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Think critically, research and publish

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Introduction

This chapter describes how you can get involved in research, publishing and writing. Crucially, it describes the key concepts surrounding evidence-based thinking and decision making in dermatology. These concepts are the essential foundations on which you can build your thinking and clinical approach during your career. This chapter is designed to help you to strengthen your academic expertise, and to gain satisfaction from investigating and contributing your ideas to the wider dermatology community.

Why undertake research?

Dermatology is a dynamic research-led specialty. Skin-related research leads the way in many spheres of scientific endeavour in relation to patient care. The dermatology training programme provides an ideal opportunity to appreciate and undertake research. So what is research?

Research is the creation of new knowledge that builds on the established foundation of our understanding. Medical research, ultimately seeking to improve individuals' wellbeing, can take many forms, including laboratory experiments, clinical studies (observation or intervention), clinical trials, quality improvement projects and evidence-based summation of findings.

Find something that genuinely interests you. The demands on your time are great, but they can be managed. Research projects do take time to complete. Moreover, if there's a chance that things can go wrong, they invariably do and the only driving force to complete a project will be your desire to succeed. Supervisors look most of all for motivated individuals, as technical skills can be taught but motivation cannot. Research success comes from a motivated person working in a supportive environment.

Dermatology Training: The Essentials. Edited by Mahbub M.U. Chowdhury, Tamara W. Griffiths and Andrew Y. Finlay.

Companion website: www.wiley.com/go/chowdhury/dermatologytraining

When should I do research?

As a junior dermatology trainee, your immediate priority is to learn safe and efficient clinical competencies. But make use of the time allotted for research: as your interest in research grows you can try to expand your research sessions, for example by cross-covering with colleagues. Start on a small project that you can complete within months. You will still be surprised at how long it takes to complete a project, and to present and publish the findings. Start the journey by writing a simple case report based on an interesting clinical observation, making sure that the patient concerned has given written consent for the clinical photographs to be used for medical publication. Then take care to write it up promptly and see it through to publication; a case report is often the first step on the publishing ladder.

What type of research should I conduct?

Evidence-based medicine is the production of clinical protocols, guidelines and standards, which can inform the development of clinical care pathways. Clinical audit is used to evaluate and improve the implementation of such pathways. These approaches form the foundation for improving healthcare delivery.

Clinical audit

During your training you will be required to undertake clinical audit, preferably in cooperation with a colleague. Begin by identifying an area of clinical practice that could be improved (Table 1.1). Next identify all the key components of the process, from beginning to end (Figure 1.1).

Define standards that you can measure for each component and the acceptable benchmark for this standard that will demonstrate efficiency. The standard needs to be clearly defined so that data collection is free of ambiguity. Poorly defined standards are the main cause of failure to implement audit changes.

Next choose one simple intervention to the process pathway that will result in the greatest improvement. Discuss your proposed intervention with the staff and patients who follow the pathway. Decide on the standard for this step. Write a simple protocol for the audit and get feedback from colleagues. Seek permission from your audit committee and carry out the audit survey. Analyse the data, identify how far current practice falls short from the acceptable benchmark, and present your findings to your department, including making a credible case for the intervention.

To complete the audit cycle, you will be expected to implement your change and repeat the survey. Good-quality audit projects can often be published, either as an abstract submitted to a national or international meeting or as a short article. You should aim to carry out any audit to a standard that would potentially make it publishable so that other departments can benefit from your findings.

Medical research

Medical research may be laboratory based, 'at the bench', or clinical, 'at the bedside'. However, the boundaries between laboratory and clinical research are often blurred, with an increased emphasis on translational research. Successful research is based on ensuring that bedside observations are addressed at the bench to develop new diagnostic tools or therapies, to be evaluated once more at the bedside.

Many clinicians naturally have a clear bias towards clinical research. All trainees should ideally participate in at least one clinical trial, as this gives great insight into the reality of gathering the evidence on which we base so many of our clinical decisions. By the end of your training, you should be comfortable formulating a clinical project and taking it through to completion. In addition to taking part in clinical trials, it is important to contribute to large data registries and to understand how the data from registries can influence patient care; for some trainees this activity may constitute the majority of their research experience.

Evidence-based dermatology

Before starting a research project, you should have a good understanding of the basics of evidence-based dermatology (EBD). This knowledge is also crucial to your ability to take an informed critical approach to your reading of dermatology articles.

EBD is the process of identifying relevant evidence to inform clinical decisions. There is a science to it, in gathering evidence and assessing its quality, and an art, in applying the information to the particular patient's care and making a clinical decision in partnership with the patient. The science of EBD is based on critical appraisal of evidence, ensuring that clinicians stay up to date with new developments as part of continuous professional development and lifelong learning. The Centre of Evidence Based Dermatology at Nottingham University provides an excellent source of relevant publications.

Critically appraised topic

The EBD process is nicely illustrated by the concept of critically appraised topics (CATs). A CAT starts with a clinical decision, for example what is the most effective and safe treatment for a middle-aged man presenting with erythrodermic psoriasis? A carefully formulated question is constructed using the 'PICO' format: **p**atient (demographics), **i**ntervention, **c**omparator and **o**utcome. The components of the question ensure that only relevant medical

Table 1.1 Clinical audit categories and possible examples of the process

Clinical audit categories	Examples	Standards and benchmarks	Initiatives to improve the process
Outpatient service delivery	Number of outpatients seen	100% patient attendance	Patient-initiated telephone or text verification of appointment
Training	Research time	3-hour phone-free time per week	Internal cover timetable
Patient care	Patient satisfaction survey	All patients should know their named consultant	Create an outpatient information pack
Care pathway protocols	Surgical procedures	Every patient should sign a consent form	Consent forms available in outpatients prior to booking the procedure
Drug safety	Prescription of azathioprine	Every patient should have a thiopurine methyltransferase assay	Drug checklist and monitoring sheet available to be incorporated into medical notes
Local protocols such as shared care	Methotrexate prescribing	No interruption in treatment or its monitoring	Make available patient-held drug monitoring cards and clear protocols of care
Professional body (BAD) guidelines	Treatment of non-melanoma skin cancer	Appropriate surgical margins for excision	Make a template to document each tumour type
National professional body (RCP) guidelines	Osteoporosis	DEXA scan for all patients under 60 years of age prescribed oral corticosteroids	Clear pathway to collaborate with DEXA service
National (NICE) guidelines	Appropriate use of biologics	100% of patients should meet criteria for receiving such medication	Criteria made available to all caregivers
Health costs	Generic prescribing	No patient should be on named drug	Create a pharmacy process to intercept any new named drug prescribed

BAD, British Association of Dermatologists; DEXA, dual-energy X-ray absorptiometry; NICE, National Institute for Health and Care Excellence; RCP, Royal College of Physicians.

literature is assessed, searching databases such as PubMed. The quality of the studies is also assessed to allow a judgement about the reliability of the evidence. Then the evidence is applied back to the patient to support a clinical decision. The final element is to consider writing up and publishing the CAT, to disseminate knowledge and provide a service to other clinicians encountering the same question.

Pyramid of evidence

There are several ways to assess the quality of evidence; however, a good place to start is the 'pyramid of evidence' (Figure 1.2). While expert opinion is often very persuasive, this lies at the bottom of the pyramid if it is not based on evidence. Systematic reviews, which combine the results of multiple randomised controlled trials (RCTs) by meta-analysis, are at the top of the pyramid because they typically contain results from many more patients, providing more reliable and precise evidence.

Systematic reviews

A systematic review involves a careful and comprehensive search for all the evidence pertaining to a particular issue. The search terms and databases examined are included in the published methods to permit replication. Where results from comparable trials can be combined, they are often presented in a forest plot (Figure 1.3). Each row of the plot represents results from a single trial, with the centre of the horizontal bar representing the effect size and the horizontal line denoting the width of the 95% confidence interval (95% CI). If the 95% CI crosses the vertical line of no effect relative to the comparator intervention, then the result is non-significant. The diamond at the bottom of the plot represents the pooled results, with its vertical axis showing the pooled effect size and the width of the diamond giving the pooled 95% CI.

High-quality guidelines are typically underpinned by a systematic review. A formal system should be used to convert evidence into strengths of recommendation, such as GRADE (Grading of Recommendations Assessment, Development and Evaluation).

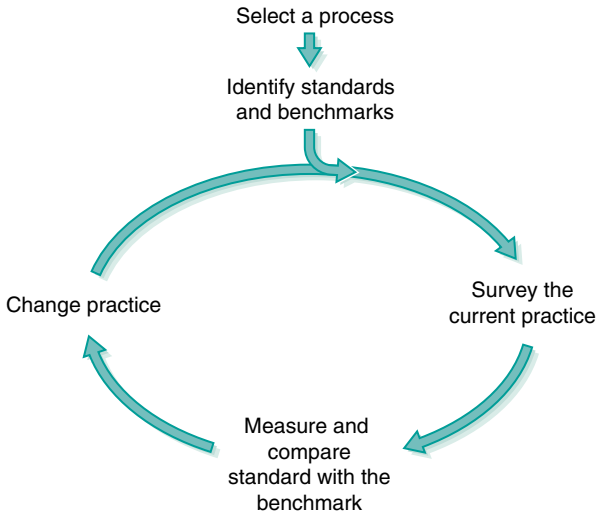


Figure 1.1 The key components of the audit process. Finlay AY, Chowdhury MMU. *Specialist Training in Dermatology*. © 2007 Mosby Elsevier.

Randomised controlled trials

RCTs are performed to reduce the potential for bias to affect the results of a trial, so that they accurately reflect the effect of an intervention in the population being studied. Bias is defined as a systematic deviation from the truth ('moving the goalposts'), as opposed to imprecision, which usually results from small trials that can be influenced by a few outliers ('darts around the centre of a dartboard').

Randomisation is designed to minimise selection bias, giving an equal chance for the participant to enter any arm of the trial. Performance bias, in which results can be affected by other aspects of care, are mitigated by blinding study personnel to the intervention allocated to participants. Be critical of whether blinding was really achieved in terms of the interventions being very similar in appearance, administration procedure and adverse effect profile.

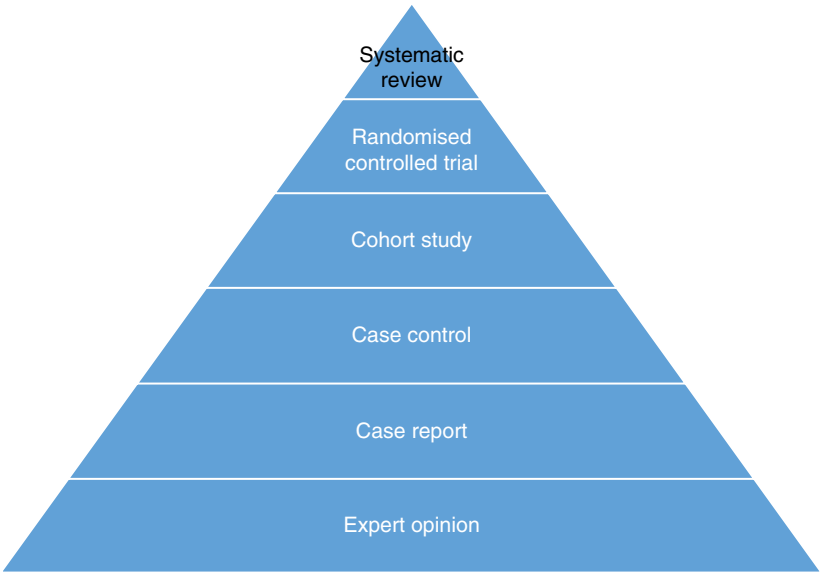
Mitigation of detection bias can be achieved by blinded assessment of outcomes, for example using photos rather than assessing a participant in person. Attrition bias is the effect of dropouts from the study; extreme examples include loss to follow-up due to death or disease resolution. It is reduced by an intention-to-treat analysis and careful handling of missing data.

A CONSORT flow diagram (Figure 1.4) should be provided in any RCT report to allow readers to appreciate any loss to follow-up; the CONSORT guidelines contribute to the consistency of reporting of research studies. Reporting bias can occur due to selective reporting of the most favourable trial outcomes, and this can be assessed by reference to the registration document for the trial. All RCTs should be prospectively registered in a clinical trials database and the registration reference number should be included in the trial report and publication.

Case–control and cohort studies

Observational studies do not usually include an intervention. Case–control studies compare a variable within the target population, for example the rate of current smoking, to the same variable in another, control population. They provide information on associations, but generally cannot demonstrate causation. Cohort studies follow a group of patients over time. They can be used to assess whether exposure to a potential risk factor increases the subsequent chances of disease development compared to unexposed individuals and may provide insight into causation.

Figure 1.2 Pyramid of evidence.



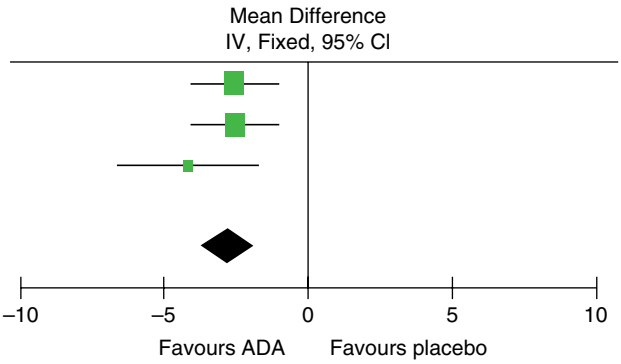


Figure 1.3 Forest plot for improvement in Dermatology Life Quality Index (DLQI) scores for three trials comparing adalimumab (ADA) with placebo in hidradenitis suppurativa. Negative change scores represent an improvement in quality of life. The overall effect of adalimumab versus placebo is an improvement of 2.7 DLQI points (95% confidence interval –3.7 to –1.8 points). Modified from Ingram JR *et al.* Interventions for hidradenitis suppurativa. *Cochrane Database Syst Rev* 2015; **10**:CD010081.

Case reports

Case reports are at the bottom of the reliability pyramid for studies in humans. They are very likely to be affected by positive reporting bias, in which reports of successful treatment are more likely to be published than those in which the treatment was unsuccessful, providing an overly positive impression in the literature. Standards of reporting vary from case to case and it is important to carefully describe the patient, intervention and outcomes.

Where do I start and what are the hurdles?

Finding the hypothesis

All good research should start with a question, which can then be pared down to a yes/no answer. This is the basis of a hypothesis, a question that can be tested. Herein lies one of the great paradigms of modern research, that it is easier to refute a hypothesis than to prove it, thus favouring the setting for each study of a well-defined single research question (the reductionist approach) rather than trying to understand a system as a whole.

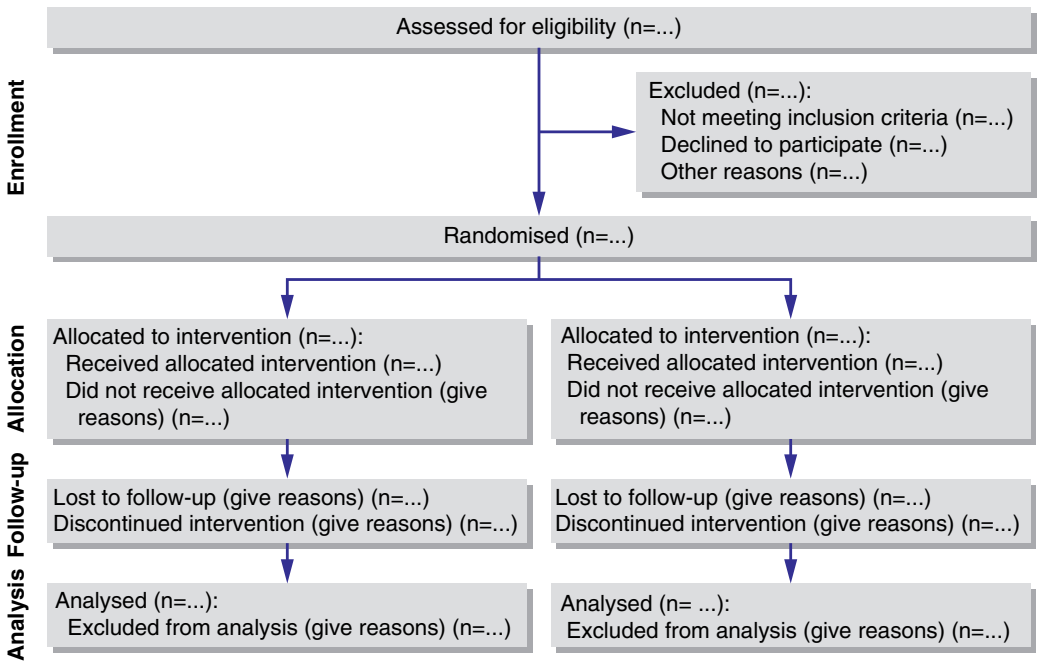


Figure 1.4 CONSORT diagram describing flow of patients through a parallel group randomised trial. Schulz KF *et al.* CONSORT 2010 Statement: updated guidelines for reporting parallel group randomised trials. *BMJ* 2010; **340**:c332.

Literature search and critical appraisal

Has anyone else thought of trying to test your hypothesis? If so, what approach did they use? To answer these questions, you need to conduct a literature search. This involves four main challenges:

- Deciding where to search.
- Using the defined research question (the hypothesis) to devise a search strategy.
- Critical appraisal of the information collected.
- Storage of references for easy access.

Searching PubMed, with or without Boolean search operations, is a minimum requirement. Limit your search by subheadings (e.g. aetiology, treatment) or language, age group or publication year. There are numerous other search engines that may be more appropriate, including Google Scholar, OVID, Web of Science, Cochrane Database and Embase. Use phrases in inverted commas and be careful to look at the URLs (e.g. .ac = academic, .edu = US university).

Do not forget the old-fashioned ways that still work: the use of an up-to-date textbook, review articles and most importantly cross-referencing (looking up the references within an article).

The hardest part of the process is to prioritise and carefully go through all the papers. Critical appraisal is a way to rationalise the papers you amass. Some basic questions to always ask yourself are listed in Table 1.2; for further guidance read the articles by Trisha Greenhalgh on how to read a paper (see Further Reading).

Table 1.2 Critical appraisal: how to question

Critical appraisal		
	Yes	**No**
Do I know the research group and can I trust it?		
Is there a relevant question?		
Is it clearly focused, in terms of the population, methods and outcomes?		
Is this the best or correct method to answer the question?		
Is the population studied correct and accounted for?		
Was the study randomised and blinded?		
Are the compared groups similar?		
Apart from the intervention, were both groups treated the same?		
Was the study effect large enough?		
Did they consider confounding and bias?		
Was the follow-up long enough?		
Are the data shown clearly interpretable?		
Are the statistics okay?		
Is the study funding described?		
Is it applicable locally?		

Writing a protocol

Even the simplest clinical study needs a clear, detailed written protocol before starting. This is essential for institutional permission, ethical review and financial planning. The intellectual process of thinking about and writing a protocol is an essential basis for ensuring that the work is successful.

1. Protocol housekeeping

The protocol will go through several versions before it is ready to submit for review. First write the date and the draft number, '1'. Update this heading for each version: the date is the most useful as draft numbers can get muddled.

2. Title of study

Choose a clear, descriptive and preferably interesting study title. The title should include keywords that search engines are likely to use to find your article. Avoid acronyms.

3. Researchers involved

Decide who you want involved in the study, get their agreement and list their names. This list defines who you can expect to contribute. It also defines who will expect to gain authorship on abstracts and publications. Many journals now publish a description for each author of their individual contribution. Discuss and resolve all authorship issues (if any) before you submit, as these can cause problems at the publication or post-publication stage and even delay publication.

4. Background

Three or four paragraphs of background information are essential to convince the ethical and other committees that the work is worth doing. Describe how the current published work has led to a certain level of understanding about the subject, and clarify how the proposed study leads logically forward, by addressing unanswered questions (hypothesis). Reference the background, including the most relevant recent references. The work in writing the protocol background is not 'wasted', as it can be used as the basis of the introductory paragraphs of the study report, abstract or publication.

5. Decide the aims

It is essential to write down a clear aim for any proposed study. Identify as few aims as possible, preferably only one. State the main aim and the question to be answered. Document any secondary aims that provide useful confirmatory information.

6. Method (study design)

In writing the methods section, you should plan to give enough detail so that the study could be carried out successfully even without your involvement. Think through the reality of the study, imagining every step, anticipating questions that may arise and writing down the instructions. Clarify whether the study is an open study, controlled, single or double blinded.

7. Patient selection

Define the entry criteria, for instance define the disease or level of activity of disease for entry, and the sex and age range. Define exclusion criteria, such as pregnancy or presence of other diseases. Decide on the number of patients to be studied, with advice from a statistician. Consider ethnic diversity issues in your recruitment strategy. Describe how and where patients will be recruited in a timely manner. In deciding these limitations, be aware of selection biases influencing the study outcome.

8. Controls

If you are planning to include controls in the study, they need to be defined with as much care as the test group. State how you are to match the controls to the patients, and how you are going to recruit them.

9. Intervention

If a treatment or other intervention is being tested, you need to clearly define this. If you are studying a drug, you need to state the dosage and frequency. If the drug is topical, give clear definitions of how much is to be applied, and to where. Consider any techniques to be used to monitor compliance, such as patient diaries or weighing application containers. If the intervention is not licensed for the indication, you may need Medicines and Healthcare products Regulatory Agency (MHRA) approval; talk through your plans with the local research and development (R&D) department, who will guide you.

10. Assessment criteria

How will you know if the proposed intervention has worked? If there are published CORE Outcome Measures, include these if possible. All measures should be clearly defined, for example use of the Psoriasis Area and Severity Index in a study on psoriasis. The assessment methods should be as simple as possible, and you should give consideration to defining reproducibility between observers. Consider the use of objective quantitative methods if available, such as ultrasound to measure psoriasis plaque thickness.

11. Patient information sheet

The patient information sheet is an integral part of any protocol. Write it in simple English, using straightforward and non-technical terms. Be honest. Use clear paragraph headings. The Health Research Authority provides templates (see Useful websites).

12. Patient consent form

This is an integral part of the protocol. You will need to adhere to local institutional guidelines and national requirements. Usually you will require forms that are signed and witnessed.

13. Statistician

Discuss the protocol with a statistician before submitting the study for R&D approval. Advice on the number of patients, data collection and design is very helpful at this stage. It is no good going to a statistician after a study has been completed, seeking help on the interpretation of data, and discovering that there are fundamental avoidable mistakes in the study design.

14. Costing

All studies use resources. These resources need to be costed and you need to decide who will pay. Remember in costing studies that realistic estimates need to be made about how much time you and your co-workers will spend on the study. Remember to include secretarial time, nursing time and patient expenses (see Seeking support and funding).

15. Indemnity

It is essential to clarify the indemnity arrangement for any study involving patients or other volunteers. Indemnity may be provided by an NHS Trust R&D department, university and/or pharmaceutical company. Personal insurance cover is also essential. Seek advice about these matters.

16. Ethical approval

Any study involving patients or volunteers must be approved by the appropriate R&D department and ethical committee *before* it begins.

Seeking support and funding

Securing funding is a major challenge for all academic dermatologists. Government funds, such as from the Medical Research Council, are in very short supply, and so most researchers rely heavily upon charitable foundations such as the British Skin Foundation (BSF). Alternative sources of funding include grants from pharmaceutical companies or departmental funds.

Try to quickly seek and identify a senior staff member capable of getting research funding and ask for their advice. If you have decided on an academic career, consider the trainee fellowships offered by the Medical Research Council or Wellcome Trust.

The path to successful research

Learn to say 'no'

For some researchers this represents the biggest barrier to success. When undertaking research, especially in the laboratory, interruptions such as your phone can ruin your concentration and eat into your time. It is simply not possible to complete all the tasks asked of you. Hence you have to be able to prioritise and develop the ability to say 'no' with sincerity and diplomacy, within the limits of your employment contract.

Pick and choose your projects carefully. Select projects that you can see being completed in a practical timeframe. Stagger projects, so that at any one time you are not writing up two projects simultaneously. Plan some slack into your schedule, because interruptions are likely to occur in your clinical practice.

The mentor

We all need mentors to guide us through difficult career decisions. Choose your mentor carefully. A good mentor will listen and understand the issues that concern you. Most importantly, they will give you advice that you can trust even when it is unfavourable.

Clear questions, ideal methods and data analysis

Choosing the correct research question to answer is the single most important factor in defining the success of a project. The best scientific papers resolve hypotheses that everyone can understand and thus their relevance is far-reaching. The ability to identify such opportunities comes from an in-depth understanding of the subject area, experience and a creative intellect. Though you should always strive to use the best methodological approach to address the hypothesis, this has to be balanced against the time it takes to derive results. Statistical analysis provides confidence against a chance finding. There are many statistical approaches and although you should have a basic idea of statistical techniques, it is prudent to consult with a statistician before carrying out a project.

Publish or perish

A clear measure of success is the ability to publish, hence the phrase 'publish or perish'. Publications can take the form of an abstract, case report, basic science or clinical trial paper, review article or book chapter. For some people writing comes naturally, though for most of us it is a skill that we acquire by practice. Choose the journal to publish in carefully. A good measure of the strength of a journal is the number of times articles within it are cited. The journal's impact factor is also used when measuring the success of an academic department (Table 1.3). Other measures of impact include downloads, social media impact and a range of other measures as captured by Altmetrics.

The pathway to publication is often fraught with traps and delays, particularly for your first publication, but stick at it and you will prevail. The process takes much longer than may seem possible.

How to write the first draft of your article

The most common reason that clinical research studies are not published is that they are never submitted for publication. This is how to avoid that depressing outcome.

Table 1.3 Impact factors for journals (2020)

Journal	Impact factor
Scientific journals (selected)	
Nature Medicine	53
Nature	49
Science	47
Cell	42
Journal of Clinical Investigation	15
General medical journals (selected)	
New England Journal of Medicine	91
The Lancet	79
Journal of the American Medical Association	56
BMJ	40
Annals of Internal Medicine	25
PLOS Medicine	11
Dermatology journals (top five)	
Journal of the American Academy of Dermatology	11.5
JAMA Dermatology	10.3
British Journal of Dermatology	9.3
Journal of Investigative Dermatology	8.6
American Journal of Clinical Dermatology	7.4

Based on The Clarivate Analytics Impact Factor, Clarivate. Available at https://clarivate.com/webofsciencegroup/essays/impact-factor.

First, immediately a study is completed, sit down and start writing. If you have not written an article based on a clinical research study before, you may need help in overcoming the initial 'how do I start?' confusion. In fact, the task is not as difficult as it seems (Table 1.4).

Write '1st draft. Date. Your name.' On the next line give the title of the paper. Next write the names of all the authors, with your name first. Then give the institution(s) that employ the authors. Next write your contact address, telephone, email and address for correspondence. Also give your ORCID number: this is the 'Open Researcher and Contributor ID' number that is unique to you and facilitates recognition and author identification accuracy within the research community. Register for yours if you have not done so already (see Useful websites). Following this, the first heading is Abstract or Summary. After this leave a blank for the time being; this can be completed later. The next heading is Introduction. You wrote this some time ago as the 'Background' paragraphs for the protocol. Cut and paste it across; you may need to make some minor adjustments, such as in the tenses used.

Table 1.4 Rapid guide to writing your manuscript

Title page	Write draft number, date and your name
	Title
	List of authors and institutions
	Correspondence details
Introduction	This should be a broad description leading to the question your study addresses
	Mostly derived from the protocol
Methods	Mostly derived from the protocol
Results	Give a detailed summary of all the findings in a logical order
Discussion	This should put your study findings into the context of the known literature
	Discuss perceived difficulties, weaknesses and strengths of your study
Acknowledgements	Thank those whose contribution is not sufficient to warrant authorship
	Funding sources
	Conflict of interests statement
References	Begin with the Vancouver style, though this may change depending on the journal to which you plan to submit
Legends	Should clearly describe the data presented in the figures
Figures and tables	These should consist of stand-alone data, easily interpreted with the help of the legend

The next heading is Methods. Again, all of the details are already in the protocol, so you can also copy this and make any necessary minor changes. The Results heading is next. Start to write this as completely as possible, leaving blanks where the data have not yet been analysed. Having this template also makes the process of data analysis more focused. The next heading is Discussion. You can usually write at least half of this without the final results being ready. This is where you can raise issues, difficulties or perceived weaknesses of the study – better to point these out rather than having the manuscript turned down. You should place the results in context with other previously published work, some of which you may have referred to in the Introduction.

The next heading is Acknowledgements. Here you can thank those who have contributed but whose contributions were not sufficient to warrant authorship. You can also thank patients or doctors who helped recruit participants. You can acknowledge funding here. Remember to list any conflict of interest either here or in the covering letter to the editor when the manuscript is submitted.

Each time you mention a reference in the text, add the details to the list of References. Use the Vancouver style, a numbered system also described as the 'author–number' system, as used by the *British Journal of Dermatology* and most medical journals. Although you may be using reference manager software, you may have to tweak the final version of the reference list to ensure that it complies with the journal's specific requirements.

List Tables and Figures, along with a descriptor for each. Then provide each table and figure on a separate page, or as separate files, depending on the journal's requirements.

After getting this far, you are already halfway there, and most importantly you have a first draft, which must now be reviewed and amended by the co-authors. Decide which journal you will submit the article to first and read the 'instructions for authors' for that journal. Reformat the manuscript as necessary. Now you should evaluate the data with a statistician. Put the results into a second draft and circulate it to all co-authors. Redraft, rewrite, redraft, rewrite. The main author often bears much of the burden of the work, but encourage your co-authors to contribute, and in a timely fashion. If slow responses are delaying things, politely give deadlines, stating that you will continue anyway if they are not met. The process of preparing the manuscript can often take discouraging turns, over which you must be resilient. Finally, do not rest until the manuscript has been fully submitted for publication. Remember that an important criterion for submission is that all co-authors must approve of the submitted manuscript.

You must expect either to be asked to make various changes or for the manuscript to be rejected. If you are asked to make changes, go to considerable trouble to answer and to try to meet every suggestion. This is the best way to ensure eventual acceptance. If the manuscript is rejected, do not be discouraged; rejection is normal in the academic world. Make changes

based on the referees' comments, but do not give up; identify another journal and resubmit. Never be tempted to submit the same manuscript to two journals at the same time, however. Such 'duplicate publication' is forbidden by most journals (with rare exceptions such as guideline publication) and is considered a major academic offence.

Full-time research and higher degrees

If you find the challenge of research enticing, the time restraints imposed by clinical training become burdensome. A practical approach is to devote a period of your career to full-time research. Such positions are sought after and usually mean a drop in salary unless they are linked to clinical tasks. If you are committed to this kind of career change, you must seriously consider the merits of completing a higher degree, an MD or PhD. A higher degree is desirable for a successful academic career.

An important factor is the ability to retain a training post or National Training Number (NTN) during the time away from direct patient care, without which of course you cannot complete training as a dermatologist. Postgraduate deans may allow time out of programme for research, which must be pre-agreed with all relevant supervisors.

Fellowships and research abroad

If you are bitten by the research bug, completing a higher degree reinforces the need to apply for a substantive postdoctoral position in order to master the skills necessary to conduct independent research. This has major implications for developing clinical skills and also revalidation.

You should only consider a research position during your final year or after completion of specialist training, in order to allow the greatest flexibility. Do not exit a training programme and risk re-applying for training positions when returning to clinical work. There are other important considerations, such as funding (e.g. fellowships), the project and its location. Many individuals, rightly or wrongly, believe that such a post should be abroad, such as in the USA, Australia or Europe. Though many institutions will support funding applications, it is difficult to maintain one's clinical or previous level of income during research.

But in the end. . .

Whether or not you decide to pursue your academic endeavours to postdoctoral level or beyond, at the heart of your dermatology career there should remain a desire to maintain or support research. All forms of research can be continued whilst in a senior or consultant post and there are many such successful examples in the UK. It is important to realise that research offers a mindset that questions and answers the uncertainties that surround us in daily practice. By participating in research, you will enrich your own career, as well as impacting directly on the future wellbeing of your patients.

Pearls and pitfalls

- Choose your co-authors wisely: you need to work with colleagues who are interested in the project and who are committed to making it a success. Be aware that your co-authors may have other work priorities.
- The most common reason for research not getting published is the manuscript never being submitted. After completing any research work, start writing it up immediately.
- Try to be resilient when facing research difficulties. It is normal for things not to go smoothly, which makes the process eventually even more rewarding!
- Do not take it personally if your manuscript is rejected. Work hard to build on the feedback, improve the manuscript and resubmit.

SCE Questions. See questions 5 and 6.

FURTHER READING AND KEY RESOURCES

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Ingram JR. The quest for excellence (part 2): reviewing a clinical trial for the *British Journal of Dermatology*. *Br J Dermatol* 2014; **171**:1277–8.

Ingram JR, Anstey A. The evolution of clinical guidelines for dermatologists: GRADE, AGREE and occasionally consensus by experts. *Br J Dermatol* 2017; **176**:3–4.

Williams H. How to reply to referees. *J Am Acad Dermatol* 2004; **51**:79–83.

Textbooks

Brian J, Schofield J, Gerrish K *et al*. *A Guide for Clinical Audit, Research and Service Review Activities*. London: Healthcare Quality Improvement Partnership, 2011.

Greenhalgh T. *How to Read a Paper: The Basics of Evidence-Based Medicine and Healthcare*, 6th edn. Chichester: Wiley-Blackwell, 2019.

Williams HC, Bigby M, Herxheimer A *et al*., eds. *Evidence-Based Dermatology*, 3rd edn. Oxford: Blackwell Publishing, 2014.

Useful websites

Albert T, Wager E. How to handle authorship disputes: a guide for new researchers. Available at: https://publicationethics.org/files/2003pdf12_0.pdf.

Clarivate. The Clarivate Analytics Impact Factor. Available at: https://clarivate.com/webofsciencegroup/essays/impact-factor.

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Equator Network. Reporting guidelines. Available at: https://www.equator-network.org/reporting-guidelines.

Health Research Authority. Consent and participant information guidance. Available at: http://www.hra-decisiontools.org.uk/consent/examples.html.

International Committee of Medical Journal Editors. Defining the role of authors and contributors. Available at: http://www.icmje.org/recommendations/browse/roles-and-responsibilities/defining-the-role-of-authors-and-contributors.html.

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Medical Research Council. Available at: https://mrc.ukri.org.

ORCiD. Available at: https://orcid.org.

University of Nottingham. Centre of Evidence Based Dermatology. Available at: https://www.nottingham.ac.uk/research/groups/cebd/index.aspx.