



**How to get involved with undergraduate
research:
a guide for medical students**

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Objectives

This guide aims to serve as a practical introduction to undergraduate medical research by exploring the following themes:

- Why get involved in research as an undergraduate?
- Types of research
- How to choose a research supervisor
- How to choose a research project
- Funding for undergraduate research
- Further opportunities

Why get involved in research as an undergraduate?

Although conducting research at an undergraduate level may seem like a daunting prospect, it can also be hugely rewarding. Historically, medical students have been instrumental in major scientific breakthroughs¹ and your contribution to medical science could have a wide-reaching impact on patients.

Many UK medical schools offer opportunities for students to engage with research, whether through summer projects, student selected modules, research electives or intercalated degree programmes in a medical science. As an undergraduate researcher, you have the choice of where to work and should select an area of medicine that you find particularly fascinating. Being surrounded by like-minded, enthusiastic individuals can be an inspirational experience in itself and it is likely that you will learn a lot about your specialty of interest.

If you are keen on pursuing a career in academic medicine then it is never too early to start accumulating experience. Even if you are not considering an academic career, an undergraduate research project will equip you with a set of highly valuable and transferable skills. Almost all specialty-training programs (including core medical and core surgical training) use evidence of research skills as essential and desirable selection criteria². The GMC also recognises the importance of academic training and requires that all medical graduates can appraise and apply scientific literature, understand principles of research ethics and formulate basic research questions³. Although it might seem a long way ahead, gaining experience of research as a student represents a good investment for future job applications.

Achieving authorship of a paper as an undergraduate represents a large amount of time, effort and some degree of luck; for this reason, not all student research projects result in publication. However, if you do manage to get published it not only looks impressive on your CV but you will also earn a point for the Foundation Programme Application System (FPAS)⁴.

Types of research

Primary medical research involves original data collection and usually takes place either in a clinical or laboratory setting.

Laboratory research aims to further our fundamental understanding and manipulation of biological processes. Laboratory research can be broadly divided into “wet lab” projects (experimentation with organic matter) or “dry lab” projects (computer modelling and data analysis).

Clinical research takes an applied approach to ‘real life problems’ in medicine. It aims to create new knowledge about best practice to inform the creation of clinical guidance.

Secondary medical research involves the collation and analysis of existing data, for example systematic review and meta-analysis. For more information on systemic review see the NSAMR guide “How to write a systemic literature review”.

Clinical audit is not the same as research; it aims to measure real-life practice against a recognised standard of care and assess the efficacy of an intervention at improving practice⁵ (e.g. NICE guidance). For more information on the differences between audit and research the NSAMR guide “How to conduct a clinical audit”.



How to choose a research supervisor

A research supervisor is an experienced academic who provides guidance and support throughout your project from planning to publication.

Start by searching for a researcher who works at your home university in your research area of interest. Most academic departments provide online profiles of all their staff members including a list of publications. It may be tempting to approach the most distinguished professor in the department, but beware; they are likely to be extremely busy individuals with many competing demands on their time. A more junior researcher (e.g. PhD student or clinical trainee interested in research) may be able to provide more personal and continuous support, as well as appreciate the time you have available to spend on research. Importantly, you should look up the potential supervisor on PubMed to have a look at their publication record and to gauge how likely your project is to ultimately end up in PubMed indexed print.

Try to find out which academics in your desired specialty have a good track record of working with undergraduates, and also how many of these projects result in presentations at local meetings/national conferences, and even publications. Potential sources of information include the local student academic medicine society, students in the year above and direct enquiry at the departmental reception. If at all possible, speak to a student who has previously done a placement with your prospective supervisor and ask about their experiences.

Once you have identified a potential supervisor, send them an email to express your interest in working with them. To some extent good supervisors are self-selecting; they will reply to your email reasonably promptly. Do not feel guilty about approaching multiple supervisors simultaneously; making enquiries is fine as long as you do not make any commitments. It pays to be persistent and a well-timed phone call can achieve more than numerous emails. If possible, it may be more fruitful to try to meet the individual in person, for example by arranging a meeting via their secretary

It is a good idea to be well prepared when meeting your supervisor for the first time. They will expect you to be enthusiastic, to know a bit about their research and to have a general idea about what you want to do. Undergraduates are not usually expected to come up with an original research idea but do not be afraid to propose something you think is interesting, and have thought through. More likely, your supervisor will be involved in several existing projects and will identify an area you could help with – e.g. data collection, a lab process, data analysis etc. You should find out if there is a choice of projects, pin down what your role(s) might be and discuss a possible timeframe. It is important to ensure that your supervisor is aware of how much time you can spend on the project, so that plans are kept realistic.

How to choose a research project



Personal interest and curiosity are the most important factors when choosing a research project. If you are struggling to decide between multiple interests, try reading more around each subject using academic journals from your university library/database. Your project is likely to last months and may be frustrating at times, so it is crucial that you can draw motivation from a genuine interest in the area.

Try to be honest with yourself about how much time you are prepared to put into a research project. Consider the intensity of work as well as the duration. It is possible to contribute a few hours a week on top of your regular course commitments, but you may prefer to work full time on a project during a summer holiday or student selected module. Remember that a couple of months is a very short amount of time in the world of research and that even the best laid plans are liable to overrun. Taking on a research project will impact on other areas of your life and its important to weigh up the potential consequences on course grades, extra-curricular activities and social life before you commit yourself.

Ask yourself what you want to get out of a research project and try to be specific. Perhaps you are hoping to get an oral or poster presentation for your CV or trying to decide whether you want a career in research or not? How much do you value being published as a named author compared to gaining valuable skills and experience?

Taking time to reflect on what you are prepared to put in and what you hope to get out of a project may seem a little contrived or unnecessary. However, this process may help you to choose the right project and prevent you losing interest halfway through.

Important definitions:

A *poster presentation* is a visual summary of your entire project, usually in A2, A1 or A0 format. At a national conference there may be 50-100 posters on display. Be prepared to answer a few questions from the judges who look at all the posters and give them each a mark. The best poster (usually scored on content, relevance and presentation) may win a prize.

An *oral presentation* is a 10-15 minute summary of your project, followed by questions from the audience. A panel of judges may also ask questions and the best oral presentation will win a prize. Oral presentations are considered more prestigious than poster presentations. When submitting abstracts, keep the title interesting and not lengthy and dry.

Funding for undergraduate research

Many organisations and charitable trusts offer grants to medical students undertaking vacation research projects, research electives and intercalated research degrees. Application for funding requires forward planning, as you must provide full details of your intended project and supervisor. Often the application window for bursaries only opens once a year.

The Wellcome Trust offers Biomedical Vacation Scholarships to fund students for a 6-8 week project in between university terms.

<http://www.wellcome.ac.uk/Funding/Biomedical-science/Funding-schemes/PhD-funding-and-undergraduate-opportunities/wtd004448.htm>

The Wolfson Foundation is another large organisation that offers funding for intercalation projects. Application is through your university and each institution can only enter a certain number of candidates every year. Enquire at your medical school for more information. <http://www.wolfson.org.uk/funding/education/inter/>

The Carnegie Trust Scotland is open to Scottish students in their 3rd year. Application is via your university and successful candidates are awarded funding for 2-8 week projects.

<http://www.carnegie-trust.org/schemes/undergraduate-schemes/vacation-scholarships.html>

Medical Research Scotland supports students for a 6-8 week vacation scholarship at a Scottish institution. http://www.medicalresearchscotland.org.uk/apply.htm?zoom_highlight=vacation+scholarship

Amgen Scholars is an organisation that provides 8-week research placements with full funding at scientific institutions across Europe. Each participating institution has its own selection process but you can apply to as many as you choose. <http://www.amgenscholars.eu/>

Money for Med Students is a website offering financial advice to medical undergraduates. Their website details research and elective funding opportunities. <http://www.money4medstudents.org/bursaries-and-grants>

The UK Medical Student Association (UKMSA) advertises specific research projects that students can apply for. Their website also lists external organisations which offer research opportunities and funding. <http://ukmsa.org/research/get-involved/>

The *NSAMR* website details many more subject-specific research grants for electives, intercalated degrees and vacation projects (e.g. Royal College Haematology, The Renal Association etc.) <http://www.nsamr.org/?q=funding>

This is by no means an exhaustive list and it is well worth enquiring about funding opportunities at your medical school and local academic medicine society.

Further opportunities

If the research project has not finished at the end of your placement, try to stay involved and keep in touch with your supervisor. Take any opportunities to help write

up results and present at a national conference. For more information, see other NSAMR guides which detail how to write up an abstract, how to prepare a scientific poster and how to give a good oral presentation.

If you have enjoyed a vacation research project, research elective or student-selected module why not apply for an intercalated research degree? You could even consider applying for the academic foundation program, which provides research, teaching and leadership opportunities to newly qualified doctors.

<http://www.foundationprogramme.nhs.uk/pages/academic-programmes>

Key points:

- Undergraduate medical research is fascinating, worthwhile and rewarding.
- When choosing a research area, prioritise your own personal interests (which will be essential to motivate you throughout the project).
- Select a supervisor based on evidence of previous successful partnerships with undergraduates.
- Be upfront about how much work you can contribute and what you hope to gain from the project (e.g. co-authorship of a paper).
- Investigate funding opportunities well in advance of the start of your project.



References

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