

How to become a successful researcher

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7.1.1 Learning objectives

To understand the lifelong joys and challenges of becoming a successful researcher, by appreciating the importance and value of:

1. Gain a mastery of varied research methodologies to answer timely scientific questions.
2. Field research conducted in real-world and natural environments, which can give the researcher a deeper understanding and appreciation of the research topics and a respect for the research subjects.
3. The ability to work autonomously, set clear goals, be organized, and have a good research plan while meeting deadlines and expectations.
4. Mentorship and of working collaboratively with other researchers, mentors, learning to lead with questions using mature listening and communication skills.

7.1.2 Introduction

The enormous progress made in improving health and life spans during the 20th century is owed in no small part to the impact of high-quality research. (1) However, researchers, the public and policy makers are increasingly talking about the challenges of effectively delivering quality care, and a growing implementation gap (2-4). This gap manifests as a lack of success in translating research-based scientific findings into routine practice, policy and personal behavior change. Other concerns being raised include those about research waste – either because the right research is not being done, or because the findings of the right research are not being implemented (5). This also holds true in supporting and applying Health EDM in disaster preparedness and response.

“Every time a scientific paper presents a bit of data, an error bar – a quiet but insistent reminder that no knowledge is complete or perfect, accompanies it. The most each generation can hope for is to reduce the error bars a little, and to add to the body of data to which error bars apply”.

This quote, from Carl Sagan’s *The Demon Haunted World* (6), highlights the challenges of pursuing a career in medical research, where one can contribute to addressing the most pressing questions of the day in the constantly emerging challenges of science, such as when managing the aftermath of natural or man-made disasters.

Our aim in this chapter, and of this book as a whole, is to encourage the reader to become passionate about the process of generating, advocating for, and learning how to use high quality and effective research to help support and drive better public awareness, discourse and health policy.

7.1.3 How to become a researcher?

If you want to contribute to the body of knowledge and understanding of how to improve Health EDRM while implementing more resilient systems, it is important to understand and learn about research methods and how best to apply them(7). Being a researcher can be the most powerful, empowering and learning experience of your career – it can be challenging and fascinating to address real pain and suffering, while seeing healthcare in its stark reality and learning to improve the delivery of public health by mapping out the full potential of policy interventions (8) and, if appropriate, perhaps working at the frontline of the humanitarian response or in an active pandemic. Talking to practitioners and administrators, listening carefully to the concerns of front line workers and leaders, and what drives their understanding will help you appreciate their behavioural choices or mindsets when offering potential solutions to address these concerns (9). Observing their interactions with patients and the public can offer you a new perspective on what frightened, vulnerable people in disasters and emergencies really feel and need, and, what types of research communication can get in the way of effective implementation of public policy, even in the most organized and mature social systems.

Devising and conducting research, for example, to investigate the epidemiological basis of a contagious disease, such as with the novel coronavirus in 2020, to understand issues around weapons of mass destruction (10), or to identify effective public health interventions requires the ability to assess and address complex questions. This might relate, for example, to the causes of earthquake disasters and ways to prepare public health systems to deal with disasters caused by natural or human-induced hazards. Finally, effective written and oral communication skills, and having the ability to present and defend one’s ideas and recommendations, are essential to becoming a successful and independent researcher.

Many young people embark on a career in research with little guidance provided about the expectations and immense challenges awaiting them. There is often no set career path, no clear milestones, and limited leadership to guide young students on the most effective pathways. The roadmap to becoming a successful researcher is complex and rather



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opaque, as the profession demands distinctive skills and expertise along with a long mandatory formal education (11).

The cornerstone of pursuing a career in research starts with obtaining a formal education in areas such as the biological and medical sciences, public health or the wider healthcare disciplines. One might seek to study and train at an influential university or healthcare organization, aiming for a formal degree such as a bachelor's or master's degree, or ideally at the doctoral level, such as a public health or medical doctorate or PhD. After completing a formal programme with tailored courses, the next milestone towards the development of a career in medical research is participating in a research-based internship or joining an existing ongoing study. In most graduate schools, participating in a research internship and undertaking a research project is an essential part of the exclusively designed curriculum. This will allow for opportunities to be mentored by a practitioner or a research scientist and collaborate with other researchers tackling real public health issues, such as infectious disease pandemics, medication safety, or the mental health challenges of displaced persons (Chapters 5.1 and 5.3).

As a junior researcher, you may be required to assist a senior scientist in devising trials, collecting data (including conducting analytical data mining), interpretation of results and writing a scientific manuscript that can be critically replicated and tested by peers and is generalizable to other settings. A research career revolves around investigations – for example, to understand clinical symptoms caused by diseases or an aberrant human behaviour – and rigorous laboratory or field work – such as to assess the impact of vaccinating refugees in austere environments or the impact of people congregating without social distancing during a pandemic. To be a researcher, formal education will not suffice, though; working in a team on high-quality research requires essential set of key skills, including:

- creative critical thinking, free from prejudice, exercising healthy scepticism and not accepting anything at face value, including the ability to reflect and use hindsight and logical reasoning
- problem solving abilities
- logical decision making
- accurate and verifiable data collecting, and attention to detail
- assimilating critical data and feedback
- drawing clear and meaningful conclusions
- developing a strong work ethic
- performance management of self and others
- good project planning and management
- effective interpersonal communication skills
- identifying and citing appropriate sources
- team building
- excellent writing skills to enable you to present your work in a clear and transparent way (Chapter 7.7) in a peer-reviewed journal of good standing, while avoiding predatory publishers (12).

You will need to read widely to prepare yourself, covering academic papers and reference articles in your research area but also in different areas, and produce good quality academic articles. This practice will help you to better assimilate and appreciate the vast knowledge in your domain and increase the quality and impact of your writing and professional judgement skills.

Building a valued scientific network, learning to appreciate your peers (in your own discipline and others) and those from other sectors, establishing a reputation for humble inquiry, probing questions, integrity and generosity, will help to attract other researchers to collaborate with you in building a great research team. (9)

7.1.4 Establish your research interests

Research interests often spawn from one's own background and curiosity. Practitioners in health care and other areas are blessed if they keep their mind's eye open and remain curious, and are exposed to many potential research questions during their routine clinical work. Consider the following four questions as you narrow your research focus in Health EDRM and support a successful line of inquiry into disaster risk management. This will also be key as you prepare a grant application for funding your research (Chapter 7.3):

- Why is this research needed now?
- Who cares about this phenomenon or research question?
- Will the research, if successful, make a difference to the people, leadership and systems affected by health emergencies and disasters?
- Why are you and your team well suited to study this problem?

Focusing your research interests can give a young researcher an opportunity to master specific research domains, tools, methods, and to become familiar with pertinent networks and resources. However, this is also a delicate balance – it is best to avoid too narrow a focus early on in a young researcher's career, but young researchers should also avoid being a "jack of all trades".

In order to secure funding, academic positions, employment or promotion, a young researcher will often have to describe their passion for their research interests and demonstrate refined skills in a specific area of interest such as being facile in using quantitative, qualitative or data mining methods (13). It is often easy to identify a clear research focus in "successful" researchers. Initial steps, such as reading senior faculty's researcher profiles, reviewing their abstracts and published manuscripts, drilling down into earlier successive papers from the same researcher or research team, and writing and sharing drafts of research interests can help young researchers gain valuable insights into the academic ideation, and implementation process.

Reading existing articles on related topics will advance your knowledge on the topic and help you to critically interpret other researchers' findings, even and especially if they are negative reviews. Furthermore, immersing oneself in clinical encounters will trigger you to think about ideas for new studies, and help you to understand when others have found answers, so



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that you do not replicate existing studies. Most journals of merit will decline your studies if they are merely copies of earlier studies.

Some formal training in research methods, either quantitative or qualitative, is essential, and will give you an added advantage to complement your content expertise. Mastering the important concepts discussed elsewhere in this book, such as the formulation of a research question (Chapter 3.5), study design (Section 4), basic descriptive and analytical statistics (Chapter 4.2), sources of bias and research ethics (Chapters 3.4 and 7.4) can often make the difference between publishable manuscripts and fatally flawed ones (14-16). More importantly, poorly designed and conducted research studies might jeopardize a young researcher's reputation and self-confidence, the safety of participants in the research, the possibility to acquire more funds in the future and the reputation of their institution (17). This often results in wasting of limited resources. Young researchers are invited to consider all the available options, such as short courses on grant writing, online resources, and formal degrees. Within institutions, young researchers can organize journal clubs, and widely read and share their critical assessments with each other of their research and how best to learn from one another's work.

7.1.5 Start writing early

The penultimate outcome of research is a published scientific publication in a reputable peer review journal, that has potential for public health impact. The original findings can be shared, judged and used to improve practice and policy. Strong and clear-eyed writing skills are important for successfully achieving grant funding (Chapter 7.3) or peer review publications (Chapter 7.7) and will contribute to career development and success milestones (18). Mastery of the skills required for prolific authorship (including language accuracy, technical accuracy, structured discourse and conciseness) needs to be acquired early. It is essential to learn to formulate a hypothesis and the aims of your study; to learn about different article outcomes; and to learn how to do an expert literature search and review. It is unlikely that you can acquire all the skills required for scientific writing without a lot of practice – hence the earlier a young researcher experiences the hurdles and workload involved in manuscript preparation, the better. Learning to work “smart” with realistic planning and efficient time management will go far, even if you spend only 15 minutes a day refining your work (19). Learning how to deal with and plan for research and grant deadlines is essential. Presenting your research outcomes to your team, your immediate colleagues and perhaps to a wider group of colleagues at conferences – and being receptive to criticisms even when delivered in a critical manner – can be remarkably beneficial and humbling.

When you choose an important but highly complex problem, remember to break it down into digestible parts and build your research competencies one study at a time. First-hand experience with manuscript formatting, referencing, determining authorship, reporting data, grant reviewing, and undergoing peer review are important steps towards an independent career in research. Discuss your proposal with as many people as possible before you start to write to ensure that you have a solid experimental design.

Finally, finding which grants are applicable for your research focus, and being prepared in time for deadlines are battles that will push your limits no matter how wonderful and experienced your supervisors. It is inevitable that one's respect for those who have gone before will grow with each and every passing day.

7.1.6 Doing action research in the field

Strive to do active field research as early and often as you can because this will greatly deepen your understanding of the workflow, enrich your sense of accomplishment and grow your career. Evaluating Health EDRM interventions is critical, while helping you to build rapport and respect with disaster and risk management clinicians and policy makers(20). As you refine your research focus and start to design your research study, you should reflect on the guidance elsewhere in this book. This includes obtaining the necessary funding (Chapter 7.3) and ethical approval (Chapter 7.4) and planning to do the research in the field (Chapter 7.5). Doing field research will help you to learn more about a variety of issues described next, as well as improving your knowledge of practice in the field.

Overcoming lack of data

Field research can resolve gaps in data. Very often, there is limited to no data about a chosen study topic, especially in a specific environment, such as in trying to assess the pattern of a disease outbreak – the problem might be known or suspected, but there is no way to validate your assumptions without primary data. Conducting field research not only helps plug gaps in data and your understanding of the problem, but also helps with the collection of supporting material, such as the availability of suitable drugs and equipment for emergency care and information about how decisions are made under real world constraints (21).

Understanding the context of the study

In many cases, field research supplements other data and can help you better frame the research question (Chapter 3.5). This can provide insights into the existing data but also into the culture and the workflow context of the people working in the field, such as how healthcare systems actually behave when stressed during a tsunami (22). For example, if the data states that clinicians can easily perform emergency intravenous resuscitation while wearing a hazmat suit because the clinicians are well trained (23), field research might identify other factors that influence the success of and barriers to successful donning of disaster hazmat suits. In depth ethnographic observations for example, can help the researcher to avoid preconception bias with regard to fit and comfort, reading and operating equipment, hearing and communicating, reaching and moving, and dexterity to use touch screens, press buttons, open vials/taps and use of syringes. These might also include the fogging up of their glasses, the lack of full proprioception of their gloved hands, the impact of distracting human factors elements such as noise, harsh weather and the subjective personal danger and anxiety of the treating clinicians under adverse conditions (24).



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Increasing the quality of data using mixed methods

Since field research usually uses more than one tool to collect data, mixed methods data will be richer and of higher quality (25). This might allow you to harvest more meaning from the data (26). Inferences can be made from the data collected and triangulation of multiple methods (Chapter 4.13) can be used in the analyses to help to overcome the small sample sizes or incomplete data description (27).

Collecting ancillary data

Collecting field research data puts you in a position of localized thinking, which opens you to new lines of inquiry and understanding of the phenomenon and can help avoid getting locked into groupthink. This can help you better appreciate and more critically review existing published articles while using the rich nature of mixed methods data sources to address the challenges of variable data sizes and levels of robustness (28-29).

Applying the data to real world clinical risk management and disaster service care

It is key to appreciate the workflow and work processes of frontline emergency, disaster workers and managers in order to better evaluate the impact of emergency service delivery interventions and how best to modify and improve them (30-31). This applied work can help you to reconcile the rich quantitative and qualitative traditions and methods as you strive to anticipate and support the needs of frontline health care workers in improving patient care under real world demands and resources (32).

7.1.7 Find an expert and nurturing mentor

Perhaps the most important predictor of your success as a researcher will be your ability to find the right mentors. It is important to distinguish between a supervisor and a mentor. A mentor is a wise, confident and trusted counselor or teacher, someone who enthuses you, and has your best interest at heart. Supervisory roles are often limited in time and commitment, usually leading to distinct academic outcomes or professional goals. On the other hand, a mentor and mentee can negotiate their expectations and goals and use a wide variety of skill transfer techniques to achieve them, often for extended periods. The benefits of mentoring have been reported to be associated with a wide range of favourable behavioural, attitudinal, health-related, relational, motivational and career outcomes (33). They also include a greater likelihood of publishing, better academic and career growth, higher research productivity, and a genuine opportunity to learn skills that cannot be achieved through formal channels (34). Today, with improved communication facilities, a young researcher can expand their pool of potential mentors to distant geographic regions globally. In addition to the direct knowledge transfer that occurs between a mentor and a mentee, the mentor can also introduce the mentee to a wider network of collaborators in different disciplines. Reverse mentoring adds great value to the mentor by helping senior mentors learn about various new topics of strategic, technical and cultural relevance.

Mentorship is not without drawbacks, and it is crucial to establish a mechanism to determine when such relationships are not working well.

Mentees can be taken advantage of however, including when their ideas or funding are usurped. At times, these relationships can be fraught with tension, competition and difficult dynamics given the uneven power hierarchy. Always look for mentors who are known to be generous and honest with their mentees, have high integrity and enjoy mentoring. Such people do things not out of selfish gain, but for the good of science and to support the people being mentored first and foremost. They educate rather than give orders, leaving the final decisions to the mentee. Consider publications of potential mentors to ascertain that they consistently support their trainees to be first authors and present key scientific output at conferences.

When you find someone who has heart, expertise, and the right personality, let them know you want to be successful in medical research just like them and that you would like to be mentored by them. But remember this truth: mentorship is a two-way process. You must commit to the hard work and show your dedication, learning from each interaction and never taking your mentor's valuable time for granted. A mentor teaches you but you must demonstrate that you are applying what they taught you if you are to succeed. Make sure to keep a log of all your meetings with your mentor and learn to prepare a summary memo that will enshrine what was discussed and help to hold you and your mentor to the agreed upon meeting actions. This will demonstrate to your mentor your ability and maturity as a budding colleague.

7.1.8 Conclusions

A successful career in biomedical research can be an exciting life choice that can add a special extra meaningful dimension to your professional career and life. Seek out work on important problems – problems that truly matter to you – and choose to study research topics that can make a difference to patients, their families, society and humanity. Strive to work, and surround yourself with people who are smart, courageous and curious. You want to work with the right people and at the right university, healthcare system, non-governmental organizations or international institutions, such as WHO or the United States Agency for International Development. In doing so, you will be inspired by this work, by the people who need help and by those trying to help them.

Research and academic studies are both challenging and time consuming, so seek out research problems about which you are passionate about. Good academic research is hard and daunting; it becomes more so without genuine passion for the subject matter. You need to be passionate about your research if you are to negotiate the challenges that lie ahead, and as you live through the inevitable days of grant and research frustration and disappointment. Learn to savour the small wins and celebrate the findings and joy that come with being able to help reduce pain and suffering while seeking to understand and master the mysteries of the world.

7.1**7.1.9 Key messages**

- o Research can be exciting, rewarding and innovative, improve the evidence of policies, reduce uncertainties and lead to improvements in patient care, practice and policy.
- o Formal education is the foundation of a career as a researcher, but other key skills and practical training are vital too – such as refining your critical thinking and problem solving abilities, a strong work ethic, good project management and communication skills, and being receptive to feedback.
- o It is important to establish your research interests. Ask yourself: Why is this research needed now? Who cares about this phenomenon or research question? Will the research, if successful, make a difference to the people and systems affected by health emergencies and disasters? Why are you and your team well suited to study this problem?
- o Research projects should be scientifically sound and guided by ethical principles in all their aspects.
- o Doing research in the field can help to plug gaps in the data, improve data quality and provide ancillary data, and also give you and your research team a more nuanced understanding of the real-world context of a problem and potential suitability of proposed solutions.
- o Finding the right mentor is essential and can be instrumental to a researcher's career success.
- o Research implementation is essential and while it may seem straightforward requires careful advanced planning, multiple stakeholder involvement, addressing other contextual constraints to increase chances for programme stickiness, scale up success and sustainability.
- o The best research consists of an iterative process of learning, is typically incremental, and is constantly being infused by everyday work experience and hard-earned lessons by researchers working closely with frontline clinicians and staff to provide exceptional, high quality and patient centered clinical care.

7.1.10 Further reading

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