of the project being completed within the suggested timeframe, the value for money of the project, and the suitability of the lead applicant and research team to deliver the research effectively and efficiently. Project grants are ideally suited to fund a single, stand-alone piece of work, but there may be greater likelihood of funding going to experienced researchers rather than those starting out. However, working with a respected research team and senior applicant who is supportive of you as a co-investigator may allow you to play a major role in the development of the application and subsequent delivery of the project.

1. Fellowships/Scholarships

Although project grants are excellent to fund a research project to completion, this type of grant does not provide any protected, funded time for the researcher to develop essential knowledge and skills needed to develop into an independent researcher. Fellowships are designed to meet this need and so are suitable for a person whose goal is an academic career. Different fellowship opportunities cater for people at different stages of their career. In contrast to project grants, fellowship applications focus on the individual, rather than the research *per se*, and so the academic abilities and skills of the individual applicant are carefully assessed via the written application and sometimes at interview. Prior research experience and/or publications will therefore enhance an application. Equally, or perhaps even more important is the environment in which the applicant proposes to work. Fellowships are prestigious positions, both for the successful applicant and the hosting institution. Funding bodies will be seeking some assurance that their investment will be fruitful, and that the applicant will have access to suitable expertise, support and training within the research team to develop into a future leader in research. Some fellowships provide a salary for the individual to work with a research group to gain training and experience and others require a project proposal submission as part of the application. It is essential that your choice of hosting institution is well thought through, and that you have engaged with the team to ensure the necessary support is available to you if you are successful.

*Choosing the right funding body*

There is a large number of funding bodies spanning the many fields of clinical medicine and basic science. Whilst ostensibly all offer similar types of funding as described above, the scope of these varies considerably between organisations. Both commercial and non-commercial organisations provide research funding nationally and internationally. Commercial funding by industry or the private sector often involves recognised experts rather than new researchers. Negotiation of contracts and conditions can be complex and will take into account the needs and requirements of the industry, as well the reputation of the researcher and associated academic institution and the ‘ownership’ of information yielded through the research. Non-commercial funding bodies fall broadly into the following categories: Government funding such as UK Research and Innovation (UKRI; includes Research Councils) and the Department of Health (through the National Institute for Health Research (NIHR)); Charities; Professional organisations and learned societies (including National Academies). Senior researchers in your field of interest will have experience of interaction with different funders and will be able to guide you to those that are more likely to fund the kind of research you wish to pursue, and this can save time and effort. However, it is important to ensure that you identify all potential funders. Funders’ own websites can be searched and many Higher Education institutions themselves collate and disseminate information about research funding opportunities. Other organisations publish information online about research funding, but a subscription is required for some of these.

*Responding to the funder’s call or brief*

Every funder will have its own guidance, and although there are many similarities between organisations, there are differences in the way the funding call is worded, and the expectations of the application. Obvious though it may sound, once you have chosen a suitable funder for your proposal, it is extremely important to read very carefully the information on the relevant organisation’s website. A funding call may be generic, aiming to draw a wide range of proposals, or may be a specific focused call or brief for a particular area of research of topical interest. If your research idea falls within one of the preferred areas this can provide a good opportunity. Whichever is the case, no grant awarding body is likely to fund a project that does not fit with the details of the call, or where the applicant does not appear to have taken on board the advice provided.

*Setting a timeline*

Before embarking on writing the proposal, make sure that you are familiar with the timelines for the relevant funder. The time between deciding to apply for funding, and the award of the funding will vary between funders and calls. Some applications are designed in two stages, with the first being a relatively brief outline application. This application is then considered and reviewed to make a decision about whether a full application for the second stage should be invited. A panel convened on a regular basis will often filter outline proposals, while full stage applications are also sent out for external review to a number of reviewers with different expertise. This external review will cover all aspects needed to properly consider the proposed research, and make recommendations to provide funding or not. Between these periods of review, feedback may be provided asking the applicants to revise and improve the proposal or clarify areas of uncertainty. Given the multiple processes and procedures that are involved, it is clear that any grant application will spend a significant amount of time under consideration. The whole process may take up to a year, and sometimes even longer, depending on the complexity of the contract drawn up between the funder and recipients. This time needs to be factored into your plans, particularly if time out of a training programme needs to be arranged in advance.

The other period that needs planning is the time to write the application prior to submission. Experienced researchers often advise to “decide how long you think it will take, and then double it!” This is wise counsel, because when embarking on a project proposal, every step seems to take longer than anticipated. Planning a timeline is useful, dividing the time available into sections, to avoid leaving anything until the last minute. Try not to work to the absolute deadline as this will become very stressful towards that date. With online submissions being most common, be aware of potential difficulties of large numbers of applicants trying to access the same website at the same time, close to the deadline – websites can and do “crash”, increasing problems and anxiety for everyone.

**The Research Proposal**

The purpose of writing a research proposal is to “sell” your proposal to the funding body. You will therefore need to persuade the panel that your project is important, timely, worthwhile, feasible to carry out, and that you and your colleagues/collaborators have the knowledge, expertise, skills and competence to deliver the research. As a new researcher, you will also need to demonstrate that the support you will receive will be adequate. Before you start to write, you will need to know your subject well. You should be able to show there is a need for your proposed work, that your idea is novel, the answer to your question is not already known, and that your work will substantially add to the already available literature. The potential funder will also wish to see evidence that your work has potential to provide benefit to the scientific community, patients, health care services and the public. Basic things, such as the structure of the application and attention to spelling and grammar are important. Funders are unlikely to support a proposal that is poorly written or difficult to understand. Remember the panel reviewing your proposal will consist of a number of people, including some who will be lay representatives, and others who may not be experts in your own field, so clarity is important, and you should explain terms that, although familiar to you, may not be to others.

*Developing the hypothesis and research question*

This the first and critical part of the process. It will require a good deal of thought and discussion; do not underestimate the time needed. You will need conduct a thorough review of the literature to identify areas where more research is needed and formulate a hypothesis. Your research question itself will need to be clear and detailed. Depending on the type of question, it may be helpful to consider constructing it using the PICOT format (Population; Intervention; Comparison; Outcome; Timeframe). Make sure you discuss your proposed question with others, and be prepared to modify it in the light of their comments and as you think through the practicalities of delivering the project. Your question is the starting point, and it will guide the rest of the study design, so it is important to get it right.

*Literature review*

The review of literature around your chosen subject should provide background information and place your research question into context, as well as demonstrate your understanding of the subject. It should be a concise synthesis of the existing literature, with critical evaluation of relevant issues. Include all influential and recent papers related to your research question. Where possible, use original sources of evidence rather than citing review papers or drawing on opinion.

*The detailed research plan*

Having determined your research question and placed it in context, you will need to convince the funders you are able to answer that question. This will involve setting out, in some detail, what you are planning to do and how you are going to do it. It is helpful to set this out using headings, including some of these suggested below.

Aims and objectives: Your aims should consist of one or two broad statements highlighting what you ultimately wish to achieve by conducting this research. Follow this with a number of more specific objectives that indicate how you will address each part of the research question in turn.

Study design and methods: The study design will vary depending on the most appropriate way of answering the research question. Some proposals will contain different “workstreams” that may use different methodologies. These include randomised controlled trials, prospective cohort studies, or qualitative studies. Increasingly it is recognised that a good research proposal may draw simultaneously on a number of different methodologies to obtain a more rounded view of the subject that is being investigated, and provide value for money.

Sample size: Your sample size calculation should demonstrate that you are planning to recruit sufficient participants to answer your research question. Enlist the help of a statistician with this, but you will need to provide them with clinical information to perform the calculation, such as the prevalence of the outcome of interest and the amount by which you expect your intervention to change this.

Consent process: For most clinical research involving patients or healthy subjects, written informed consent is required. Your proposal should include a description of the process you intend to use to inform participants and obtain appropriate consent. Remember that the age of your participants will determine who should give consent, and whether the patients themselves are considered able to decide whether or not to participate.

Recruitment: Funders will want to know that the proposed sample size is likely to be achievable. Discuss the measures you will put in place to optimise participation and address any unanticipated problems with recruitment. If you have pilot work available to justify the feasibility of the work you are suggesting, it can be helpful to draw on this.

Oversight committees: For any research, but particularly in the case of large studies or interventional trials, funders will wish to see evidence of plans to set up independent committees to oversee progress. This may include a “Trial/Study Steering Committee” to guide the research process and a “Data (and Safety) Monitoring Committee” to ensure data emerging from the research is not indicating harm or obvious benefit to some participants. The latter is always needed for blinded randomised controlled trials and will generally set “stopping criteria”, above which they may perform detailed reviews of the data on which to base recommendations for study discontinuation or continuation.

Research ethics: At the time of the proposal, research ethics approval is not usually required. However, it is essential to consider any major ethical implications associated with your proposed work and how you will deal with these.

Patient and Public Involvement in research (PPI): Research is highly unlikely to be funded without evidence of PPI. Most application forms will contain a section devoted to PPI, and will want to see strong evidence of commitment to this. Involve user groups early in your plans and engage with them to justify the importance of your research for the community as a whole and for individual patient groups. There should be PPI in developing the study design and methods, and planned involvement in the conduct of the study and in dissemination of results.

Impact: This refers to the important effects that your research will have on different sectors of the community, through improvements in knowledge, patient management, policy or cost-effectiveness. Many applications will require a summary of what you consider the main areas of impact likely to emerge when your research is completed. In this summary, you should provide information about what you think will be achieved and when it will be achieved, together with some assurance that these are feasible.

Intellectual property (IP): This refers to knowledge that is generated by your research, for which you or the institution can claim “ownership”. IP is often considered in terms of commercial endpoints, such as products, patents and trademarks. However in clinical research, it more broadly includes all potentially useful knowledge in all formats, including academic journal publications, conference presentations or treatment protocols developed within a research project.

*Summaries*

The summary or abstract is the first thing that many reviewers will read, in order to get a flavour of the overall proposal, so needs to impress. Although summaries often form one of the opening sections of the application form, they will probably be one of the final things to write, once your ideas are completely clear. Two summaries will generally be required, a scientific summary and a summary for the lay reader, as the reviewer panel will always include a lay member. It is a good idea to ask people without specialist knowledge to review and comment on these prior to submission.

**Money matters**

You will need help with costing your application. Your costs will need to be realistic to allow delivery of the research, but also within the limits of the specified budget. Staff salaries, consumables, equipment, travel expenses and costs for meetings and PPI, and increasingly the cost of open access publication of papers should all be included. The financial part of the application looks complex, and every host institution will have individuals used to dealing with these. Categories of costs are:

1. Directly incurred costs, relating to the project itself and including costs for staff working on the project, consumables, travel expenses and equipment.
2. Directly allocated costs are estimated and shared, including principal and co-investigators’ time on the project, and estates costs.
3. Indirect costs are non-specific estimated costs applicable across the institution, such as human resources, financial services, administrative services.

Other costs may include the involvement of a Clinical Trials Unit. For National Health Service (NHS), research in the UK, service support costs (NHS staff time for delivery of the project) and excess treatment costs (costs of delivering the study intervention over and above standard care) will also need to be addressed. These calculations can be complex; costs are met either by the relevant healthcare trust, or by the NIHR Clinical Research Network (CRN), whose staff will be able to advise and assist.

**Submitting the application and returning to normality**

It is often helpful to draft the application content in a separate document, and then cut and paste into the relevant sections, as forms are not always easy to work with. Allow time to do this, well before submission, as online forms generally have strict character counts, and last minute “tweaks” are sometimes necessary to fit your writing in the allotted spaces. Once you have completed your application form, read and re-read it yourself, and ask your supervisor and/or co-investigator(s) to do the same, to address any last minute issues, and scan for typographical errors. Only when you are completely happy with this should you “push the button” and submit. Make sure that you have also uploaded any required supporting documentation.

By this stage, you will probably have invested a considerable number of months on your research proposal, and the finality of submission may seem like an anti-climax. Enjoy the fact that you can return to normal life without constantly thinking about it. However, in the months before you anticipate hearing the outcome, make sure that you keep up with the emerging literature in your field to help address any reviewers’ comments and ensure that there is no new evidence to inform your proposed research, on which you should act.

**The successful application**

Not all applications will be successful by any means, and it is essential, given the unpredictability of the process, to have other “irons in the fire” and plans for a way forward if the outcome is disappointing. However, if you are one of the fortunate people to have your research proposal or fellowship funded, then that will rightly be cause for celebration and a great sense of achievement. This is the exciting part, where you will start to see your ideas take shape and hopefully make a difference. Good luck!

**Box 1**

**Questions to ask yourself about your proposal**

* Is my research question important?
* Is my research proposal new and timely?
* Why is it needed now?
* Will my research fill a gap in current knowledge?
* Who will benefit from or use the results?
* Will conducting this research benefit my training/career?
* Have I involved the right people to support me in my research?
* Will this grant provide me with the resource to successfully complete the research?

**Box 2**

**Avoiding pitfalls**

* Choose an area that interests you
* Take time to choose an appropriate funder
* Read the funder’s instructions, requirements, and selection process carefully
* Plan and allow plenty of time
* Be realistic
* Establish good working relationships with your supervisor and/or team
* Involve other essential collaborators early
* Write clearly and concisely

**Box 3**

**Other sources of information and support**

* Funding bodies provide contact details of relevant staff, who can deal with queries related to specific funding calls.
* Vitae a free, non-profit programme dedicated to realising the potential of researchers globally.
* Local Research Design Service work with researchers designing research proposals.
* Clinical Research Network can advise on research delivery in the NHS.

**Further Reading:**

# Royal College of Paediatrics and Child Health Progress domain resources: Research and scholarship <https://www.rcpch.ac.uk/resources/rcpch-progress-domain-resources-research-scholarship>

# Vitae <https://www.vitae.ac.uk/>

* National Institute for Health Research <https://www.nihr.ac.uk/>
* NIHR Clinical research Network <https://www.nihr.ac.uk/explore-nihr/support/clinical-research-network.htm>
* UK Research and Innovation <https://www.ukri.org/>
* INVOLVE <https://www.invo.org.uk/>